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COMPATIBILITY OF REFRIGERANTS AND LUBRICANTS WITH ELASTOMERS

Final Report

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ABSTRACT

The information contained in this report is designed to assist the air-conditioning and refrigeration industry in the selection of suitable elastomeric gasket and seal materials that will prove useful in various refrigerant and refrigeration lubricant environments. In part I of the program the swell behavior in the test fluids has been determined using weight and in situ diameter measurements for the refrigerants and weight, diameter and thickness measurements for the lubricants. Weight and diameter measurements are repeated after 2 hours and 24 hours for samples removed from the refrigerant test fluids and 24 hours alter removal from the lubricants. Part II of the testing program includes the evaluation of tensile strength, hardness, weight, and dimensional changes after immersion aging in refrigerant/lubricant mixtures of selected elastomer formulations at elevated temperature and pressure.

SCOPE

The Compatibility of Refrigerants and Lubricants with elastomers program is a 12 month research effort supported by a grant from the Department of Energy through the Air-Conditioning and Refrigeration Technology Institute. The elastomers research effort was initiated at the University of Akron on March 1,1992 and completed in all respects in October 1993.

A broad base of elastomer formulations (85 chosen by University of Akron and 10 gasket materials supplied by industry) were chosen so as to best represent the elastomeric seal materials that may be available to air conditioning and refrigeration manufacturers for the design and engineering of their components. Selection of rubber materials to be evaluated in the study included choosing chemically dissimilar classes of elastomers and varying other parameters in a single class through variations in cure systems and filler loadings.

Part I of the program involved the evaluation of each of the 95 test materials with respect to hardness changes, dimensional changes and weight changes due to contact with the 10 refrigerants and 7 lubricants used in this study.

Part II of the program involved the evaluation of some of the elastomers (25) chosen from the Part I study in elevated temperature and pressure conditions in selected mixtures of refrigerants and lubricants. The 25 elastomers were chosen based on information obtained from test data generated in Part I of the program and the refrigerant/lubricant mixtures were selected by ARTI and their affiliates. Test data was obtained to determine the deteriorative effect on the physical properties of the selected elastomers when subjected to immersion in the refrigerant/lubricant test mixtures at elevated temperatures and pressures. Property changes measured included hardness changes, tensile strength changes and dimensional changes.

INTRODUCTION

Criteria for Compound Selection

There are many factors that may affect the potential of an elastomer to resist swelling in a specific type of fluid. These may include but are not limited to the chemical structure of the base polymer, the crosslink density of the cured rubber and filler types and amounts.

Although there are many companies manufacturing similar types of rubber and rubber ingredients, it can be assumed than in this study and for all practical purposes similar materials can be expected to interact with test fluids in a similar manner. For example, 2 SBR materials manufactured by different companies that are similar in styrene content and molecular weight can be considered equal for use in this study. Similarly, nitrile rubber stocks with similar acrylonitrile contents and similar molecular weights may also be considered equal. Manufacturing differences for polymers do exist, however, and there may be differences in swelling data even among similar materials. The test data produced in this study is therefore specific to only those elastomers and materials used in producing test samples.

The selection of elastomers for use in this study was based on selecting materials with dissimilar chemical attributes. For example, butyl materials were selected based on differences in the unsaturation in the backbone of the polymer chain as well as differences in the halogenation of butyl rubber (e.g., bromobutyl and chlorobutyl elastomers). Nitrile elastomers were selected to represent a broad base of butadiene-acrylonitrile rubbers ranging from low acrylonitrile content to very high acrylonitrile content. Selection of silicone rubbers was based on variations in the pendant substitution of methyl, ethyl or phenyl groups on the silicone

backbone. Chlorinated polyethylenes were chosen based on the chlorine content of the base rubber. Other materials were chosen using similar selection criteria as indicated in the previous examples.

In all cases, rubber materials were formulated using only those ingredients necessary to produce a cured network or to provide for reinforcement as for those cases where carbon black has been added. Plasticizers were not used in any compound formulations due to the inherent nature of these low molecular weight materials to be extracted in the presence of other low molecular weight refrigerant fluids. Carbon black on the other hand was added to base elastomers in some of the formulations as a reinforcing filler. The net result of the addition of a reinforcing filler to a base elastomer is an increase in the modulus or a net increase in the effective crosslink density. This phenomenon, in the absence of dissolution, may lead to a decrease in swelling of the base elastomer.

Appendix C lists all formulations of elastomers used in this study. There are no antioxidants, plasticizers or other ingredients contained in these formulations that might affect swelling other than that expected based solely on the base elastomer-filler-test fluid interaction. The study is therefore able to focus on the intrinsic ability of each of the elastomers to resist swelling in each of the test fluids in the absence of other extraneous materials and their influences.

Other materials tested included gasket materials supplied by industrial sources and are listed in Appendix D. Some of these 10 materials were elastomeric in nature, however, many appeared to be similar in nature to floor tile materials. It is expected that these gaskets are

comprised of small amounts of elastomers (polymers) used to bind together relatively large quantities of inorganic fillers. The TGA curves in Appendix H support this conclusion. Inorganic fillers are inherently resistant to swelling in organic solvents. This factor can lead to a significant reduction in the overall amount of swelling depending on the amount of filler loading and the level of fluid-binder interaction. These gaskets are expected to be useful where high clamping forces can be applied to the gasket material to prevent leakage of the refrigeration fluids from the system to the surroundings.

Lubricant and Refrigerant Types

Refrigerants and lubricants for use in this study were selected by the MCLR technical program committee and are listed in Appendix B. The refrigerants are generally less nebulous in their composition than the lubricant materials. Refrigerants are generally comprised of only one chemical moiety with perhaps very small quantities of contaminate by-products or co-products.

Lubricants, on the other hand, may be more difficult to characterize completely. The lubricants listed in the various lubricant classes may differ slightly in their composition due to differences in the manufacturing process. It should be expected that test results associated with the use of different test fluids in a single class of lubricants may be found to vary depending on such parameters as the particular manufacturer used to supply the lubricant and process variations.

Characterization of Elastomeric Materials

Elastomers used in this study were characterized by cure rheometry using an oscillating disk rheometer (ODR), Thermogravimetric Analysis (TGA) and physical properties including modulus, tensile strength elongation at break and Shore A and Shore D hardness.

The ODR is used primarily to determine the cure characteristics of the elastomer formulation. Suitable temperatures were determined for each elastomer formulation. For example, natural rubber is generally cured at lower temperatures (300°F to 310°F). Synthetic rubbers (ie. SBR and butyl rubbers) may be cured at 320°F while nitrile rubbers are generally cured at higher temperatures (330°F to 340°F).

The ODR measures the increase in torque exhibited by the test sample on an oscillating disk, as the test sample becomes more crosslinked. This is demonstrated by an initial reduction in the torque as the sample viscosity decreases due to sample warming, followed by an increase in the torque value due to the onset of cure. After some time as the sample becomes fully cured, one or more of several phenomenon can occur. The first is the observance of a plateau, which indicates that neither additional curing or degradation (oxidation) is occurring. The second is seen as a steady increase in torque with time. This phenomenon is most likely the hardening (formation of additional crosslinks) of the sample material through oxidation mechanisms or due to changes in the average sulfur type crosslink length. Sulfur type crosslinks are generally two to 10 sulfur atoms in length and may undergo rearrangement freeing some sulfur for additional crosslinking. The third phenomenon seen in some materials is termed reversion and is the consequence of oxidation which leads to chain scission and a overall softening of the

sample material with time.

The ODR curves can be used to qualitatively describe the material in a number of ways. There is clearly a relationship between the maximum torque and the hardness or modulus of the sample material. There is not, however, an exact mathematical representation for this relationship and the maximum torque is commonly used only as a first approximation during compound development. Information can be obtained directly from these curves relating the degree of cure of the sample at any given time and temperature. The test sheets for use in this study were cured to a state of cure expressed as T_{95}. Cure curves for all elastomer formulations in this study requiring a cure to be functional elastomers are included in Appendix G. Some materials such as the TPE's and the industry-supplied gaskets were already in their final form for testing. The definition of T_{95} is that time required at a given temperature to produce a torque equal to 95 % of the maximum change in torque achieved during the test.

Thermogravimetric Analysis (TGA) was done on all elastomers and gaskets materials used in this study to further characterize the elastomers. TGA test results are located in Appendix H. This analytical method is primarily used to observe the decomposition and the subsequent loss of weight of an organic material with temperature increase. Generally, materials are subjected to a steady increase in temperature from ambient up to 1470°F (800°C) in a nitrogen atmosphere. Low molecular weight materials are volatilized first, followed by decomposition of high molecular weight polymer with an accompanying loss in sample weight. If carbon black is present in the sample, a change in atmosphere from nitrogen to air is made at approximately 1100°F (600°C). The oxygen in the air oxidizes the carbon to carbon dioxide

and a further reduction in the weight of the test sample is noted on the TGA curve. This reduction in sample weight corresponds to the amount of carbon black present in the original test sample. Residual material remaining above 1100°F (600°C) are inorganic and may include such materials as zinc oxide, calcium carbonate, calcium oxide or silica fillers.

Physical properties were also determined for each of the elastomers and the industrial supplied gasket materials. Test results are listed in Appendix J. Physical properties examined included tensile strength, modulus values at various elongations, elongation at break, and hardness measurements.

Tensile strenghts and elongation at break are material parameters that are highly dependent on the inclusion of stress raisers present in the elastomer material. These stress raisers result from the inclusion of foreign materials during processing or large agglomerates of fillers or other ingredients not broken down during processing. Stress raisers, as described above, can lead to premature tensile failure in elastomeric materials. In addition, tensile values for elastomers with poor green strength may vary significantly when these materials are processed without reinforcing fillers. Modulus values are more commonly used to characterize materials whose tensile strenghts vary widely. These values are dependent on state of cure, type and degree of reinforcement and inherent strength of the base elastomer.

Hardness values were determined for each of the elastomers and are included in Appendix J. Hardness tests are generally done on samples that measure 1 in x 2 in. This sample size provides sufficient surface area for the foot of the gauge to rest while the measurement is being performed. It had been originally proposed that hardness measurements be performed

on fluid immersed samples after the 14 day immersion period and compared to original values. The size of the immersion samples (approximately .625" in diameter), however, precluded the accurate measurement of hardness values with a standard Shore A hardness durometer. Some hardness values in the early fluid immersion were not recorded due to problems associated with obtaining reasonable data on small samples as indicated. Through a request by ARTI, however, a best effort was made at obtaining this data and those values were recorded and are listed in Appendix M.

Characterization of Refrigerant and Lubricant Test Fluids

Refrigerant and lubricant test fluids were characterized by Fourier Transform Infrared (FTIR) spectroscopy. The resulting spectra are included in Appendix I. The spectral data was obtained to classify the refrigerants and lubricants and to provide reference information as a basis for future material identification.

Gas chromatography was performed on all refrigerants used in this study in order to classify the purity of the material. All samples appear to be relatively free of impurities. The unidentified-broad peak at approximately 21 minutes retention for the HFC-134a refrigerant is most likely due to a heavy fraction from sources unknown or from bleed-out from the previous run. It is not expected to represent a contaminate of the HFC-134a.

RESULTS AND DISCUSSION

Theoretical Background

Rubber materials that are crosslinked form a network structure that resists solvent uptake depending on the degree of crosslinking. More crosslinking ("tighter" network) leads to less swelling for a given elastomer.

The degree of interaction with a solvent is another factor that affects the degree of swelling of an elastomer. The Flory-Rehner equation relates the extent of swelling (V_{ro} is the volume fraction of rubber in the swollen gel) to the crosslink density, *v*, the polymer-solvent interaction parameter, *x*, and the molar volume of the solvent, V_S (1).

$$v = -\frac{1}{V_s}\,\frac{\ln(1-V_{ro}) + V_{ro} + \chi V_{ro}^2}{V_{ro}^{1/3} - \frac{V_{ro}}{2}}$$

If the polymer and solvent have a strong affinity, *x* will be negative (exothermic heat of mixing) and swelling will be enhanced. On the other hand, positive values of *x* result in reduced swelling. Also, all else being equal, large solvent molecules will cause less swelling than small ones.

In filled elastomers, filler-polymer interactions can act as pseudo crosslinks to reduce swelling. Swelling is also reduced since the filler does not swell. An equation, which incorporates these factors, is given below (2):

$$\frac{V_{ro}}{V_r} = 1 - [3c(1 - V_{ro}^{1/3}) + V_{ro} - 1] \frac{\phi}{1 - \phi}$$

where ϕ is the volume fraction of the filler, c is a filler-rubber interaction parameter, and V_r is the volume fraction of rubber in the swollen network for the filled system.

Filler-polymer interactions depend on the number and type of bonds formed. A low structure large particle size carbon black, such as N990, has low specific surface area and therefore does not affect the apparent crosslink density of the network as much as highly structured, finely divided N330 carbon black does. Therefore, an elastomer containing the latter results in a composition with a lower degree of swell.

Why not simply increase the cure level and filler content to minimize swelling? As cure level and filler loading are increased beyond optimum levels, compositions become hard and brittle, thus rendering them unsuitable as seals. The composition of elastomer seals for the HVAC and refrigeration industries must be selected based on swelling behavior, which is affected by filler amount, elastomer filler interaction, swellant-elastomer interaction, and crosslink density.

Beyond the swell behavior, there are other important engineering criteria, which must be met in seal applications. Desirable properties include high resilience, low compression set and low stress relaxation. Each elastomer composition must be fine-tuned to meet the demands of the intended use.

Part I - Swelling in Refrigerants or Lubricants

Rubber formulations (#1 - 85) have been tested for swell in refrigerants: R-123, R-142b, R-124, R-22, R-125, R-134, R-134a, R-143a, R-152a, R-32, and in lubricants: alkyl benzene (AB), mineral oil (MO), pentaerythritol ester mixed acid (PEMA), pentaerythritol ester branched acid (PEBA), polypropylene glycol diol (PPGD), polypropylene glycol butyl monoether (PPGBM), or a modified polyglycol (MPG). The rubber formulations include general purpose and specialty thermoset elastomers, and thermoplastic elastomers. Some compounds were filled, others were not. In addition, several vendor-supplied materials (#86-95) have been tested for swelling resistance in the various fluids. Solid bars (with brief composition descriptors) are used to show the in situ percent change in diameter after 14 days of immersion. In all cases, filled compositions had less swelling compared to corresponding unfilled ones. R-123, the dichloro-substituted HCFC, generally gave the greatest swelling. There were, however, several compositions which swelled little in this refrigerant, including EPDM/PP thermoplastic elastomers (#45 - 48), a butyl rubber/PP TPE (#85), and four of the vendor supplied compositions (#88 - 91, 93). Some compositions (e.g., #46 - 48) shrunk during immersion, indicating that the swellant was removing soluble components from the rubber.

The refrigerants with the next highest swelling power were the monochlorinated HCFCs, R-124 and R-22, which usually had similar swelling behavior. A notable exception was #91, which swelled significantly in R-22, but not in R-124. Compositions #45 - 48, #56 - 57, #74, #86, #88 - 90, #92 - 93 all had good resistance to R-124 and R-22. The other monochlorinated

HCFC, R-142b, swelled most elastomers less than the previous two. Epichlorohydrin and nitrile elastomers were much more resistant to R-142b than they were to R-124 or R-22. Additionally, compositions #45 - 48, #49 - 51, #56 - 59, #63, #85 - 93, and #95 were resistant to R-142b.

The HFCs give much less swelling than the HCFCs. The two tetrafluoroethane isomers, R-134 and R-134a, show similar swelling behavior. The fluoroelastomers and fluorosilicone elastomers exhibit high swelling in the HFCs. However, most of the elastomer samples have 5% or less increase in diameter after immersion in the HFCs. A great variety of elastomers are resistant to swelling in the HFCs including both the inexpensive, general purpose hydrocarbon elastomers as well as several of the specialty and thermoplastic elastomers. Among the vendor samples submitted #94 is clearly the worst for swelling resistance. Some of the vendor samples resisted swelling in all refrigerants.

The hydrocarbon lubricants, AB and MO, greatly swelled the general-purpose hydrocarbon elastomers, while the nitrile rubbers, fluoroelastomers, and nitrile/PP thermoplastic elastomers were quite resistant to these lubricants. The glycol and ester lubricants swelled the hydrocarbon elastomers a little. The two pentaerythritol ester lubricants (PEMA and PEBA) gave similar swelling behavior.

Several of the compositions including some of the vendor-supplied materials were resistant to swelling in all lubricants. These included: #89 - 93, #17 -18, #28 - 30, #53 - 55, #49 - 51, and #56 - 59.

Part II - Tensile Strength After Swelling In Refrigerant - Lubricant Mixtures

Twenty-five formulations, based on resistance to swelling found in Phase I, were immersed in selected refrigerant/ lubricant mixtures for 2 weeks at 100°C and 275-300 psi pressure. When swelling was large, tensile strength decreased after undergoing this treatment. Refrigerant and lubricant swell the elastomers, weakening the force between polymeric chains as well as reducing chain density. However, in some cases, when swelling was slight or negative (i.e., shrinkage) tensile strength increased after aging in these test fluids. For example, formulations #45, #49, #50, #54, #55, #85, and #95 in HFC-125/ PEBA have increased strength after fluid aging. A small degree of plasticization can facilitate orientation during extension, which increases strength. Also, a small increase in crosslink density with aging can increase the number of load bearing chains and enhance strength, although extensive crosslinking causes embrittlement and weakening.

In all cases, filled rubbers showed less change of tensile strength after fluid aging compared to unfilled counterparts. This can be seen, for example, by examining the behavior of gum butyl rubber (#7) and carbon black filled butyl (#8). Filler restricts swelling of the elastomeric phase, thereby reducing deterioration by the test fluids (Appendix M).

Overall, the decrease in tensile strength of the 25 formulations after immersion in the 17 test fluids has the following order:

[HCFC-22/MO ~ HCFC-123/MO ~ HFC-I52a/AB ~ HCFC-142b/AB ~ HCFC-124/AB]

>[HFC-32/PEBA ~ HFC-32/ PEMA ~HFC-134a/PPGD ~ HFC-125/PPGD]

>[HFC-125/PEMA ~ HFC-125/PEBA ~ HFC-134a/PEMA ~ HFC-134a/PEBA~ HFC-143a/PEBA ~ HFC-134/PEBA ~ HFC152a/PEBA]

>[HFC-134a/MPG]

A comparison can be made by considering mixtures, which contain the same refrigerant but different lubricants.

HFC-125 mixtures (with PEMA, PPGD, or PEBA).

Mixtures with PPGD generally had the higher swelling power and decrease in tensile strength compared to mixtures with PEMA or PEBA. PPGD contains diol functionality capable of H-bonding, more so than the ester groups in PEMA and PEBA.

HFC-32 mixtures (with PEBA or PEMA).

There was practically no difference in the swelling and tensile behavior for mixtures with PEBA or PEMA. These lubricants are the same chemical type and cause similar effects.

HCF-134a mixtures (with PEMA, PEBA , PPGD, or MPG).

Again, with the two similar ester types of lubricants, PEMA and PEBA, behavior was about the same. Comparatively, there was a somewhat greater effect with PPGD and a lesser effect with MPG. PPGD- containing fluid had the greatest swelling power and reduction of strength, especially for the polyurethanes and polysulfides.

HFC-152a mixtures (with AB or PEBA)

For most compounds, the mixture with AB was more detrimental to strength than was the mixture with PEBA.

HCFC mixtures and HFC-152a/AB

Formulations #54, #55, and #95 showed less than 10% change in strength after fluid aging, whereas formulations #7, #8, #12, #17, #57, #58, #61, #74, #83, and #85 exhibited more than a 50% decrease in strength after aging.

HFC mixtures excluding HFC-152a/AB

Formulations #45, #46, #47, #50, #54, #55, #74, #85, #86, and #95 exhibited little deterioration after aging, while compositions #17, #56, #57, #63, and #90 had substantial strength losses.

Some interesting findings include that butyl rubbers (#7, #8, and #12) have high swelling and strength loss in HCFC mixtures, but less effect after immersion in HFC mixtures, except for HFC-152a/AB. Also, Neoprene composition #95 shows a high degree of swell in HCFC mixtures and lower swelling in HFC mixtures with the notable exception of HFC-152a/AB. The butyl/PP thermoplastic elastomer #85 has higher swelling in HCFC mixtures compared to HFC mixtures. Formulations #54, #55, and #95 showed the least decrease of tensile strength after aging in most of the HCFC mixtures. Formulations #45, #46, #47, #50, #54, #55, #74, #85, #86, and #95 showed the least change in strength after swelling in most of the HFC mixtures.

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PRINCIPAL INVESTIGATOR EFFORT

Dr. Gary Hamed and R.H. Seiple are the principal investigators for the UA/ARTI MCLR program. During this contract period, Dr. Gary Hamed has devoted a total of 140 hours (5 % of his available work hours) and R. Seiple has devoted 500 hours (20 % of his available work hours) on the UA/ARTI MCLR program.

COMPLIANCE WITH AGREEMENT

The University of Akron has complied with all requirements of the agreement except to those procedures or items changed through mutual agreement between ARTI and the University of Akron.

APPENDIX A

TEST METHODOLOGY-PARTS I AND II

PART I TEST METHODOLOGY

Mixing: Most of the formulations tested in this study were mixed on a laboratory size rubber mill. The base polymer was milled for a short period of time to allow the normal breakdown of the elastomer. The ingredients were then added to the elastomer on the 2 roll mill in the order they appear in the compound recipe. The materials are mixed thoroughly until the rubber compound appears to be homogeneous.

Cure Characteristics: The cure time for each of the formulations is determined using normal cure temperature ranges as suggested by the manufacturers or temperatures commonly used by the rubber industry. The oscillating disk rheometer (ODR) is used to determine the cure characteristics of the compound in question at the appropriate temperature.

The ODR is used to obtain information concerning the state of cure of the formulation with time. This instrument produces a cure curve (torque vs. time) and the cure time to 95 % of the maximum torque is calculated from this graph. All test compounds formulated at the University of Akron were cured into sheets at the T_{95} % cure level.

Other Compounds: The thermoplastic elastomer materials were either tested as received (when received in sheet form) or injection molded when received in pellet form. Gasket materials received from vendors were tested as received.

Sample Preparation: Sheet materials were placed on a vacuum table attached to a drill press fitted with a cutter assembly. The cutter assembly consists of a holder and a stainless steel blade. The machine was turned on and the cutter lowered so as to cut through the rubber sheet. Round disk-like samples measuring approximately .075 inches (.19 cm) in thickness by .625 inches (1.6 cm) in diameter were prepared in this manner for the swell tests.

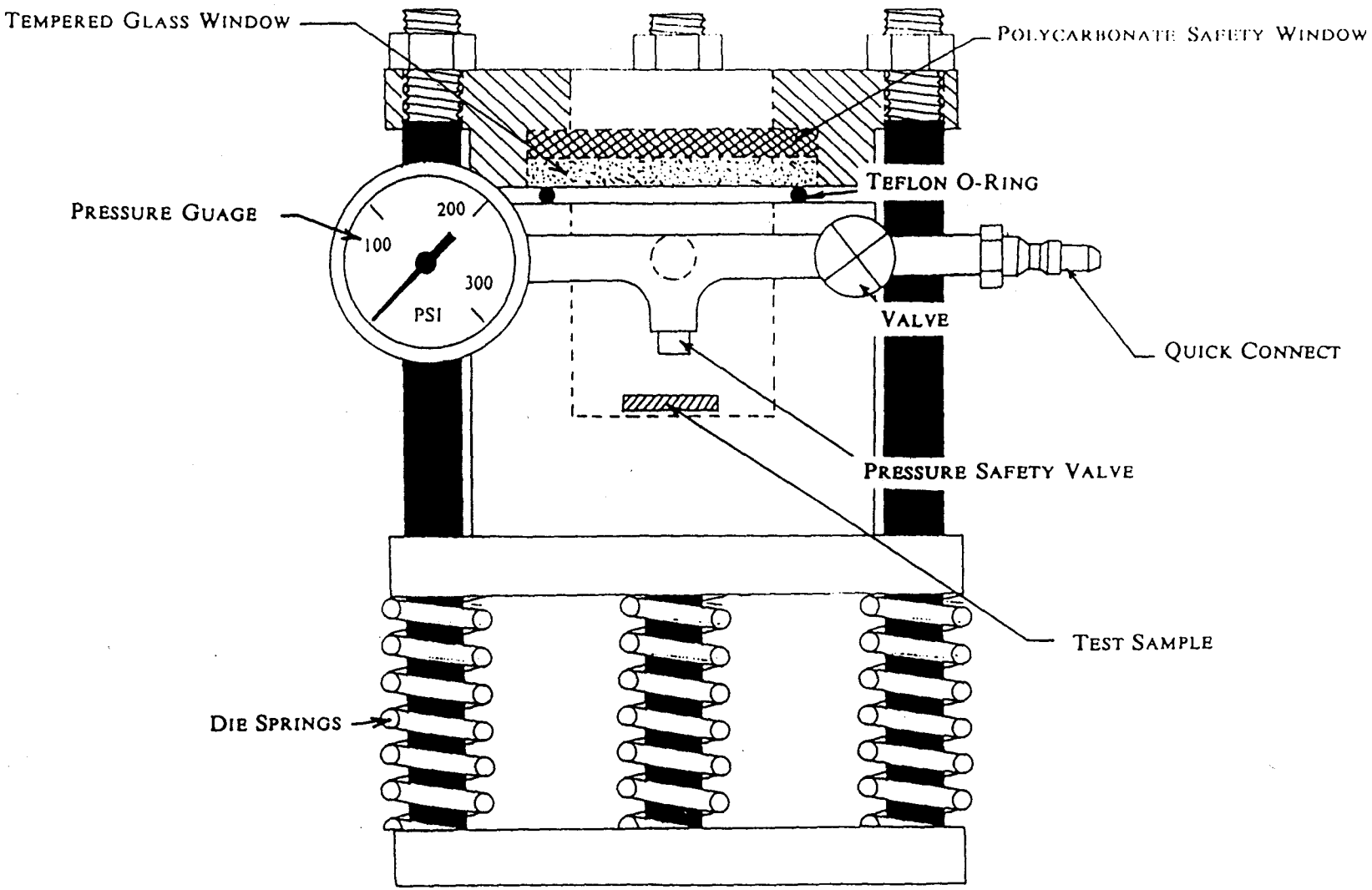
Dimensional Measurements: Diameter measurements were obtained using a traveling microscope. Thickness measurements were obtained using a thickness gauge. Weight measurements were obtained using an analytical balance.

Lubricant Swell: The round disk samples were measured (2 each test) and placed in 2 oz. jars with lids, the pre-dried lubricants were poured into each of the containers and sealed. The containers were placed in an oven at 140 degrees Fahrenheit (60 degrees Centigrade).

Diameter measurements on the top most sample were taken at 1 day and 14 days. Weight, thickness and diameter measurements were taken on both samples at 14 days.

Refrigerant Swell: The round disk-like samples were measured (2 each test) and placed in the bottom of the refrigerant test vessel (A-1). Stainless steel screens were placed between the

Figure A-1
Phase I - Refrigerant Swell Test Vessel



samples so that the samples could be differentiated from each other. They also acted as weights to submerge the rubber disks. Samples were placed on top of each other; however, it was assumed that sufficient solvent contact was made due to the irregularity of the screen material that separated the samples.

The test vessels were closed using a hydraulic press to compress the die springs. The springs maintained a constant force (2500 lbs.) on the Teflon O-Ring such that the volatile refrigerant gases were contained in the vessel.

Test vessels were filled with refrigerant by first pulling a vacuum in the chamber. The refrigerant valve was then opened and refrigerant was allowed to fill the chamber to a mark slightly above the samples.

In. situ diameter changes were taken at 1 day, 3 day and 14 days through the use of a traveling microscope and microscope lights. These measurements were made possible by the use of a glass/polycarbonate window in the top of the test vessel.

Test Temperatures: Samples immersed in the lubricants were conditioned at 140°F (60°C). Samples tested in the refrigerants were at ambient conditions.

Thermogravimetric Analysis: Thermogravimetric analysis was done on each of the elastomer samples used in this study. The tests were performed at a heating rate of 36°F (20°C) per minute. The test samples were tested under a blanket of nitrogen to a temperature of 1110°F (600°C). At approximately 1110° F (600° C) the atmosphere was changed to air.

Under a nitrogen atmosphere, organic materials basically crack and form low molecular weight materials based on the structure of the organic compound. This process occurs at relatively low temperatures during a TGA analysis. Polymer, oils, stearic acid and other organics volatilize under these conditions.

As the temperature is increased and the test atmosphere is changed to air and if carbon black is present, it is burned to form carbon dioxide. The residual materials include zinc oxide, the iron oxides and other inorganic materials present in the original compound.

Figure A-2 is the TGA spectrum of polyisoprene containing no carbon black filler. It can be seen that 94.1 % of the total compound weight is organic by nature and the residual material, which is known to be zinc oxide comprises approximately 5.7 % of the total compound weight. This closely matches the weights used to mix the polyisoprene compound.

Figure A-3 is the TGA spectrum of polyisoprene containing 35 phr (parts per hundred parts of rubber) carbon black. The first loss in weight (71.05 %) occurs due to the volatilization of

the polymer and other organics present in the compound. At 1110° F (600°C) when the atmosphere is changed to air additional weight loss (24.54 %) occurs due to the oxidation of the carbon black and the residual material (4.2 %) known to be primarily zinc oxide remains.

FIGURE A-2

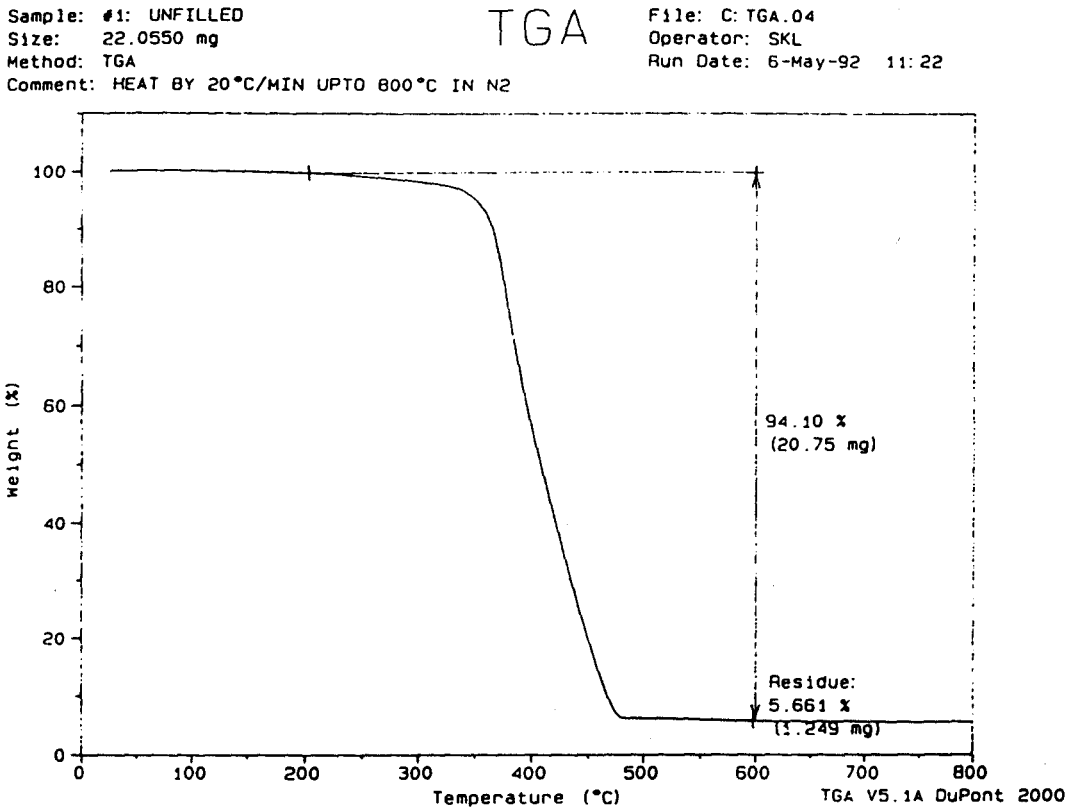
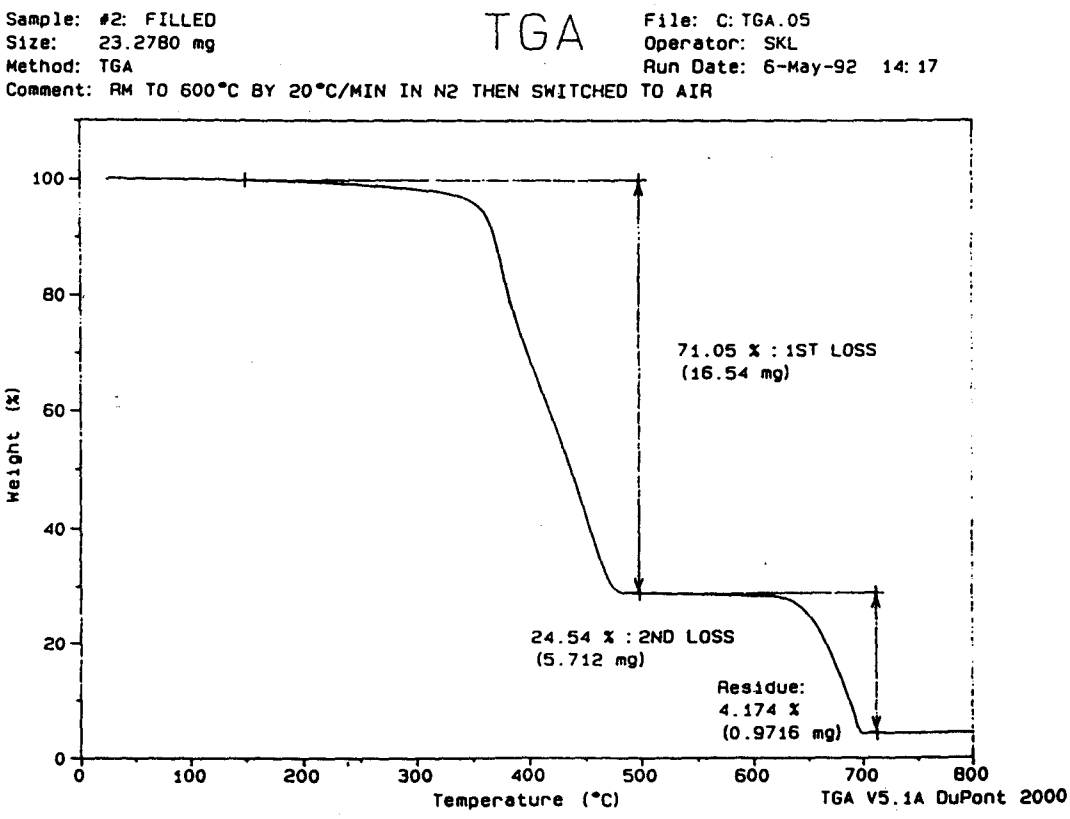


FIGURE A-3



PART II TEST METHODOLOGY

Test Objectives: To determine the change in the tensile strength, hardness and swell characteristics after aging the elastomer based material in pre-specified refrigeration and lubricant mixtures at an elevated temperature. The test method is a determination of deteriorative properties of a material when subjected to fluid immersion.

Test Sample Selection Criteria: Twenty five sample formulations for part II evaluation were selected based on their ability to resist swell in the refrigeration fluids studied in part I of the program. Charts were constructed to aid in the selection of those materials that showed the least swell.

Test Fluid Selection: Mixtures of refrigeration fluids to be included in the part II program were designated by ARTI in the work statement. Some changes were made in the selection of the fluid mixtures by ARTI. The final mixtures used for the study are listed in Appendix L.

Test Sample Preparation: The test samples were originally to be molded in the form of O-Rings. Many of the selected phase II elastomer based materials, however, were not suitable for molding in this manner. Therefore the samples were prepared in flat sheet form and dumbbell specimens were cut from the flat sheets.

Test Fluid Mixture Calibration: The work statement required that the pressure in the test fixture be maintained at 275 PSI to 300 PSI during the 2 week aging period at 212°F (100°C). To determine the correct refrigerant to lubricant ratios to maintain this pressure at the desired test temperature a calibration was performed for each of the mixtures. Varying amounts of the refrigerant and lubricants were placed into the vessels at 212°F (100°C) and the pressures were recorded. Appropriate refrigerant to lubricant ratios were determined in this manner for each of the mixtures.

For those refrigerant/lubricant mixtures that contained refrigerants with sufficiently low vapor pressures at the test temperature, mixtures were made up of 50 wt % of each of the fluids. The weight percent of each of the fluids in the 17 mixtures is listed in Appendix L, Table L-1.

Aging: Test samples were placed in the test vessels (Figure A-4) containing a known weight of lubricant. The vessels were closed and charged with the corresponding weight of refrigerant. This method of charging was accomplished by slightly overfilling the vessel with refrigerant through the quick connect fill port and placing the setup on a top-loading balance. Refrigerant was allowed to escape until the correct weight of refrigerant remained in the vessel.

The test vessels were placed in a silicone oil bath at 212° F (100° C) and test vessel internal pressures were monitored through the pressure gauges. After 14 days the test vessels were

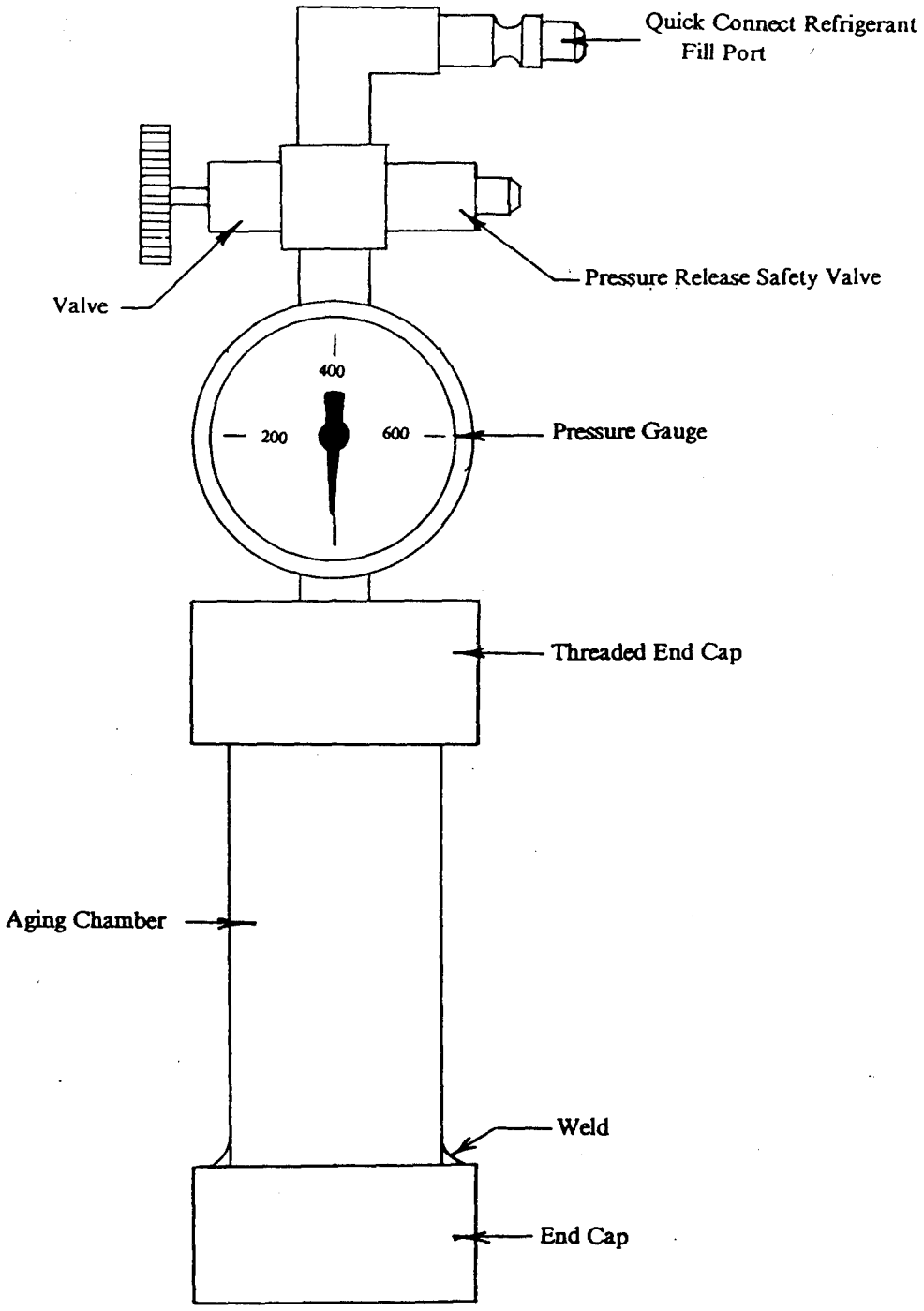
removed from the bath, the refrigerant was released and the vessel was opened. The test samples were removed and measured for thickness, width, weight, tensile strength and hardness.

Data Reduction: All values for the part II study are based on the following data reduction formula:

Percent Change in Weight, Thickness, Width, Tensile Strength and Hardness

= [(Aged Value - Original Value)/Original Value] X 100

FIGURE A-4
Part II Aging Pressure Vessel



APPENDIX B

LUBRICANT AND REFRIGERANT TYPES

Lubricants and Refrigerants Utilized in the Research
Compatibility of Refrigerants and Lubricants with Elastomers

mineral oil

MO	naphthenic mineral oil	Witco Suniso 3GS (32cSt)

alkylbenzene

AB	alkylbenzene	Shrieve Zerol® 150 (32cSt)

polyglycols

PPGBM	polypropylene glycol butyl monoether	ICI Emkarox® (32cSt)
PPGD	polypropylene glycol diol	Dow P425 (32cSt)
MPG	modified polyglycol	Allied Signal BRL-150 (32cSt)

polyolesters

PEMA	pentaerythritol ester mixed acid	ICI Emkarate® RL 244 (22cSt)
PEBA	pentaerythritol ester branched-acid	Emery 2927-A (32cSt)

refrigerants

HCFC-22	HFC-134
HFC-32	HFC-134a
HCFC-123	HCFC-142b
HCFC-124	HFC-143a
HFC-125	HFC-152a

APPENDIX C

TEST MATERIAL FORMULATIONS

Note:

All values in this Appendix are in Parts Per Hundred Parts of Elastomer

Formula #1	Polyisoprene (Natsyn™ 2200)	10
	Zinc Oxide	5
	Sulfur	2.25
	Stearic acid	2
	N-t-butyl-2-benzothiazyl sulfenamide	0.7
Formula #2	Polyisoprene (Natsyn™ 2200)	100
	Zinc Oxide	5
	Sulfur	2.25
	Stearic acid	2
	N-t-butyl-2-benzothiazyl sulfenamide	0.7
	N330 Carbon Black	35
Formula #3	Polyisoprene (Natsyn™ 2200)	100
	Zinc Oxide	5
	Stearic acid	2
	N-oxydiethylene-2-benzothiazyl-sulfenamide	1.0
	Tetramethylthiuram disulfide	1.0
	Di-morpholino disulfide	1.0
Formula #4	Polychloroprene (Neoprene™ W)	100
	Stearic acid	0.5
	Magnesium oxide	4
	Zinc oxide	5
Formula #5	Polychloroprene (Neoprene™ W)	100
	Stearic acid	0.5
	Magnesium oxide	4
	Zinc oxide	5
	N330 Carbon Black	30
Formula #6	Isobutyl isoprene (0.7% unsaturated)	100
	Zinc oxide	3
	Sulfur	1.65
	Stearic acid	1
	Tetramethylthiuram disulfide	1

Formula #7	Isobutyl isoprene (2.2% unsaturated)	100
	Zinc oxide	3
	Sulfur	1.75
	Stearic acid	1
	Tetramethylthiuram disulfide	1
Formula #8	Isobutyl isoprene (2.2% unsaturated)	100
	Zinc oxide	3
	Sulfur	1.75
	Stearic acid	1
	Tetramethylthiuram disulfide	1
	N330 Carbon black	50
Formula #9	Bromobutyl	100
	Zinc oxide	5
	Stearic acid	1
Formula #10	Bromobutyl	100
	Zinc oxide	5
	Stearic acid	1
	N330 Carbon Black	40
Formula #11	Chlorobutyl	100
	Zinc oxide	5
	Stearic acid	1
Formula #12	Chlorobutyl	100
	Zinc oxide	5
	Stearic acid	1
	N330 Carbon Black	40
Formula #13	SBR 1502 (23.5% styrene)	100
	Zinc oxide	3
	Sulfur	1.75
	Stearic acid	1
	N-t-butyl-2-benzothiazyl sulfenamide	1

Formula #14 SBR 1502 (23.5% styrene)	100
Zinc oxide	3
Sulfur	1.75
Stearic acid	1
N-t-butyl-2-benzothiazyl sulfenamide	1
N330 Carbon Black	50
Formula #15 SBR (29% styrene)	100
Zinc oxide	3
Sulfur	1.75
Stearic acid	1
N-t-butyl-2-benzothiazyl sulfenamide	1
Formula #16 SBR (40% styrene)	100
Zinc oxide	3
Sulfur	1.75
Stearic acid	1
N-t-butyl-2-benzothiazyl sulfenamide	1
Formula #17 Nitrile (Chemigum™ N206) (very high ACN)	100
Zinc oxide	3
Sulfur ($MgCO_3$ coated)	1.5
Stearic acid	1
N-t-butyl-2-benzothiazyl sulfenamide	0.7
Formula #18 Nitrile (Chemigum™ N300) (high ACN)	100
Zinc oxide	3
Sulfur ($MgCO_3$ coated)	1.5
Stearic acid	1
N-t-butyl-2-benzothiazyl sulfenamide	0.7
Formula #19 Nitrile (Chemigum™ N615B (medium ACN)	100
Zinc oxide	3
Sulfur ($MgCO_3$ coated)	1.5
Stearic acid	1
N-t-butyl-2-benzothiazyl sulfenamide	0.7

Formula #20	Nitrile (Chemigum™ N917) (low ACN)	100
	Zinc oxide	3
	Sulfur ($MgCO_3$coated)	1.5
	Stearic acid	1
	N-t-butyl-2-benzothiazyl sulfenamide	0.7
Formula #21	Nitrile (Chemigum™ N917) (low ACN)	100
	Zinc oxide	3
	Sulfur ($MgCO_3$ coated)	1.5
	Stearic acid	1
	N-t-butyl-2-benzothiazyl sulfenamide	0.7
	N330 Carbon Black	35
Formula #22	Nitrile (very high ACN)(Chemigum™ N206)	100
	Zinc oxide	3
	Sulfur ($MgCO_3$ coated)	1.5
	Stearic acid	1
	N-t-butyl-2-benzothiazyl sulfenamide	0.7
	N330 Carbon Black	35
Formula #23	Hydrogenated nitrile (Tornac™ A3850) (38% ACN)	100
	Zinc oxide	5
	Stearic add	1
	Magnesium oxide	10
	2,5-Dimethyl-2,5-di (t-butylperoxy) hexane (50%)	10
	1,2 polybutadiene liquid coagent	6.5
Formula #24	Hydrogenated nitrile (Tornac™ A3850) (38% ACN)	100
	Zinc oxide	5
	Stearic acid	1
	N 774 Carbon black	40
	Magnesium Coated Sulphur	1.5
	Tetramethylthiuram monosulfide	0.3
	Benzothiazyl disulfide	1.5

Formula #25	Hydrogenated nitrile (Tornac™ A4555) (45% ACN)	100
	Zinc oxide	5
	Stearic acid	1
	2,5-Dimethyl-2,5-di (t-butylperoxy) hexane (50%)	10
	1,2 polybutadiene liquid coagent	6.5
Formula #26	Hydrogenated nitrile (Tornac™ A4555) (45% ACN)	100
	Zinc oxide	5
	Stearic acid	1
	2,5-Dimethyl-2,5-di (t-butylperoxy) hexane (50%)	10
	1,2 polybutadiene liquid coagent	6.5
	N 774 Carbon black	40
Formula #27	Fluoroelastomer (Viton™ A)	100
	Magnesium Oxide (fluoroelastomer grade)	15
	N,N'-Dicinnamylidene-1,6-hexanediamine	3
Formula #28	Fluoroelastomer (Viton™ B)	100
	Magnesium Oxide (fluoroelastomer grade)	15
	N,N'-Dicinnamylidene-1,6-hexanediamine	3
Formula #29	Fluoroelastomer (Viton™ GF)	100
	PbO	3
	Triallylisocyanurate	3
	2,5-Dimethyl-2,5-di(tert-Butylperoxy) hexane	3
Formula #30	Fluoroelastomer (Viton™ GF)	100
	PbO	3
	Triallylisocyanurate	3
	2,5-Dimethyl-2,5-di(tert-Butylperoxy) hexane	3
	N330 Carbon Black	30
Formula #31	Fluorinated/Chlorinated Rubber (Kel-F™ 3700)	100
	PbO	1.8
	Triallylisocyanurate	1.8
	2,5-Dimethyl-2,5-di(tert-Butylperoxy) hexane	1.8

Formula #32	Fluorinated/Chlorinated Rubber (Kel-F™ 3700)	100
	Magnesium Oxide (fluoroelastomer grade)	15
	N,N'-Dicinnamylidene-1,6-hexanediamine	3
Formula #33	Fluorinated/Chlorinated Rubber (Kel-F™ 3700)	100
	Magnesium Oxide (fluoroelastomer grade)	15
	N,N'-Dicinnamylidene-1,6-hexanediamine	3
	N330 Carbon black	30
Formula #34	Epichlorohydrin homopolymer (Hydrin™ H-65)	100
	Stearic acid	1
	Nickel Dibutyldithiocarbamate	1
	Red lead	5
	Ethylene thiourea	1.85
Formula #35	Epichlorohydrin homopolymer (Hydrin™ H-65)	100
	Stearic acid	1
	Nickel Dibutyldithiocarbamate	1
	Red lead	5
	Ethylene thiourea	1.85
	N330 Carbon Black	40
Formula #36	Epichlorohydrin copolymer (Hydrin™ C-65)	100
	Stearic acid	1
	Nickel Dibutyldithiocarbamate	1
	Red lead	1.0
	Ethylene thiourea	1.85
Formula #37	Epichlorohydrin copolymer (Hydrin™ C-65)	100
	Stearic acid	1
	Nickel Dibutyldithiocarbamate	1
	Red lead	5
	Ethylene thiourea	1.85
	N330 Carbon black	40
Formula #38	Epichlorohydrin copolymer (Hydrin™ T-75)	100
	Stearic acid	1
	Nickel Dibutyldithiocarbamate	1
	Red lead	5
	Ethylene thiourea	1.85

Formula #39	Epichlorohydrin copolymer (Hydrin™ T-75)	100
	Stearic acid	1
	Nickel Dibutyldithiocarbamate	1
	Red lead	5
	Ethylene thiourea	1.85
	N330 Carbon black	40
Formula #40	Methyl vinyl silicone rubber (SE-33™)	100
	50 % Active Benzoyl Peroxide in Silicone Oil	1.5
Formula #41	Dimethyl silicone rubber (SE-436 U™)	100
	Dicumyl peroxide on calcium carbonate (40%)	1
Formula #42	Methyl vinyl phenyl silicone rubber (SE-565 U™)	100
	Dicumyl peroxide on calcium carbonate (40%)	0.6
Formula #43	Silicone rubber (SE-3808 U™)	100
	Dicumyl peroxide on calcium carbonate (40%)	0.8
Formula #44	Fluorinated silicone rubber (LS-63 U™)	100
	Iron Oxide	1.5
	2,4-Dichlorobenzoyl peroxide (50 % active)	1.3
Formula #45	EPDM/Polypropylene TPE (Santoprene™ 201-87)	100
Formula #46	EPDM/Polypropylene TPE (Santoprene™ 201-73)	100
Formula #47	EPDM/Polypropylene TPE (Santoprene™ 203-40)	100
Formula #48	EPDM/Polypropylene TPE (Santoprene™ 203-50)	100
Formula #49	Nitrile/Polypropylene TPE (Geolast™ 701-87)	100
Formula #50	Nitrile/Polypropylene TPE (Geolast™ 701-80)	100
Formula #51	Nitrile/Polypropylene TPE (Geolast™ 701-40	100
Formula #52	Copolyester TPE (Hytrel™ 4056)	100
Formula #53	Copolyester TPE (Hytrel™ 5526)	100

Formula #54	Copolyester TPE (Hytrel™ 6356)	100
Formula #55	Copolyester TPE (Hytrel™ 7246)	100
Formula #56	Polysulfide Rubber (FA™)	100
	Zinc oxide	10
	Stearic acid	0.5
	Benzothiazyl disulfide	0.4
	Diphenyl guanidine	0.1
	2-mercapto imidazoline	0.1
Formula #57	Polysulfide Rubber (FA™)	100
	Zinc oxide	10
	Stearic add	0.5
	Benzothiazyl disulfide	0.4
	Diphenyl guanidine	0.1
	2-mercapto imidazoline	0.1
	N330 Carbon black	60
Formula #58	Polysulfide Rubber (ST™)	100
	Zinc peroxide	5
	Stearic acid	1
	Calcium Hydroxide	1
Formula #59	Polysulfide Rubber (ST™)	100
	Zinc peroxide	5
	Stearic acid	1
	Calcium Hydroxide	1
	N330 carbon black	60
Formula #60	Polyurethane (Airthane™ PET-95A) (Ether Based)	100
	Moca	21.7
Formula #61	Polyurethane (Airthane™ PET-60D) (Ether Based)	100
	Moca	25.9
Formula #62	Polyurethane (Cyanaprene™ A-8) (Ester Based)	100
	Moca	10.9

Formula #63	Polyurethane (ester based) (Cyanaprene™ D-55)	100
	Moca	19.8
Formula #64	Polyurethane (Millathane™ 76) (Ester based)	100
	Benzothiazyl disulfide	1.0
	2-Mercaptobenzothiazole	0.5
	Zinc chloride/benzothiazyl disulfide complex	1.0
	Sulfur	1.5
Formula #65	Polyurethane (Millathane™ E-34) (Ether based)	100
	Benzothiazyl disulfide	1.0
	2-Mercaptobenzothiazole	0.5
	Zinc chloride/benzothiazyl disulfide complex	1.0
	Sulfur	1.5
Formula #66	Polyurethane (Millathane™ 76) (Ester based)	100
	Benzothiazyl disulfide	1.0
	2-Mercaptobenzothiazole	0.5
	Zinc chloride/benzothiazyl disulfide complex	1.0
	Sulfur	1.5
	N330 Carbon black	40
Formula #67	Chlorosulfonated polyethylene (Hypalon™ 20) (chlorine 29 %, sulfur 1.4 %)	100
	PbO	25
	Benzothiazyl disulfide	0.5
	Dipentamethylenethiuram hexasulfide	2
Formula #68	Chlorosulfonated polyethylene (Hypalon™ 40) (chlorine 35 %, sulfur 1 %)	100
	PbO	25
	Benzothiazyl disulfide	0.5
	Dipentamethylenethiuram hexasulfide	2

Formula #69	Chlorosulfonated polyethylene (Hypalon™ 40) (chlorine 35 %, sulfur 1 %)	100
	Magnesia	4
	Pentaerythritol	3
	Dipentamethylenethiuram hexasulfide	2
Formula #70	Chlorosulfonated polyethylene (Hypalon™ 40) (chlorine 35 %, sulfur 1 %)	100
	PbO	20
	Benzothiazyl disulfide	0.5
	Dipentamethylenethiuram hexasulfide	0.75
	Magnesia	10
	Nickel Dibutyldithiocarbamate	3
Formula #71	Chlorosulfonated polyethylene (Hypalon™ 4085) (Chlorine 35 %, sulfur 1 %)	100
	PbO	25
	Benzothiazyl disulfide	0.5
	Dipentamethylenethiuram hexasulfide	2
Formula #72	Ethylene propylene rubber (Vistalon™ 404)	100
	Dicumyl peroxide	3.0
Formula #73	Ethylene propylene rubber (Vistalon™ 707)	100
	Dicumyl peroxide	3.0
Formula #74	Ethylene propylene rubber (Vistalon™ 707)	100
	Dicumyl peroxide	3.0
	N330 carbon black	40
Formula #75	Ethylene acrylic rubber (Vamac™ G)	100
	Methylene Dianiline	1
	Diphenyl guanidine	3.2
Formula #76	Ethylene acrylic rubber (Vamac™ B-124 MB)	124
	N774 Carbon black	35
	Methylene Dianiline	1
	Diphenyl guanidine	3.2

Formula #77	Chlorinated polyethylene (DOW CM0136™) (Chlorine 35%)	100
	Magnesium oxide	10
	Triallyl Isocyanurate	2
	Dicumyl peroxide	4.0
Formula #78	Chlorinated polyethylene (DOW CM0136™) (Chlorine 35%)	100
	Magnesium oxide	10
	Triallyl Isocyanurate	2
	Dicumyl peroxide	4.0
	N330 carbon black	40
Formula #79	Chlorinated polyethylene (DOW 4211P™) (Chlorine 42%)	100
	Magnesium Oxide	10
	Triallyl Isocyanurate	2
	Dicumyl peroxide	4
Formula #80	Ethylene propylene diene rubber (Royalene™ 552) (high ethylene content)	100
	Zinc Oxide	5
	Sulfur	1.5
	Stearic Add	1.0
	Tetramethylthiuram disulfide	1.0
	2-Mercaptobenzothiazole	0.5
Formula #81	Ethylene propylene diene rubber (Royalene™ 525) (high unsaturation)	100
	Zinc Oxide	5
	Sulfur	1.5
	Stearic Acid	1
	Tetramethylthiuram disulfide	1
	2-Mercaptobenzothiazole	0.5
Formula #82	Ethylene propylene diene rubber (Royalene™ 359)	100
	Zinc Oxide	5
	Sulfur	1.5
	Stearic Acid	1.0
	Tetramethylthiuram disulfide	1.0
	2-Mercaptobenzothiazole	0.5

Formula #83	Ethylene propylene diene rubber (Royalene™ 552)	100
	Zinc Oxide	5
	Sulfur	1.5
	Stearic Acid	1
	Tetramethylthiuram disulfide	1
	2-Mercaptobenzothiazole	.5
	N330 carbon black	40
Formula #84	Ethylene propylene diene rubber (Royalene™ 359)	100
	Zinc Oxide	5
	Stearic Acid	1
	Dicumyl peroxide	1
Formula #85	EPDM/Butyl TPE (Trefsin™)	100

APPENDIX D

INDUSTRIALLY SUPPLIED GASKET MATERIAL INFORMATION

Industrially Supplied Gasket Material Information

	Material	Type Description
Formulation # 86	Precision Rubber Products #2167	Chloroprene compound (35%wt) with carbon black (45%), mineral (5%), and extractables (15%)
Formulation # 87	Precision Rubber Products #7507	Acrylonitrile compound (17% wt) with carbon black (37%), mineral (3%), butadiene (32%) and extractables (12%)
Formulation # 88	Garlock 2930 (gasket)	Neoprene with synthetic fibers
Formulation # 89	Armstrong N-8092	A non-asbestos nitrile bound reinforced cellulose fiber product
Formulation # 90	Specialty Paperboard NI-2085G	A non-asbestos material composed of inorganic filler blend, encapsulated with nitrile rubber, with a small proportion of cellulosic fiber
Formulation # 91	Victopac 69 (gasket)	Non-asbestos
Formulation # 92	Klinger C-4401 (gasket)	Nitrile/non-asbestos
Formulation # 93	Specialty Paperboard 2099	Nitrile/aramid fiber
Formulation # 94	Parker V747-75	Fluorocarbon
Formulation # 95	Green Tweed 956	Neoprene

APPENDIX E

ELASTOMER SAMPLE SWELL DATA CHARTS

Samples Tested In Refrigerants At Ambient Temperature
For 14 Days

Samples Tested in Lubricants At 140°F (60°C)
For 14 Days

Description of Information and Test Results Contained in Appendix E

Test Conditions: Refrigerant exposures and measurements were made at room temperature. Lubricant exposures were at 60°C (140°F).

Test Sample Recipe: The test sample recipe is contained in the upper left hand corner of the data sheets. The information identifies the generic classification of elastomer and ingredients used in the compound formulation. More specific information regarding the exact materials used is contained in Appendix A. Also given in this portion of the data sheet is the corresponding quantities of each of the compound ingredients.

Lubricant Legend: Generic identification of the lubricants used in this study is located in the upper right hand corner of the data sheets. More detailed information concerning the exact material and supplier is found in Appendix G.

Column 1: Each of the test formulation sample materials was submersed in 17 different test fluids. This column of information identifies each of the test fluids used in the phase I study. More detailed information concerning each of the test fluids is contained in Appendix G.

Columns 2,3 & 4: Measurements of the diameters of the test samples were made at various time intervals while in contact with the test fluids. Samples tested in refrigerants were measured in situ. Samples being tested in the lubricants were removed from the test fluid, quickly measured and returned to the test medium. These columns of data reflect the % diameter change of the samples over the indicated time interval and the values are based on the original sample dimensions.

Column 5: The sample materials were submersed in the test fluids for a period of 14 days after which time they were removed from the fluid and certain measurements were made. This column of information reflects the % weight change of the samples due to contact with the specified test fluid and the measurement is made immediately after removal from the test medium.

Columns 6 and 7: During the initial testing it was observed that some sample materials in some of the refrigerant test fluids were observed to quickly increase and then decrease in size during the first several hours subsequent to their removal from the refrigerant test fluid. These columns of data provide information concerning the state of the sample material 2 hours and 24 hours after their removal from the specified test fluid. The data is based on the original sample diameters.

Through the comparison of column 4 (14 day diameter change) information and columns 6 and 7 (2 hr. and 1 day diameter change) one is able to determine the state of the sample during this time interval. Extreme and violent outgassing can lead to drastic changes in the size of the sample during this time period. This phenomenon can lead to changes in the integrity of the sample material such as fractures and perhaps a permanent dimensional change.

Column 8: This column provides information that can be used to determine the permanent/reversible effect of the indicated solvent with the sample material. Negative values indicate some degree of extractibility of the sample material. Large positive values indicate the non-reversible swelling behavior of the fluid.

Column 9: This column provides information relating to the change of the hardness of the material 24 hours after removal from the indicated test fluid.

Formula # 1		
	Polyisoprene	100.00
	Zinc Oxide	5.00
	Stearic Acid	2.00
	Sulfur	2.25
	N-t-butyl-2-benzothiazyl sulfenamide	.7

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	10.3	10.4	10.2	-	45.3/42.4	43.9			-2.1/0.5	-.8	-2.0/-1.5	-1.8	
HFC-32	2.8	2.7	2.7	-	8.9/8.6	8.8	1.0/0.4	.8	0.3/-0.7	-0.2	1.7/1.8	1.8	46/47 A
HCFC-124	5.6	5.6	5.8	-	30.2/29.8	30.0	2.7/3.3	3.0	-0.4/0.8	0.2	-1.3/1.3	0	
HFC-134a	1.4	-	1.2	-	4.9/4.8	4.9	-0.4		-0.2/-0.3	-0.3	-0.9/-0.9	-0.9	
HFC-125	4.6	4.2	4.2	-	14.9/14.3	14.6	3.4		2.7/2.2	2.5	9.1/8/7	8.9	
HFC-143a	2.2	1.7	1.9	-	5.4/4.9	5.2	1.5		1.1/0	0.6	-0.7/-0.7	-0.7	
HFC-152a	4.1	4.2	4.2	-	12.3/13.1	12.7	1.1		-0.3/0.2	-0.1	1.6/2.1	1.9	
HCFC-123	48.1	47.5	48.0	-	328/327	328.	3.0		0.2/0	0.1	0.9/1.7	1.3	
HCFC-142b	10.3	10.0	10.2	-	40.1/38.7	29.4	1.6		0.7/0.5	0.6	-1.3/-1.1	-1.2	
HFC-134	1.7	1.5	1.5	-	7.8/7.6	7.7	-0.4/0.1	-0.2	-1.5/-0.9	-1.2	-0.1/-0.1	-0.1	45/46 A
AB	41.8	-	57.3/55.7	56.5	264/261	263.			54.4/54.4	54.4	251/520	251	
MO	43.1	-	53.1/53.2	53.2	248/247	247.					238/236	237	
PEMA	16.1	-	29.2/28.0	28.6	117/113	115.			24.7/25.5	25.1	105/102	104	
PEBA	16.6	-	26.5/25.7	26.1	106/104	105.					97.7/96.1	96.9	
PPGD	1.0	-	2.1/2.2	2.2	7.9/7.7	7.8					7.4/7.1	7.3	
PPGBM	4.3	-	8.1/8.0	8.1	28.1/27.8	28.0			6.9/5.9	6.4	19.2/19.9	19.6	
MPG	1.7	-	2.3/2.8	2.6	8.5/8.6	8.6			1.5/2.0	1.8	7.6/7.6	7.6	39/40 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 2		
	Polyisoprene	100.00
	Zinc Oxide	5.00
	Stearic Acid	2.00
	Sulfur	2.25
	N-t-butyl-2-benzothiazyl sulfenamide	0.70
	N330 Carbon Black	35.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.3	9.3	9.0		33.3/30.8	32.1			-0.8/0	-0.4	-1.1/-1.0	-1.1	
HFC-32	1.7	1.6	1.4		4.9/4.8	4.9	0.3/0.2	0.3	-0.5/-0.8	-0.7	-0.2/-0.1	-0.2	63/64 A
HCFC-124	5.5	5.8	5.6		22.4/22.5	22.5	2.7/2.2	2.5	0.2/-0.6	-0.2	0.5/0.4	0.5	
HFC-134a	1.1		1.0		3.7/3.8	3.8	0.2		-0.1/0.5	0.2	-0.5/-0.4	-0.5	
HFC-125	2.9	2.8	3.1		9.5/8.7	9.1	2.4		1.3/1.2	1.3	5.4/4.8	5.1	
HFC-143a*	2.0	2.5	2.2		3.8/3.4	3.6	1.0		0.7/0.8	0.8	-0.5/-0.4	-0.5	
HFC-152a	2.2	2.3	2.5		8.1/8.3	8.2	1.0		-0.6/-0.4	-0.5	-0.4/-0.2	-0.3	
HCFC-123	36.0	36.0	37.6		220/221	221	3.7		1.1/0.1	0.6	1.6/1.5	1.6	
HCFC-142b	7.8	7.8	7.8		31.2/29.8	30.5	7.8		-1.1/0.6	-0.3	-0.9/-0.7	-0.8	
HFC-134	1.3	1.3	1.1		5.7/5.7	5.7	0.2/0.4	0.3	-0.5/-0.2	-0.4	-0.2/-0.2	-0.2	63/64 A
AB	29.5	-	46.2/45.9	46.1	186/182	184			44.3/45.1	44.7	177/175	176	
MO	31.0	-	41.1/40.3	40.7	166/165	165					159/159	159	
PEMA	11.5	-	21.8/21.6	21.7	77.6/77.6	77.6			20.3/20.5	20.4	71.1/69.8	70.5	
PEBA	9.8	-	18.4/17.9	18.2	65.9/62.9	64.4					60.6/58.8	59.7	
PPGD	1.6	-	2.3/2.1	2.2	6.6/6.5	6.6					6.1/5.8	5.9	
PPGBM	3.4	-	7.0/6.2	6.6	21.0/20.6	20.8			5.0/5.6	5.3	15.5/14.9	15.2	
MPG	1.0	-	2.2/2.1	2.2	7.0/7.0	7.0			1.5/1.1	1.3	6.3/6.3	6.3	55/56 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 3			Lubricant Legend Information	
	Polyisoprene	100.00		PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	5.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	2.00		PPGBM - Polypropylene Glycol Butyl Monoether
	N-oxydiethylene-2-benzothiazyl-sulfenamide	1.00		MO - Mineral Oil
	Tetramethylthiuram disulfide	1.00		MPG - Modified Polyglycol
	Di-morpholino disulfide	1.00		PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.6	10.1	8.9		44.4/42.5	43.5			-1.9/0.8	-0.5	-3.7/-3.4	-3.6	
HFC-32	1.3	0.8	1.5		4.7/4.4	4.6	2.5/0.5	1.5	0.7/-0.6	0.1	-1.8/-1.7	-1.8	43/44 A
HCFC-124	6.5	6.5	6.1		28.2/28.3	28.3	1.8/1.2	1.5	-0.5/-0.9	-0.7	-2.6/-2.1	-2.4	
HFC-134a	1.0	-	1.2		3.8/3.4	3.6	-0.8		-0.6/0.5	-0.1	-2.4/-2.0	-2.2	
HFC-125	3.3	2.9	2.7		10.3/10.1	10.2	2.0		0.9/1.3	1.1	4.7/4.6	4.7	
HFC-143a	2.0	2.5	2.7		4.6/4.1	4.4	2.1		1.5/-0.3	0.6	-0.2/-1.7	-1.9	
HFC-152a	3.1	2.8	3.1		8.3/9.5	8.9	0.2		-0.9/-1.2	-1.1	-2.3/-1.8	-2.1	
HCFC-123	52.7	52.3	51.8		386/390	388	8.2/8.1	8.2	-1.1/-0.7	-0.9	-1.0/-0.2	-0.6	40/41 A
HCFC-142b	9.2	9.1	9.5		40.1/39.1	39.6	-0.5		-1.3/-0.9	-1.1	-2.9/-2.4	-2.7	
HFC-134	0.8	0.9	1.0		6.3/5.9	6.1	-0.6/-0.6	-0.6	-1.5/-1.4	-1.5	-1.5/-1.5	-1.5	41/42 A
AB	47.0	-	56.2/55.6	55.9	257/257	257			64.1/67.3	65.7	247/247	247	
MO	49.5	-	56.7/57.0	56.9	271/272	271					262/261	262	
PEMA	18.8	-	22.0/21.9	22.0	83.1/83.2	83.2			19.0/18.4	18.7	70.7/71.3	71.0	
PEBA	14.7	-	20.3/20.2	20.3	75.8/76.4	76.1					65.9/66.6	66.3	
PPGD	0.6	-	0.7/0.6	0.7	1.4/1.7	1.6					1.1/1.1	1.1	
PPGBM	4.5	-	5.7/5.9	5.8	17.7/18.1	17.9			3.0/3.9	3.5	9.2/9.5	9.4	
MPG	1.2	-	1.8/2.2	2.0	5.7/6.4	6.1			-0.2/0.3	0.1	4.6/5.1	4.9	32/33 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 4		
	Poly(chlorobutadiene)	100.00
	Zinc Oxide	5.00
	Stearic Acid	0.50
	Magnesium Oxide	4.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	6.3	6.1	6.1		22.2/21.6	2.19			24.8/28.0	26.4	-5.7/5.1	-0.3	
HFC-32	1.1	1.1	1.0		4.3/4.4	4.4	1.4/0.4	0.9	0.6/0	0.3	0.6/0.4	0.5	68/69 A
HCFC-124	1.9	2.7	2.8		10.3/10.1	10.2	2.4/3.0	2.7	1.5/1.4	1.5	5.1/5.0	5.1	
HFC-134a	1.1		1.2		3.4/3.4	3.4	1.3		0.6/0.7	0.7	1.6/2.0	1.8	
HFC-125	1.4	2.4	2.7		5.5/5.0	5.3	1.8		2.7/2.3	2.5	4.5/4.0	4.3	
HFC-143a	1.1	1.3	1.2		3.3/3.6	3.5	2.5		3.1/3.4	3.3	1.5/1.5	1.5	
HFC-152a	2.9	3.1	3.0		7.6/7.5	7.6	2.1		0.7/0.1	0.4	1.3/1.2	1.3	
HCFC-123	16.0	15.6	15.3		65.0/65.2	65.1	6.2		1.4/1.3	1.4	8.4/9.0	8.7	
HCFC-142b	6.6	6.6	6.5		18.4/18.6	18.5	4.9		2.9/0.7	1.8	3.3/3.2	3.1	
HFC-134	-0.1	0.3	0.6		3.3/3.4	3.4	0.7/0.7	0.7	1.8/1.1	1.5	1.9/1.8	1.9	73/74 A
AB	10.0	-	19.6/20.1	19.9	51.1/53.2	52.2			19.7/20.8	20.3	47.1/48.7	47.9	
MO	12.9	-	26.5/26.0	26.3	74.7/71.9	73.3					70.1/66.9	68.5	
PEMA	25.7	-	53.7/53.3	53.5	202/211	206			52.3/52.6	52.5	188/198	193	
PEBA	11.4	-	35.4/26.0	30.7	128/77.1	103					122/75.0	98.7	
PPGD	3.7	-	7.3/7.9	7.6	19.9/18.7	19.3					19.1/17.6	18.4	
PPGBM	4.8	-	12.3/11.4	11.9	29.7/31.1	30.4			9.8/11.3	10.6	29.2/30.8	30.0	
MPG	0.4	-	3.9/4.1	4.0	11.7/12.0	11.9			3.7/3.6	3.7	11.5/11.7	11.6	35/36 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 5		
	Poly(chlorobutadiene)	100.00
	Zinc Oxide	5.00
	Stearic Acid	0.50
	Magnesium Oxide	4.00
	N330 Carbon Black	30.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.8	4.9	4.9		17.2/16.8	17.0	3.2		-0.7/-1.0	-0.9	0.6/1.0	0.8	
HFC-32	1.3	1.6	1.4		3.7/3.6	3.7	0.7/1.1	0.9	-0.2/-0.1	-0.2	0.3/0.3	0.3	81/82 A
HCFC-124	1.1	2.8	1.6		7.6/7.7	7.7	1.3/2.0	1.7	0.4/1.3	0.9	4.0/4.2	4.1	
HFC-134a	0.6		1.0		2.7/2.6	2.7	0.3		0.1/0.7	0.4	1.3/1.3	1.3	
HFC-125	0.5	1.8	2.1		4.6/4.6	4.6	1.3		1.3/1.1	1.2	3.7/3.8	3.8	
HFC-143a	0.4	0.9	0.8		2.5/5.1	2.3	0.4		0.1/0.6	0.4	1.1/1.0	1.1	
HFC-152a	2.5	2.9	2.9		5.6/5.9	5.8	1.9		0.6/0	0.3	1.6/1.2	1.4	
HCFC-123	11.9	11.8	11.4		48.9/49.5	49.2	5.0		1.4/0.9	1.2	7.2/6.9	7.1	
HCFC-142b	4.6	5.1	4.8		14.4/14.5	14.5	2.0		1.2/1.2	1.2	3.4/3.9	3.7	
HFC-134	0.4	0.9	0.9		2.7/2.7	2.7	0.6/0.3	0.5	0.3/0.2	0.3	1.4/1.4	1.4	82/83 A
AB	7.6	-	16.1/15.3	15.7	23.5/38.5	31.0			14.2/15.0	14.6	35.0/35.7	35.4	
MO	7.9	-	18.9/18.2	18.6	49.0/48.4	48.7					46.2/45.3	45.8	
PEMA	12.5	-	30.5/28.7	29.6	93.0/91.8	92.4			27.3/27.3	27.3	90.1/88.6	89.4	
PEBA	7.3	-	22.1/22.1	22.1	65.9/63.6	64.9					64.4/62.6	63.5	
PPGD	2.5	-	5.0/4.8	4.9	13.2/13.9	13.6					13.2/13.9	13.5	
PPGBM	3.2	-	9.2/9.5	9.4	23.0/23.0	23.0			8.5/9.2	8.9	22.0/22.2	22.1	
MPG	8.4	-	2.8/2.9	2.9	8.3/6.7	7.5			2.2/2.2	2.2	8.1/6.5	7.3	57/58 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 6		
	Isobutyl isoprene (0.7% unsaturated)	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	Sulfur	1.66
	Tetramethyl thiuram disulfide	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	4.5	4.5	3.9		21.8/22.4	22.1	2.0		55.2/60.6	57.9	1.9/2.6	2.3	
HFC-32	0.5	0.7	1.0		4.0/4.0	4.0	45.9/47.0	46.5	33.7/33.3	33.5	1.7/1.7	1.7	25/26 A
HCFC-124	1.0	1.5	3.2		16.3/16.4	16.4	2.5/4.0	3.3	2.5/2.9	2.7	13.1/13.1	13.1	
HFC-134a	0.3		0.6		3.0/2.7	2.9	0.4		0.5/0.1	0.3	1.8/1.9	1.9	
HFC-125	1.6	2.4	2.6		8.2/7.2	7.7	2.6		9.5/7.5	8.5	7.1/6.3	6.7	
HFC-143a	0.7	0.6	1.3		4.1/3.5	3.8	10.1		31.0/25.1	28.1	3.1/2.7	2.9	
HFC-152a	0.6	1.0	1.7		7.6/6.4	7.0	1.6		2.7/2.5	2.6	3.9/4.0	4.0	
HCFC-123	16.8	16.8	16.3		90.2/90.2	90.2	8.1		5.5/5.5	5.5	26.2/28.1	27.2	
HCFC-142b	4.7	6.1	6.2		25.5/25.8	25.7	4.5		4.1/3.2	3.7	13.0/13.5	13.3	
HFC-134	-0.1	0.1	0.5		2.9/2.8	2.9	-0.1/-0.2	-0.2	0.2/-0.1	0.1	1.7/1.8	1.8	33/34 A
AB	23.4	-	67.5/67.7	67.6	341/338	339			67.2/66.7	67.0	329/327	328	
MO	27.7	-	72.1/65.7	68.9	386/335	361					374/326	350	
PEMA	1.6	-	3.1/2.8	3.0	10.1/9.9	10.0			2.5/2.6	2.6	8.7/8.9	8.8	
PEBA	0.9	-	2.0/2.4	2.2	6.9/7.5	7.2					6.0/7.0	6.5	
PPGD	-0.1	-	0.4/-0.3	0.1	-0.1/-0.1	-0.1					-0.3/-0.3	-0.3	
PPGBM	0	-	0.2/0.2	0.2	0.4/0.4	0.4			-0.1/0.6	0.3	0.1/-0.1	0	
MPG	3.2	-	-2.1/-0.3	-1.2	-0.1/-0.1	-0.1			-0.4/-0.6	-0.5	-0.5/-0.5	-0.5	27/28 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 7		
	Isobutyl isoprene (2.2% unsaturated)	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	Sulfur	1.75
	Tetramethyl thiuram disulfide	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	5.6	5.2	5.2		22.5/22.5	22.5	3.8		1.9/2.3	2.1	-0.9/-0.6	-0.8	
HFC-32*	0.4	0.6	1.2		4.0/4.0	4.0	37.3/36.4	36.9	10.3/9.0	9.7	1.1/1.0	1.1	33/34 A
HCFC-124	1.3	1.4	3.5		17.1/16.7	16.9	3.1/3.0	3.1	2.4		13.2/13.3	13.3	
HFC-134a	0.2		0.6		2.7/2.8	2.8	0.3		0.6/0.2	0.4	1.8/1.8	1.8	
HFC-125	2.1	2.6	3.0		8.9/7.9	8.4	2.5		3.5/2.8	3.2	7.6/6.8	7.2	
HFC-143a	0.5	0.7	1.4		4.2/4.3	4.3	2.1		11.9/12.9	12.4	3.3/3.5	3.4	
HFC-152a	1.1	1.4	1.9		10.1/7.9	9.0	1.2		1.2/1.3	1.3	3.8/4.0	3.9	
HCFC-123	16.6	16.5	16.3		90.1/89.9	90.0	8.9		5.2/5.1	5.2	27.5/26.7	27.1	
HCFC-142b	4.1	6.5	6.6		26.7/25.8	26.3	4.5		3.5/4.0	3.8	13.8/13.4	13.6	
HFC-134	-0.1	0.6	0.5		3.2/2.9	3.1	0.6/0.1	0.4	0.5/-0.3	0.1	2.3/2.1	2.2	
AB	18.0	-	54.6/55.2	54.9	254/253	253			53.4/54.6	54.0	246/245	246	
MO	24.7	-	59.4/56.4	57.9	292/271	282					282/263	273	
PEMA	1.8	-	3.0/3.0	3.0	10.0/10.7	10.4			2.4/2.4	2.4	9.5/10.2	9.9	
PEBA	0.1	-	1.3/2.6	2.0	7.2/7.9	7.6					6.6/7.4	7.0	
PPGD	0.1	-	0.5/-0.5	0	0.3/0.5	0.4					0.2/0.2	0.2	
PPGBM	0.2	-	0.7/0.5	0.6	1.0/1.4	1.2			-0.2/-0.6	-0.4	0.8/0.9	0.9	
MPG	-0.1	-	-0.2/0.2	0	0.2/0.2	0.2			-0.9/-0.5	-0.7	-0.2/-0.2	-0.2	34/35 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 8				
	Isobutyl isoprene (2.2% unsaturated)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	3.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Sulfur	1.75		MO - Mineral Oil
	Tetramethyl thiuram disulfide	1.00		MPG - Modified Polyglycol
	N330 Carbon Black			PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	4.2	4.4	4.4		15.0/15.1	15.1	4.8		1.6/1.6	1.6	6.0/6.3	6.2	
HFC-32	0.4	0.8	1.0		2.8/2.6	2.7	1.0/0.5	0.8	0.7/0.7	0.7	2.3/0.5	1.4	64/65 A
HCFC-124	0.4	1.0	2.7		19.5/18.2	18.9	3.1/2.1	2.6	2.1/2.1	2.1	16.6/15.6	16.1	
HFC-134a	0.1		0.4		1.9/1.9	1.9	0.4		0.6/0.3	0.5	1.1/1.1	1.1	
HFC-125	0.6	1.5	1.9		5.4/5.4	5.4	1.1		0.7/1.0	0.9	4.7/4.6	4.7	
HFC-143a	0.3	0.1	0.7		2.7/2.3	2.5	0.5		0.6/0.8	0.7	2.0/2.0	2.0	
HFC-152a	0.6	0.4	1.6		-3.4/-2.4	-2.9	1.2/1.4	1.3	0.9/1.4	1.2	-4.8/-3.7	-4.3	
HCFC-123	11.9	11.9	12.0		57.9/57.8	57.9	6.4		4.0/3.9	4.0	20.0/20.3	20.2	
HCFC-142b	2.5	4.9	4.7		17.3/17.3	17.3	2.9		2.9/2.0	2.5	9.8/8.9	9.4	
HFC-134	-0.2	0.1	0.4		1.8/1.7	1.8	-0.3/0.1	-0.1	0.1/0.1	0.1	1.1/1.1	1.1	65/66 A
AB	8.1	-	35.9/35.3	35.6	129/126	128			34.4/34.5	34.5	126/123	124	
MO	10.7	-	39.8/39.4	39.6	151/151	151					147/147	147	
PEMA	0.5	-	2.1/2.3	2.2	6.7/6.6	6.7			1.8/2.3	2.1	6.8/6.4	6.6	
PEBA	0.5	-	1.5/1.7	1.6	4.1/4.8	4.5					3.8/4.3	4.1	
PPGD	-0.1	-	0.4/0.3	0.4	0.1/0.2	0.1					0.2/0.3	0.3	
PPGBM	0.2	-	0.5/0.5	0.5	0.7/0.6	0.7			0.2/0.7	0.5	0.5/0.4	0.5	
MPG	0.1	-	-0.1/-0.1	-0.1	-0.1/-0.1	-0.1			-0.3/-0.3	-0.3	-0.3/-0.3	-0.3	62/63 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 9		
	Bromobutyl	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	5.3	5.6	5.3		23.5/23.4	23.5	3.4		83.7/85.0	84.4	4.3/4.4	4.4	
HFC-32	0.8	1.1	1.1		4.1/4.0	4.1	61.3/661.0	61.2	37.0/39.2	38.1	1.3/1.4	1.4	23/24 A
HCFC-124	1.7	2.4	4.1		17.4/18.3	17.9	3.8/3.2	3.5	3.0		13.5/13.1	13.3	
HFC-134a	0.1		0.6		3.1/2.8	3.0	1.1		0.6/0.3	0.5	2.0/2.1	2.1	
HFC-125	1.6	2.6	2.9		8.5/7.6	8.1	12.4		19.7/13.0	16.4	7.6/6.6	7.1	
HFC-143a	0.4	0.4	1.1		4.3/4.4	4.4	20.9		39.2/41.2	40.2	3.4/3.3	3.4	
HFC-152a	0.6	1.6	1.9		6.9/6.1	6.5	1.6		1.6/6.2	3.9	4.0/3.9	4.0	
HCFC-123	18.7	18.9	18.8		102/102	102	10.1		6.0/5.1	5.6	28.0/27.4	27.7	
HCFC-142b	4.9	6.7	6.5		26.9/26.3	26.6	4.2		2.5/3.4	3.0	12.9/13.8	13.4	
HFC-134	0.3	0.2	0.2		2.9/2.7	2.8	0.2/0.1	0.1	-0.1/-0.1	-0.1	2.1/2.1	2.1	32/33 A
AB	30.3	-	85.9/77.2	81.6	523/447	485			84.1/77.3	80.7	475/412	444	
MO	37.8	-	86.2/86.2	86.2	521/509	515					496/486	491	
PEMA	1.6	-	5.9/6.0	6.0	21.2/21.5	21.4			5.8/4.5	5.2	20.8/21.2	21.0	
PEBA	1.1	-	3.3/4.0	3.7	10.9/12.9	11.9					10.5/12.5	11.5	
PPGD	0.6	-	0.8/1.5	1.2	5.1/5.3	5.2					5.1/5.1	5.1	
PPGBM	0.1	-	1.0/0.8	0.9	4.0/4.1	4.1			1.2/0.1	0.7	3.7/3.9	3.8	
MPG	0.1	-	0.2/-0.1	0.1	1.0/1.1	1.1			-0.5/-0.3	-0.4	0.8/0.8	0.8	28/29 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 10		
	Bromobutyl	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00
	N330 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	3.9	3.9	3.8		17.0/16.8	16.9	2.8		1.0/0.6	0.8	6.4/6.2	6.3	
HFC-32	0.3	0.2	0.5		3.5/3.3	3.4	0.6/1.0	0.8	0.1/1.0	0.6	1.6/1.5	1.6	57/58 A
HCFC-124	0.8	1.4	2.5		12.5/12.6	12.6	2.4/3.2	2.8	1.7		10.2/10.2	10.2	
HFC-134a	0.2		0.4		1.6/1.9	1.8	0.4		0.4/-0.3	0.1	1.2/1.3	1.3	
HFC-125	1.3	2.0	2.7		7.9/7.1	7.5	2.1		2.1/2.1	2.1	6.9/6.2	6.6	
HFC-143a	0.5	0.4	0.9		3.1/2.7	2.9	0.8		0.8/0.7	0.8	2.3/2.5	2.4	
HFC-152a	0.4	0.7	1.2		4.6/5.0	4.8	0.9		0.9/0.8	0.9	3.1/3.0	3.1	
HCFC-123	14.3	14.4	14.4		71.6/71.8	71.7	8.3		4.1/3.9	4.0	20.8/21.6	21.2	
HCFC-142b	2.2	5.3	5.6		19.2/19.2	19.2	4.1		2.5/3.1	2.8	10.5/10.4	10.5	
HFC-134	-0.1	0.4	-0.2		2.1/2.4	2.3	0.2/0.2	0.2	0.5/0.2	0.4	1.5/1.6	1.6	55/56 A
AB	15.5	-	47.1/47.6	47.4	187/190	188			43.1/46.1	44.6	178/180	179	
MO	19.2	-	52.2/50.9	51.6	229/225	227					223/219	221	
PEMA	1.5	-	4.0/3.9	4.0	12.6/12.3	12.5			4.2/4.0	4.1	12.2/12.0	12.1	
PEBA	0.2	-	1.9/2.2	2.1	7.8/6.4	7.1					7.5/6.1	6.8	
PPGD	0.5	-	1.4/1.1	1.3	3.2/3.2	3.2					3.3/3.2	3.3	
PPGBM	0.5	-	1.0/0.6	0.8	3.0/2.7	2.9			0.7/0.5	0.6	2.4/2.3	2.4	
MPG	-0.1	-	0.3/0.2	0.3	0.8/0.7	0.8			0.3/-0.6	-0.2	0.5/0.4	0.5	56/57 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 11		
	Chlorobutyl	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	5.8	6.1	5.7		26.2/25.5	25.9	152/151	152	42.6/37.3	40.0	3.0/5.3	4.2	
HFC-32	0.6	0.7	1.2		4.5/4.6	4.6	44.0/42.4	43.2	28.4/26.3	27.4	1.6/1.5	1.6	27/28 A
HCFC-124	1.3	2.0	3.6		19.7/17.6	18.7	2.4/2.4	2.4	2.2/2.3	2.3	12.9/12.9	12.9	
HFC-134a	0.1	0.3	0.5		2.8/2.6	2.7	-0.3/-0.1	-0.2	-0.2/0.2	0.0	2.1/2.1	2.1	
HFC-125	1.8	2.1	2.5		8.1/7.2	7.7	9.8/8.2	9.0	9.3/6.0	7.7	6.8/6.0	6.4	
HFC-143a	0.5	0.7	1.3		4.0/3.8	3.9	17.9/23.4	20.7	22.7/23.4	23.1	3.1/3.1	3.1	
HFC-152a	0.8	1.1	1.9		6.7/6.6	6.7	1.1/1.4	1.3	1.1/1.0	1.1	4.2/4.4	4.3	33/34 A
HCFC-123	18.2	18.2	18.5		32.9/34.1	33.5	11.9/11.7	11.8	6.1/4.9	5.5	26.7/27.5	27.1	32/33 A
HCFC-142b	4.9	6.7	7.0		27.9/28.0	28.1	5.6/6.2	5.9	3.8/3.1	3.4	14.9/15.2	15.1	
HFC-134	-0.2	0.1	-0.1		3.0/2.7	2.9	0.2/-0.3	-0.1	0.1/0.4	0.2	2.1/2.0	2.1	34/35 A
AB	29.9	-	62.7/61.3	61.9	304/292	298			60.7/61.2	60.9	300/289	294	5/6 A
MO	38.3	-	69.1/68.7	68.9	385/371	378			67.9/67.1	67.5	371/367	369	8/9 A
PEMA	1.4	-	4.2/4.1	4.2	14.8/14.5	14.7			3.3/3.1	3.2	14.5/14.3	14.4	24/25 A
PEBA	0.9	-	3.4/3.7	3.6	13.0/13.1	13.1			3.1/2.7	2.9	12.5/12.5	12.5	25/26 A
PPGD	0.3	-	1.3/1.4	1.3	4.4/4.4	4.4			0.2/-0.1	0.1	4.2/4.3	4.3	27/28 A
PPGBM	-0.2	-	0.6/0.7	0.7	3.0/3.3	3.2			0.1/0.1	0.1	2.8/3.0	2.9	29/30 A
MPG	0.5	-	0.1/.01	0.1	1.1/1.1	1.1			-0.5/-0.1	-0.3	0.9/1.0	1.0	30/31 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid extreme cavitation.

Formula # 12		
	Chlorobutyl	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00
	N330 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.9	5.1	4.0		25.6/14.7	20.2	4.2/4.3	4.3	2.7/2.6	2.7	13.1/3.7	8.4	
HFC-32	0.3	0.3	0.4		3.0/3.0	3.0	0.6/1.3	1.0	0.7/0.7	0.7	1.4/1.4	1.4	55/56 A
HCFC-124	0.7	1.5	2.6		13.2/13.2	13.2	2.2/1.8	2.0	0.6/1.4	1.0	9.7/9.6	9.7	
HFC-134a	0.1	0.1	0.3		2.0/1.7	1.9	0.2/0.1	0.1	-0.3/-0.3	-0.3	1.4/1.3	1.4	
HFC-125	0.9	1.1	1.5		4.5/3.9	4.2	1.1/1.2	1.2	1.4/0.6	1.0	3.8/3.4	3.6	
HFC-143a	0.2	0.2	0.8		2.0/2.5	2.3	0.2/0.5	0.4	0.8/0.4	0.6	1.6/2.1	1.9	
HFC-152a	0.4	0.6	1.1		5.1/4.9	5.0	0.8/0.8	0.8	0.6/0.6	0.6	3.2/3.2	3.2	55/56 A
HCFC-123	13.8	13.6	13.6		73.2/73.4	73.3	8.5/10.8	9.7	3.6/4.8	4.2	21.7/23.9	22.8	50/51 A
HCFC-142b	3.7	4.9	5.3		20.0/20.1	20.0	4.4/4.2	4.3	3.2/2.8	3.0	11.0/11.4	11.2	
HFC-134	-0.1	0.1	-0.6		2.5/2.0	2.3	0.4/-0.1	0.2	0.4/-0.2	0.1	1.4/1.5	1.5	55/56 A
AB	17.6	-	39.5/38.6	39.1	151/145	148			35.1/37.9	36.5	151/144	148	26/27 A
MO	23.4	-	45.1/43.9	44.5	186/183	184			46.9/44.2	45.6	185/182	184	31/32 A
PEMA	1.0	-	3.3/3.4	3.3	10.4/10.5	10.5			2.9/3.1	3.0	10.2/10.4	10.3	48/49 A
PEBA	1.1	-	2.7/3.2	2.9	8.7/9.3	9.0			2.5/3.6	3.1	8.3/9.1	8.7	48/49 A
PPGD	0.2	-	0.8/0.5	0.6	2.7/2.4	2.6			0.5/0.4	0.5	2.6/2.4	2.6	52/53 A
PPGBM	-0.3	-	0.2/0.3	0.3	2.3/2.3	2.3			0.4/0.1	0.3	1.9/1.9	1.9	51/52 A
MPG	-0.3	-	0.3/-0.1	0.1	0.9/1.0	1.0			-0.1/-0.3	-0.2	0.8/0.8	0.8	54/55 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 13			Lubricant Legend Information	
	SBR (23.5% Styrene Content)	100.00		PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	3.00		PEBA - Pentaerythritol Ester Branched Acid
	Sulfur	1.75		PPGBM - Polypropylene Glycol Butyl Monoether
	Stearic Acid	1.00		MO - Mineral Oil
	N-t-butyl-2-benzothiazyl sulfenamide	1.00		MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.9	10.0	9.8		41.1/39.5	40.3	7.6		-0.1/-1.9	-1.0	13.4/-18.6	-2.6	
HFC-32	2.0	1.6	2.0		7.0/6.6	6.8	0.7/0.1	0.4	-1.3/-0.7	-1.0	-1.0/-0.9	-1.0	49/50 A
HCFC-124	5.9	5.4	4.1		22.5/22.5	22.5	3.5/2.7	3.1	0.5		2.5/1.3	1.9	
HFC-134a	1.1		1.0		5.0/5.0	5.0	-0.4		-0.2/-0.8	-0.5	-0.4/-0.3	-0.4	
HFC-125	3.1	3.8	3.6		10.8/10.0	10.4	6.4		3.0/1.3	2.2	6.6/5.8	6.2	
HFC-143a	1.4	1.5	1.5		5.2/5.2	5.2	0.3		-1.1/0.1	-0.6	0.2/0.2	0.2	
HFC-152a	30.	3.1	2.8		11.1/10.6	10.9	0.4		-1.6/-1.2	-1.4	-1.6/-1.5	-1.6	
HCFC-123	41.4	41.2	40.8		271/271	271	4.4		-0.9/-1.2	-1.1	-0.4/-0.9	-0.7	
HCFC-142b	7.8	7.5	7.3		31.1/30.3	30.7	1.0		-1.0/-1.8	-1.4	-3.0/-2.2	-2.6	
HFC-134	1.9	2.0	1.4		7.3/7.5	7.4	0.9/0.8	0.9	-0.2/-0.1	-0.2	0.8/0.5	0.7	47/48 A
AB	29.7	-	43.6/42.3	43.0	175/171	173			42.2/41.5	41.9	160/156	158	
MO	32.5	-	44.5/44.1	44.3	186/186	186					175/175	175	
PEMA	16.3	-	22.9/22.6	22.8	85.6/84.7	85.2			21.4/20.7	21.1	78.8/78.5	78.7	
PEBA	9.4	-	16.0/16.1	16.1	57.0/56.5	56.8					51.4/51.1	51.2	
PPGD	1.6	-	1.2/1.8	1.5	5.9/5.5	5.7					4.6/4.4	4.5	
PPGBM	5.9	-	10.0/9.2	9.6	29.4/29.5	29.5			8.2/7.9	8.1	21.4/21.7	21.6	
MPG	1.6	-	2.5/2.7	2.6	8.1/8.3	8.2			1.5/1.7	1.6	7.4/7.5	7.5	39/40 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 14			Lubricant Legend Information	
	SBR 1502 (23.5% Styrene content)	100.00		PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	3.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Sulfur	1.75		MO - Mineral Oil
	N-t-butyl-2-benzothiazyl sulfenamide	1.00		MPG - Modified Polyglycol
	N330 Carbon Black	50.00		PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.6	7.1	7.1		26.9/27.1	27.0	4.7		-0.9/-1.2	-1.1	-2.9/-2.5	-2.7	
HFC-32	1.2	1.2	1.1		4.5/4.4	4.5	0.2/0.5	0.4	-0.7/-0.7	-0.7	-0.7/-0.7	-0.7	72/73 A
HCFC-124	3.4	3.4	3.1		15.0/15.3	15.2	1.6/2.7	2.2	-0.7		1.7/2.3	2.0	
HFC-134a	.9		0.6		3.3/3.7	3.5	0.2		-0.5/0.3	-0.1	0.1/0.4	0.3	
HFC-125	2.0	2.1	2.1		7.0/6.5	6.8	1.4		0.9/1.0	1.0	4.4/4.1	4.3	
HFC-143a	0.9	1.1	0.9		3.7/3.6	3.7	0.3/0.7	0.5	-0.2/0.1	-0.1	0.3/0.3	0.3	
HFC-152a	2.3	2.1	2.0		6.4/6.6	6.5	1.0		-1.0/-0.4	-0.7	-0.9/-0.6	-0.8	
HCFC-123	24.3	24.2	24.9		138/138	138	5.7		0.8/-0.9	-0.1	1.9/1.5	1.7	
HCFC-142b	6.0	6.0	5.9		20.1/20.0	20.1	2.4		0.2/0.3	0.3	-1.4/-0.7	-1.1	
HFC-134	1.2	1.3	1.1		4.6/4.8	4.7	-0.2/0.4	0.1	-0.5/-0.2	-0.4	0.6/0.5	0.6	70/71
AB	15.7	-	24.0/24.2	24.1	81.9/81.2	81.6			22.9/23.1	23.0	75.9/75.3	75.6	
MO	17.4	-	24.2/23.7	24.0	88.8/88.6	88.7					84.6/83.9	84.3	
PEMA	8.8	-	13.2/13.2	13.2	45.5/45.1	45.3			12.9/13.3	13.1	42.7/42.8	42.8	
PEBA	4.2	-	9.2/9.2	9.2	31.3/30.8	31.1					29.6/29.2	29.4	
PPGD	1.1	-	2.1/1.4	1.8	5.0/4.8	4.9					4.4/4.1	4.3	
PPGBM	3.3	-	5.5/5.4	5.5	18.8/19.0	18.9			5.3/5.1	5.2	15.0/15.3	15.2	
MPG	1.1	-	1.8/1.8	1.8	5.6/5.6	5.6			1.6/1.2	1.4	5.3/5.4	5.4	67/68 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 15		
	SBR (Medium Styrene) Content	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	Sulfur	1.75
	N-t-butyl-2-benzothiazyl sulfenamide	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	10.2	11.3	11.4		43.8/41.90	42.9			2.1/0.3	1.3	-1.4/-1.5	-1.5	63/64 A
HFC-32	1.3	1.2	1.2		7.8/7.4	7.6	-1.0/-0.5	-0.8	-1.6/-1.3	-1.5	-0.3/-0.2	-.03	67/68 A
HCFC-124	4.4	4.2	3.7		24.0/23.1	23.6	3.0/0.6	1.8	-0.7/1.0	0.2	0.1/-0.1	0	66/67 A
HFC-134a	1.9	1.6	1.7		7.5/7.4	7.5	2.1/1.8	2.0	1.6/1.4	1.5	1.3/1.4	1.4	
HFC-125	2.3	2.7	1.9		10.1/9.8	10.0	1.8/1.7	1.7	0.4/0.1	0.3	6.0/6.0	6.0	67/68 A
HFC-143a	1.7	1.6	1.6		7.1/6.9	7.0			0.1/2.1	1.1	1.0/0.9	1.0	67/68 A
HFC-152a	2.7	2.4	3.0		10.2/10.0	10.1	0.4/-0.4	0	0.4/0.6	0.5	-0.4/-0.3	-0.4	66/67 A
HCFC-123	43.5	44.6	45.7		316/313	315	14.0/11.2	12.6	4.9/3.7	4.3	33.6/35.5	34.6	64/65 A
HCFC-142b	8.3	8.6	7.6		31.7/30.6	31.1			-0.7/-0.9	-0.8	-0.4/-0.3	-0.4	67/68 A
HFC-134	1.2	1.3	1.2		8.5/8.1	8.3	0.5/1.2	0.9	-0.3/-1.0	-0.7	0.5/0.5	0.5	68/69 A
AB	34.0	-	43.5/61.3	52.4	179/292	236			40.8/53.1	47.0	176/287	232	19/20 A
MO	32.7	-	42.1/41.1	41.6	179/176	178			39.2/36.2	37.7	173/170	172	
PEMA	14.0	-	20.3/20.2	20.3	78.0/78.0	78.0			19.8/19.0	19.4	76.1/76.0	76.1	31/32 A
PEBA	11.0	-	16.9/47.0	32.0	64.5/62.2	63.4			15.3/15.5	15.4	63.5/61.3	62.4	35/36 A
PPGD	2.6	-	3.4/3.2	3.3	12.7/12.1	12.4			2.2/1.9	2.0	11.0/10.3	10.7	57/68 A
PPGBM	5.2	-	8.5/7.7	8.1	28.5/28.1	28.3			7.0/7.3	7.2	26.1/26.1	26.1	51/52 A
MPG	2.2	-	2.8/2.6	2.7	10.0/10.2	10.1			3.7/2.8	3.3	9.3/9.5	9.4	60/61 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 16		
	SBR (High Styrene) Content	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	Sulfur	1.75
	N-t-butyl-2-benzothiazyl sulfenamide	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	10.7	10.6	1.2		44.7/42.5	43.6			65.6/63.9	64.8	-1.9/-1.9	-1.9	24/25 A
HFC-32	2.3	2.3	2.3		14.0/0.4	7.2	0.8/0.7	0.8	-0.1/-.3	-0.2	5.1/-6.1	-0.5	82/83 A
HCFC-124	5.2	5.1	5.1		22.4/22.4	22.4	1.9/1.5	1.7	-0.4/-0.6	-0.5	0.3/0.5	0.4	83/84 A
HFC-134a	2.1	1.9	1.7		7.6/6.7	7.2	0.7/0.6	0.7	0.1/0	0.1	1.2/0.7	1.0	
HFC-125	2.9	3.0	2.8		9.2/8.8	9.0	2.4/1.9	2.1	1.8/1.6	1.7	5.3/5.1	5.2	82/83 A
HFC-143a	1.4	1.6	1.4		6.2/5.7	6.0			-0.4/-0.4	-0.4	0.2/0.2	0.2	84/85 A
HFC-152a	3.8	3.4	3.5		10.3/10.1	10.2	1.1/0.2	0.7	-0.7/-0.9	-0.8	-0.7/-0.6	-0.7	83/84 A
HCFC-123	52.9	53.1	52.6		380/393	386	11.8/12.8	12.3	2.0/1.9	2.0	-4.8/-4.5	-4.7	79/80 A
HCFC-142b	7.9	7.8	7.8		31.0/30.1	30.6			0.6/0.6	0.6	-0.5/-0.4	-0.5	81/82 A
HFC-134	1.6	1.5	1.7		7.5/7.6	7.6	0.1/0.4	0.3	-0.7/-0.4	-0.6	0.1/0.4	0.2	83/84 A
AB	38.6	-	59.3/59.0	59.2	275/271	273			55.6/55.2	55.4	269/265	267	10/11 A
MO	36.3	-	53.4/52.5	53.0	268/255	261			45.6/48.4	47.0	260/246	253	
PEMA	15.8	-	32.0/28.2	30.1	141/112	127			29.1/26.7	27.9	139/109	124	15/16 A
PEBA	12.4	-	20.9/22.0	21.5	83.6/82.6	83.1			18.7/18.1	18.4	83.0/81.9	82.5	15/16 A
PPGD	2.1	-	3.6/3.2	3.4	11.3/11.4	11.4			2.7/2.7	2.7	10.8/10.8	10.8	73/74 A
PPGBM	5.9	-	11.1/11.0	11.1	37.3/37.0	37.2			9.1/9.2	9.2	35.5/35.3	35.4	37/38 A
MPG	2.4	-	3.7/3.0	3.4	11.0/11.0	11.0			3.4/2.5	3.0	10.4/10.2	10.3	70/71 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 17		
	Very High ACN Nitrile	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	Magnesium Carbonate Coated Sulfur	1.50
	N-t-butyl-2-benzothiazyl sulfenamide	0.70

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	47.8	47.5	47.6		255/238	247	4.3/3.7	4.0	1.1/0.6	0.9	3.0/2.8	2.9	
HFC-32*	8.5	8.5	8.4		30.0/29.3	29.7	28.3/25.4	26.9	6.2/6.6	6.4	0.1/0.4	0.3	35/36 A
HCFC-124	39.6	39.7	40.2		257/241	249	12.9/11.6	12.3	6.2/5.5	5.9	29.1/27.1	28.1	
HFC-134a	2.0	3.0	4.9		20.7/20.4	20.6	4.2/4.4	4.3	3.9/3.8	3.9	15.2/15.2	15.2	
HFC-125*	0.8	0	1.7		7.4/9.7	8.6	6.5/10.2	8.4	7.6/10.7	9.2	6.0/7.6	6.8	
HFC-143a	0.2	0.4	0.9		3.2/3.4	3.3	2.7/1.6	2.2	1.6/1.3	1.5	2.7/2.9	2.8	
HFC-152a	7.8	7.9	7.9		24.9/24.3	24.6	6.0/5.3	5.7	2.9/3.1	3.0	9.6/9.9	9.8	55/56 A
HCFC-123	78.5	79.2	77.5		669/664	666	20.3/20.4	20.4	7.6/7.7	7.7	38.0/37.5	37.8	52/53 A
HCFC-142b	3.8	5.6	7.3		28.8/28.7	28.8	6.6/6.8	6.7	4.6/5.1	4.9	18.4/18.7	18.6	
HFC-134	21.7	22.0	21.4		111/109	110	10.8/10.3	10.6	4.8/4.5	4.7	22.1/21.7	21.9	47/48 A
AB	0.2	-	0.2/-0.1	0.1	0.2/0.2	0.2			0/0.1	0.1	0.3/0.4	0.4	55/56 A
MO	-0.2	-	0.3/0.3	0.3	1.5/1.6	1.6			0.1/0.6	0.4	1.4/1.4	1.4	54/55 A
PEMA	0.8	-	1.6/1.9	1.7	5.0/5.3	5.2			1.6/1.8	1.7	5.0/5.5	5.3	55/56 A
PEBA	0.4	-	0.9/1.1	1.0	3.1/3.6	3.4			1.4/1.3	1.4	2.8/3.3	3.1	56/57 A
PPGD	1.0	-	2.0/2.0	2.0	5.6/5.7	5.7			1.9/1.8	1.8	5.8/5.8	5.8	52/53 A
PPGBM	0.4	-	0.3/0.1	0.2	0.3/0.5	0.4			0.1/0	0.1	0.5/0.6	0.6	55/56 A
MPG	0.4	-	-0.4/-0.3	-0.3	-0.2/-0.1	-0.1			-0.5/-0.2	-0.4	-0.1/-0.1	-0.1	58/59 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 18		
	High ACN Nitrile	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	Magnesium Carbonate Coated Sulfur	1.50
	N-t-butyl-2-benzothiazyl sulfenamide	0.70

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	51.4	50.8	51.4		275/260	268	4.5/4.4	4.5	0.5/0.7	0.6	3.3/3.6	3.5	
HFC-32*	8.3	8.3	8.3		30.0/29.3	29.7	6.6/6.8	6.7	2.5/1.8	2.2	-0.3/-0.4	-0.4	38/39 A
HCFC-124	45.4	45.3	45.9		289/274	282	11.7/11.1	11.4	5.4/4.9	5.2	25.3/24.5	24.9	
HFC-134a	2.5	4.1	5.1		22.0/21.9	21.9	4.2/4.4	4.3	3.6/3.3	3.5	14.6/14.5	14.6	
HFC-125*	1.5	2.0	3.9		16.2/15.9	16.1	3.6/5.6	4.6	5.4/8.2	6.8	12.7/12.3	12.5	
HFC-143a	0.6	1.0	2.0		5.8/5.8	5.8	1.4/1.5	1.5	1.3/1.2	1.3	4.7/4.8	4.8	
HFC-152a	8.9	8.7	8.8		27.5/27.3	27.4	6.2/6.0	6.1	2.4/2.5	2.5	7.5/7.6	7.6	53/54 A
HCFC-123	82.9	83.4	83.7		720/713	716	19.3/20.1	19.7	7.0/7.1	7.1	35.1/35.8	35.5	53/54 A
HCFC-142b	6.5	8.6	8.7		34.2/34.4	34.3	7.4/7.7	7.6	4.1/4.4	4.3	17.1/17.1	17.1	
HFC-134	20.4	20.6	20.6		104/103	103	10.7/10.0	10.4	4.4/4.2	4.3	20.2/20.1	20.2	53/54 A
AB	0.4	-	0.2/0.2	0.2	0.7/0.9	0.8			0.3/0	0.2	0.8/1.0	0.9	51/52 A
MO	0.4	-	0.7/0.9	0.8	2.5/2.7	2.6			0.6/1.0	0.8	2.4/2.6	2.5	51/52 A
PEMA	1.6	-	3.8/3.2	3.5	10.9/10.4	10.7			3.8/3.3	3.6	10.8/10.5	10.7	49/50 A
PEBA	1.0	-	2.1/2.6	2.4	6.3/7.2	6.7			2.2/2.6	2.4	6.0/7.1	6.6	52/53 A
PPGD	1.5	-	3.2/2.7	2.9	9.7/8.3	9.0			2.9/2.4	2.7	10.1/8.4	9.3	48/49 A
PPGBM	0.3	-	0.4/0.2	0.3	1.0/1.1	1.1			0.4/0.3	0.3	1.2/1.2	1.2	52/53 A
MPG	0.3	-	-0.2/-0.3	-0.2	0.1/0.1	0.1			0.5/-0.4	0.1	0/0.1	0.1	54/55 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 19			Lubricant Legend Information	
	Medium ACN Nitrile	100.00		PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	3.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Magnesium Carbonate Coated Sulfur	1.50		MO - Mineral Oil
	N-t-butyl-2-benzothiazyl sulfenamide	0.70		MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	49.8	49.8	50.4		262/244	253	2.6/2.1	2.4	-0.8/-0.9	-0.9	-1.6/-1.9	-1.8	
HFC-32*	7.7	7.7	7.8		26.8/26.0	26.4	37.7/39.2	38.5	5.9/6.6	6.3	-0.5/-0.5	-0.5	41/42 A
HCFC-124	46.2	46.1	45.8		311/284	298	7.8/3.7	5.8	3.0/0.9	2.0	13.8/4.9	9.4	
HFC-134a*	5.1	5.8	5.7		25.0/23.7	24.4	4.1/3.8	4.0	2.2/2.4	2.3	10.1/11.9	11.0	
HFC-125*	3.5	5.1	6.2		23.5/23.1	23.3	10.7/9.5	10.1	13.6/11.5	12.6	11.9/11.9	11.9	
HFC-143a	1.4	2.3	2.7		9.0/9.0	9.0	1.9/1.9	1.9	1.4/1.3	1.3	4.8/4.7	4.8	
HFC-152a	8.8	8.9	8.7		28.4/27.8	28.1	4.5/5.5	5.0	-0.4/1.3	0.5	3.4/3.7	3.6	51/52 A
HCFC-123	94.2	94.1	94.4		875/883	879	14.8/16.1	15.5	3.9/5.0	4.5	22.9/22.5	22.7	50/51 A
HCFC-142b	11.6	11.6	11.6		47.2/46.8	47.0	7.8/8.3	8.1	2.4/2.5	2.5	10.0/10.5	10.3	
HFC-134	14.9	14.5	14.6		75.5/74.8	75.2	6.2/6.7	6.5	1.2/2.1	1.7	11.6/11.8	11.7	48/49 A
AB	0.9	-	1.7/1.9	1.8	5.1/4.9	5.0			1.6/1.5	1.6	4.9/4.9	4.9	45/46 A
MO	1.3	-	2.6/2.7	2.7	8.3/8.7	8.5			1.7/1.9	1.8	8.1/8.3	8.2	44/45 A
PEMA	6.4	-	9.9/9.7	9.8	33.2/33.2	33.2			10.2/9.9	10.1	32.7/32.9	32.8	38/39 A
PEBA	3.8	-	7.7/7.7	7.7	25.4/25.6	25.5			7.5/7.7	7.6	24.9/25.2	25.1	39/40 A
PPGD	5.8	-	8.0/7.9	7.9	25.6/25.4	25.5			7.3/7.4	7.4	25.4/25.3	25.4	37/38 A
PPGBM	1.3	-	2.0/1.8	1.9	5.9/5.8	5.9			1.5/1.3	1.4	5.9/5.9	5.9	46/47 A
MPG	0.5	-	0.7/0.7	0.7	2.6/2.9	2.8			0.2/0.4	0.3	2.7/2.8	2.8	47/48 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 20			Lubricant Legend Information	
	Low ACN Nitrile	100.00		PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	3.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Magnesium Carbonate Coated Sulfur	1.50		MO - Mineral Oil
	N-t-butyl-2-benzothiazyl sulfenamide	0.70		MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	35.6	35.1	35.4		180/174	177	0.2/0	0.1	-1.8/-2.2	-2.0	-3.4/-3.5	-3.5	
HFC-32*	6.2	6.1	6.1		21.6/21.0	21.3	8.2/9.4	8.8	0.7/0.3	0.5	-0.2/-0.1	-0.2	49/50 A
HCFC-124	31.0	31.2	29.9		199/187	193	4.9/5.2	5.1	0.6/0.6	0.6	5.6/6.5	6.1	
HFC-134a	4.5	4.3	4.3		19.2/18.8	19.0	1.4/5.3	3.4	-0.6/3.1	1.3	3.6/3.4	3.5	
HFC-125*	5.0	5.3	5.2		21.9/21.4	21.7	7.4/10.1	8.8	3.9/3.4	3.7	6.5/5.7	6.1	
HFC-143a	2.8	3.2	3.4		11.9/11.1	11.5	1.1/1.8	1.5	0.2/0.7	0.5	3.8/3.1	3.5	
HFC-152a	7.4	8.1	7.4		27.3/27.0	27.2	3.2/3.3	3.3	-0.4/-0.9	-0.7	1.2/1.0	1.1	47/48 A
HCFC-123	73.9	71.3	73.2		739/755	747	12.1/11.7	11.9	1.0/1.5	1.3	10.5/11.4	10.9	52/53 A
HCFC-142b	13.8	14.1	14.0		59.9/58.9	59.4	7.1/7.5	7.3	0.6/0.7	0.7	5.0/4.9	5.0	
HFC-134	9.4	9.1	8.9		45.4/44.1	44.8	4.1/3.8	4.0	-0.5/1.0	0.3	5.6/5.6	5.6	50/51 A
AB	4.8	-	6.9/7.1	7.0	21.0/22.0	21.5			6.1/6.1	6.1	20.5/20.4	20.5	41/42 A
MO	4.2	-	7.0/8.4	7.7	26.9/26.9	26.9			7.5/7.3	7.4	26.3/26.3	26.3	42/43 A
PEMA	21.5	-	23.9/24.7	24.1	98.4/98.9	98.6			22.0/23.5	22.8	96.6/97.4	97.0	31/32 A
PEBA	13.1	-	18.9/19.2	19.0	72.0/72.1	72.1			17.4/18.2	17.8	70.6/70.7	70.7	33/34 A
PPGD	11.0	-	11.1/11.4	11.3	39.9/39.9	39.9			9.7/9.4	9.6	37.7/38.0	37.9	37/38 A
PPGBM	24.0	-	7.2/7.6	7.4	23.7/23.8	23.7			6.9/7.3	7.1	23.5/23.4	23.5	38/39 A
MPG	2.3	-	4.3/3.9	4.1	13.9/14.3	14.1			4.2/3.4	3.8	13.8/14.1	14.0	42/43 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 21		
	Low ACN Nitrile	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	MgCo3 Coated Sulfur	1.50
	N-t-butyl-2-benzothiazyl sulfenamide	0.70
	N330 Carbon Black	35.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	25.8	23.0	22.0		121/115	118			-2.0/-1.3	-1.7	-0.7/-0.9	-0.8	65/66 A
HFC-32	4.3	4.5	4.2		15.9/15.7	15.8	1.3/1.0	1.2	-0.2/0.1	-0.1	0.2/0.2	0.2	67/68 A
HCFC-124	20.3	23.5	23.5		110/106	108	8.1/5.7	6.9	1.3/1.0	1.2	9.1/7.1	8.1	65/66 A
HFC-134a	3.3	3.4	3.5		15.5/15.4	15.5	1.7/1.9	1.8	0.6/0.9	0.8	2.3/2.3	2.3	
HFC-125	3.0	3.8	3.4		15.8/15.6	15.7	2.5/2.6	2.5	1.5/1.2	1.4	8.0/8.1	8.1	68/69 A
HFC-143a	1.6	1.7	1.4		8.0/7.9	8.0			0.2/0.3	0.3	2.8/2.5	2.7	67/68 A
HFC-152a	5.6	5.3	5.2		19.6/19.0	19.3	1.7/2.6	2.2	-0.6/-0.6	-0.6	1.4/1.5	1.5	65/66 A
HCFC-123	42.5	41.9	40.9		352/362	357	10.0/10.8	10.4	0.9/0.4	0.7	-17.4/-19.5	-18.4	68/69 A
HCFC-142b	8.5	9.0	9.1		41.3/40.5	40.9			0.5/1.1	0.8	4.0/4.6	4.3	67/68 A
HFC-134	7.3	7.3	7.0		33.9/33.3	33.6	3.9/3.3	3.6	1.5/0.4	1.0	6.7/6.1	6.4	67/68 A
AB	3.4	-	4.8/4.4	4.6	13.7/14.1	13.9			4.2/4.4	4.3	14.3/14.4	14.4	60/61 A
MO	2.9	-	5.3/5.0	5.2	18.4/18.3	18.4			4.2/4.4	4.3	18.1/17.9	18.0	63/64 A
PEMA	7.3	-	15.0/14.0	14.5	57.0/57.0	57.0			14.5/12.8	13.7	57.0/56.8	56.9	53/54 A
PEBA	5.8	-	12.2/11.6	11.9	46.5/46.4	46.5			12.5/11.2	11.9	46.6/46.8	46.7	53/54 A
PPGD	4.7	-	6.1/7.1	6.6	26.6/27.1	26.9			5.6/5.0	5.3	26.3/26.5	26.4	60/61 A
PPGBM	2.1	-	4.5/4.4	4.5	16.0/15.6	15.8			4.2/3.8	4.0	15.4/15.6	15.5	63/64 A
MPG	1.4	-	2.5/2.9	2.7	9.7/9.8	9.8			1.7/1.7	1.7	9.6/9.8	9.7	64/65 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 22		
	Very High ACN Nitrile	100.00
	Zinc Oxide	3.00
	Stearic Acid	1.00
	MgCo 3 Coated Sulfur	1.50
	N-t-butyl-2-benzothiazyl sulfenamide	0.70
	N330 Carbon Black	35.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	31.5	31.6	31.7		157/165	161			-1.2/3.8	1.3	3.0/11.4	7.2	63/64 A
HFC-32	6.3	6.4	6.2		22.4/22.2	22.3	3.0/3.3	3.2	0.6/0.8	0.7	4.3/4.5	4.4	66/67 A
HCFC-124	27.9	29.2	28.7		136/138	137	11.0/11.1	11.1	3.8/4.2	4.0	21.7/21.7	21.7	62/63 A
HFC-134a	1.2	2.5	4.2		15.7/15.8	15.8	3.3/3.0	3.2	3.1/2.5	2.8	10.0/9.9	10.0	
HFC-125	0.4	0.8	1.6		6.8/7.0	6.9	1.5/1.8	1.7	1.7/1.4	1.6	6.2/6.3	6.2	68/69 A
HFC-143a	0.4	0.3	0.8		2.8/2.3	2.6			0.2/0.6	0.4	2.2/2.0	2.1	71/72 A
HFC-152a	5.6	5.9	5.6		18.3/18.4	18.4	3.4/2.4	2.9	1.6/1.1	1.4	7.2/7.2	7.2	63/64 A
HCFC-123	49.3	49.4	49.7		388/391	390	17.6/20.1	18.8	5.6/5.6	5.6	30.5/32.3	31.4	61/62 A
HCFC-142b	1.9	4.2	5.5		21.1/21.3	21.2	4.6/4.8	4.7	3.2/3.0	3.1	13.7/13.7	13.7	
HFC-134	16.0	15.6	16.5		80.4/78.6	79.5	7.4/8.6	8.0	2.9/3.4	3.2	18.1/18.1	18.1	62/63 A
AB	-0.1	-	0.1/0.1	0.1	0.3/0.3	0.3			-0.2/-0.3	-0.3	0.8/0.8	0.8	74/75 A
MO	0.1	-	0.4/0.5	0.5	1.1/1.2	1.2			-0.1/0.3	0.1	0.8/0.9	0.9	75/76 A
PEMA	0.1	-	0.8/0.8	0.8	3.0/2.5	2.8			1.0/0.3	0.7	2.6/2.5	2.6	73/74 A
PEBA	0.4	-	7.5/-1.3	3.1	2.4/2.6	2.5			-0.3/-0.1	-0.2	3.3/3.2	3.2	74/75 A
PPGD	1.0	-	2.2/2.0	2.1	6.4/6.6	6.5			1.9/1.4	1.7	6.5/6.6	6.6	69/70 A
PPGBM	0.2	-	0.2/0.1	0.1	0.3/0.3	0.3			-0.6/0.5	-0.1	0.2/0.3	0.3	75/76 A
MPG	-0.2	-	-0.1/-0.1	-0.1	-0.4/-0.2	-0.3			-0.7/-0.6	-0.7	-0.4/-0.3	-0.4	75/76 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 23	38% ACN Hydrogenated Nitrile	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	5.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Magnesium oxide	10.00		MO - Mineral Oil
	2,5-dimethyl-2,5-di(t-butyl-peroxy) hexane	10.00		MPG - Modified Polyglycol
	Ricon 153-D	6.50		PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	33.7	34.1	34.2		171/159	165	3.3/4.7	4.0	0/-0.7	-0.3	4.7/4.9	4.8	67/68 A
HFC-32	4.7	5.4	5.1		18.2/21.5	19.9	0.3/2.0	1.2	1.7/0.2	1.0	-3.1/2.2	-0.5	61/62 A
HCFC-124	31.8	32.2	31.8		189/181	185	8.4/8.0	8.2	2.1/2.0	2.1	17.6/15.9	16.8	69/70 A
HFC-134a	4.2	4.9	5.0		23.3/23.3	23.3	2.8/3.4	3.1	1.0/1.0	1.0	9.7/8.5	9.1	68/69 A
HFC-125	4.4	7.6	7.1		30.0/29.2	29.6	5.5/4.8	5.2	3.0/2.2	2.6	15.0/15.2	15.1	68/69 A
HFC-143a	0.7	0.8	1.3		3.6/3.5	3.6	1.2/-0.1	0.6	-0.2/-0.7	-0.5	0.6/0.6	0.6	70/71 A
HFC-152a	7.7	6.8	6.8		22.8/23.1	23.0	4.1/3.4	3.8	0.6/0.1	0.4	3.0/2.9	3.0	69/70 A
HCFC-123	45.8	44.0	45.2		314/317	316	12.9/12.2	12.5	3.8/3.3	3.6	24.3/23.6	23.9	68/69 A
HCFC-142b	9.7	10.6	10.8		44.1/44.0	44.1	5.0/5.4	5.2	1.5/1.2	1.3	9.3/9.4	9.4	69/70 A
HFC-134	14.9	13.9	14.3		69.7/68.8	69.3	7.8/7.0	7.4	2.4/2.2	2.3	13.2/13.2	13.2	69/70 A
AB	0.3	-	1.6/1.8	1.7	5.5/6.0	5.8			0.7/0.6	0.7	5.1/5.2	5.2	64/65 A
MO	1.2	-	2.8/2.6	2.7	10.6/9.6	10.1			3.1/1.5	2.3	8.7/8.5	8.6	66/67 A
PEMA	0.4	-	4.2/5.3	4.8	17.6/17.9	17.8			3.8/5.1	4.5	17.7/17.8	17.8	66/67 A
PEBA	1.3	-	5.6/3.8	4.7	15.3/13.1	14.2			5.2/3.3	4.2	15.3/13.2	14.2	63/64 A
PPGD	1.1	-	2.4/2.9	2.6	8.2/9.0	8.6			1.5/2.6	2.1	8.1/8.8	8.4	65/66 A
PPGBM	-0.1	-	0.4/0.3	0.4	3.4/3.1	3.3			0.5/0.1	0.3	2.3/2.3	2.3	65/66 A
MPG	0	-	-0.1/0.1	0	2.1/1.2	1.7			-0.4/-0.3	-0.4	0.9/0.9	0.9	65/66 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 24		
	38% ACN Hydrogenated Nitrile	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00
	MgCo 3 Coated Sulfur	1.50
	TMTM	0.30
	MBTS	1.50
	N774 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	68.4	66.4	66.0		320/208	264			113/72.3	92.7	-11.9/-10.2	-11.1	
HFC-32*	6.3	6.2	6.0		20.4/20.5	20.5	99.6/115	107	20.1/28.1	24.1	-0.2/0.2	0	37/38 A
HCFC-124*	69.9	68.9	68.0		338/328	333	240/96.0	168	209/63.1	136	2.3/-8.9	-3.3	
HFC-134a	4.7	5.3	5.5		21.1/21.2	21.2	2.2/2.6	2.4	0.9/0.7	0.8	4.3/4.4	4.4	
HFC-125*	5.2	6.7	6.7		26.0/26.1	26.1	63.1/56.5	59.8	66.8/63.8	65.3	11.2/11.1	11.1	35/36 A
HFC-143a	1.2	2.1	2.4		8.0/15.2	11.6			1.0/0.9	1.0	4.6/4.3	4.5	59/60 A
HFC-152a	7.1	6.9	7.0		22.0/22.0	22.0	3.8/3.6	3.7	0.4/0.7	0.6	3.3/3.4	3.4	59/60 A
HCFC-123*	122	121	115		1294/1300	1297	16.2/14.6	15.4	5.8/5.5	5.7	-8.2/-8.3	-8.2	51/52 A
HCFC-142b	10.8	10.6	11.0		42.1/40.8	41.5			1.6/0.9	1.3	7.7/8.2	8.0	56/57 A
HFC-134	15.3	15.5	15.4		70.8/69.9	70.4	5.6/5.1	5.4	1.3/1.3	1.3	10.4/10.8	10.6	55/56
AB	1.0	-	1.9/1.9	1.9	4.9/4.9	4.9			1.4/1.9	1.7	5.5/5.4	5.5	59/60 A
MO	1.3	-	3.3/3.0	3.2	8.8/8.7	8.8			2.8/2.3	2.6	8.3/8.3	8.3	56/57 A
PEMA	3.4	-	6.9/6.8	6.9	16.0/28.1	22.1			6.4/6.7	6.6	15.6/27.7	21.7	48/49 A
PEBA	2.0	-	5.7/7.6	6.7	18.4/18.4	18.4			4.9/4.6	4.8	19.1/18.9	18.9	52/53 A
PPGD	-0.6	-	0.1/2.7	1.4	8.6/8.5	8.6			1.3/1.6	1.5	8.3/8.5	8.4	57/58 A
PPGBM	-1.4	-	-1.3/0.6	-0.4	1.6/1.7	1.7			-0.3/-0.3	-0.3	1.4/1.4	1.4	63/64 A
MPG	-1.0	-	-0.6/-0.1	-0.4	0.2/0.4	0.3			-1.0/-0.8	-0.9	0/0.1	0.1	65/66

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 25		
	45% ACN Hydrogenated Nitrile	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00
	2,5-dimethyl-2,5-di(t-butyl-peroxy) hexane	10.00
	Ricon 153-D	6.50

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	41.9	41.9	42.0		215/203	209	3.6/4.9	4.3	0/0.6	0.3	6.0/6.0	6.0	63/64 A
HFC-32*	5.8	5.9	5.6		22.8/26.2	24.5	-0.1/3.0	1.5	-1.8/0.5	-0.7	-2.7/3.7	0.5	62/63 A
HCFC-124	39.5	39.3	39.1		260/246	253	9.1/9.7	9.4	2.3/2.4	2.4	20.6/20.6	20.6	62/63 A
HFC-134a	4.3	5.4	5.2		25.3/25.8	25.6	2.9/3.0	3.0	1.4/1.6	1.5	11.1/10.4	10.8	64/65 A
HFC-125	4.0	6.2	6.2		29.0/30.0	29.5	4.3/3.7	4.0	2.4/2.6	2.5	16.8/16.2	16.5	61/62 A
HFC-143a	1.3	1.6	2.1		7.9/7.7	7.8	1.2/1.6	1.4	0.6/0.2	0.4	4.8/4.9	4.9	61/62 A
HFC-152a	7.8	8.0	7.8		26.6/25.6	26.1	2.6/3.4	3.0	-0.1/0.8	0.4	4.3/4.6	4.5	64/65 A
HCFC-123	56.1	56.9	57.2		442/449	446	13.9/13.7	13.8	3.6/3.9	3.7	30.5/29.5	30.0	62/63 A
HCFC-142b	9.9	10.2	10.1		42.9/42.4	42.6	5.1/5.2	5.2	1.2/1.9	1.5	12.4/12.4	12.4	62/63 A
HFC-134	20.8	19.8	20.0		105/103	104	8.8/8.9	8.9	2.1/2.9	2.5	16.5/18.0	17.2	61/62 A
AB	0.4	-	0.9/0.3	0.6	3.5/2.5	3.0			0.2/-0.3	-0.1	2.8/2.2	2.5	60/61 A
MO	0.4	-	1.6/1.9	1.8	7.8/7.5	7.7			1.5/1.6	1.6	6.5/6.2	6.4	59/60 A
PEMA	1.4	-	4.5/3.4	4.0	12.8/12.3	12.6			4.1/3.7	3.9	12.8/12.1	12.5	61/62 A
PEBA	1.0	-	2.6/3.3	3.0	9.5/11.2	10.4			2.3/3.2	2.8	9.5/11.3	10.4	57/58 A
PPGD	1.5	-	2.6/2.2	2.4	7.0/7.3	7.2			1.4/1.3	1.4	7.1/7.2	7.2	60/61 A
PPGBM	-1.5	-	-0.9/0.4	-0.3	2.0/2.8	2.4			-0.3/0.5	0.1	1.0/0.9	1.0	61/62 A
MPG	-0.3	-	-0.6/-0.2	-0.4	0.6/0.4	0.5			-1.0/-0.5	-0.8	-0.1/-0.3	-0.2	59/60 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 26		
	45% ACN Hydrogenated Nitrile	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00
	2,5-dimethyl-2,5-di(t-butyl-peroxy) hexane	10.00
	Ricon 153-D	6.50
	N774 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	24.3	25.3	25.8		130/123	127	1.7/2.1	1.9	-0.1/-0.1	-0.1	2.3/2.2	2.3	79/80 A
HFC-32	5.2	5.4	5.1		18.3/17.7	18.0	0.3/1.3	0.8	-0.4/-0.2	-0.3	0.6/0.4	0.5	83/84 A
HCFC-124	23.2	23.6	23.7		145/129	137	5.9/6.2	6.1	1.5/1.4	1.5	12.4/11.7	12.1	80/81 A
HFC-134a	3.1	3.2	3.1		16.4/16.1	16.3	1.6/1.7	1.7	6.3/0	3.7	4.3/4.7	4.5	80/81 A
HFC-125	3.6	4.6	4.8		22.7/23.2	23.0	3.5/3.7	3.6	2.1/2.3	2.2	11.3/11.2	11.3	79/80 A
HFC-143a	0.6	0.6	0.6		3.4/3.5	3.5	0.3/0.8	0.6	0.1/0.6	0.3	1.7/1.3	0.5	81/82 A
HFC-152a	6.1	4.8	5.3		16.3/16.3	16.3	1.7/1.8	1.8	-0.1/-0.8	-0.4	0.7/0.9	0.8	81/82 A
HCFC-123	32.4	31.7	35.2		211/216	213	7.6/7.9	7.8	2.3/2.9	2.6	18.3/19.3	18.8	80/81 A
HCFC-142b	5.6	6.7	6.6		27.5/27.4	27.4	3.4/2.8	3.1	0.8/1.0	0.9	5.7/6.0	5.9	80/81 A
HFC-134	13.1	13.5	13.4		67.4/66.9	67.2	4.2/5.0	4.6	1.1/1.9	1.5	7.9/8.5	8.2	81/82 A
AB	0.4	-	0.3/0.5	0.4	1.2/0.9	1.0			0.7/-0.2	0.3	0.9/0.7	0.8	79/80 A
MO	0.1	-	1.0/0.5	0.8	3.8/3.1	3.5			0.9/0.3	0.6	3.9/3.2	3.6	80/81 A
PEMA	0.1	-	2.2/2.7	2.5	8.2/9.2	8.7			2.3/3.0	2.7	8.0/9.1	8.6	78/79 A
PEBA	0.5	-	2.8/2.1	2.5	7.3/7.0	7.2			2.5/2.4	2.5	7.5/7.1	7.3	78/79 A
PPGD	0.5	-	1.0/1.1	1.1	4.2/4.2	4.2			1.4/1.0	1.2	4.3/4.3	4.3	78/79 A
PPGBM	-0.6	-	-1.0/-0.4	-0.7	-0.7/-0.5	-0.6			-0.1/0.2	0.1	-0.7/-0.6	-0.7	80/81 A
MPG	-0.4	-	-1.1/-0.2	-0.7	-1.7/-1.9	-1.8			-0.7/-0.3	-0.5	-1.7/-1.9	-1.8	82/83 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 27		
	Fluorinated rubber	100.00
	Magnesium Oxide	15.00
	N,N'-dicinnamylidene-1,6-hexanediamine	3.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	34.2	34.2	33.2		84.4/81.5	83.0	3.4/3.5	3.5	0.6/0.2	0.4	2.5/2.2	2.3	58/59 A
HFC-32*	23.6	23.2	23.2		46.4/36.4	41.4	1.6/1.4	1.5	-0.1/0.3	0.1	0.2/0.2	0.2	65/66 A
HCFC-124	27.9	29.6	28.9		91.0/88.0	89.5	7.5/6.9	7.2	2.8/1.9	2.4	9.5/10.0	9.8	57/58
HFC-134a	25.8	26.1	25.6		68.2/67.3	67.8	6.9/6.0	6.5	2.9/1.9	2.4	7.1/6.3	6.7	57/58 A
HFC-125	11.0	11.8	11.7		31.5/31.2	31.4	5.8/5.7	5.8	3.0/2.4	2.7	8.5/9.0	8.8	54/55 A
HFC-143a*	17.1	14.3	13.6		28.6/28.0	28.3	5.2/5.8	5.5	1.9/2.3	2.1	6.5/5.9	6.2	56/57 A
HFC-152a	39.0	39.4	39.1		83.8/79.3	81.6	6.2/4.9	5.6	1.8/1.8	1.8	2.4/1.7	2.1	59/60 A
HCFC-123	34.8	31.8	31.6		105/103	104	11.0/12.7	11.9	4.3/3.7	4.0	13.1/14.2	13.7	56/57 A
HCFC-142b	32.6	32.6	31.8		82.4/77.9	80.1	6.9/6.0	6.4	2.7/2.2	2.4	7.4/6.7	7.0	52/53 A
HFC-134	36.6	37.9	37.8		122/114	118	6.7/4.7	5.7	2.8/1.4	2.1	5.1/4.4	4.7	61/62 A
AB	0.7	-	0.1/0.1	0.1	0.4/0.5	0.5			0.1/-0.7	-0.3	0.2/0.2	0.2	63/64 A
MO	-1.1	-	-1.4/0.2	-0.6	0.6/0.5	0.6			-0.4/-0.9	-0.7	0.2/0.2	0.2	61/62 A
PEMA	1.3	-	3.3/3.2	3.3	6.6/6.0	6.3			2.8/2.6	2.7	6.5/5.8	6.2	57/58 A
PEBA	2.2	-	8.1/8.9	8.5	16.5/16.7	16.6			6.7/7.5	7.1	16.7/16.9	16.8	50/51 A
PPGD	1.0	-	0.8/1.2	1.0	1.4/1.7	1.6			0.2/0.3	0.3	1.4/1.6	1.5	62/63 A
PPGBM	-0.2	-	0/0.3	0.2	0.7/0.9	0.8			-0.4/0	-0.2	0.2/0.4	0.3	64/65 A
MPG	0.1	-	0.1		0.7				-0.3		0.4		61/62 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 28		
	Fluoroelastomer	100.00
	Magnesium oxide	15.00
	N,N'-dicinnamylidene-1,6-hazanediamine	3.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	37.2	36.4	35.6		99.6/94.0	96.8	2.8/4.2	3.5	0.1/1.2	0.7	-0.3/-0.9	-0.6	57/58 A
HFC-32*	22.3	22.1	22.2		40.8/40.9	40.9	13.3/1.9	7.6	9.1/1.6	5.4	-0.1/0.2	0.1	62/63 A
HCFC-124	38.6	38.4	37.8		125/120	123	7.3/6.6	7.0	2.7/2.6	2.7	7.7/8.0	7.9	58/59 A
HFC-134a	29.2	29.9	29.4		84.1/81.5	82.8	5.2/5.1	5.2	2.4/2.0	2.2	4.0/3.8	3.9	57/58 A
HFC-125*	15.1	15.2	15.2		42.0/41.6	41.8	10.7/12.1	11.4	3.8/3.6	3.7	4.8/4.9	4.9	53/54 A
HFC-143a*	16.9	16.6	17.1		26.5/26.2	26.4	7.6/6.6	7.1	3.1/4.5	3.8	3.6/2.7	3.2	53/54 A
HFC-152a*	41.0	40.7	40.1		92.9/82.8	87.9	2.8/4.4	3.6	0.9/1.1	1.0	-1.0/-0.1	-0.5	61/62 A
HCFC-123	37.5	37.9	37.4		133/134	133	12.3/12.4	12.4	3.5/3.9	3.7	10.9/10.7	10.9	60/61 A
HCFC-142b	38.6	39.3	38.7		102/96.6	99.1	6.2/7.2	6.7	2.3/2.3	2.3	5.0/5.3	5.2	57/58 A
HFC-134	38.2	38.5	37.7		119/112	115	5.4/4.9	5.2	1.6/1.6	1.6	3.4/2.1	2.7	59/60 A
AB	0.5	-	0.3/0.1	0.2	0.5/0.3	0.4			-0.2/-0.5	-0.4	0.2/0.2	0.2	61/62 A
MO	-0.5	-	0.2/0	0.1	0.5/0.4	0.5			-0.1/-0.9	-0.5	0.2/0.1	0.2	63/64 A
PEMA	0.5	-	1.0/0.9	1.0	2.3/2.2	2.3			0.3/0.8	0.6	2.0/1.8	1.9	61/62 A
PEBA	0.8	-	2.1/1.9	2.0	3.5/4.0	3.7			1.4/1.7	1.5	3.6/4.0	3.8	59/60 A
PPGD	-0.5	-	1.3/0.6	1.0	1.1/1.2	1.2			0.7/0.2	0.5	1.0/1.0	1.0	62/63 A
PPGBM	-0.1	-	0/-1.0	-0.5	1.0/1.1	1.1			-1.0/-0.8	-0.9	0.2/0.2	0.2	63/64 A
MPG	-0.7	-	-0.6/0.9	0.2	0.7/0.6	0.7			-0.4/0.5	0.1	0.3/0.3	0.3	65/66 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 29		
	Fluoroelastomer	100.00
	Litharge (Sublimed)	3.00
	Triallyl Isocyanurate	3.00
	2,5-Dinethyl-2,5-bis (t-butylperoxy) hexane	3.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	36.2	35.2	35.5		91.2/83.8	87.5	3.3/3.9	3.6	0.3/0.2	0.3	1.5/1.8	1.7	
HFC-32*	19.5	19.6	19.6		35.8/32.5	34.1	2.4/2.8	2.6	0.5/0.3	0.4	0.5/0.5	0.5	55/56 A
HCFC-124	39.8	40.4	39.9		126/120	123	6.4/6.9	6.7	3.0/3.3	3.2	8.2/8.7	8.5	
HFC-134a	30.4	30.4	30.2		79.0/77.0	78.0	6.4/6.8	6.6	2.5/2.5	2.5	6.5/7.1	6.8	
HFC-125*	19.8	19.7	19.6		49.9/48.7	49.3	4.3/4.6	4.5	2.3/2.7	2.5	6.0/6.2	6.1	
HFC-143a	20.7	20.7	20.8		38.4/37.8	38.1	3.1/3.2	3.2	1.5/1.1	1.3	3.8/4.0	3.9	
HFC-152a	34.8	34.9	34.4		62.7/58.9	60.8	7.3/7.2	7.3	2.1/1.7	1.9	2.4/2.4	2.4	56/57 A
HCFC-123	35.7	37.0	37.8		121/121	121	13.1/13.1	13.1	4.9/5.2	5.1	12.6/12.6	12.6	56/57 A
HCFC-142b	37.9	38.0	37.6		95.2/91.1	93.2	14.7/14.6	14.7	2.6/3.1	2.9	6.4/6.8	6.6	
HFC-134	32.4	32.3	32.3		87.0/84.9	85.0	7.3/7.9	7.6	2.4/2.9	2.7	6.2/6.6	6.4	54/55 A
AB	0.8	-	0.2/-0.1	0.1	0.2/0.1	0.2			-0.4/-0.2	-0.3	0.1/0.1	0.1	56/57 A
MO	-0.6	-	-0.2/0.8	0.3	0.2/0.2	0.2			-0.2/1.1	0.5	0.1/0.1	0.1	59/60 A
PEMA	1.0	-	0.7/0.7	0.7	1.0/1.1	1.1			0.3/0.1	0.2	1.0/1.1	1.1	59/60 A
PEBA	0.8	-	1.3/0.9	1.1	1.6/1.7	1.6			0.5/1.2	0.8	1.4/1.4	1.4	57/58 A
PPGD	1.0	-	0.5/1.0	0.7	0.8/0.7	0.8			-0.1/-0.3	-0.2	0.8/0.7	0.8	58/59 A
PPGBM	0.5	-	0.2/-0.1	0.1	0.4/0.3	0.3			-0.1/-0.3	-0.2	0.2/0.2	0.2	58/59 A
MPG	0.1	-	-0.3/0.1	-0.1	0.2/0.2	0.2			-0.1/-0.4	-0.3	0.2/0.1	0.2	60/61 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 30		
	Fluoroelastomer	100.00
	Litharge (Sublimed)	3.00
	Triallyl Isocyanurate	3.00
	2,5-Dimethyl-2,5-bis (t-butyl-peroxy) hexane	3.00
	N330 Carbon Black	30.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	22.0	22.2	22.5		57.8/56.4	57.1	5.1/5.2	5.2	1.7/1.5	1.6	2.8/3.1	3.0	
HFC-32	13.6	12.7	13.7		27.0/25.6	26.3	3.0/3.8	3.4	0.3/1.6	1.0	2.0/1.8	1.9	83/84 A
HCFC-124	24.1	23.4	24.0		73.7/68.4	71.1	5.0/5.6	5.3	2.6/3.1	2.9	7.1/7.4	7.3	
HFC-134a	19.2	18.8	18.2		50.0/47.2	48.6	5.2/4.4	4.8	1.3/1.6	1.5	5.8/5.3	5.6	
HFC-125*	13.4	13.5	13.3		36.5/35.8	36.2	5.3/6.2	5.8	3.6/3.4	3.5	7.4/7.9	7.7	
HFC-143a	13.8	14.2	14.0		27.9/26.9	27.4	3.8/4.3	4.1	1.9/2.8	2.4	4.6/4.6	4.6	60/61 A
HFC-152a	21.5	21.9	21.5		41.8/40.2	41.0	5.9/6.3	6.1	1.6/2.2	1.9	2.3/2.2	2.3	86/87 A
HCFC-123	22.6	22.9	24.3		70.7/58.5	64.6	8.7/10.6	9.7	4.6/4.0	4.3	10.8/11.1	11.0	82/83 A
HCFC-142b	23.2	23.6	23.0		56.2/52.5	54.4	10.2/13.7	12.0	3.5/4.4	4.0	5.5/7.7	6.6	
HFC-134	19.9	19.1	21.1		54.0/53.0	53.5	4.9/5.6	5.3	2.4/2.5	2.5	5.0/5.0	5.0	78/79 A
AB	0.3	-	0.1/0.1	0.1	0.2/0.3	0.3			-0.1/0.5	0.2	0.1/0.2	0.2	90/91 A
MO	-0.1	-	0.5/0.3	0.4	0.3/0.3	0.3			0.1/0.1	0.1	0.2/0.2	0.2	89/90 A
PEMA	0.4	-	1.0/0.4	0.7	1.0/1.0	1.0			1.0/0.8	0.9	0.9/0.9	0.9	88/89 A
PEBA	0.3	-	1.0/0.5	0.8	1.5/1.6	1.6			0.1/1.0	0.6	1.2/1.3	1.3	88/89 A
PPGD	-0.1	-	0.4/0.5	0.5	0.9/0.9	0.9			1.5/-0.3	0.6	0.9/0.9	0.9	89/90 A
PPGBM	0.2	-	0.3/0.2	0.2	0.4/0.4	0.4			0.1/-0.1	0.0	0.3/0.3	0.3	89/90 A
MPG	0.1	-	0.3/0.4	0.3	0.2/0.2	0.2			-0.2/-0.3	-0.3	0.2/0.2	0.2	88/89 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 31		
	Fluoroelastomer	100.00
	Litharge (Sublimed)	1.80
	Triallyl Isocyanurate	1.80
	2,5-Dinethyl-2,5-bis(t-butyl-peroxy) hexane	1.80

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	25.8	25.6	25.9		71.6/69.1	70.4			1.4/2.7	2.1	7.0/7.1	7.1	58/59 A
HFC-32*	17.4	17.5	16.7		34.2/34.0	34.1	3.4/3.1	3.3	1.0/0.4	0.7	2.8/3.0	2.9	60/61 A
HCFC-124	20.8	21.1	21.5		64.0/63.5	63.8	9.2/10.6	9.9	4.4/5.1	4.8	15.3/15.0	15.2	60/61 A
HFC-134a	15.7	15.6	16.2		43.2/42.2	42.7	4.5/4.8	4.7	2.9/2.2	2.6	8.1/7.7	7.9	
HFC-125	5.8	7.6	8.6		22.0/22.0	22.0	7.4/5.5	6.5	5.5/4.3	4.9	14.2/12.0	13.1	60/61 A
HFC-143a	9.9	10.0	10.2		22.7/22.4	22.6			2.8/3.6	3.2	9.0/8.8	8.9	
HFC-152a	27.9	27.2	27.0		59.3/57.0	58.2	7.6/7.5	7.6	3.0/2.3	2.7	6.3/6.4	6.4	59/60 A
HCFC-123	27.8	27.3	29.1		106/108	107	15.6/14.9	15.2	5.2/6.6	5.9	20.9/19.1	20.0	58/59 A
HCFC-142b	26.3	25.9	25.1		67.1/66.9	67.0			2.3/4.8	3.4	11.4/11.3	11.4	59/60 A
HFC-134	22.7	22.8	22.3		67.0/66.1	66.6	9.0/8.0	8.5	3.7/4.1	3.9	11.4/11.3	11.4	58/59 A
AB	-2.6	-	-0.1/0.4	0.2	0.3/0.3	0.3			-1.4/-0.5	-1.0	0.5/0.5	0.5	59/60 A
MO	-0.1	-	0.6/0.3	0.5	0.4/0.3	0.4			-0.3/0.1	-0.1	0.2/0.1	0.2	59/60 A
PEMA	10.8	-	31.5/31.5	31.5	77.3/77.4	77.4			30.0/30.6	30.3	77.3/77.3	77.3	57/58 A
PEBA	14.6	-	35.6/28.7	32.2	85.9/66.8	76.4			33.2/26.5	29.9	86.2/66.9	76.6	49/50 A
PPGD	1.5	-	4.5/4.9	4.7	9.8/8.6	9.2			4.0/4.4	4.2	9.7/8.5	9.1	59/60 A
PPGBM	0.1	-	0.4/0.1	0.3	1.0/1.1	1.1			0.4/2.7	1.6	0.9/0.9	0.9	59/60 A
MPG	0.1	-	0.5/0.4	0.5	1.0/0.8	0.9			-0.3/0.1	-0.2	0.8/0.8	0.8	61/62 A

* Indicates that material shows some forms of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 32			Lubricant Legend Information	
	Fluoroelastomer	100.00		PEMA - Pentaerythritol Ester Mixed Acid
	Magnesium oxide	15.00		PEBA - Pentaerythritol Ester Branched Acid
	N,N'-dicinnamylidene-1,6-hexanediamine	3.00		PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	24.8	24.9	23.5		87.0/81.0	84.0	5.5/6.4	6.0	1.9/4.6	3.3	2.8/3.6	3.2	56/57 A
HFC-32*	13.5	12.8	13.1		32.5/32.5	32.5	10.3/9.0	9.7	4.6/5.1	4.9	2.9/2.5	2.7	66/67 A
HCFC-124	19.3	20.1	19.7		81.0/78.0	79.5	7.0/6.7	6.9	3.0/3.2	3.1	12.5/12.9	12.7	60/61 A
HFC-134a*	12.6	13.2	13.0		45.0/44.5	44.8	6.4/7.0	6.7	2.4/3.4	2.9	9.8/9.5	9.7	65/66 A
HFC-125*	5.2	6.0	6.5		22.3/22.7	22.5	13.0/19.4	16.2	7.0/8.9	8.0	7.5/8.1	7.8	53/54 A
HFC-143a*	7.6	7.5	8.1		22.2/22.0	22.1	13.4/6.7	10.1	7.2/3.2	5.2	5.0/7.0	6.0	53/54 A
HFC-152a	26.1	26.8	25.4		70.0/66.5	68.3	4.3/6.0	5.2	1.8/2.1	1.9	2.7/2.5	2.6	57/58 A
HCFC-123	34.1	36.8	36.0		169/166	168	11.3/11.8	11.6	4.5/4.7	4.6	10.6/11.2	10.9	64/65 A
HCFC-142b	29.3	27.3	28.9		91.1/80.2	85.6	6.2/6.2	6.2	3.3/3.5	3.4	7.0/7.8	7.4	58/59 A
HFC-134	19.8	19.7	20.0		69.4/72.6	71.0	11.3/9.4	10.3	5.5/4.6	5.0	11.8/10.3	11.1	65/66 A
AB	0.5	-	0.7/0	0.4	1.5/1.3	1.4			-0.1/-0.9	-0.5	1.1/0.9	1.0	74/75 A
MO	0.5	-	1.5/0.4	0.9	2.1/1.6	1.9			1.3/0.8	1.1	1.4/1.4	1.4	65/66 A
PEMA	9.9	-	50.2/43.9	47.1	197/167	182			51.6/44.6	48.1	197/168	183	26/27 A
PEBA	8.9	-	48.8/45.7	47.3	171/143	157			52.1/41.8	47.0	171/144	157	28/29 A
PPGD	1.3	-	3.5/3.1	3.3	9.5/9.0	9.3			3.0/4.0	3.5	9.9/9.3	9.6	65/66 A
PPGBM	1.0	-	0.9/0.7	0.8	3.0/3.3	3.2			0.2/0.4	0.3	2.1/2.2	2.2	71/72 A
MPG	-0.1	-	0.8/0.8	0.8	2.5/3.2	2.9			-0.5/0.4	-0.1	1.9/2.0	2.0	74/75 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 33		
	Fluoroelastomer	100.00
	Magnesium oxide	15.00
	N,N'-dicinnamylidene-1,6-hexanediamine	3.00
	IRB6 (Carbon Black)	30.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.0	7.0	6.5		22.8/20.8	21.8	2.7/2.7	2.7	1.7/1.0	1.4	5.0/6.6	5.8	67/68 D
HFC-32	6.5	6.9	6.5		18.7/17.3	18.0	1.8/3.0	2.4	0/1.8	0.9	2.6/2.6	2.6	95/96A 55/56D
HCFC-124	4.5	5.3	5.0		24.1/29.2	26.7	3.5/4.2	3.9	2.3/3.0	2.7	9.3/10.0	9.7	65/66 D
HFC-134a	3.4	4.6	4.1		18.2/17.3	17.8	3.6/1.2	2.4	2.0/1.7	1.9	7.9/7.7	7.8	66/67 D
HFC-125	2.7	4.0	4.8		14.7/13.2	14.0	3.2/2.8	3.0	2.3/0.8	1.6	8.5/8.5	8.5	62/63 D
HFC-143a	4.5	3.3	3.0		12.8/11.9	12.4	2.6/3.7	3.2	1.9/2.4	2.2	6.6/6.9	6.8	65/66 D
HFC-152a	4.9	6.1	6.2		16.7/16.6	16.7	2.7/1.9	2.3	1.3/1.6	1.5	5.2/3.8	4.5	69/70 D
HCFC-123	2.4	5.8	6.5		23.6/28.8	26.2	4.7/3.8	4.3	2.8/1.4	2.1	13.3/10.8	12.1	67/68 D
HCFC-142b	5.5	6.8	5.7		21.3/18.0	19.7	3.5/3.4	3.5	2.3/2.0	2.1	6.7/8.7	7.7	65/66 D
HFC-134	7.2	8.3	7.4		29.8/26.1	28.0	4.7/4.6	4.7	1.7/2.5	2.1	6.4/7.3	6.9	52/53 D
AB	0.4	-	0.2/0.2	0.2	0.9/1.0	1.0			0.5/0.6	0.6	0.7/0.8	0.8	70/71 D
MO	-0.1	-	-0.1/-0.1	-0.1	0.7/0.7	0.7			0.2/0.3	0.3	0.7/0.7	0.7	71/72 D
PEMA	0.8	-	6.7/5.4	6.1	16.8/17.6	17.2			5.5/5.4	5.5	17.2/17.9	17.6	51/52 D
PEBA	2.1	-	6.0/5.9	6.0	20.3/-30.0	-4.9			5.9/5.6	5.8	20.7/17.7	19.2	52/53 D
PPGD	0.4	-	2.1/1.7	1.9	5.5/5.5	5.5			1.8/1.6	1.7	5.9/5.8	5.9	64/65 D
PPGBM	-0.1	-	0.2/1.6	0.9	1.3/1.3	1.3			0.9/1.6	1.3	1.3/1.4	1.4	69/70 D
MPG	0.5	-	1.0/0.8	0.9	1.6/1.5	1.6			0.6/0.6	0.6	1.6/1.5	1.6	67/68 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 34		
	Epichlorohydrin Homopolymer	100.00
	Stearic Acid	1.00
	Nickel Dibutyldithiocarbamate	1.00
	Red Lead	5.00
	Ethylene Thiourea	1.85

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	12.3	12.1	12.3		38.9/38.4	38.7			-0.3/0.2	-0.1	-1.9/-1.7	-1.8	37/38 A
HFC-32*	4.7	4.3	4.2		11.9/11.8	11.9	2.4/2.4	2.4	0.2/-0.2	0	-0.6/-0.5	-0.6	37/38 A
HCFC-124	0.8	1.7	3.4		11.7/11.3	11.5	2.4/2.4	2.4	2.2/2.4	2.3	9.0/9.0	9.0	41/42 A
HFC-134a	0.3	0.9	1.3		4.2/4.3	4.3	0.8/0.7	0.8	0.5/0.4	0.5	2.7/2.8	2.8	
HFC-125	0	0.1	0.1		1.3/1.4	1.4	0.5/0.8	0.7	0.5/0.8	0.7	1.3/1.5	1.4	38/39 A
HFC-143a	0.2	0.4	0.9		2.6/2.7	2.7			1.9/2.0	2.0	1.9/2.0	2.0	40/41 A
HFC-152a	4.3	4.9	4.8		11.9/11.9	11.9	3.6/3.6	3.6	1.3/2.2	1.8	4.6/4.9	4.8	41/42 A
HCFC-123	16.4	17.5	17.1		68.0/68.0	68.0	13.3/12.9	13.1	5.8/5.6	5.7	25.9/23.6	24.8	39/40 A
HCFC-142b	2.3	4.3	5.0		14.4/14.3	14.4			2.9/2.7	2.8	8.9/8.9	8.9	37/38 A
HFC-134	1.3	2.8	3.5		12.7/12.0	12.4	3.1/3.1	3.1	2.3/2.1	2.2	8.6/8.8	8.7	40/41 A
AB	1.6	-	0.2/0.3	0.3	0.5/0.5	0.5			-0.5/-0.2	-0.4	0.9/1.0	1.0	40/41 A
MO	0.6	-	1.2/0.7	1.0	2.6/2.6	2.6			0.4/0.7	0.6	2.3/2.4	2.4	38/39 A
PEMA	13.4	-	26.8/26.8	26.8	73.0/72.7	72.9			25.8/25.8	25.8	72.1/72.1	72.1	31/32 A
PEBA	7.7	-	17.2/17.5	17.4	44.0/44.9	44.5			16.2/15.4	15.8	44.4/45.4	44.9	32/33 A
PPGD	9.0	-	18.2/17.9	18.1	46.4/46.6	46.5			17.2/16.4	16.8	46.2/46.6	46.4	33/34 A
PPGBM	0.4	-	2.0/2.0	2.0	3.9/4.0	4.0			0.7/1.3	1.0	3.8/3.8	3.8	38/39 a
MPG	0.3	-	0.4/0.4	0.4	0.5/0.6	0.6			-0.8/-0.7	-0.8	0.4/0.5	0.5	40/41 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 35	Epichlorohydrin Homopolymer	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Stearic Acid	1.00		PEBA - Pentaerythritol Ester Branched Acid
	Nickel Dibutyldithiocarbamate	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Red Lead	5.00		MO - Mineral Oil
	Ethylene Thiourea	1.85		MPG - Modified Polyglycol
	N330 Carbon Black	40.00		PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	8.7	8.7	5.6		28.8/28.1	28.5			1.9/1.9	1.9	4.8/5.1	5.0	66/67 A
HFC-32	3.7	3.4	3.3		8.5/8.3	8.4	2.2/2.7	2.5	0.6/1.1	0.9	1.8/2.3	2.1	70/71 A
HCFC-124	0.5	1.0	1.8		7.4/7.7	7.6	0.5/1.0	0.8	1.3/1.2	1.3	6.1/6.3	6.2	70/71 A
HFC-134a	0.2	0.3	1.0		2.7/3.0	2.9	1.1/0.7	0.9	0.8/0.6	0.7	1.9/2.1	2.0	
HFC-125	0	0.1	0.1		0.9/0.9	0.9	1.0/0.2	0.6	0.2/0.3	0.3	0.9/0.9	0.9	71/72 A
HFC-143a	0.2	0.4	0.6		1.6/1.8	1.7			0.7/0.8	0.8	1.3/1.5	1.4	71/72 A
HFC-152a	2.0	3.5	3.5		8.5/8.4	8.5	3.1/2.8	3.0	2.0/1.5	1.8	3.9/3.7	3.8	70/71 A
HCFC-123	10.4	12.0	11.8		45.7/45.8	45.8	9.0/8.7	8.8	4.2/5.0	4.6	18.9/20.5	19.7	66/67 A
HCFC-142b	1.1	2.8	2.9		10.3/10.5	10.4			2.0/2.5	2.3	6.8/6.9	6.9	69/70 A
HFC-134	0.4	1.5	2.8		8.7/8.8	8.8	1.4/1.6	1.5	1.4/1.0	1.2	6.5/6.3	6.4	70/71 A
AB	-0.1	-	0.3/0.4	0.4	0.4/0.4	0.4			-0.1/0.2	0.1	0.8/0.8	0.8	74/75 A
MO	0.4	-	1.1/1.0	1.1	2.0/1.9	2.0			1.1/0.9	1.0	1.7/1.7	1.7	73/74 A
PEMA	5.8	-	15.6/15.1	15.4	39.7/40.2	40.0			15.0/14.3	14.7	39.6/40.2	39.9	59/60 A
PEBA	3.8	-	10.7/10.6	10.7	26.6/26.6	26.6			9.6/9.9	9.8	27.2/27.1	27.1	61/62 A
PPGD	4.1	-	10.5/10.5	10.5	26.2/27.0	26.6			9.9/10.0	10.0	26.4/27.2	26.8	62/63 A
PPGBM	0.4	-	1.4/1.4	1.4	2.8/2.6	2.7			1.1/1.5	1.3	2.8/2.6	2.7	71/72 A
MPG	0.2	-	0.2/0.2	0.2	0.5/0.5	0.5			0.1/-0.6	-0.3	0.4/0.4	0.4	74/75 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 36		
	Epichlorohydrin Copolymer	100.00
	Stearic Acid	1.00
	Nickel Dibutyldithicarbamate	1.00
	Red Lead	5.00
	Ethylene Thiourea	1.85

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	36.3	36.5	36.0		133/120	126			-2.1/-2.2	-2.2	-5.6/-5.6	-5.6	43/44 A
HFC-32*	6.9	6.4	6.3		20.7/20.4	20.6	1.5/1.0	1.3	0.3/0.4	0.4	-1.3/-1.1	-1.2	44/45 A
HCFC-124	22.7	22.3	22.0		83.2/82.2	82.7	7.0/7.8	7.4	-1.8/-0.1	-1.0	2.9/3.7	3.3	43/44 A
HFC-134a	3.8	3.6	3.7		12.1/12.1	12.1	0.8/1.6	1.2	-0.5/-0.1	-0.3	-0.9/-0.5	-0.7	
HFC-125*	2.2	3.0	3.1		10.6/10.6	10.6	15.9/17.8	16.8	1.0/0.3	1.2	3.0/2.6	2.8	38/39 A
HFC-143a	1.2	1.6	1.6		4.8/4.8	4.8			0/-0.1	-0.1	1.0/1.2	1.1	42/43 A
HFC-152a	4.8	4.8	5.0		16.3/16.0	16.2	2.4/1.7	2.1	-0.6/-2.0	-1.3	-0.8/-0.6	-0.7	45/46 A
HCFC-123	67.3	67.2	68.0		418/418	418	14.9/16.8	15.9	0.3/0.3	0.3	5.7/7.2	6.4	44/45 A
HCFC-142b	6.8	6.6	5.8		20.8/20.6	20.7			0.1/0.1	0.1	1.9/2.0	2.0	46/47 A
HFC-134	13.4	13.3	12.7		51.4/50.1	50.8	4.6/4.1	4.4	-0.8/-1.6	-1.2	1.9/2.4	2.2	46/47 A
AB	0.2	-	0.5/0.1	0.3	0.4/0.4	0.4			-0.1/-0.2	-0.1	1.3/1.3	1.3	41/42 A
MO	0.6	-	1.0/0.9	1.0	2.3/2.3	2.3			0.8/-0.1	-0.4	2.5/2.4	2.5	43/44 A
PEMA	6.6	-	6.7/7.0	6.9	17.2/17.6	17.4			5.9/4.8	5.4	16.8/17.4	17.1	38/39 A
PEBA	3.6	-	4.7/5.0	4.9	12.4/12.5	12.4			3.9/3.6	3.8	13.1/13.3	13.2	37/38 A
PPGD	10.4	-	12.4/12.5	12.5	33.1/33.7	33.4			10.4/10.6	10.5	33.7/33.7	33.7	34/35 A
PPGBM	0.8	-	0.9/1.0	1.0	1.4/1.6	1.5			-0.3/0.1	-0.1	1.6/1.8	1.7	41/42 A
MPG	-0.1	-	-0.3/-0.3	-0.3	-0.7/-0.7	-0.7			-0.8/-1.6	-1.2	-0.3/-0.2	-0.3	42/43 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 37		
	Epichlorohydrin Copolymer	100.00
	Stearic Acid	1.00
	Nickel Dibutyldithiocarbamate	1.00
	Red Lead	5.00
	Ethylene Thiourea	1.85
	N330 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	25.6	26.1	23.8		89.6/83.8	86.7			-0.9/-0.7	-0.8	-1.5/-2.0	-1.8	67/68 A
HFC-32	5.5	5.7	5.4		14.7/14.6	14.7	1.2/1.2	1.2	-0.6/0.1	-0.3	-0.6/-0.3	-0.5	69/70 A
HCFC-124	16.4	15.9	15.6		55/52.4	53.7	5.6/5.5	5.6	-0.0/0.6	0.3	3.5/2.8	3.2	68/69 A
HFC-134a	2.7	2.5	2.7		8.8/8.3	8.6	1.8/1.6	1.7	0.2/0.4	0.3	-0.04/0.1	-0.07	
HFC-125	1.5	2.1	2.4		7.3/7.3	7.3	1.8/2.2	2.0	0.9/0.9	0.9	3.4/3.3	3.4	67/68 A
HFC-143a	.8	1.1	1.2		3.4/4.3	3.9			0.7/0.2	0.5	1.1/1.4	1.3	67/68 A
HFC-152a	5.3	5.2	2.0		11.6/11.5	11.6	1.5/1.1	1.3	-0.9/-0.3	-0.6	0.1/-0.1	0	71/72 A
HCFC-123	43.1	44.6	43.2		209/213	211	11.8/11.2	11.5	0.3/1.1	0.7	5.7/6.5	6.1	67/68 A
HCFC-142b	5.0	5.3	4.8		14.9/15.0	15.0			0.3/0.5	0.4	1.6/2.1	1.9	69/70 A
HFC-134	9.8	9.2	9.0		35.2/34.5	34.9	4.0/4.7	4.4	-0.8/0.5	-0.2	2.4/3.4	2.9	69/70 A
AB	-0.2		0.1/0.2	0.1	0.2/0.2	0.2			-0.2/0.3	0.1	0.9/0.9	0.9	69/70 A
MO	0.5		0.5/0.9	0.7	1.9/1.9	1.9			0.9/0.6	0.8	1.9/2.0	2.0	68/69 A
PEMA	3.9		5.1/5.0	5.1	11.5/11.7	11.6			3.4/3.9	3.7	11.6/11.4	11.5	63/64 A
PEBA	2.1		3.8/3.7	3.8	8.5/8.7	8.6			2.7/3.7	3.2	9.1/9.2	9.2	64/65 A
PPGD	6.5		8.5/8.2	8.4	20.8/21.0	20.9			7.2/6.8	7.0	20.7/26.6		60/61 A
PGBM	0.2		0.7/0.5	0.6	1.1/1.5	1.3			0.2/-0.4	-0.1	1.3/1.5	1.4	69/70 A
MPG	-0.4		-0.2/-0.1	-0.2	-0.2/-0.2	-0.2			-0.5/-0.4	-0.5	0.1/0.1	0.1	70/71 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 38		
	Epichlorohydrin Terpolymer	100.00
	Stearic Acid	1.00
	Nickel Dibutyldithiocarbamate	1.00
	Red Lead	5.00
	Ethylene Thiourea	1.86

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	39.8	39.0	38.4		154/145	149			-2.3/-2.5	-2.4	-4.8/-4.5	-4.7	41/42 A
HFC-32*	7.5	7.4	7.3		21.7/21.0	21.4	0.5/0.4	0.5	0/0.1	0.1	-1.1/-1.0	-1.1	44/45 A
HCFC-124	26.2	26.1	25.6		97.0/95.0	96.0	7.5/8.3	7.9	-1.3/-0.1	-0.7	2.6/3.1	2.9	44/45 A
HFC-134a	4.3	3.4	4.5		14.4/14.5	14.5	1.0/0.9	1.0	-1.2/-1.0	-1.1	-0.8/-0.5	-0.7	
HFC-125*	2.8	3.2	3.4		12.2/12.0	12.1	18.0/15.9	17.0	0.1/1.2	0.7	1.7/2.0	1.9	37/38 A
HFC-143a	1.7	1.7	1.5		4.8/1.7	4.8			-0.3/-0.6	-0.5	0.8/0.6	0.7	43/44 A
HFC-152a	6.9	6.7	6.8		18.0/17.9	18.0	3.0/2.3	2.7	-0.9/-1.0	-1.0	-0.8/-0.5	-0.7	46/47 A
HCFC-123	69.4	69.5	70.5		447/449	448	15.2/21.1	18.2	0.4/1.7	1.1	6.3/11.4	8.9	44/45 A
HCFC-142b	8.0	7.4	7.4		22.5/22.3	22.4			-0.3/0.4	0.1	1.3/1.4	1.4	46/47 A
HFC-134	14.9	15.0	14.3		56.4/56.3	56.4	5.8/4.3	5.1	0.2/-1.3	-0.6	2.4/1.9	2.2	48/49 A
AB	0.2	-	-1.5/0.3	-0.9	0.8/0.7	0.8			-0.5/0.1	-0.2	1.6/1.6	1.6	42/43 A
MO	0.1	-	0.8/0.9	0.9	2.6/2.7	2.7			-0.2/0.3	0.1	2.8/2.8	2.8	42/43 A
PEMA	5.4	-	8.1/7.6	7.9	18.9/19.0	19.0			5.8/6.2	6.0	18.7/18.4	18.6	39/40 A
PEBA	4.0	-	5.1/6.4	5.8	13.3/13.5	13.4			4.3/4.8	4.5	14.0/41.2	14.1	40/41 A
PPGD	10.9	-	13.9/13.5	13.7	37.0/37.1	37.1			12.7/11.5	12.1	36.2/36.5	36.4	36/37 A
PPGBM	0.2	-	1.3/1.1	1.2	2.7/2.9	2.8			0.4/-0.1	0.2	3.1/3.0	3.1	43/44 A
MPG	0.1	-	-0.1/-0.2	-0.1	0.2/0.3	0.3			-0.8/-0.9	-0.9	0.5/0.7	0.6	43/44 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation

Formula # 39		
	Epichlorohydrin Terpolymer	100.00
	Stearic Acid	1.00
	Nickel dibutyldithiocarbamate	1.00
	Red Lead	5.00
	Ethylene Thiourea	1.85
	IRB6	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	26.7	26.8	26.3		103/95.9	99.2			-1.6/-1.0	-1.3	-3.2/-1.9	-2.6	69/70 A
HFC-32	5.1	5.5	5.4		15.4/15.2	15.3	0.6/1.2	0.9	-0.7/-0.7	-0.7	-0.7/-0.5	-0.6	70/71 A
HCFC-124	17.6	17.7	17.4		70.4/68.9	69.7	5.8/5.9	5.9	0.1/0.4	0.3	0.1/0.4	0.3	69/70 A
HFC-134a	3.0	3.0	3.1		10.2/10.3	10.3	1.5/1.6	1.6	0.2/-0.2	0	-0.3/-0.3	-0.3	
HFC-125	1.9	2.5	3.0		9.0/8.6	8.8	1.5/1.6	1.6	0.7/0.7	0.7	3.4/3.1	3.3	68/69 A
HFC-143a	0.7	0.8	1.3		3.6/3.5	3.6	1.2/-0.1	0.6	-0.2/-0.7	-0.5	0.6/0.6	0.6	70/71 A
HFC-152a	5.1	4.7	4.8		12.6/12.6	12.6	2.4/2.6	2.5	-0.4/-0.6	-0.5	-0.4/-0.4	-0.4	69\70 A
HCFC-123	42.3	43.2	41.8		228/227	227	10.9/10.1	10.5	0.5/0.5	0.5	5.9/5.2	5.5	68/69 A
HCFC-142b	5.5	5.5	5.1		16.4/16.1	16.3			0.4/0.2	0.3	1.6/1.6	1.6	69/70 A
HFC-134	9.8	10.0	10.3		39.3/38.8	39.1	2.9/4.0	3.5	-1.4/-1.0	-1.2	1.6/2.0	1.8	69/70 A
AB	0.2	-	-2.0/0.3	-0.9	0.2/0.3	0.3			0.5/0.5	0.5	1.0/1.1	1.1	69/70 A
MO	1.3	-	-1.1/1.0	-1.1	2.1/2.0	2.1			0.2/0.7	0.5	2.1/2.2	2.2	68/69 A
PEMA	4.0	-	5.2/5.2	5.2	12.9/13.0	13.0			4.6/4.0	4.3	12.9/13.0	13.0	63/64 A
PEBA	1.8	-	3.7/3.8	3.8	9.3/9.2	9.2			2.8/3.1	3.0	9.9/9.9	9.9	63/64 A
PPGD	7.8	-	8.7/8.6	8.7	22.7/22.9	22.8			6.3/7.5	6.9	22.6/16.9	19.8	59/60 A
PPGBM	-0.2	-	1.3/1.2	1.3	1.9/2.3	2.1			1.1/6.5	3.8	2.1/2.4	2.3	69/70 A
MPG	0.8	-	0.8/0.2	0.5	0.3/0.3	0.3			0.5/0.1	0.3	0.6/0.7	0.7	70/71 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 40	Silicone elastomer	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Peroxide	1.50		PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	64.0	64.4	64.3		395/332	364	-0.8/-1.0	-0.9	-2.0/-1.0	-1.5	-3.0/-3.4	-3.2	32/33 A
HFC-32*	6.9	8.0	6.9		12.5/5.0	8.8	-0.5/-0.4	-0.5	-0.4/-1.5	-1.0	-2.1/1.8	-0.2	31/32 A
HCFC-124	53.9	54.1	52.8		338/315	326	-1.6/-2.0	-1.8	-1.6/-2.3	-2.0	-4.4/-3.9	-4.2	29/30 A
HFC-134a	6.5	6.2	5.9		26.6/25.3	26.0	-1.5/-1.1	-1.3	-1.1/-1.4	-1.3	-2.7/-2.6	-2.7	31/32 A
HFC-125*	8.4	8.5	8.4		34.3/33.5	33.9	0.8/1.4	1.1	0.6/0.4	0.5	2.4/3.0	2.7	25/26 A
HFC-143a	11.2	11.5	11.0		25.5/21.3	23.4	-0.5/-1.3	-0.9	-0.6/-1.1	-0.9	-3.5/-2.6	-3.1	31/32 A
HFC-152a	21.3	21.0	19.4		53.6/50.2	51.9	-1.1/-2.0	-1.6	-1.2/-2.3	-1.8	-4.1/-4.2	-4.2	29/30 A
HCFC-123*	74.6	74.2	73.5		639/635	637	-2.3/-1.7	-2.0	-1.8/-1.7	-1.8	-4.9/-4.7	-4.8	29/30 A
HCFC-142b	66.8	67.1	66.2		363/318	341	-1.5/-1.6	-1.6	-1.7/-2.0	-1.9	-4.4/-3.9	-4.1	30/31 A
HFC-134	7.8	6.3	6.7		22.8/21.8	22.3	-1.3/2.2	0.5	-0.3/0.8	0.3	-2.3/-2.1	-2.2	31\32 A
AB	14.8	-	14.4/18.4	16.4	58.4/58.9	58.7			10.2/14.5	12.4	45.8/44.3	45.1	22/23 A
MO	10.1	-	9.2/10.1	9.6	26.9/26.2	26.6			6.6/6.9	6.8	18.7/18.3	18.5	26/27 A
PEMA	1.7	-	1.6/1.2	1.4	4.7/0.8	2.8			0.9/0.2	0.6	2.2/-1.4	0.4	32/33 A
PEBA	2.5	-	2.9/2.9	2.9	7.7/7.8	7.7			0.6/-0.1	0.2	3.2/3.8	3.5	24/25 A
PPGD	0.6	-	-0.6/-0.2	-0.4	-0.5/0.1	-0.2			-0.9/-0.2	-0.5	-1.1/-0.8	-1.0	29/30 A
PPGBM	0.7	-	0.3/0.5	0.4	0.1/0	0.1			0.1/-0.2	-0.1	-1.0/-1.0	-1.0	31/32 A
MPG	1.5	-	0.4/-0.3	0.1	-0.1/-0.6	-0.4			-0.1/0.2	0.1	-0.6/-1.6	-1.1	27/28 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 41	dimethyl Silicone Rubber	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Dicumyl Peroxide on Calcium Carbonate	1.00		PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	49.9	51.9	52.4		223/200	211	-2.5/-2.2	-2.4	-2.3/-2.2	-2.3	-5.1/-5.3	-5.2	
HFC-32*	5.8	5.9	5.8		15.4/12.2	13.8	0.5/-0.3	0.1	0.5/-0.6	-0.1	-1.7/-1.4	-1.6	38/39 A
HCFC-124	41.5	40.7	40.0		211/190	200	-2.0/-1.7	-1.9	-2.0/-1.7	-1.9	-5.2/-5.1	-5.2	
HFC-134a	6.1	18.3	6.0		18.5/16.4	17.5	-1.3/-1.0	-1.2	-1.3/-0.7	-1.0	-2.0/-1.7	-1.9	
HFC-125*	7.2	7.6	7.2		21.7/21.8	21.8	0.6/0.7	0.7	0.3/0.7	0.5	1.1/2.1	1.6	
HFC-143a*	9.9	9.8	9.3		21.0/19.1	20.1	-0.7/0.3	-0.2	-0.8/-0.2	-0.5	-2.8/-2.5	-2.7	
HFC-152a	17.3	17.1	17.0		48.9/39.7	44.3	-3.0/-2.3	-2.7	-2.2/-1.7	-2.0	-3.9/3.7	-0.1	42/43 A
HCFC-123	60.4	60.9	59.9		398/387	393	-1.5/-2.2	-1.9	-1.7/-2.2	-2.0	-6.3/-6.2	-6.3	44/45 A
HCFC-142b	52.6	51.6	50.7		247/216	232	-0.7/-1.2	-1.0	-1.7/-2.0	-1.9	-3.8/-3.3	-3.6	
HFC-134	4.8	5.1	5.5		18.5/17.6	18.1	-1.1/-0.8	-1.0	-1.3/-0.8	-1.1	-1.7/-1.4	-1.6	42/43 A
AB	15.9	-	15.7/15.9	15.8	44.6/44.2	44.4			11.9/10.4	11.2	34.7/34.5	34.6	29/30 A
MO	7.9	-	7.1/7.4	7.3	19.5/19.4	19.5			5.3/5.3	5.3	14.7/14.4	14.6	33/34 A
PEMA	1.5	-	1.2/1.5	1.4	3.7/3.7	3.7			0.6/0.5	0.6	2.3/2.4	2.4	39/40 A
PEBA	2.8	-	2.5/2.3	2.4	7.3/7.2	7.2			0.9/1.4	1.1	5.3/5.2	5.2	38/39 A
PPGD	0.6	-	0.2/0.2	0.2	0.2/0.2	0.2			-0.4/-0.7	-0.6	-0.3/-0.2	-0.3	38/39 A
PPGBM	0.4	-	-0.1/0.1	0	0.7/0.6	0.6			-1.0/-0.5	-0.8	0.1/0.1	0.1	39/40 A
MPG	0.4	-	-0.3/-0.4	-0.4	-0.2/-0.4	-0.3			-0.7/-1.1	-0.9	-0.8/-0.7	-0.8	41/42 A

* Indicates that material shows some form of deteriorative effect alter removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 42		
	Methylphenylvinyl Silicone Rubber	100.00
	Dicumyl Peroxide on Calcium Carbonate	0.60

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	50.8	51.3	50.5		218/210	214	-1.7/0.5	-0.6	-1.7/0.3	-0.7	-4.4/-4.5	-4.5	
HFC-32	4.8	4.8	4.7		9.8/8.8	9.3	-1.3/-1.0	-1.2	-1.1/-1.3	-1.2	-3.2/-3.0	-3.1	54/55 A
HCFC-124	41.8	41.8	42.6		195/193	194	-1.5/-1.9	-1.7	-1.8/-1.4	-1.6	-5.1/-5.3	-5.2	
HFC-134a	5.1	5.3	5.4		17.0/17.1	17.1	-1.3/-0.4	-0.9	-0.8/0.3	-0.6	-1.8/-1.3	-1.6	
HFC-125	5.8	5.9	6.0		16.0/17.0	17.0	0.3/0.5	0.4	0.3/0.9	0.6	0.1/1.5	0.8	
HFC-143a	6.8	6.8	6.1		14.5/12.9	13.7	-1.5/-1.3	-1.4	-1.9/-1.6	-1.8	-3.7/-3.4	-3.6	
HFC-152a	14.0	14.6	14.8		37.7/33.1	35.4	1.7/-1.0	0.4	-1.2/-1.3	-1.3	-5.0/-4.9	-5.0	59/60 A
HCFC-123	62.8	63.2	65.1		415/399	407	-0.1/-0.5	-0.3	-1.4/-1.3	-1.4	-5.8/-5.8	-5.8	59/60 A
HCFC142b*	52.8	55.6	53.5		253/227	240	1.7/0.7	1.2	-0.2/-0.7	-0.5	-3.8/-2.8	-3.3	
HFC-134	4.7	4.4	4.9		14.7/13.3	14.0	-0.5/-1.4	-1.0	-1.0/-1.6	-1.3	-3.4/-3.0	-3.2	55/56 A
AB	25.9	-	26.5/26.7	26.6	78.1/74.4	77.8			21.9/23.6	22.8	70.5/69.8	70.2	21/22 A
MO	11.5	-	12.0/12.5	12.3	32.5/32.8	32.7			8.5/1.0	9.2	26.2/27.9	27.0	29/30 A
PEMA	9.7	-	9.6/8.0	8.8	26.3/26.2	26.2			7.4/6.0	6.7	23.8/24.0	23.9	29/30 A
PEBA	12.1	-	12.3/12.9	12.6	37.2/37.2	37.2			10.3/11.8	11.0	34.0/34.0	34.0	27/28 A
PPGD	2.6	-	1.6/0.6	1.1	3.7/3.8	3.7			0.2/0.8	0.5	3.3/3.3	3.3	43/44 A
PPGBM	4.5	-	4.2/3.5	3.8	9.5/9.5	9.5			3.3/2.2	2.8	8.9/8.9	8.9	36/37 A
MPG	3.0	-	2.8/2.8	2.8	8.6/8.9	8.8			2.2/2.4	2.3	8.3/8.6	8.5	44/45 A

* Indicates that material shows some foam of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 43	Silicone Rubber	100.00
	Dicumyl Peroxide on Calcium Carbonate	0.80

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	21.3	21.6	22.1		97.1/86.6	91.9	-0.7/-1.0	-0.9	-0.9/-1.2	-1.1	-2.1/-2.2	-2.2	
HFC-32	3.4	3.8	3.7		8.7/7.2	8.0	-0.3/-0.8	-0.6	-0.7/-0.9	-0.8	-1.5/-1.4	-1.5	78/79 A
HCFC-124	17.5	17.2	17.4		89.0/82.3	85.7	-0.3/-0.8	-0.6	-0.2/-1.0	-0.6	-2.3/-2.3	-2.3	
HFC-134a	3.6	3.9	3.6		12.6/11.9	12.3	-1.3/-0.8	-1.1	-1.0/-1.1	-1.1	-1.9/-1.7	-1.8	
HFC-125	4.5	4.4	4.8		15.8/15.5	15.7	0/0.2	0.1	0.3/0.3	0.3	0.7/0.9	0.8	
HFC-143a	6.1	5.9	5.9		15.7/13.8	14.8	-0.5/-1.2	-0.9	-0.5/-0.9	-0.7	-2.2/-2.0	-2.1	
HFC-152a	9.1	9.1	9.2		28.0/25.7	26.9	-1.2/-0.7	-1.0	-1.0/-1.0	-1.0	-2.7/-2.5	-2.6	81/82 A
HCFC-123	22.9	23.0	22.3		139/136	137	-0.7/2.5	0.9	-0.5/-0.7	-0.6	-2.9/-2.9	-2.9	79/80 A
HCFC-142b	21.7	21.8	22.0		91.5/82.8	87.2	0.2/0.1	0.2	-0.7/-1.0	-0.9	-2.2/-2.0	-2.1	
HFC-134	3.2	3.0	3.3		12.8/12.1	12.5	-1.1/-0.8	-1.0	-1.0/-0.7	-0.9	-1.6/-1.5	-1.6	80/81 A
AB	8.5	-	8.1/7.9	8.0	22.1/22.0	22.1			6.9/6.5	6.7	19.3/19.1	19.2	67/68 A
MO	5.4	-	4.5/4.6	4.6	12.6/12.5	12.6			4.0/3.0	3.5	10.1/10.3	10.2	68/69 A
PEMA	2.2	-	1.7/1.8	1.8	5.1/5.0	5.1			1.7/1.1	1.4	4.6/4.4	4.5	69/70 A
PEBA	2.7	-	2.3/2.1	2.2	7.0/7.0	7.0			1.9/2.1	2.0	5.9/5.9	5.9	72/73 A
PPGD	0.5	-	0.4/0.5	0.4	1.6/1.4	1.5			0.5/0.3	0.4	1.3/1.1	1.2	75/76 A
PPGBM	0.8	-	0.6/0.9	0.7	2.7/2.6	2.7			0.9/0.3	0.6	2.6/2.6	2.6	74/75 A
MPG	0.9	-	0.7/0.5	0.6	2.5/2.7	2.6			0.7/1.3	1.0	2.5/2.6	2.6	75/76

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 44		
	Fluorosilicone	100.00
	Iron Oxide	1.50
	Bis(2,4-dichlorobenzoyl peroxide)	1.30

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	41.7	41.8	42.5		141/129	135	0.7/0.6	0.7	-0.7/-0.4	-0.6	-1.5/-0.7	-1.1	
HFC-32	31.6	31.7	31.4		68.0/63.6	65.8	-0.1/0.3	0.1	-0.3/-0.7	-0.5	-0.9/-1.2	-1.1	58/59 A
HCFC-124	32.5	33.1	32.2		137/127	132	0.5/0.8	0.7	-0.3/0.0	-0.2	-1.2/-1.2	-1.2	
HFC-134a	34.6	34.8	34.4		127/122	125	0.4/0.4	0.4	-0.6/-0.1	-0.3	-0.9/-0.8	-0.9	
HFC-125*	14.9	15.0	15.0		49.6/48.2	48.9	0.1/0.1	0.1	-0.3/-0.1	-0.2	0.2/0.1	0.1	
HFC-143a*	24.0	24.0	24.5		64.1/57.8	70.0	-0.3/0.4	0.1	-0.4/0.3	-0.1	-0.9/-1.0	-1.0	
HFC-152a	39.6	39.8	39.4		106/102	104	0.4/0.4	0.4	-0.7/-0.9	-0.8	-1.2/-1.1	-1.2	61/62 A
HCFC-123	31.8	31.0	31.4		137/137	137	2.7/2.4	2.6	0.1/-4.0	-2.0	1.1/-1.1	0	64/65 A
HCFC-142b	43.3	43.0	41.9		151/148	149	4.6/4.2	4.4	-0.3/-0.4	-0.4	-1.1/-0.7	-0.9	
HFC-134	34.0	36.2	33.3		145/134	140	0.8/0.9	0.9	-0.5/-0.2	-0.2	-1.0/-0.9	-1.0	62/63 A
AB	0.8	-	-0.3/0.3	0	1.1/1.0	1.1			0.7/0.5	0.6	0.9/0.9	0.9	57/58 A
MO	1.0	-	0.6/0.4	0.5	0.8/0.9	0.9			0.4/0.3	0.4	0.8/0.8	0.8	57/58 A
PEMA	2.5	-	2.1/1.9	2.0	4.9/4.9	4.9			2.7/1.8	2.3	4.7/4.8	4.8	53/54 A
PEBA	2.3	-	2.7/3.6	3.1	7.5/7.5	7.5			3.0/3.6	3.3	7.4/7.4	7.4	49/50 A
PPGD	1.1	-	0.7/0.7	0.7	1.3/1.4	1.4			0.5/0.4	0.5	1.4/1.4	1.4	58/59 A
PPGBM	0.1	-	-0.1/0.1	0.1	0.6/0.5	0.6			0.2/-0.2	0	0.7/0.6	0.7	60/61 A
AMPG	-0.6	-	-0.7/0.1	-0.3	0.3/0.5	0.4			-0.6/-0.3	-0.5	0.5/0.5	0.5	65/66 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 45	EPDM/Polypropylene TPE Shore A 87	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	-0.7	-0.9	-0.9		5.9/3.1	4.5			-4.9/-4.4	-4.7	-24.7/-24.3	-24.5	
HFC-32	0.7	0.9	0.8		3.3/3.2	3.3	0.6/0.7	0.7	-0.1/-0.1	-0.1	-0.1/-0.1	-0.1	93/94 A
HCFC-124	-0.8	-0.9	-1.3		8.8/8.9	8.9	-2.4/-2.2	-2.3	-4.4		-21.0/-20.8	-20.9	
HFC-134a	0.0		0.1		2.4/2.3	2.4	-0.2		-0.6/-0.5	-0.6	-1.0/-0.6	-0.8	
HFC-125	1.0	1.4	1.7		9.6/10.4	10.0	1.2		0.7/1.3	1.0	5.9/6.5	6.2	
HFC-143a	0.8	0.6	0.9		2.9/3.0	3.0	-0.1		0.3/-0.4	-0.1	-1.1/-0.9	-1.0	
HFC-152a	0.8	0.7	0.8		5.9/4.2	5.1	-0.2		-1.1/-0.8	-1.0	-1.5/-1.0	-1.3	
HCFC-123	0.3	0.1	0.1		19.2/19.2	19.2	-6.7		-8.3/-8.6	-8.5	-24.3/-24.3	-24.3	
HCFC-142b	-0.1	-0.3	-0.6		7.0/6.2	6.6	-4.5		-6.3/-6.0	-6.2	-27.0/-26.0	-26.5	
HFC-134	0.4	0.5	0.5		2.7/2.5	2.6	-0.3/-0.1	-0.2	-0.7/-0.4	-0.6	-0.7/-0.5	-0.6	92/93 A
AB	3.6	-	4.5/4.6	4.6	17.3/18.1	17.7			3.9/3.7	3.8	14.9/14.9	14.9	
MO	6.6	-	6.6/6.7	6.7	26.0/26.2	26.1					24.4/24.1	24.3	
PEMA	-1.3	-	-1.7/-1.7	-1.7	-1.7/-2.0	-1.7			-1.9/-1.7	-1.8	-2.6/-2.9	-2.8	
PEBA	-0.8	-	-1.2/-1.6	-1.4	-1.7/-1.8	-1.8					-2.7/-2.7	-2.7	
PPGD	-2.8	-	-3.5/-2.7	-3.1	-9.0/-8.9	-8.9					-7.3/-8.1	-7.7	
PPGBM	-1.2	-	-1.9/-2.4	-2.2	-4.4/-4.4	-4.4			-2.2/-2.4	-2.3	-5.1/-5.2	-5.2	
MPG	-1.7	-	-2.1/-2.5	-2.3	-4.1/-3.7	-3.9			-2.7/-2.5	-2.6	-4.2/-4.1	-4.2	93/94 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 46	EPDM/Polypropylene TPE Shore A 73	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	-2.5	-3.2	-3.5		-7.0/-8.1	-7.6	4.7		-9.2/-9.0	-9.1	-29.4/-29.1	-29.3	
HFC-32	0.7	0.7	0.7		3.6/3.5	3.6	-0.2/0.5	0.2	-0.5/-0.1	-0.3	-0.1/-0.1	-0.1	74/75 A
HCFC-124	-2.4	-3.4	-4.2		-5.9/-6.4	-6.2	-3.9/-4.6	-4.3	-6.9		-22.2/-20.9	-21.6	
HFC-134a	0.4		0.1		2.6/2.7	2.7	-0.3		-0.1/-0.9	-0.5	-0.5/-0.5	-0.5	
HFC-125	1.3	2.7	3.2		11.3/12.9	12.1	2.2		2.2/1.2	1.7	8.2/9.1	8.7	
HFC-143a	0.1	0.2	0.4		3.3/3.5	3.4	-0.4		-1.1/-0.7	-0.9	-1.2/-1.0	-1.1	
HFC-152a	0.7	0.3	0.6		4.5/3.9	4.2	-1.0		-1.6/-1.2	-1.4	-2.9/-2.0	-2.5	
HCFC-123	-1.3	-1.3	-1.4		15.2/15.1	15.2	-9.6		-11.2/-11.0	-11.1	-33.1/-32.9	-33.0	
HCFC-142b	-3.3	-3.8	-4.2		-6.1/-6.4	-6.3	-8.6		-11.1/-11.7	-11.4	-32.9/-32.1	-32.5	
HFC-134	0.6	0.6	0.5		2.7/2.9	2.8	-0.1/0.3	0.1	-0.1/-0.4	-0.2	-0.4/-0.3	-0.4	76/77 A
AB	8.7	-	11.1/10.3	10.7	38.6/38.5	38.6			9.0/9.3	9.2	35.5/35.9	35.7	
MO	13.8	-	13.2/14.1	13.7	54.2/54.0	54.1					51.1/50.9	51.0	
PEMA	-3.9	-	-8.0/-5.1	-6.6	-13.5/-13.7	-13.6			-5.1/-5.1	-5.1	-14.9/-15.1	-15.0	
PEBA	-3.2	-	-4.2/-4.3	-4.3	-12.5/-12.6	-12.5					-14.3/-13.9	-14.1	
PPGD	-5.6	-	-6.0/-7.3	-6.7	-21.6/-21.3	-21.5					-19.3/-20.4	-19.9	
PPGBM	-4.0	-	-6.1/-6.5	-6.3	-18.1/-17.9	-18.0			-6.5/-2.0	-4.3	-19.0/-18.7	-18.9	
MPG	-5.0	-	-6.4/-6.4	-6.4	-18.6/-18.6	-18.6			-5.8/-7.0	-6.4	-19.0/-18.8	-18.9	84/85 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 47	EPDM/Polypropylene TPE Shore D 40	100.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	-0.4	-0.4	-0.5		7.6/3.4	5.5	-0.8		-3.6/-3.5	-3.6	-21.6/-21.2	-21.4	
HFC-32	0.4	0.2	0.2		3.0/2.7	2.9	-0.2/0.5	0.1	-0.1/0	-0.5	0/0	0	43/44 D
HCFC-124	-0.4	-0.5	-0.5		11.8/10.6	11.2	-2.3/-0.9	-1.3	-3.2		-18.6/-17.1	-17.9	
HFC-134a	0.2		0.3		2.2/2.1	2.2	0.3		0.1/-0.1	0	-0.5/-0.2	-0.4	
HFC-125	0.8	1.7	1.8		9.4/9.5	9.5	1.1		0.7/0.5	0.6	6.3/5.9	6.1	
HFC-143a	0.7	0.6	0.6		2.8/2.7	2.8	0		-0.1/-0.4	-0.3	-1.0/-0.9	-1.0	
HFC-152a	0.3	0.6	0.6		6.1/4.8	5.5	-0.1		-0.4/-0.3	-0.4	-0.5/-0.4	-0.5	
HCFC-123	0.9	0.5	0.5		18.8/18.5	18.7	-5.1		-6.4/-6.6	-6.5	-18.8/-19.8	-19.3	
HCFC-142b	0.2	-0.2	-0.2		8.1/7.0	7.6	-3.9		-4.5/-3.9	-4.2	-23.7/-23.0	-23.4	
HFC-134	0.1	0.2	0.1		1.5/1.8	1.7	0.1/-0.3	-0.1	-0.5/-0.4	-0.5	-0.6/-0.4	-0.5	39/40 D
AB	2.9	-	3.4/2.9	3.2	13.5/14.4	14.0			2.6/2.5	2.6	11.2/11.3	11.3	
MO		-	4.1/3.9	4.0	18.3/18.0	18.2					17.3/17.1	17.2	
PEMA	-0.5	-	-0.6/-0.2	-0.4	1.0/1.2	1.1			-0.8/-0.3	-0.6	0.3/0.5	0.4	
PEBA	-0.5	-	0.1/-0.4	-0.2	0.9/1.1	1.0					0.1/0.3	0.2	
PPGD	-1.0	-	-1.2/-1.1	-1.2	-3.2/-3.2	-3.2					-2.8/-2.5	-2.7	
PPGBM	-0.4	-	-0.3/-0.9	-0.5	-0.4/-0.5	-0.5			-1.1/-1.2	-1.2	-1.2/-1.4	-1.3	
MPG	-0.2	-	0.4/-0.7	-0.2	-0.3/-0.3	-0.3			-0.8/-1.0	-0.9	-0.7/0.7	-0.7	44/45 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 48	EPDM/Polypropylene TPE Shore D 50	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	0.1	0.5	0.1		7.8/6.4	7.0	-0.6		-2.5/-2.7	-2.6	-16.6/-16.6	-16.6	
HFC-32	0.7	0.7	0.7		2.1/2.0	2.1	0.1/0.1	0.1	-0.2/-0.2	-0.2	-0.2/-0.1	-0.2	95/96A 46/47D
HCFC-124	0.1	-0.2	-0.3		9.7/9.3	9.5	-1.6/-0.8	-1.2	-2.7		-13.4/-13.0	-13.2	
HFC-134a	0.3		0.3		1.9/2.2	2.1	-0.1		0/-0.3	-0.2	0/0.3	0.2	
HFC-125	0.6	1.3	1.4		8.8/9.4	9.1	0.8		0.5/0.9	0.7	6.1/6.0	6.1	
HFC-143a	0.2	0.4	0.7		2.3/2.4	2.4	0.1		0/-0.2	-0.1	-0.3/-0.4	-0.4	
HFC-152a	0.1	-0.2	-0.1		2.0/1.2	1.6	-0.6		-1.5/-1.2	-1.4	-3.4/-3.1	-3.3	
HCFC-123	1.4	1.0	1.1		17.8/17.8	17.8	-2.9		-4.2/-5.0	-4.6	-12.9/-12.9	-12.9	
HCFC-142b	0.7	0.7	0.4		7.9/7.7	7.8	-2.1		-3.5/-3.6	-3.6	-17.8/-17.2	-17.5	
HFC-134	0.1	0.2	-0.1		2.6/1.8	2.2	-0.1/-0.4	-0.3	-0.3/-0.4	-0.4	0.1/0.4	0.3	47/48 D
AB	1.5	-	2.5/2.2	2.4	9.5/9.2	9.4			1.9/2.3	2.1	9.1/9.0	9.1	
MO	2.6	-	2.7/2.6	2.7	13.9/13.7	13.8					12.8/12.5	12.7	
PEMA	0.6	-	0.2/0	0.1	2.0/1.6	1.8			0.1/-0.3	-0.1	1.5/1.1	1.3	
PEBA	0	-	-2.5/0	-1.3	1.5/1.8	1.6					1.1/1.2	1.2	
PPGD	-0.6	-	-1.1/-1.3	-1.2	-1.5/-1.6	-1.6					-0.1/-0.6	-0.4	
PPGBM	-0.5	-	-0.4/-0.4	-0.4	0.8/0.7	0.8			-0.8/-0.6	-0.7	0.3/0.2	0.3	
MPG	-0.2	-	-0.8/-0.7	-0.8	0.9/0.8	0.9			-0.5/-0.9	-0.7	0.4/0.4	0.4	47/48 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 49	Nitrile/Polypropylene TPE Shore A 87	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.9	10.3	10.2		65.2/54.7	60.0	-1.0/-0.8	-0.9	-3.7/-3.3	-3.5	-12.9/-11.5	-12.2	
HFC-32	0.6	1.0	0.7		4.2/3.9	4.1	-0.5/-1.0	-0.8	-1.6/-1.5	-1.6	-6.5/-6.2	-6.4	42/43 D
HCFC-124	5.7	5.8	6.6		51.1/50.0	50.6	-0.9/-0.6	-0.8	-2.8/-2.6	-2.7	-5.5/-4.8	-5.2	
HFC-134a	0.4	0.7	-0.2		4.4/4.0	4.2	-0.6/-0.5	-0.6	-1.4/-1.1	-1.3	-3.0/-2.7	-2.9	
HFC-125	1.3	14.2	1.7		7.8/8.8	8.3	0.8/0.8	0.8	0.4/0.6	0.5	2.2/2.5	2.3	
HFC-143a	1.1	0.4	-0.4		0.7/1.5	1.1	-0.7/-0.2	-0.5	-1.3/-0.9	-1.1	-4.5/-3.9	-4.2	
HFC-152a	1.0	0.3	0.4		2.6/3.4	3.0	-1.1/-1.2	-1.2	-3.2/-3.0	-3.1	-10.8/-10.3	-10.6	95/96 A
HCFC-123	19.6	20.0	20.6		140/139	140	0.7/1.4	1.1	-2.6/-2.0	-2.3	-2.6/-2.6	-2.6	95/96 A
HCFC-142b	2.3	1.7	1.7		12.3/12.1	12.2	-0.6/-0.8	-0.7	-3.4/-3.4	-3.4	-10.0/-9.7	-9.9	
HFC-134	2.1	1.7	1.2		14.7/14.6	14.7	-0.1/0.4	0.2	-2.0/-1.7	-1.9	-1.7/-1.7	-1.7	96/97 A
AB	1.0	-	0.5/0.7	0.6	-0.9/-0.9	-0.9			0.1/0.8	0.5	-1.2/-1.1	-1.2	37/38 D
MO	1.8	-	0.9/0.4	0.7	1.1/1.1	1.1			0.9/0.5	0.7	0.8/0.9	0.9	37/38 D
PEMA	0.9	-	0.7/1.1	0.9	3.6/3.6	3.6			1.1/1.1	1.1	3.3/3.3	3.3	38/39 D
PEBA	-0.1	-	0.3/0.9	0.6	2.5/2.5	2.5			0.8/0.7	0.8	2.2/2.2	2.2	38/39 D
PPGD	0.6	-	0.4/-0.1	0.2	0.5/0.8	0.6			0.1/0.4	0..3	0.8/0.9	0.9	36/37 D
PPGBM	-0.2	-	-0.4/-0.8	-0.6	-2.2/-2.1	-2.1			-0.6/-0.4	-0.5	-2.0/2.0	2.0	40/41 D
MPG	-1.34	-	-1.2/-1.2	-1.2	-2.7/-2.4	-2.6			-1.1/-0.9	-1.0	-2.6/-2.5	-2.6	42/43 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 50	Nitrile/Polypropylene TPE Shore A 80	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	14.3	14.6	14.6		78.4/75.5	77.0	-2.6/-2.1	-2.4	-5.7/-4.7	-5.2	-17.6/-16.5	-17.1	
HFC-32	1.3	0.9	0.7		3.8/4.3	4.1	-1.9/-1.7	-1.8	-3.0/-3.1	-3.1	-10.8/-10.2	-10.5	86/87A 26/27 D
HCFC-124	10.5	10.2	10.6		77.7/74.8	76.3	-2.0/-2.2	-2.1	-4.3/-4.5	-4.4	-11.3/-10.2	-10.8	
HFC-134a	0.7	-0.2	-1.3		1.2/3.7	2.5	-2.3/-2.1	-2.2	-3.6/-2.7	-3.2	-10.0/-7.1	-8.6	
HFC-125	1.8	1.7	0.3		4.8/4.7	4.8	-1.0/-0.4	-0.7	-1.3/-1.6	-1.5	-3.3/-3.8	-3.6	
HFC-143a	0.4	2.8	-1.2		-2.6/-0.2	-1.4	-1.9/-1.5	-1.7	-2.6/-2.1	-2.4	-8.6/-6.4	-7.5	
HFC-152a	-0.1	-0.3	-0.4		0.4/0.1	0.3	-3.6/-3.2	-3.4	-5.6/-5.4	-5.5	-16.8/-16.2	-16.5	94/95 A
HCFC-123	31.1	31.5	31.8		216/216	216	0.3/0.4	0.4	-4.0/-4.1	-4.1	-8.6/-8.5	-8.6	89/90 A
HCFC-142b	1.5	1.1	0.6		11.1/11.5	11.3	-1.4/-1.3	-1.4	-5.1/-5.0	-5.1	-14.9/-14.0	-14.5	
HFC-134	3.0	2.2	1.6		19.1/19.4	19.3	-1.6/-0.4	-1.0	-4.1/-2.9	-3.5	-8.9/-8.1	-8.5	86/87 A
AB	-0.3	-	-1.4/-1.3	-1.4	-5.9/-5.7	-5.8			-1.2/-1.0	-1.1	-6.3/-6.2	-6.3	23/24 D
MO	0.7	-	-0.8/-0.9	-0.9	-3.3/-3.1	-3.2			-0.7/-0.5	-0.6	-3.5/-3.4	-3.5	83/84 A
PEMA	1.4	-	0.9/0.8	0.9	3.3/3.5	3.4			1.4/1.1	1.3	3.1/3.3	3.2	82/83 A
PEBA	0.5	-	0.3/-0.1	0.1	1.4/1.4	1.4			1.0/.0.2	0.6	1.0/1.1	1.1	83/84 A
PPGD	1.0	-	0.6/0.7	0.7	1.2/1.4	1.3			0.5/0.6	0.6	0.4/0.7	0.6	22/23 D
PPGBM	-0.8	-	-1.9/-1.9	-1.9	-6.0/-6.2	-6.1			-1.3/-1.4	-1.4	-6.0/-6.0	-6.0	24/25 D
MPG	-1.9	-	-2.8/-2.5	-2.7	-7.7/-7.9	-7.8			-2.6/-2.4	-2.5	-7.6/-7.8	-7.7	87/88 A

* Indicates that material shows some form of deteriorative effect alter removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 51	Nitrile/Polypropylene TPE Shore D 40	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	6.9	7.1	7.4		47.4/42.9	45.2	-0.2/-0.2	-0.2	-2.5/-2.4	-2.5	-8.5/-8.4	-8.5	
HFC-32	0.8	0.5	0.4		3.7/4.0	3.9	-0.3/2.1	0.9	-1.4/0.4	-0.5	-4.4/-3.9	-4.2	45/46 D
HCFC-124	4.7	4.6	4.5		39.7/39.0	39.4	0.2/0.4	0.3	-1.3/-1.3	-1.3	-1.7/-1.4	-1.6	
HFC-134a	0.9	0.9	0.5		6.6/7.2	6.9	0.9/0.8	0.9	0.4/0.7	0.6	2.4/2.4	2.4	
HFC-125	1.0	1.8	1.8		7.5/8.2	7.9	1.0/1.4	1.2	0.7/0.8	0.8	3.4/3.6	3.5	
HFC-143a	0.8	1.3	0.3		1.8/2.0	1.9	0.2/-0.2	0	-0.6/-0.7	-0.7	-2.2/-2.2	-2.2	
HFC-152a	1.2	0.4	0.3		3.0/3.0	3.0	-0.3/0.3	0	-1.7/-2.0	-1.9	-7.4/-7.3	-7.4	51/52 D
HCFC-123	14.2	14.5	15.4		103/101	102	1.6/1.6	1.6	-1.1/-1.1	-1.1	0.9/1.0	1.0	96/97 A
HCFC-142b	2.3	1.9	1.7		12.0/11.5	11.8	0.3/0.3	0.3	-2.4/-2.3	-2.4	-6.7/-6.1	-6.4	
HFC-134	1.6	1.6	0.8		11.9/12.6	12.3	0.6/0.5	0.6	-0.6/-0.5	-0.6	1.9/2.4	2.2	96/97 A
AB	1.4	-	0.7/1.1	0.9	1.0/1.0	1.0			1.2/0.8	1.0	0.7/0.9	0.8	44/45 D
MO	1.8	-	1.1/1.1	1.1	2.9/3.1	3.0			1.5/1.3	1.4	2.8/2.7	2.8	44/45 D
PEMA	0.8	-	0.9/0.8	0.9	3.4/3.3	3.4			1.0/1.2	1.1	3.1/3.0	3.1	44/45 D
PEBA	0.1	-	0.5/0.4	0.5	2.8/2.6	2.7			0.9/0.7	0.8	2.3/2.1	2.2	45/46 D
PPGD	0.1	-	-0.2/-0.2	-0.2	0.4/0.5	0.5			0.1/0.3	0.2	0.6/0.7	0.7	44/45 D
PPGBM	-0.1	-	-0.2/-0.4	-0.3	-0.8/-0.9	-0.9			-0.2/-0.2	-0.2	-1.0/-1.0	-1.0	45/46 D
MPG	-0.6	-	-1.0/-0.6	-0.8	-1.6/-1.5	-1.5			-0.8/0.8	0	-1.6/-1.6	-1.6	47/48 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation

Formula # 52	Polyester TPE (40 shore D)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	25.5	25.7	26.4		128/124	126	-4.8/-7.6	-6.2	-2.0/-8.7	-5.4	-2.4/-2.2	-2.3	35/36 D
HFC-32	3.9	4.2	3.8		11.1/10.2	10.7	0.1/0.2	0.2	-0.7/-0.8	-0.8	-0.6/-0.5	-0.6	33/34 D
HCFC-124	19.9	19.8	19.3		109/102	105	4.5/4.3	4.4	-2.7/-0.3	-1.5	0.5/0.6	0.6	36/37 D
HFC-134a	3.7	3.3	3.3		12.3/12.0	12.2	1.2/1.7	1.5	-0.4/0.2	-0.1	0.4/1.2	0.8	39/40 D
HFC-125	4.4	4.6	4.9		16.4/16.2	16.3	3.1/2.5	2.8	1.2/1.5	1.4	5.3/5.2	5.3	39/40 D
HFC-143a	1.6	2.2	2.1		5.3/5.2	5.3	1.1/0.5	0.8	-0.8/-0.4	-0.6	0.4/0.6	0.5	39/40 D
HFC-152a	4.1	4.4	4.2		12.1/11.5	11.8	0.2/0.4	0.3	-0.8/-1.2	-1.0	-0.5/-0.5	-0.5	40/41 D
HCFC-123*		Dissolved											
HCFC-142b	7.1	6.6	6.7		24.4/22.8	23.6	1.0/1.3	1.1	-0.9/-1.2	-1.1	0.2/0	0.1	37/38 D
HFC-134	6.7	7.7	6.7		31.0/29.7	30.0	1.6/1.5	1.6	-0.3/-1.3	-0.8	0.1/0.2	0.2	39/40 D
AB	2.4	-	2.8/3.3	3.1	6.4/6.3	6.4			2.2/2.1	2.2	6.0/6.0	6.0	37/42 D
MO	1.8	-	9.5/3.4	6.5	8.7/8.9	8.8			3.7/3.0	3.4	8.5/8.6	8.6	35/36 D
PEMA	3.2	-	4.6/4.7	4.7	12.7/12.9	12.8			4.8/3.9	4.4	12.6/12.6	12.6	32/32 D
PEBA	3.0	-	4.7/4.4	4.6	10.3/10.5	10.4			4.4/3.8	4.1	10.4/10.5	10.5	36/38 D
PPGD	3.5	-	4.2/4.4	4.3	11.4/11.4	11.4			3.8/3.6	3.7	10.9/10.7	10.8	37/38 D
PPGBM	1.6	-	2.3/2.7	2.5	6.0/6.2	6.1			2.3/1.8	2.1	6.1/6.1	6.1	35/36 D
MPG	0.7	-	1.9/1.9	1.9	3.8/3.6	3.7			0.5/1.6	1.1	3.8/3.6	3.7	40/41 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 53	Polyester TPE (63 Shore D)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
R-22	14.4	14.0	13.8		52.0/47.6	49.8	0.8/0.6	0.7	-0.8/-1.5	-1.2	-0.5/-0.5	-0.5	43/44 D
HCFC-32	2.8	2.9	3.6		8.0/7.2	7.6	0.4/0.2	0.3	-0.6/-0.4	-0.5	-0.5/-0.4	-0.5	45/46 D
HFC-124	8.6	9.5	9.4		39.0/38.3	38.7	2.9/3.1	3.0	-0.3/-0.4	-0.4	2.9/3.0	3.0	46/47 D
HCFC-134a	2.4	2.7	2.5		8.7/8.3	8.5	1.5/1.3	1.4	0.3/-0.1	0.1	1.5/1.3	1.4	50/51 D
HFC-125	1.9	2.6	2.8		10.0/10.4	10.2	1.6/2.4	2.0	0.9/1.6	1.3	4.4/4.3	4.4	47/48 D
HFC-143a	1.4	1.3	1.2		3.5/3.4	3.5	0.7/1.2	1.0	-0.1/-0.2	-0.2	1.1/1.1	1.1	49/50 D
HFC-152a	3.5	3.0	2.8		7.2/7.1	7.2	1.1/1.4	1.2	-0.9/-0.4	-0.7	-0.3/-0.1	-0.2	51/52 D
HCFC-123	25.4	25.0	24.9		125/128	126	3.5/3.9	3.7	0.5/-0.7	-0.1	3.6/3.6	3.6	47/48 D
HCFC-142b	5.0	4.4	4.5		13.9/13.6	13.7	1.4/1.9	1.6	0/-0.2	-0.1	1.2/1.4	1.3	47/48 D
HFC-134	5.7	5.1	5.2		18.8/18.1	18.4	2.1/1.8	2.0	0.4/0.1	0.3	1.3/1.5	1.4	52/53 D
AB	0.8	-	1.3/1.7	1.5	2.7/3.1	2.9			0.9/1.3	1.1	2.7/3.0	2.9	51/52 D
MO	0.9	-	1.9/2.0	2.0	4.6/4.7	4.7			1.8/2.4	2.1	4.6/4.7	4.7	49/50 D
PEMA	0.6	-	1.9/1.8	1.9	5.2/5.4	5.3			1.9/1.7	1.8	5.1/5.2	5.2	47/48 D
PEBA	0.8	-	1.8/1.6	1.7	4.0/4.2	4.1			2.1/1.2	1.6	4.1/4.3	4.2	49/50 D
PPGD	1.2	-	1.9/2.0	2.0	5.1/4.8	5.0			1.8/2.0	1.9	5.2/5.0	5.1	49/50 D
PPGBM	0.6	-	0.8/0.9	0.9	2.5/2.4	2.5			0.7/0.4	0.6	2.6/2.6	2.6	48/49 D
MPG	0.3	-	0.6/0.5	0.6	1.4/1.5	1.5			-0.1/0.4	0.2	1.3/1.5	1.4	51/52 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 54	Polyester TPE (72 Shore D)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.9	10.3	9.9		40.7/38.6	39.7	0.9/0.4	0.7	-0.4/-1.1	-0.8	1.0/1.2	1.1	50/51 D
HFC-32	2.1	2.8	2.6		6.6/6.2	6.4	0.8/0.4	0.6	-0.5/-0.4	-0.5	0.1/0	0.1	52/53 D
HCFC-124	7.2	7.0	6.9		27.2/26.6	26.9	2.9/2.4	2.7	0.7/0.2	0.5	5.1/4.8	5.0	52/53 D
HFC-134a	1.2	1.9	2.0		7.7/7.5	7.6	1.3/1.4	1.4	0.1/0.6	0.4	2.9/3.1	3.0	54/55 D
HCFC-125	0.4	2.1	2.2		7.4/7.8	7.6	1.8/1.3	1.6	0.8/1.1	1.0	4.6/4.7	4.7	54/55 D
HFC-143a	1.1	1.4	1.2		2.9/2.8	2.9	0.4		0.2/0.2	0.2	1.8/1.7	1.8	55/56 D
HFC-152a	3.1	2.6	2.6		6.8/6.5	6.7	0.9/1.2	1.1	0.1/0.3	0.2	1.2/9.5	5.4	55/56 D
HCFC-123	14.7	15.4	16.4		74.4/80.5	77.5	4.1/4.1	4.1	1.2/0.6	0.9	7.4/7.9	7.7	55/56 D
HCFC-142b	3.3	3.6	3.4		12.9/11.2	12.1	1.7/1.7	1.7	0.1/0.4	0.2	2.6/2.9	2.8	51/52 D
HFC-134	4.9	4.4	4.4		15.9/15.6	15.7	2.6/2.8	2.7	0.9/1.0	1.0	4.0/4.0	4.0	53/54 D
AB	0.3	-	0.7/1.0	0.9	2.0/2.1	2.1			0.6/0.5	0.6	1.7/2.0	1.9	54/55 D
MO	0.7	-	1.0/1.9	1.5	3.4/3.2	3.3			1.3/0.6	1.0	3.5/3.5	3.5	54/55 D
PEMA	0	-	1.2/1.2	1.2	3.4/3.6	3.5			0.8/0.8	0.8	3.4/3.4	3.4	52/53 D
PEBA	0	-	0.8/1.1	1.0	2.8/2.7	2.7			1.3/1.0	1.2	3.0/2.8	2.9	54/55 D
PPGD	0.6	-	1.4/1.0	1.2	3.5/3.6	3.6			1.1/2.4	1.5	3.7/4.2	4.0	54/55 D
PPGBM	0.3	-	0.5/0.6	0.6	1.8/1.6	1.7			0.4/0.6	0.5	1.6/1.6	1.6	54/55 D
MPG	-0.3	-	-0.1/0.5	0.2	0.9/1.0	1.0			-0.1/0.2	0.1	0.9/1.0	1.0	55/56 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 55	Polyester TPE (55 shore D)	100.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.0	6.8	6.9		26.8/25.3	26.1	1.7/1.0	1.4	0.1/-0.2	-0.1	4.5/4.1	4.3	55/56 D
HFC-32	2.1	2.3	2.0		6.0/4.2	5.1	0.4/1.1	0.8	-0.1/0.4	0.2	1.9/2.3	2.1	55/56 D
HCFC-124	0.8	4.2	4.2		16.9/17.1	17.0	3.1/3.2	3.2	1.1/1.6	1.4	10.0/10.0	10.0	52/53 D
HFC-134a	0.2	0.8	1.3		3.8/3.8	3.8	1.1/0.4	0.8	0.6/0.4	0.5	3.1/3.2	3.2	52/53 D
HFC-125	-0.1	0.1	0.3		2.5/2.1	2.3	-0.2/0.3	0.1	-0.2/-0.1	-0.1	1.5/1.6	1.6	57/58 D
HFC-143a	0.1	0.2	0.4		0.8/0.8	0.8	0.3/-0.3	0	-0.4/-0.6	-0.5	1.3/1.4	1.4	57/58 D
HFC-152a	1.0	2.1	1.9		5.5/5.3	5.4	1.7/0.7	1.2	1.0/1.0	1.0	3.4/3.2	3.3	58/59 D
HCFC-123	6.1	9.6	9.5		40.4/42.1	41.3	4.6/4.8	4.7	1.9/1.9	1.9	12.2/12.5	12.3	56/57 D
HCFC-142b	0.2	1.8	2.2		7.6/7.6	7.6	1.7/2.0	1.8	1.3/2.0	1.6	5.6/6.0	5.8	56/57 D
HFC-134	0.8	3.0	3.2		12.4/12.0	12.2	2.2/2.6	2.4	1.4/1.3	1.4	7.2/7.1	7.2	52/53 D
AB	-0.2	-	0.1/-0.1	0	0.3/0.4	0.4			0.4/-0.1	0.2	0.3/0.3	0.3	64/65 D
MO	0.2	-	0.4/0.3	0.4	0.7/0.9	0.8			-0.2/0.3	0.1	0.9/0.9	0.9	60/61 D
PEMA	-0.1	-	0/-0.2	-0.1	0.6/0.4	0.5			-0.5/-0.7	-0.6	0.3/0.3	0.3	60/61 D
PEBA	0.2	-	0/0.3	0.2	0.1/0.2	0.2			-0.2/-0.1	-0.2	0.2/0.2	0.2	60/61 D
PPGD	-0.4	-	-0.3/-0.6	-0.5	1.0/1.1	1.1			0.3/0.3	0.3	1.2/1.3	1.3	58/59 D
PPGBM	0.1	-	-0.1/0	-0.1	0.2/0.2	0.2			-0.4/0.2	-0.1	0.3/0.1	0.2	60/61 D
MPG	-0.1	-	0/-0.2	-0.1	0/0.1	0.1			-0.1/0.1	0	-0.3/0.1	-0.1	60/61 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 56		
	FA Polysulfide Rubber	100.00
	Zinc oxide	10.00
	Stearic Acid	0.50
	2,2'-Benzothiazyl disulfide	0.40
	Diphenyl guanidine	0.10
	2-mercapto imidazoline	0.10

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	3.5	4.4	3.8		12.3/12.3	12.3	1.3/-0.4	0.5	-0.8/-1.9	-1.4	-3.9/-3.6	-3.8	45/46 A
HFC-32*	0.6	0.8	0.2		3.0/3.2	3.1	0.1/-0.7	-0.3	-0.1/-0.7	-0.4	-1.2/-0.8	-1.0	52/53 A
HCFC-124	-0.1	0.4	0.5		1.6/1.7	1.7	-0.4/0.3	-0.1	-0.6/-0.2	-0.4	-0.2/-4.4	-2.3	51/52 A
HFC-134a	-0.7	-0.5	-0.4		-0.4/0.4	0	-0.8/0.3	-0.3	-1.1/-0.3	-0.7	-1.0/-0.5	-0.8	49/50 A
HFC-125*	-0.1	0.3	0.6		0.5/1.0	0.8	-0.1/0.8	0.4	9.4/11.9	10.7	0.3/0.3	0.3	32/33 A
HFC-143a	-0.2	0.3	0.1		-0.3/0.1	-0.1	-0.2/-0.1	-0.1	7.2/10.2	8.7	-0.7/-0.3	-0.5	36/37 A
HFC-152a	0.5	1.0	0.5		1.0/1.5	1.3	1.4/0.1	0.7	2.3/-0.6	0.9	-1.8/-1.1	-1.5	47/48 A
HCFC-123	7.6	8.0	7.8		32.2/32.3	32.2	4.3/3.7	4.0	-0.6/-0.8	-0.7	6.1/6.3	6.2	49/50 A
HCFC-142b	0.5	0.7	1.0		2.3/2.7	2.5	-0.4/0.4	0	-0.5/-0.4	-0.5	0/0.3	0.2	49/50 A
HFC-134	-0.5	0.5	0.6		2.7/2.8	2.8	-0.4/0.7	0.2	-0.9/0.1	-0.5	0.8/0.9	0.9	53/54 A
AB	-0.3	-	-0.8/-0.9	-0.9	-3.9/-3.7	-3.8			-0.8/-1.4	-1.1	-4.7/-4.0	-4.4	57/58 A
MO	0.4	-	-0.4/-0.2	-0.3	-1.8/-1.1	-1.5			-0.8/-0.3	-0.6	-2.2/-1.4	-1.8	44/45 A
PEMA	-0.3	-	-3.0/-2.7	-2.9	-9.0/-8.3	-8.7			-3.3/-2.3	-2.8	-9.3/-8.6	-9.0	49/50 A
PEBA	-0.6	-	-3.9/-3.1	-3.5	-10.8/-8.7	-9.7			-4.4/-3.7	-4.1	-10.8/-8.9	-9.8	47/48 A
PPGD	0	-	-3.7/-2.4	-3.1	-11.2/-10.4	-10.8			-4.1/-4.0	-4.1	-11.6/-10.5	-11.0	48/49 A
PPGBM	-1.9	-	-3.2/-4.1	-3.7	-8.6/-6.5	-7.6			-3.1/-3.7	-3.4	-9.5/-8.0	-8.7	49/50 A
MPG	-1.1	-	-2.6/-2.5	-2.6	-8.4/-6.2	-7.3			-3.3/-2.5	-2.9	-9.1/-7.2	-8.2	46/47 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 57		
	FA Polysulfide Rubber	100.00
	Zinc oxide	10.00
	Stearic acid	0.50
	2,2'-Benzothiazyl disulfide	0.40
	Diphenyl guanidine	0.10
	2-mercapto imidazoline	0.10
	IR B6 (Carbon Black)	60.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.0	2.3	3.1		8.1/8.3	8.2	1.7/1.4	1.6	0.1/-0.6	-0.3	0.3/0.5	0.4	78/79 A
HFC-32	0.7	0.8	0.7		1.6/-1.6	0	-0.4/0	-0.2	-0.2/-0.3	-0.3	0/-0.1	-0.1	83/84 A
HCFC-124	0.1	0.2	0.3		0.9/1.2	1.1	0.1/0.1	0.1	-0.3/-0.4	-0.4	0.2/0.4	0.3	80/81 A
HFC-134a	-0.1	-0.1	0.1		-0.3/-0.1	-0.2	-0.2/-0.7	-0.5	-0.4/-0.5	-0.5	-0.4/-0.4	-0.4	81/82 A
HFC-125	0	-0.1	-2.6		0.5/0.5	0.5	-1.0/-0.3	-0.7	-0.1/-0.1	-0.1	0.2/0.3	0.3	81/82 A
HFC-143a	-0.4	0.3	-0.1		-0.3/-0.2	-0.3	0.4/-0.1	0.2	-0.3/-0.1	-0.2	-0.2/-0.1	-0.2	80/81 A
HFC-152a	0.7	1.0	0.9		0.6/0.8	0.7	0.4/3.5	2.0	-0.3/3.1	1.4	-0.4/-0.5	-0.5	81/82 A
HCFC-123	4.1	5.9	6.0		20.3/20.5	20.4	3.9/4.2	4.0	0.7/1.3	1.0	7.3/7.1	7.2	76/77 A
HCFC-142b	0.2	0.6	0.5		1.6/1.9	1.8	0.5/0.4	0.4	-0.3/-0.3	-0.3	0.3/0.6	0.5	80/81 A
HFC-134	-0.1	0.9	1.7		1.2/1.4	1.3	0.3/0.2	0.3	-0.2/0.2	0	0.4/0.5	0.5	82/83 A
AB	-0.5	-	-0.9/-0.7	-0.8	-1.7/-1.7	-1.7			-1.0/-0.5	-0.8	-1.7/-1.7	-1.7	80/81 A
MO	-0.1	-	-0.5/-0.7	-0.6	-0.4/-0.2	-0.3			0.2/-0.5	-0.2	-0.7/-0.5	-0.6	80/81 A
PEMA	-0.5	-	-0.6/-1.4	-1.0	-1.5/-1.6	-1.6			-0.8/-0.9	-0.9	-2.0/-1.8	-1.9	79/80 A
PEBA	-0.7	-	-0.7/-0.8	-0.8	-1.5/-1.7	-1.6			-0.5/-1.0	-0.8	-2.2/-1.9	-2.0	81/82 A
PPGD	-0.6	-	-0.6/-0.5	-0.6	-1.7/-1.4	-1.6			-0.4/-0.7	-0.6	-1.8/-1.6	-1.7	81/82 A
PPGBM	-0.8	-	-1.0/-0.7	-0.8	-1.9/-1.3	-1.6			-0.9/-0.7	-0.8	-2.8/-2.2	-2.5	79/80 A
MPG	-0.8	-	-0.6/-0.7	-0.7	-2.4/-2.2	-2.3			-0.8/-1.2	-1.0	-2.8/-2.4	-2.6	83/84 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 58	ST Polysulfide Rubber	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Zinc peroxide	5.00		PEBA - Pentaerythritol Ester Branched Acid
	Stearic Acid	1.00		PPGBM - Polypropylene Glycol Butyl Monoether
	Calcium Hydroxide	1.00		MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	8.1	10.6	8.6		30.6/30.2	30.4	-3.1/-3.3	-3.2	-3.1/-3.1	-3.1	-10.2/-9.7	-10.0	41/42 A
HFC-32*	2.2	2.1	1.7		5.3/5.0	5.2	-0.6/-0.8	-0.7	-0.6/-0.2	-0.4	-2.3/-2.1	-2.2	44/45 A
HCFC-124	1.2	1.7	2.5		11.2/9.6	10.4	1.0/1.2	1.1	-1.3/-1.0	-1.2	1.9/2.0	2.0	41/42 A
HFC-134a	-0.1	-0.1	-0.1		1.5/2.0	1.8	-0.7/0.3	-0.2	-0.9/-0.9	-0.9	-0.6/-0.4	-0.5	42/43 A
HFC-125	-1.2	-0.1	0.2		1.8/2.4	2.1	8.6/7.8	8.2	-0.3/0.1	-0.2	0.1/0.6	0.3	31/32 A
HFC-143a	0.1	0.2	0.3		0.8/0.9	0.9	6.9/7.8	7.4	0.1/-0.1	0	-1.0/-1.0	-1.0	37/38 A
HFC-152a	2.1	2.3	1.6		3.7/4.0	3.9	0.1/0.1	0.1	-1.5/-1.6	-1.6	-1.9/1.9	-1.9	43/44 A
HCFC-123	59.1	57.6	56.0		330/321	325	12.8/12.1	12.4	-4.3/-4.3	-4.3	-4.9/-5.4	-5.1	43/44 A
HCFC-142b	1.3	2.3	2.1		6.5/7.1	6.8	0.7/0.9	0.8	-1.1/-0.7	-0.9	-0.2/0.6	0.2	42/43 A
HFC-134	2.3	2.3	1.8		7.7/7.9	7.8	0.2/-15.8	-7.8	-1.9/-17.4	-9.7	-2.2/-1.9	-2.1	46/47 A
AB	-0.5	-	-2.5/-2.5	-2.5	-9.0/-8.7	-8.9			-3.2/-3.2	-3.2	-9.4/-8.8	-9.1	47/48 A
MO	-0.1	-	-1.8/-1.3	-1.6	-4.5/-2.8	-3.7			-1.6/-1.7	-1.7	-5.0/-3.4	-4.2	39/40 A
PEMA	1.0	-	-3.9/-3.7	-3.8	-11.0/-10.5	-10.8			-4.4/-3.5	-4.0	-11.7/-11.2	-11.5	39/40 A
PEBA	-1.2	-	-8.6/-8.2	-8.4	-24.7/-22.8	-23.7			-8.7/-8.0	-8.3	-25.3/-23.2	-24.3	47/48 A
PPGD	1.6	-	-4.5/-3.9	-4.2	-24.7/-20.9	-22.8			-5.4/-3.9	-4.7	-24.9/-21.2	-23.1	44/45 A
PPGBM	-0.7	-	-4.8/-4.8	-4.8	-12.3/-10.7	-11.5			-5.1/-4.5	-4.8	-13.5/-11.7	-12.6	42/43 A
MPG	-1.0	-	-4.0/-2.9	-3.5	-11.3/-11.5	-11.4			-3.9/-4.1	-4.0	-11.5/-11.8	-11.7	48/49 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 59		
	ST Polysulfide Rubber	100.00
	Zinc peroxide	5.00
	Stearic acid	1.00
	Calcium Hydroxide	1.00
	IR B6 (Carbon Black)	60.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	39.6	7.8	6.3		19.1/18.9	19.0	0.9/0.1	0.5	-1.1/-1.8	-1.5	-3.4/-3.4	-3.4	78/79 A
HFC-32	2.0	2.0	1.9		3.5/3.4	3.5	1.0/0.3	0.7	-0.2/-0.3	-0.3	-0.4/-0.4	-0.4	82/83 A
HCFC-124	1.3	2.2	1.4		5.1/5.4	5.3	1.0/1.0	1.0	0.1/-0.1	0	1.3/1.7	1.5	75/76 A
HFC-134a	0.6	-0.1	0.1		0.9/1.1	1.0	-0.2/0.3	0.1	-0.4/-0.6	-0.5	-0.1/0.1	0	78/79 A
HFC-125	-4.1	0.9	0.7		0.9/1.8	0.4	0.4/0.1	0.3	0.1/-0.1	0	0.5/0.8	0.7	77/78 A
HFC-143a	0.2	0.3	0.3		0.3/0.3	0.3	-0.1/-0.1	-0.1	-0.2/-0.3	-0.3	-0.1/-0.1	-0.1	76/77 A
HFC-152a	1.6	1.9	1.5		2.1/2.2	2.2	0.8/-0.2	0.3	-0.6/-0.7	-0.7	-0.6/-0.9	-0.8	80/81 A
HCFC-123	26.9	26.5	27.2		115/115	115	9.0/9.5	9.2	-1.2/-0.9	-1.0	2.7/2.6	2.6	78/79 A
HCFC-142b	0.8	1.7	1.6		3.4/3.3	3.4	0.4/0.5	0.5	-0.5/-0.5	-0.5	0.4/0.3	0.3	75/76 A
HFC-134	0.8	2.1	1.6		4.9/4.8	4.9	0.6/0.7	0.7	0.1/0.4	0.3	1.2/1.5	1.4	79/80 A
AB	-0.4	-	-0.9/-0.9	-0.9	-2.0/-2.3	-2.2			-1.0/-1.2	-1.1	-2.3/-2.2	-2.3	80/81 A
MO	0.2	-	-0.5/-0.4	-0.5	-0.9/-0.5	-0.7			-0.8/-0.5	-0.7	-1.1/-0.7	-0.9	76/77 A
PEMA	-0.3	-	-1.7/-1.4	-1.6	-3.4/-2.8	-3.1			-1.8/-1.4	-1.6	-3.7/-3.3	-3.5	80/81 A
PEBA	-0.4	-	-1.7/-2.0	-1.9	-3.4/-4.0	-3.7			-1.7/-2.0	-1.8	-3.8/-4.1	-4.0	77/78 A
PPGD	0.6	-	-0.5/-0.7	-0.6	-2.0/-1.3	-1.7			-0.7/-0.7	-0.7	-2.0/-5.0	-3.5	77/78 A
PPGBM	-0.5	-	-2.0/-2.3	-2.2	-4.0/-2.4	-3.2			-2.5/-1.4	-2.0	-4.9/-3.8	-4.4	81/82 A
MPG	-3.4	-	-2.2/-1.7	-2.0	-3.4/-3.1	-3.3			-1.8/-0.8	-1.3	-3.7/-3.2	-3.5	82/83 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 60	Polyurethane (Ether-80 shore A)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca- 95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	31.0	31.0	31.3		151/144	148	0.9/3.6	2.3	-0.6/-0.3	-0.5	-0.9/0.9	0	77/78 A
HFC-32	4.4	4.9	4.9		17.7/17.3	17.5	-0.2/1.1	0.5	-0.3/-0.4	-0.4	-0.5/-0.5	-0.5	82/83 A
HCFC-124	29.6	29.6	29.7		157/158	158	7.2/4.0	6.1	-0.7/-0.6	-0.7	6.7/2.8	4.8	76/77 A
HFC-134a	4.6	4.6	5.0		20.9/20.8	20.9	3.0/3.3	3.2	-0.1/-0.1	-0.1	1.9/1.9	1.9	80/81 A
HFC-125	7.0	6.9	6.9		27.3/27.4	27.4	3.3/4.1	3.7	1.7/1.1	1.4	5.3/6.3	5.8	81/82 A
HFC-143a	2.8	2.8	2.6		9.6/9.6	9.6	0.6/1.5	1.1	-0.7/0.4	-0.2	0.2/1.2	0.7	82/83 A
HFC-152a	6.3	6.6	6.5		20.4/20.8	20.6	1.7/1.9	1.8	-0.3/-0.9	-0.6	-0.6/-0.1	-0.4	82/83 A
HCFC-123	57.7	56.4	58.7		419/424	422	11.6/11.9	11.8	0.8/0.1	0.4	6.0/5.7	5.9	73/74 A
HCFC-142b	12.1	12.1	12.1		47.4/46.6	47.0	3.6/3.0	3.3	0.1/-0.1	0	1.7/2.2	1.9	75/76 A
HFC-134	11.3	11.3	10.9		48.9/47.8	48.4	5.4/5.2	5.3	0.6/0.6	0.6	2.7/1.8	2.3	79/80 A
AB	20.8	-	5.1/5.0	5.1	14.4/14.1	14.3			3.9/4.0	4.0	14.1/14.0	14.1	79/80 A
MO	4.8	-	6.0/5.5	5.8	16.8/16.5	16.7			4.9/4.9	4.9	16.1/15.9	16.0	75/76 A
PEMA	3.5	-	7.2/7.1	7.2	23.2/23.1	23.2			6.6/7.0	6.8	23.5/23.3	23.4	80/81 A
PEBA	2.3	-	5.5/4.8	5.2	19.8/19.5	19.6			6.2/6.0	6.1	19.8/19.6	19.7	79/80 A
PPGD	7.4	-	13.6/13.5	13.6	41.0/41.0	41.0			13.5/13.5	13.5	41.7/41.7	41.7	71/72 A
PPGBM	2.8	-	6.0/5.8	5.9	19.5/19.3	19.4			6.2/5.6	5.9	19.1/19.3	19.2	77/78 A
MPG	1.5	-	3.0/6.2	4.6	11.1/11.3	11.2			3.3/6.1	4.7	11.4/11.6	11.5	82/83 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula #61	Polyurethane (Ether-50 shore D)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca-95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	15.5	15.7	16.1		58.3/79.2	68.8	5.9/4.7	5.3	2.1/3.0	2.6	1.0/15.0	8.0	49/50 D
HFC-32	2.9	2.6	3.0		9.4/9.2	9.3	0.6/1.5	1.1	-0.2/0.1	-0.1	1.4/2.7	2.1	45/46 D
HCFC-124	11.5	12.7	13.0		59.9/58.1	59.0	7.5/8.2	7.9	3.6/4.7	4.2	18.0/19.0	18.5	47/48 D
HFC-134a	1.0	2.0	2.0		10.1/8.9	9.5	1.8/1.8	1.8	1.4/1.7	1.6	6.1/6.5	6.3	47/48 D
HFC-125	0.1	2.1	1.9		8.5/8.4	8.5	1.7/1.9	1.8	1.3/2.6	2.0	6.5/6.4	6.5	48/49 A
HFC-143a	0.6	1.2	1.3		4.2/4.2	4.2	2.7/1.1	1.9	1.4/1.3	1.4	3.3/3.4	3.4	49/50 D
HFC-152a	2.9	3.3	2.5		10.0/10.0	10.0	2.6/2.5	2.6	1.7/3.2	2.5	4.7/5.2	5.0	51/52 D
HCFC-123	28.9	29.0	30.6		168/173	170	14.6/14.3	14.4	5.7/6.3	6.0	29.2/26.9	28.0	45/46 D
HCFC-142b	2.8	5.9	5.1		19.4/19.2	19.3	4.5/6.7	5.6	2.5/3.6	3.0	10.4/9.4	9.9	48/49 D
HFC-134	2.7	4.8	4.6		19.5/19.6	19.5	4.2/4.4	4.3	2.1/1.9	2.0	10.0/10.6	10.3	92/93 A
AB	-0.3	-	0.4/1.2	0.8	2.0/1.8	1.9			0.2/0.8	0.5	1.6/1.5	1.6	51/52 D
MO	0.1	-	1.8/1.4	1.6	2.9/3.9	3.4			0.5/1.6	1.1	3.0/4.0	3.5	52/53 D
PEMA	0.2	-	2.0/0.8	1.4	2.5/2.9	2.7			0.8/1.7	1.3	2.4/3.0	2.7	51/52 D
PEBA	0.5	-	0.9/0.9	0.9	2.2/2.6	2.4			0.9/-0.4	0.2	2.5/2.8	2.6	49/51 D
PPGD	0.7	-	3.8/4.5	4.2	12.4/13.9	13.2			4.8/4.3	4.6	12.7/14.2	13.5	41/42 D
PPGBM	0.2	-	1.0/1.3	1.2	2.6/2.9	2.8			0.7/0.4	0.6	2.8/3.1	3.0	52/52 D
MPG	-0.4	-	0.3/0.1	0.2	1.2/0.9	1.1			-0.4/-0.1	-0.3	1.3/1.0	1.2	53/56 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 62	Polyurethane (Ester-80 shore A)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca- 95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	32.2	32.1	32.1		135/144	140	3.2/10.9	7.1	-0.1/4.4	2.1	-1.6/6.1	2.3	
HFC-32	5.9	6.1	6.0		19.0/18.8	18.9	2.9/2.0	2.5	0.6/-0.2	0.2	3.5/2.8	3.2	81/82 A
HCFC-124	32.2	31.7	32.5		211/147	179	11.4/9.1	10.3	4.5/3.2	3.9	50.2/14.8	32.5	68/69 A
HFC-134a	2.2	3.8	3.7		14.0/14.3	14.2	2.9/3.8	3.4	1.4/2.0	1.7	6.4/1.9	6.7	
HFC-125	0.7	1.3	2.4		10.9/10.7	10.8	2.3/1.9	2.1	1.8/1.8	1.8	7.4/7.3	7.4	72/73 A
HFC-143a	0.2	0.9	1.0		4.5/4.7	4.6	1.0/1.4	1.2	0.1/0.8	0.4	3.0/3.2	3.1	
HFC-152a	4.4	4.8	4.3		-9.9/16.3	3.2	2.2/3.1	2.7	0.6/1.0	0.8	-18.4/5.0	-6.7	77/78 A
HCFC-123	61.4	61.8	62.0		391/374	382	17.4/17.7	17.6	6.3/6.4	6.4	26.4/26.7	26.6	67/68 A
HCFC-142b	2.7	4.4	5.0		16.3/16.8	16.6	3.2/3.7	3.5	1.8/1.4	1.6	8.1/7.9	8.0	76/77 A
HFC-134	17.5	20.7	19.2		88.0/84.8	86.4	11.2/10.9	11.1	2.7/3.7	3.2	16.9/17.1	17.0	66/67 A
AB	0.5	-	11.5/-0.5	5.5	0.4/0.3	0.4			0.7/-0.1	0.3	0.5/0.4	0.5	74/75 A
MO	0.4	-	0.1/-0.1	0	3.1/1.2	2.2			0.2/0.3	0.3	1.6/1.3	1.5	76/77 A
PEMA	-0.4	-	-0.2/0.8	0.3	1.2/1.4	1.3			0.2/0.6	0.4	1.3/1.6	1.5	72/73 A
PEBA	0.3	-	0.2/0.5	0.4	1.1/1.4	1.3			0.2/0.5	0.4	1.2/1.3	1.3	72/73 A
PPGD	1.2	-	5.4/4.6	5.0	14.6/12.7	13.7			5.4/4.6	5.0	15.1/13.3	14.3	70/71 A
PPGBM	-1.1	-	-1.1/-0.1	-0.6	1.0/0.6	0.8			0.2/0.3	0.3	1.0/0.7	0.9	74/75 A
MPG	0.8	-	-0.1/-0.6	-0.3	8.2/-7.6	0.3			0.3/0.5	0.4	8.5/-7.7	0.4	73/74 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 63	Polyurethane (Ether-50 shore D)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca-95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	17.0	15.7	16.5		59.7/58.2	59.0	7.5/5.9	6.7	3.2/2.5	2.9	10.4/10.3	10.4	48/49 D
HFC-32	3.1	4.1	4.3		12.0/11.8	11.9	1.6/1.7	1.7	1.2/-0.3	0.5	4.5/5.0	4.8	46/47 D
HCFC-124	2.8	8.9	8.7		39.6/39.6	39.6	6.7/5.0	5.9	4.6/3.4	4.0	20.5/20.1	20.3	48/49 D
HFC-134a	1.1	1.0	1.4		5.0/5.8	5.4	0.8/1.8	1.3	.1/2.8	1.4	4.0/4.5	4.3	51/52 D
HFC-125	-2.0	-0.9	0.8		2.3/2.4	2.4	-2.8/-0.4	-1.6	-18.1/-0.5	-9.3	1.8/1.8	1.8	53/54 D
HFC-143a	2.4	0.3	0.5		1.1/1.2	1.2	0.3/0.2	0.3	0.9/0.8	0.9	1.2/1.2	1.2	54/55 D
HFC-152a	0.2	3.0	3.3		8.8/8.9	8.9	3.3/3.2	3.3	1.9/1.8	1.9	6.4/6.4	6.4	50/51 D
HCFC-123	20.0	24.0	24.6		115/114	115	14.4/13.0	13.7	7.7/7.2	7.4	32.4/32.0	32.2	48/49 D
HCFC-142b	0.1	1.3	1.5		6.7/7.2	6.9	1.8/1.8	1.8	0.8/1.4	1.1	5.5/5.8	5.6	51/52 D
HFC-134	4.2	9.0	8.0		33.5/33.1	33.3	5.9/5.9	5.9	3.0/4.8	3.9	15.6/15.7	15.7	95/96 A
AB	0.1	-	0.6/-0.7	-0.1	-0.4/-0.3	-0.4			0.6/-0.1	0.3	-0.4/-0.3	-0.4	58/59 D
MO	0.4	-	0.1/0.3	0.2	0.2/0.2	0.2			-0.5/-0.9	-0.7	0.2/0.1	0.2	57/58 D
PEMA	-2.4	-	-2.1/-1.5	-1.8	0/-0.1	-0.1			-2.0/-1.5	-1.8	0.1/0.1	0.1	59/60 D
PEBA	-2.0	-	0.3/0.2	0.3	-0.1/-.1	-0.1			-1.4/0.3	-0.6	-0.1/-0.1	-0.1	59/60 D
PPGD	0.1	-	1.3/1.0	1.2	2.6/2.5	2.6			0.5/1.7	1.1	27.8/26.3	27.1	56/57 D
PPGBM	-0.7	-	0.4/0.1	0.2	0.1/0.1	0.1			-0.1/-0.2	-0.2	0.2/0.2	0.2	98/99 A
MPG	-0.3	-	-0.4/-1.1	-0.8	-0.3/-0.3	-0.3			0.1/1.3	0.7	-0.3/-0.2	-0.3	58/59 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 64	Polyurethane (Millable-Ester based)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca- 95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	48.4	46.0	48.7		196/152	174	-1.0/-0.7	-0.9	-3.4/-3.0	-3.2	-7.1/-7.5	-7.3	53/54 A
HFC-32*	4.1	4.7	4.0		20.4/18.4	19.4	2.3/-0.1	1.1	-4.8/-2.7	-3.8	-1.9/-1.6	-1.8	53/54 A
HCFC-124	49.3	48.7	51.9		299/270	285	6.3/5.3	5.8	0.2/-0.8	-0.3	2.8/2.3	2.6	50/51 A
HFC-134a	4.6	4.0	4.0		15.9/14.9	15.4	1.6/1.9	1.8	0.4/0.2	0.3	2.5/3.3	2.9	50/51 A
HFC-125*	1.5	3.0	2.6		11.8/12.2	12.0	4.6/1.8	3.2	14.8/9.0	11.9	5.1/4.6	4.9	41/42 A
HFC-143a	0.2	1.4	1.3		3.3/3.5	3.4	0.2/1.1	0.7	-0.4/0.1	-0.2	1.4/1.7	1.6	50/51 A
HFC-152a	5.8	5.8	6.0		15.1/14.8	15.0	2.4/1.9	2.2	-1.8/-1.3	-1.6	0.2/0.3	0.3	49/50 A
HCFC-123	92.9	92.4	93.6		717/752	734	4.0/7.8	5.9	-1.7/-0.3	-1.0	1.2/4.4	2.8	50/51 A
HCFC-142b	6.4	5.0	4.7		16.4/16.4	16.4	3.2/3.2	3.2	0.4/0.3	0.4	3.2/3.9	3.5	50/51 A
HFC-134	27.0	27.0	27.0		122/120	121	5.5/6.9	6.2	0.7/1.1	0.9	4.6/5.1	4.9	44/45 A
AB	0.3	-	0.1/-1.8	-0.9	-1.7/-1.3	-1.5			-0.3/-2.2	-1.3	-1.5/-1.2	-1.4	49/50 A
MO	-0.3	-	-0.4/-0.9	-0.7	-0.3/-0.2	-0.3			-0.6/-2.1	-1.4	-0.6/-0.3	-0.5	51/52 A
PEMA	-0.8	-	-0.5/-1.1	-0.8	-0.2/0.1	-0.1			-1.2/0.5	-0.4	-0.3/0.1	-0.1	52/53 A
PEBA	-1.3	-	1.1/-0.4	0.4	-0.1/0.1	0			-0.7/0.6	-0.1	0.1/0.2	0.2	52/53 A
PPGD	7.4	-	8.6/8.2	8.4	22.7/23.5	23.1			8.3/9.9	9.1	22.8/23.3	23.1	35/36 A
PPGBM	-1.1	-	0.1/-0.3	-0.1	-1.2/-0.8	-1.0			0.3/-0.4	-0.1	-1.1/-0.7	-0.9	49/50 A
MPG	0.3	-	-1.7/-0.6	-1.2	-1.8/-1.4	-1.6			-0.5/-0.6	-0.6	-1.7/-1.4	-1.6	50/51 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 65	Polyurethane (Millable-Ether based)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca- 95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	48.0	48.0	46.9		246/235	240	-1.6/-0.5	-1.1	-3.2/-2.1	-2.7	-6.5/-6.7	-6.6	48/49 A
HFC-32	5.6	5.6	6.1		16.5/14.8	15.7	0.3/-1.0	-0.4	-1.1/-2.3	-1.7	-1.3/-1.1	-1.2	61/62 A
HCFC-124	52.7	52.9	51.4		343/325	334	5.8/6.7	6.3	-2.5/-1.5	-2.0	1.7/1.2	1.5	46/47 A
HFC-134a	5.4	5.6	5.3		19.9/19.9	19.9	2.3/2.4	2.4	-0.4/-0.3	-0.4	1.2/1.2	1.2	50/51 A
HFC-125	7.2	7.0	6.8		26.4/26.9	26.7	4.0/4.8	4.4	0.7/0.6	0.7	6.0/6.6	6.3	49/50 A
HFC-143a	2.8	2.7	2.7		9.2/9.3	9.3	0.7/0.1	0.4	-0.2/-0.7	-0.5	0.1/0.2	0.2	49/50 A
HFC-152a	7.2	6.7	6.9		21.3/21.6	21.5	1.9/1.7	1.8	-1.1/-1.1	-1.1	-1.4/-1.2	-1.3	50/51 A
HCFC-123	96.2	98.8	103		917/920	918	13.2/13.1	13.1	-3.6/-2.2	-2.9	-1.9/-1.7	-1.8	50/51 A
HCFC-142b	15.5	15.8	15.2		61.2/59.4	60.3	3.9/3.4	3.6	-0.5/-1.5	-1.0	1.3/1.7	1.5	50/51 A
HFC-134	10.0	9.0	10.3		52.2/48.6	50.4	-0.2/1.6	0.7	-2.1/-1.4	-1.8	-1.3/-1.3	-1.3	51/52 A
AB	6.6	-	9.7/9.8	9.8	24.7/25.2	25.0			8.1/8.5	8.3	22.9/23.3	23.1	38/39 A
MO	9.0	-	7.8/8.7	8.3	26.0/27.0	26.5			7.3/7.3	7.3	22.6/22.7	22.7	43/44 A
PEMA	22.9	-	27.3/27.4	27.4	100/98.9	99.6			23.7/24.3	24.0	89.8/88.7	89.3	30/31 A
PEBA	8.9	-	17.5/18.7	18.1	60.8/58.9	59.2			16.3/18.4	17.3	55.8/55.6	55.7	33/34 A
PPGD	23.5	-	48.2/48.5	48.4	216/216	216			44.5/45.4	45.0	209/210	210	14/15 A
PPGBM	22.7	-	32.8/31.0	31.9	126/121	123			30.8/29.8	30.3	124/119	121	19/20 A
MPG	4.3	-	11.1/10.6	10.9	36.0/36.0	36.0			10.2/10.7	10.5	36.0/36.2	36.1	40/41 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 66	Polyurethane (Millable-Ester Based)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Moca-95% stoichiometry			PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	36.9	34.4	34.8		147/117	132	0.1/-0.6	-0.3	-2.8/-2.0	-2.4	-3.9/-4.1	-4.0	76/77 A
HFC-32	5.7	5.6	5.6		14.7/13.8	14.3	0.8/0	0.4	-1.5/-1.0	-1.3	-0.9/-0.7	-0.8	82/83 A
HCFC-124	33.7	35.2	35.8		169/145	157	5.4/5.8	5.6	-1.0/-0.5	-0.8	3.9/5.2	4.6	72/73 A
HFC-134a	3.2	3.0	3.1		10.8/11.0	10.9	1.9/1.1	1.5	0.1/-0.3	-0.1	3.1/2.9	3.0	74/75 A
HFC-125	1.2	2.2	2.3		8.7/9.3	9.0	2.0/2.1	2.1	0.6/0.1	0.4	4.4/4.9	4.7	72/73 A
HFC-143a	0.2	1.0	1.1		2.7/2.8	2.8	-0.1/0.1	0	-0.5/-0.5	-0.5	1.5/1.7	1.6	76/77 A
HFC-152a	4.5	4.3	4.2		10.5/11.0	10.8	1.3/1.1	1.2	-1.4/-0.3	-0.9	0.7/0.8	0.8	76/77 A
HCFC-123	61.9	59.4	63.9		360/360	360	6.0/4.3	5.1	0.5/-1.1	-0.3	5.3/3.9	4.6	71/72 A
HCFC-142b	4.6	4.1	3.7		12.1/12.3	12.2	1.6/2.3	2.0	0.9/0.6	0.7	3.5/3.7	3.6	74/75 A
HFC-134	18.8	19.2	19.6		79.1/75.7	77.4	5.5/4.3	4.9	0.1/0.1	0.1	3.9/3.5	3.7	73/74 A
AB	-0.2	-	-0.4/-0.8	-0.6	-1.2/-1.1	-1.2			-1.1/-1.0	-1.1	-1.0/-1.0	-1.0	79/80 A
MO	-0.5	-	-1.1/-0.1	-0.6	-0.8/-0.4	-0.6			-1.3/-0.3	-0.8	-0.3/-0.2	-0.3	32/32 D
PEMA	-0.7	-	-0.1/-0.8	-0.5	-0.1/0	-0.1			-0.4/-0.7	-0.6	-0.2/0.2	0	31/32 D
PEBA	-0.2	-	-0.4/-0.6	-0.5	-0.2/-0.2	-0.2			-1.0/0.3	-0.4	-0.1/0	-0.1	33/35 D
PPGD	1.4	-	5.5/6.1	5.8	13.8/14.5	14.2			5.1/5.9	5.5	14.4/15.2	14.8	64/65 A
PPGBM	-0.4	-	-0.4/-0.6	-0.5	-1.0/-0.9	-1.0			-1.3/-0.6	-1.0	-0.7/-0.5	-0.6	32/32 D
MPG	-0.8	-	-1.0/0	-0.5	-1.6/-1.6	-1.6			-0.9/-0.9	-0.9	-1.3/-1.3	-1.3	32/33 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 67		
	Chlorosulfonated polyethylene (Cl 29%, S 1.4%)	100.00
	Litharge	25.00
	2,2'-Benzothiazyl disulfide	0.50
	Dipentamethylenethiuram hexasulfide	2.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.1	9.0	8.9		31.3/30.6	31.0	3.5/3.9	3.7	-0.1/1.0	0	2.6/2.4	5.2	
HFC-32	2.0	2.3	1.7		5.5/5.6	5.7	-0.2/1.6	0.7	1.7/-1.0	0.4	1.3/0.9	1.1	60/61 A
HCFC-124	2.4	3.7	4.0		13.2/8.5	10.9	2.8/1.3	2.1	1.8/0.4	1.1	6.9/2.4	4.7	54/55 A
HFC-134a	-0.1	0.1	1.0		4.0/4.2	4.1	0.2/0.7	0.5	-0.7/0.7	0	2.9/3.0	3.0	
HFC-125	1.4	1.5	2.3		5.8/5.2	5.5	1.8/1.7	1.8	1.6/1.8	1.7	4.9/4.3	4.6	58/59 A
HFC-143a	-0.8	0.8	1.3		4.1/4.1	4.1	0.3/1.9	1.1	0.6/0.7	0.7	2.7/2.6	2.7	
HFC-152a	2.5	3.6	4.0		11.1/15.9	13.5	2.7/3.1	2.9	1.0/2.0	1.5	5.7/10.2	8.0	60/61 A
HCFC-123	23.3	22.4	22.6		107/107	107	10.0/11.4	10.7	3.1/4.0	3.6	18.0/17.6	17.8	57/58 A
HCFC-142b	6.4	6.2	5.6		21.4/21.4	21.4	3.6/4.5	4.1	2.4/1.0	1.7	8.2/8.0	8.1	52/53 A
HFC-134	0.7	1.0	1.0		4.9/6.1	5.5	1.3/1.0	1.2	1.1/0.5	0.8	3.8/4.0	3.9	56/57 A
AB	4.2	-	11.4/12.6	12.0	29.7/28.9	29.3			4.1/20.5	12.3	13.3/45.2	29.3	55/56 A
MO	8.5	-	17.2/19.9	18.6	53.6/54.1	54.0			18.7/16.5	17.6	52.9/53.2	53.1	50/51 A
PEMA	5.5	-	16.9/21.9	19.4	65.8/68.6	67.2			19.6/18.9	19.3	65.6/68.2	66.9	49/50 A
PEBA	6.1	-	16.4/14.4	15.4	48.7/46.2	47.5			12.8/14.7	13.7	48.0/45.8	46.9	46/47 A
PPGD	0.5	-	2.1/2.3	2.2	8.6/8.2	8.4			2.1/1.2	1.7	7.3/7.3	7.3	55/56 A
PPGBM	0.8	-	1.2/3.0	2.1	7.5/7.9	7.7			1.7/3.3	2.5	7.0/7.1	7.1	56/57 A
MPG	0.1	-	-1.8/-9.8	-5.8	2.9/2.7	2.8			0.4/0.2	0.3	2.5/2.2	2.4	53/54 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 68		
	Chlorosulfonated polyethylene	100.00
	Litharge	25.00
	Benzothiazyl disulfide	0.50
	Sulfur	2.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	9.1	8.6	8.2		27.8/27.9	27.9			2.0/2.0	2.0	5.9/6.7	6.3	58/59 A
HFC-32	2.5	2.6	1.7		5.5/5.4	5.5	2.5/0.9	1.7	0/0.1	0.1	2.0/2.2	2.1	61/62 A
HCFC-124	1.1	1.4	3.5		12.7/12.8	12.8	2.7/2.8	2.8	1.7/2.3	2.0	1.7/2.3	2.0	55/56 A
HFC-134a	0.3	0.3	1.2		3.5/3.2	3.4	0.7/0.9	0.8	0.7/0.9	0.8	2.1/2.0	2.1	
HFC-125	0.7	0.9	1.2		3.5/2.8	3.2	1.2/1.0	1.0	0.9/1.0	1.0	3.2/2.5	2.9	55/56 A
HFC-143a	1.0	1.4	2.2		5.0/4.9	5.0			1.7/1.4	1.6	4.0/4.0	4.0	55/56 A
HFC-152a	1.8	3.0	3.5		8.3/8.4	8.4	1.5/3.3	2.4	1.0/2.4	1.7	4.5/4.5	4.5	56/57 A
HCFC-123	18.6	18.9	18.7		75.2/75.0	75.1	13.3/12.6	13.0	5.2/5.0	5.1	21.6/21.5	21.5	53/54 A
HCFC-142b	3.6	6.0	6.1		17.7/17.9	17.8			3.3/3.6	3.5	10.0/10.1	10.1	54/55 A
HFC-134	0.5	0.9	1.5		4.7/4.8	4.8	2.2/1.3	1.8	2.1/1.2	1.7	3.5/3.7	3.6	57/58 A
AB	3.2	-	7.6/7.3	7.5	15.5/15.5	15.5			7.5/7.3	7.4	15.7/15.7	15.7	52/53 A
MO	4.3	-	12.2/12.1	12.2	29.0/28.5	28.8			12.1/12.0	12.1	28.1/27.9	28.0	49/50 A
PEMA	10.0	-	23.2/23.0	23.1	64.0/64.0	64.0			22.9/22.7	22.8	63.9/63.6	63.8	43/44 A
PEBA	-0.6	-	15.5/15.3	15.4	40.0/39.0	40.0			15.6/14.9	15.2	40.2/39.3	39.8	46/47 A
PPGD	1.7	-	3.5/3.2	3.4	7.5/7.3	7.4			3.4/5.1	4.3	7.4/7.3	7.4	54/55 A
PPGBM	0.3	-	1.5/1.7	1.6	3.7/3.7	3.7			1.5/1.7	1.6	3.4/3.5	3.5	55/56 A
MPG	0.1	-	0.3/0.2	0.3	1.1/1.1	1.1			0.1/0.1	0.1	0.9/0.9	0.9	59/60 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 69		
	Chlorosulfonated polyethylene (Cl 35%, S 1.0%)	100.00
	Magnesia	4.00
	Pentaerythritol	3.00
	Dipentamethylenethiuram hexasulfide	2.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.9	7.5	7.5		30.5/30.9	30.7	3.5/4.8	4.2	3.5/4.8	4.2	5.6/7.1	6.4	55/56 A
HFC-32	1.8	1.9	1.6		5.4/87.0	46.2	1.4/1.2	1.3	0.9/0	0.5	1.0/0.6	0.8	65/66 A
HCFC-124	1.0	2.7	3.0		13.0/13.1	13.1	2.5/3.4	3.0	2.2/2.2	2.2	11.0/11.0	11.0	54/55 A
HFC-134a	0.3	0.6	1.0		3.8/3.1	3.5	0.9/0.1	0.5	0.8/-0.1	0.4	3.4/2.8	3.1	57/58 A
HFC-125	0.7	1.6	1.9		5.7/5.7	5.7	1.2/1.4	1.3	1.5/1.1	1.3	5.1/4.9	5.0	54/55 A
HFC-143a	0.3	0.9	1.1		3.0/2.5	2.8	1.0/0.5	0.8	1.0/1.4	1.2	3.4/2.9	3.2	54/55 A
HFC-152a	1.7	3.0	3.0		8.4/8.4	8.4	2.4/2.5	2.5	1.3/1.4	1.4	6.1/5.4	5.8	55/56 A
HCFC-123	19.2	18.6	18.1		87.0/89.1	88.0	10.2/10.3	10.3	4.8/4.6	4.7	21.5/21.1	21.3	54/55 A
HCFC-142b	4.6	5.8	5.8		19.7/19.9	19.8	5.0/5.7	5.4	3.7/3.7	3.7	11.4/11.7	11.6	54/55 A
HFC-134	0.1	0.9	1.0		5.3/5.0	5.2	1.0/1.2	1.1	0.5/0.7	0.6	3.9/3.9	3.9	59/60 A
AB	2.4	-	8.2/5.2	6.7	18.7/14.3	16.5			6.8/5.6	5.2	18.7/14.6	16.7	53/54 A
MO	6.2	-	16.2/16.2	16.2	45.7/45.7	45.7			14.8/24.6	19.7	45.2/45.2	45.2	43/44 A
PEMA	15.0	-	33.9/33.9	33.9	124/119	122			35.5/35.4	35.5	126/121	123	27/28 A
PEBA	5.5	-	22.7/24.3	23.5	72.7/76.8	74.7			22.1/23.3	22.7	73.5/77.8	75.6	36/37 A
PPGD	-0.4	-	1.8/0.7	1.3	5.1/3.8	4.5			1.8/0.9	1.4	5.8/4.4	5.1	56/57 A
PPGBM	2.9	-	1.8/1.6	1.7	4.7/4.7	4.7			1.8/2.5	2.2	4.8/4.9	4.9	57/58 A
MPG	-1.0	-	0.2/0.1	0.2	1.0/1.2	1.1			0.4/-0.1	0.2	1.0/1.3	1.2	59/60 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 70				
	Chlorosulfonated polyethylene	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Litharge	20.00		PEBA - Pentaerythritol Ester Branched Acid
	Benzothiazyl disulfide	0.50		PPGBM - Polypropylene Glycol Butyl Monoether
	Dipentamethyllenethiuram hexasulfide	0.75		MO - Mineral Oil
	Magnesia	10.00		MPG - Modified Polyglycol
	Nickel Dibutyldithiocarbamate	3.00		PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.8	7.2	7.3		23.2/23.1	23.2			0.3/0.9	0.6	2.8/3.6	3.2	52/53 A
HFC-32	1.7	2.1	1.9		5.3/5.2	5.3	1.1/1.2	1.2	-0.3/-0.1	-0.2	1.7/1.8	1.8	56/57 A
HCFC-124	0.9	1.7	3.0		11.1/11.1	11.1	3.7/2.6	3.2	2.9/2.6	2.8	2.9/2.6	2.8	50/51 A
HFC-134a	-0.1	0	0.9		3.6/3.5	3.6	0.3/0.5	0.4	0.1/0.1	0.1	2.1/2.1	2.1	
HFC-125	1.1	1.2	1.3		3.8/3.8	3.8	1.5/1.5	1.5	1.1/1.1	1.1	3.4/3.4	3.4	53/54 A
HFC-143a	0.7	1.3	1.9		4.4/4.2	4.3			1.2/1.2	1.2	3.4/3.3	3.4	51/52 A
HFC-152a	1.7	3.0	3.1		7.6/7.5	7.6	2.3/1.9	2.1	1.0/1.2	1.1	3.9/3.7	3.8	52/53 A
HCFC-123	17.9	17.8	17.5		71.2/71.3	71.2	10.8/11.5	11.2	3.5/3.2	3.4	17.1/16.4	16.8	46/47 A
HCFC-142b	3.9	5.9	5.7		16.6/16.8	16.7			2.2/2.5	2.4	7.9/8.3	8.1	50/51
HFC-134	0.4	0.6	0.8		4.5/4.2	4.4	0.1/0.4	0.3	0.4/0.7	0.6	3.0/3.2	3.1	53/54 A
AB	3.5	-	8.2/7.9	8.1	17.4/17.8	17.6			8.5/7.0	7.8	17.6/17.9	17.8	41/42 A
MO	2.6	-	12.2/11.3	11.8	34.9/26.5	30.7			12.2/12.0	12.1	34.2/25.9	30.1	37/38 A
PEMA	14.0	-	34.3/31.4	32.9	107/99.1	103			33.0/31.2	32.1	107/99.0	103	21/22 A
PEBA	8.1	-	25.9/25.0	25.5	73.3/71.6	72.2			25.3/25.0	25.1	73.7/71.4	72.5	27/28 A
PPGD	0.7	-	1.8/2.2	2.0	4.9/5.4	5.2			1.4/1.6	1.5	4.9/5.4	5.2	51/52 A
PPGBM	1.1	-	1.5/1.3	1.4	2.7/2.9	2.8			1.3/0.1	0.7	2.5/2.7	2.6	49/50 A
MPG	-0.1	-	-0.2/-0.1	-0.2	0.7/0.8	0.8			-1.2/-1.2	-1.2	0.5/0.7	0.6	52/53 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 71		
	Chlorosulfonated polyethylene	100.00
	Litharge	25.00
	2,2'-Benzothiazyl disulfide	0.50
	Dipentamethylenethiuram	2.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.8	8.0	8.8		26.6/26.5	26.6	6.3/2.1	4.2	2.6/1.2	1.9	7.4/7.3	7.4	
HFC-32	1.8	2.0	2.0		5.6/5.6	5.6	1.5/1.1	1.3	0.5/0.9	0.7	2.6/2.7	2.7	63/64 A
HCFC-124	2.9	3.7	5.1		21.1/4.9	13.0	5.0/1.0	3.0	4.5/1.0	2.8	18.8/2.9	10.9	61/62 A
HFC-134a	0.1	0	0.6		2.2/2.3	2.3	-0.6/0.7	0.1	0.4/-0.1	0.1	1.6/1.7	1.7	
HFC-125	0.5	0.4	1.0		2.4/2.5	2.5	0.6/0.8	0.7	0.5/0.8	0.7	2.1/2.1	2.1	63/64 A
HFC-143a	-0.1	0.5	0.7		2.3/2.2	2.3	0.5/0.2	0.4	0.5/0.3	0.4	1.7/1.7	1.7	
HFC-152a	-0.6	0.6	-1.8		-1.6/13.7	6.1	0.2/3.5	1.9	-0.5/3.1	1.3	-4.4/10.6	3.1	63/64 A
HCFC-123	16.8	17.6	16.5		68.5/68.3	68.4	11.6/11.0	11.3	6.0/6.4	6.2	24.0/23.1	23.6	62/63 A
HCFC-142b	3.1	5.1	5.7		17.0/17.0	17.0	5.0/5.1	5.1	3.2/3.2	3.2	10.7/10.4	10.6	61/62 A
HFC-134	0.1	0.7	-0.4		4.0/4.0	4.0	0.7/0.9	0.8	0.4/0.6	0.5	3.0/3.0	3.0	62/63 A
AB	1.1	-	4.3/4.6	4.5	9.4/10.1	9.8			3.7/4.2	4.0	8.7/9.8	9.3	61/62 A
MO	3.9	-	9.2/9.5	9.4	22.5/23.5	23.0			8.5/9.2	8.9	22.1/23.0	22.6	57/58 A
PEMA	4.7	-	17.7/20.3	19.0	50.0/53.6	51.8			18.4/20.7	19.6	49.9/53.4	51.7	55/56 A
PEBA	2.5	-	10.6/11.6	11.1	27.2/28.8	28.0			10.9/11.7	11.3	26.9/28.6	27.7	55/56 A
PPGD	0.7	-	1.9/1.8	1.9	5.2/4.9	5.1			1.7/1.2	1.5	4.8/4.7	4.8	60/61 A
PPGBM	0.9	-	1.4/1.4	1.4	3.7/3.6	3.7			1.4/1.3	1.4	3.4/3.5	3.5	63/64 A
MPG	0.2	-	0.3/-2.5	-1.1	1.6/1.4	1.5			-0.1/-0.2	-0.2	1.0/0.9	1.0	62/63 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 72	EP Rubber	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Dicumyl Peroxide	3.00		PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	6.0	6.0	5.9		27.6/26.9	27.3	11.1/10.9	11.0	-0.5/-0.5	-0.5	-1.1/-0.7	-0.9	
HFC-32*	0.4	0.2	0.7		3.6/3.6	3.6	0.1/-0.1	0	-0.8/-0.6	-0.7	-0.6/-0.3	-0.5	46/47 A
HCFC-124	2.8	3.0	2.7		19.1/18.2	18.7	0.5/0.4	0.5	-1.2/-0.9	-1.1	-0.2/0.1	-0.1	
HFC-134a	1.8	2.3	3.4		10.3/5.6	8.0	1.7/0.9	1.3	1.7/1.1	1.4	5.0/1.7	3.4	
HFC-125*	3.3	3.3	2.8		9.2/7.6	8.4	3.8/2.7	3.3	1.9/0.5	1.2	4.9/3.6	4.3	
HFC-143a*	1.4	1.5	0.9		4.1/3.7	3.9	0.9/1.9	1.4	-0.2/0	-0.1	-1.5/-1.8	-1.7	
HFC-152a	1.0	1.0	1.1		5.8/5.0	5.4	-0.2/-0.1	-0.2	-1.3/-1.4	-1.4	-2.0/-2.1	-2.1	43/44 A
HCFC-123	15.9	16.1	16.2		105/105	105	4.2/3.6	3.9	-0.9/-1.2	-1.1	1.9/0.3	1.1	44/45 A
HCFC-142b	7.5	7.4	7.6		31.7/31.7	31.7	4.8/4.0	4.4	-0.8/-0.5	-0.7	0.1/0.8	0.5	
HFC-134	0.6	0.6	0.1		3.5/3.4	3.5	-0.6/0.2	-0.2	-0.6/-0.3	-0.5	-0.3/-0.2	-0.3	45/46 A
AB	58.9	-	70.7/72.8	71.7	434/425	429			69.6/68.8	69.2	430/422	426	7/8 A
MO	66.2	-	83.4/83.3	83.4	560/534	547			79.3/82.6	81.0	553/532	542	6/7 A
PEMA	3.1	-	3.2/3.1	3.2	12.7/12.6	12.7			1.9/2.8	2.4	11.9/11.9	11.9	33/34 A
PEBA	3.2	-	3.2/2.6	2.9	12.1/12.3	12.2			3.3/2.2	2.7	11.2/11.3	11.2	34/35 A
PPGD	0.1	-	0.2/-0.1	0.1	0.4/0.3	0.3			-0.4/-0.4	-0.4	0.1/0.1	0.1	36/37 A
PPGBM	0.7	-	0.4/0.4	0.4	1.5/1.6	1.6			-0.6/0.1	-0.3	1.3/1.2	1.3	36/37 A
MPG	-0.2	-	-0.5/-0.1	-0.3	-0.3/0.4	0.1			-0.9/-0.5	-0.7	-0.5/0.1	-0.4	36/37 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 73		
	EP Rubber	100.00
	Dicumyl Peroxide	3.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.5	4.4	4.5		19.5/19.3	19.4	1.4/1.1	1.3	-1.5/-0.6	-1.1	-1.2/0.2	-0.5	
HFC-32	1.0	0.8	0.5		2.3/2.1	2.2	0.8/0.2	0.5	-0.3/-0.5	-0.4	-0.2/-0.3	-0.3	70/71 A
HCFC-124	2.1	2.4	2.4		10.8/11.3	11.1	0.4/0.6	0.5	0/-0.2	-0.1	-0.3/0.1	-0.2	
HFC-134a	0.9	1.1	0.8		2.0/1.3	1.7	-0.2/0.2	0	0.1/-0.1	0	-1.1/-1.1	-1.1	
HFC-125	2.2	2.1	2.1		7.8/6.7	7.3	1.5/1.5	1.5	1.5/1.2	1.4	4.9/4.0	4.5	
HFC-143a	1.3	1.3	1.2		2.7/2.6	2.7	0.9/0.5	0.7	0.8/0.5	0.7	-1.1/-1.0	-1.1	
HFC-152a	1.1	1.1	1.2		4.3/3.8	4.1	-1.1/-0.4	-0.8	-1.2/-1.0	-1.1	-1.5/-1.5	-1.5	66/67 A
HCFC-123	9.1	9.0	9.0		52.1/52.2	52.2	2.7/2.5	2.6	-0.7/-0.9	-0.8	0.1/0.7	0.4	67/68 A
HCFC-142b	4.9	4.9	4.8		19.8/19.5	19.7	3.0/2.9	3.0	-0.3/-0.2	-0.3	0.5/1.1	0.8	
HFC-134	0.3	0.6	0.9		2.5/2.4	2.5	0.3/-0.7	-0.2	-0.6/-1.0	-0.8	-0.1/0	-0.1	69/70 A
AB	41.0	-	49.7/48.4	49.1	231/232	232			47.2/44.5	45.9	279/219	249	28/29 A
MO	53.6	-	58.2/59.3	58.8	314/317	315			57.4/56.7	57.1	309/310	310	22/23 A
PEMA	2.6	-	2.5/1.6	2.1	9.4/9.3	9.4			1.7/2.2	2.0	8.7/8.6	8.7	60/61 A
PEBA	2.5	-	2.8/2.4	2.6	9.6/9.8	9.7			2.2/2.3	2.3	8.7/8.8	8.7	62/63 A
PPGD	0.8	-	0.4/0.1	0.3	1.2/1.4	1.3			-0.4/-0.2	-0.3	0.6/1.0	0.8	63/64 A
PPGBM	1.3	-	1.1/0.4	0.7	2.9/1.3	2.1			0.5/-0.3	0.1	2.6/0.9	1.8	64/65 A
MPG	0.4	-	0.1/0	0.1	0.3/-0.1	0.1			-0.4/-0.5	-0.5	0.1/-0.3	-0.1	62/63 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 74		
	EP Rubber	100.00
	Dicumyl Peroxide	3.00
	N330 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	2.7	2.8	2.6		13.0/13.2	13.1	1.2/0.6	0.9	-0.7/-0.6	-0.7	-0.6/-0.4	-0.5	
HFC-32	0.6	0.7	0.1		1.4/1.2	1.3	-0.1/-0.2	-0.2	-0.1/-0.4	-0.3	-0.5/-0.4	-0.5	85/86 A
HCFC-124	1.1	1.2	1.2		7.1/7.4	7.3	-0.3/0.4	0.1	-0.6/-0.2	-0.4	-0.4/0.4	0	
HFC-134a	0.2	0.3	0.2		0.3/0.3	0.3	-0.6/-0.7	-0.7	-0.6/-0.7	-0.7	-1.1/-1.1	-1.1	
HFC-125	1.8	1.8	1.7		5.6/5.4	5.5	0.5/1.1	0.8	0.8/0.8	0.8	3.5/3.4	3.5	
HFC-143a	1.2	0.9	1.21		2.4/3.1	2.8	0.3/0.4	0.4	0/0.2	0.1	-0.3/0.5	0.1	
HFC-152a	0.6	0.3	0.5		2.9/3.0	3.0	-0.5/0.1	-0.2	-0.6/-0.3	-0.5	-1.4/-1.3	-1.4	82/83 A
HCFC-123	6.8	6.6	6.1		35.9/36.3	36.1	1.9/2.4	2.3	-0.6/0	-0.3	-0.3/0.4	0.1	81/82 A
HCFC-142b	3.5	3.4	3.3		13.6/13.3	13.5	1.4/1.9	1.7	-0.5/-0.5	-0.5	0.1/0.6	0.4	
HFC-134	0.3	0.6	-0.2		1.4/1.1	1.3	0.1/0.1	0.1	-0.4/-0.4	-0.4	-0.2/-0.3	-0.3	83/84 A
AB	31.5	-	36.6/36.6	36.6	148/147	147			34.6/34.4	34.5	140/140	140	44/45 A
MO	38.5	-	45.0/43.4	44.2	206/200	203			45.1/43.5	44.3	202/197	200	38/39 A
PEMA	2.0	-	1.4/1.1	1.3	6.0/6.0	6.0			1.2/1.9	1.6	5.5/5.5	5.5	79/80 A
PEBA	1.4	-	1.9/1.4	1.6	6.3/6.5	6.4			1.4/1.5	1.5	5.5/5.5	5.5	78/79 A
PPGD	0.3	-	0.1/0.1	0.1	0.4/0.4	0.4			0.2/0	0.1	0.1/0	0.1	81/82 A
PPGBM	-0.1	-	-0.2/0.4	0.1	0.8/0.9	0.9			0.2/0.1	0.2	0.7/0.8	0.8	81/82 A
MPG	0.1	-	-0.6/-0.1	-0.4	-0.2/0.2	0			-0.3/-0.1	-0.2	-0.4/0.1	-0.2	81/82 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 75	Ethylene Acrylic Elastomer	100.00
	Methylene Diamine	1.00
	Diphenylguanidine	3.20

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22*	78.6	77.5	77.4		116/334	225			-4.2/-3.2	-3.7	-10.7/-10.3	-10.5	41/42 A
HFC-32*	10.3	11.2	10.3		32.6/26.3	29.5	0.4/0.8	0.6	-0.3/-0.7	-0.5	-0.8/-0.8	-0.8	44/45 A
HCFC-124*	88.8	87.3	86.3		603/564	585	74.4/70.1	72.3	-2.5/-2.7	-2.6	-2.5/-2.7	-2.6	38/39 A
HFC-134a*	11.9	11.9	12.3		50.7/49.6	50.2	3.3/5.3	4.3	1.6/2.8	2.2	3.2/3.6	3.4	
HFC-125*	16.9	17.0	16.7		74.2/73.9	74.1	5.5/3.0	4.3	1.6/1.8	1.7	4.0/5.0	4.5	36/37 A
HFC-143a	5.3	5.5	5.5		18.5/18.0	18.3			2.6/8.1	5.4	1.0/1.1	1.1	31/32 A
HFC-152a	14.4	14.3	14.2		46.4/44.9	45.7	4.6/4.8	4.7	-1.0/0.4	-0.3	1.8/2.3	2.1	37/38 A
HCFC-123*	119	117	116		1209/1194	1202	7.5/5.9	6.7	-0.5/-2.0	-1.3	-4.1/-4.7	-4.4	33/34 A
HCFC-142b	31.4	30.6	31.1		130/126	128			-0.6/0.5	-0.1	4.4/5.4	4.9	38/39 A
HFC-134	27.2	27.3	27.0		135/128	131	11.4/7.5	9.5	2.7/1.1	1.9	15.9/13.5	14.7	34/35 A
AB	8.1	-	14.2/14.3	14.3	40.9/41.2	41.1			12.6/13.0	12.8	40.7/41.3	41.0	24/25 A
MO	6.1	-	11.0/10.6	10.8	31.6/31.8	31.7			10.1/8.8	9.5	31.0/31.3	31.2	26/27 A
PEMA	38.8	-	54.7/54.7	54.7	260/257	259			51.2/51.4	51.3	257/255	256	13/14 A
PEBA	28.9	-	51.2/51.3	51.3	242/232	237			51.2/50.2	50.7	240/232	236	14/15 A
PPGD	37.5	-	50.9/50.8	50.9	237/235	236			46.8/46.1	46.5	232/228	230	14/15 A
PPGBM	22.0	-	47.8/46.5	47.2	208/204	206			46.6/44.1	45.4	207/201	204	14/15 A
MPG	19.1	-	49.4/40.5	45.0	221/180	201			45.7/38.6	42.2	219/180	200	14/15 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 76		
	Ethylene Acrylic Elastomer	100.00
	N 774	35.00
	Methylene Dianiline	1.00
	Diphenylguanidine	4.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	47.2	46.0	46.7		183/164	174			-3.4/-3.5	-3.5	-6.2/-5.9	-6.1	65/66 A
HFC-32	7.0	9.0	7.2		20.4/19.5	20.0	1.9/-6.7	-2.4	-0.1/-0.6	-0.4	0.2/0.1	0.2	71/72 A
HCFC-124	51.2	50.9	48.0		277/248	263	50.2/49.0	49.6	-0.8/-1.0	-0.9	-0.8/-1.0	-0.9	59/60 A
HFC-134a	8.5	8.3	7.9		29.9/29.9	29.9	2.0/2.8	2.4	0.2/0.7	0.5	0.8/1.1	1.0	
HFC-125	11.7	12.0	11.5		44.8/44.7	44.8	6.6/7.1	6.9	2.5/3.0	2.8	10.2/9.9	10.1	58/59 A
HFC-143a	4.4	4.5	4.7		10.7/10.5	10.6			1.7/2.6	2.2	3.1/3.4	3.3	62/63 A
HFC-152a	9.4	9.5	9.5		27.2/27.5	27.4	3.5/4.2	3.9	-0.7/0.1	-0.4	0.6/0.8	0.7	64/65 A
HCFC-123	65.3	66.0	69.1		458/455	456	7.2/6.9	7.0	-0.5/-0.8	-0.7	3.9/4.4	4.2	60/61 A
HCFC-142b	21.2	20.5	20.1		81.4/78.6	80.0			-0.3/-0.3	-0.3	1.6/2.8	2.2	59/60 A
HFC-134	18.9	18.2	18.1		76.6/30.1	53.4	4.4/4.6	4.5	0.1/0.5	0.3	3.6/3.6	3.6	61/62 A
AB	5.1	-	10.2/10.1	10.2	24.4/24.7	24.6			8.6/8.9	8.8	24.6/24.9	24.8	49/50 A
MO	3.9	-	7.3/7.5	7.4	19.3/20.1	19.7			5.7/5.8	5.8	18.7/19.5	19.1	52/53 A
PEMA	23.7	-	32.4/32.6	32.5	117/117	117			32.0/32.2	32.1	116/117	116	38/39 A
PEBA	17.9	-	31.5/30.7	31.2	108/107	108			32.3/29.2	30.8	108/108	108	40/41 A
PPGD	23.0	-	29.7/29.9	29.8	105/105	105			28/.3/26.7	27.5	103/103	103	39/40 A
PPGBM	14.6	-	28.3/28.2	28.3	93.2/92.6	92.9			29.0/28.6	28.8	92.9/92.6	92.8	40/41 A
MPG	7.6	-	25.4/28.1	26.8	82.0/100	91.0			26.1/26.1	26.1	82.0/99.0	91.0	42/43 A

* Indicates that material shows some form of deteriorative effect alter removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 77		
	Chlorinated Polyethylene	100.00
	Magnesium oxide	10.00
	Triallyl Isocyanurate	2.00
	Dicumyl peroxide	8.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	7.0	3.7	6.8		25.9/25.6	25.8	3.8/4.2	4.0	1.0/1.1	1.1	6.5/6.3	6.4	
HFC-32	1.4	1.5	1.3		4.8/4.5	4.7	0.3/0.1	0.2	-0.4/-0.5	-0.5	1.8/1.4	1.6	67/68 A
HCFC-124	0.9	1.2	2.6		6.4/6.8	6.6	2.2/2.0	2.1	2.2/1.5	1.9	3.9/4.3	4.1	63/64 A
HFC-134a	0.2	0.1	0.8		3.1/2.5	2.8	0.5/0.1	0.3	0.2/0.1	0.2	1.9/1.7	1.8	
HFC-125	0.2	0.2	0.7		3.0/2.8	2.9	0.5/0.9	0.7	0.5/0.6	0.6	2.6/2.4	2.5	65/66 A
HFC-143a	0.3	0.5	1.0		2.4/2.5	2.5	0.7/-0.4	0.2	0.2/-0.7	-0.3	1.7/1.7	1.7	
HFC-152a	0.8	2.0	1.9		11.0/10.2	10.6	1.1/1.6	1.4	1.1/1.1	1.1	7.6/7.2	7.4	64/65 A
HCFC-123	15.8	15.0	14.9		72.4/72.8	72.6	9.3/9.9	9.6	4.8/5.5	5.2	41.5/25.6	33.6	63/64 A
HCFC-142b	3.1	4.8	4.9		17.2/17.0	17.1	3.5/4.3	3.9	1.7/2.2	2.0	8.9/9.4	9.2	61/62 A
HFC-134	0.1	0.2	0.5		3.1/3.4	3.3	0.7/0.9	0.8	0.1/0.7	0.4	2.4/2.7	2.6	64/65 A
AB	1.9	-	7.5/7.4	7.5	18.5/18.7	18.6			6.3/6.5	6.4	17.8/18.3	18.1	55/56 A
MO	4.9	-	13.8/12.9	13.4	39.1/34.8	37.0			13.2/12.5	13.0	38.3/34.4	36.4	52/53 A
PEMA	6.6	-	21.6/21.2	21.4	63.8/68.8	66.3			21.1/20.8	21.0	69.8/68.7	69.3	48/49 A
PEBA	3.5	-	13.2/14.0	13.6	40.3/43.0	41.7			12.8/13.8	13.3	40.1/42.4	41.2	51/52 A
PPGD	0.4	-	1.6/1.4	1.5	4.6/4.3	4.5			1.4/1.1	1.3	4.0/4.0	4.0	62/63 A
PPGBM	0.3	-	1.2/1.1	1.2	3.8/3.6	3.7			0.5/0.8	0.7	3.5/3.5	3.5	63/64 A
MPG	0.1	-	0.2/0.2	0.2	0.5/1.0	0.8			0.1/0.2	0.2	0.2/0.5	0.4	64/65 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 78		
	Chlorinated PE	100.00
	Magnesium Dioxide	10.00
	Triallyl Isocyanurate	2.00
	Dicumyl Peroxide on Clay	4.00
	N330 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.7	4.2	4.5		18.6/18.4	18.5			0.8/1.2	1.0	4.0/3.8	3.9	78/79 A
HFC-32	1.0	1.4	1.2		3.5/3.5	3.5	0/-0.3	-0.2	0.5/0.3	0.4	1.3/1.3	1.3	83/84 A
HCFC-124	0	0.4	1.3		7.5/7.3	7.4	1.2/1.5	1.4	1.0/1.6	1.3	1.0/1.6	1.3	75/76 A
HFC-134a	0.2	0.3	0.6		2.2/2.0	2.1	0.5/0.1	0.3	0.4/-0.1	0.2	1.1/0.9	1.0	
HFC-125	0.0	0.3			2.2/2.1	2.2	1.1/1.0	1.1	0.7/0.2	0.5	1.8/1.8	1.8	81/82 A
HFC-143a	-0.1	0.2	0.5		1.7/1.8	1.8			1.1/0.9	1.0	1.2/1.3	1.3	81/82 A
HFC-152a	1.1	2.0	2.0		4.7/4.9	4.8	2.1/1.8	2.0	0.4/1.5	1.0	2.5/2.7	2.6	80/81 A
HCFC-123	10.2	11.7	10.2		49.0/49.5	49.2	8.3/9.4	8.8	3.4/4.7	4.1	16.6/20.5	18.6	75/76 A
HCFC-142b	1.0	3.5	3.8		12.6/12.6	12.6			1.3/2.5	1.9	7.0/7.1	7.1	74/75 A
HFC-134	0.1	0.2	0.4		1.7/2.2	2.0	-0.1/0.5	0.2	-0.8/-0.2	-0.5	1.8/1.8	1.8	82/83 A
AB	1.8	-	6.4/6.5	6.5	14.5/14.8	14.7			5.9/6.9	6.4	14.6/15.0	14.8	70/71 A
MO	3.1	-	9.9/9.4	9.7	25.8/25.4	25.6			9.6/9.0	9.3	25.2/24.9	25.1	70/71 A
PEMA	5.7	-	14.2/13.8	14.0	42.0/40.8	41.4			14.2/13.0	13.6	41.8/41.0	41.04	65/66 A
PEBA	2.1	-	11.1/10.7	10.9	31.6/30.2	30.9			11.4/11.0	11.2	32.0/31.0	32.0	66/67 A
PPGD	0.6	-	1.3/1.6	1.5	4.0/4.1	4.1			1.9/1.4	1.7	4.6/4.6	4.6	78/79 A
PPGBM	0.2	-	1.0/1.0	1.0	2.1/2.0	2.1			-0.1/-0.6	-0.3	1.9/1.7	1.8	78/79 A
MPG	0.4	-	-0.1/-0.1	-0.1	0.1/0.1	0.1			-1.1/0.1	-0.5	-0.1/-0.1	-0.1	83/84 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 79		
	Chlorinated Polyethylene	100.00
	Magnesium Oxide	10.00
	Triallyl Isocyanurate	2.00
	Dicumyl peroxide	8.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	5.4	5.3	5.0		18.6/18.8	18.7	2.2/3.0	2.6	0.6/0.9	0.8	5.2/6.4	5.8	64/65 A
HFC-32	1.5	1.8	1.3		4.6/4.1	4.4	0.7/0.2	0.5	0.1/0.2	0.2	2.2/1.8	2.0	68/69 A
HCFC-124	0.6	0.8	0.8		4.2/3.7	4.0	1.1/0.8	1.0	0.8/0.5	0.7	4.1/3.6	3.9	62/63 A
HFC-134a	0.1	-0.1	-0.1		0.5/0.9	0.7	-0.7/-0.5	-0.6	-0.4/0.1	-0.2	0.9/1.0	1.0	68/69 A
HFC-125	-0.1	0.6	0.8		1.9/2.5	2.2	0.4/0.4	0.4	0.8/0.5	0.7	1.5/1.5	1.5	69/70 A
HFC-143a	-0.1	0.4	0.3		0.6/0.6	0.6	0.7/-0.3	0.2	0.3/-0.3	0	1.2/1.3	1.3	67/68 A
HFC-152a	1.4	1.9	2.3		5.1/6.2	5.7	1.6/2.2	1.9	1.0/1.1	1.1	3.6/4.5	4.1	63/64 A
HCFC-123	9.8	10.2	9.8		47.2/46.2	46.7	7.7/7.2	7.4	3.5/3.7	3.6	20.7/19.0	19.8	55/56 A
HCFC-142b	1.7	2.6	3.4		12.7/13.3	13.0	2.9/3.0	3.0	1.6/3.0	2.3	9.7/10.6	10.2	59/60 A
HFC-134	-0.1	0.5	0.5		2.4/2.1	2.2	-0.5/0.4	-0.1	-0.1/-0.1	-0.1	2.0/1.9	2.0	69/70 A
AB	1.2	-	5.0/4.2	4.6	11.7/10.7	11.2			3.6/3.7	3.7	11.4/10.5	11.0	61/62 A
MO	-1.2	-	5.6/5.7	5.7	14.3/15.8	15.1			5.7/5.7	5.7	13.0/14.7	13.9	62/63 A
PEMA	8.3	-	31.7/34.5	33.1	119/131	125			28.4/34.9	31.7	119/131	125	35/36 A
PEBA	6.6	-	23.2		78.2				20.7		74.4		36/37 A
PPGD	0.2	-	0/0.7	0.4	2.0/2.1	2.1			0.8/-0.4	0.2	1.9/1.9	1.9	66/67 A
PPGBM	-0.3	-	-0.2/-0.2	-0.2	1.3/1.0	1.2			-0.3/0.4	0.1	-0.1/0	-0.1	70/71 A
MPG	-0.2	-	-0.7/-1.6	-1.2	-1.5/-1.4	-1.5			-2.1/-1.7	-1.9	-1.8/-1.5	-1.7	74/75 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 80	EPDM (High Ethylene Content)	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
	Zinc Oxide	5.00		PEBA - Pentaerythritol Ester Branched Acid
	Sulfur	1.50		PPGBM - Polypropylene Glycol Butyl Monoether
	Stearic Acid	1.00		MO - Mineral Oil
	TMTD	1.00		MPG - Modified Polyglycol
	MBT	0.50		PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	3.9	4.3	3.8		16.7/16.0	16.4	0.9		-0.3/-1.1	-0.7	-1.2/-1.5	-1.4	
HFC-32	0.8	0.9	0.7		2.1/2.0	2.1	-0.3/-0.2	-0.2	-0.6/-0.1	-0.4	-0.5/-0.4	-0.5	78/79 A
HCFC-124	1.7	2.2	2.1		10.2/10.6	10.4	1.1/2.2	1.7	0.5		2.4/2.5	2.5	
HFC-134a	0.5		0.6		2.4/2.5	2.5	-0.3		-0.5/-0.3	-0.4	0.1/0.1	0.1	
HFC-125	2.3	2.9	2.8		9.0/9.0	9.0	2.5		2.2/1.2	1.7	6.3/5.8	6.1	
HFC-143a	1.0	0.9	0.7		2.7/2.4	2.6	-0.1		0/-0.5	-0.3	-0.1/-0.1	-0.1	
HFC-152a	1.1	1.0	0.9		4.0/3.6	3.8	0.1		-1.2/-0.5	-0.9	-0.7/-0.6	-0.7	
HCFC-123	7.9	8.8	8.8		46.5/46.4	46.5	3.6		0.2/1.0	0.6	5.1/5.9	5.5	
HCFC-142b	3.7	3.6	3.9		15.3/15.5	15.4	0.9		-0.4/0.7	0.2	0.3/0.4	0.4	
HFC-134	0.5	0.8	0.6		2.6/2.5	2.6	-0.6/-0.4	-0.5	-0.6/-0.7	-0.7	0.4/0.8	0.6	77/78 A
AB	30.3	-	35.8/35.6	35.7	142/141	142			34.8/34.8	34.8	130/130	130	
MO	37.6	-	42.4/42.2	42.3	186/185	186					181/181	181	
PEMA	2.7	-	2.3/2.3	2.3	7.1/7.4	7.3			1.0/1.4	1.2	5.8/6.0	5.9	
PEBA	1.9	-	2.3/2.4	2.4	8.2/8.0	8.1					6.9/6.7	6.8	
PPGD	0.3	-	0.2/0	0.1	0.1/0.2	0.2					-0.1/-0.1	-0.1	
PPGBM	0.9	-	0.2/0.6	0.4	1.5/1.6	1.6			-0.1/0.4	0.2	0.6/0.7	0.7	
MPG	-0.1	-	-0.2/-0.3	-0.3	0.2/0.1	0.2			-0.7/-0.5	-0.6	-0.4/-.4	-0.4	73/74 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 81		
	EPDM (High Unsaturation)	100.00
	Zinc Oxide	5.00
	Sulfur	1.50
	Stearic Acid	1.00
	TMTD	1.00
	MBT	0.50

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	5.5	5.3	5.0		24.3/23.8	24.1	3.4		-1.0/-0.2	-0.6	-1.6/-1.6	-1.6	
HFC-32	1.4	1.1	0.9		3.4/3.3	3.4	0.2/0.1	0.2	0.5/-0.1	0.2	-0.4/-0.4	-0.4	59/60 A
HCFC-124	3.1	3.8	3.5		15.5/19.1	17.3	2.5/2.7	2.6	0.8		2.0/5.4	3.7	
HFC-134a	0.9		0.7		3.7/3.8	3.8	-0.4		0.1/0.3	0.2	0.2/0.4	0.3	
HFC-125	3.8	3.6	3.6		11.5/10.9	11.2	3.3		3.1/0.9	2.0	7.8/6.7	7.3	
HFC-143a	1.1	1.2	1.0		5.0/4.5	4.8	0.3		-0.2/0	-0.1	4.3/0.1	2.2	
HFC-152a	1.4	1.6	1.6		5.6/5.9	5.8	1.1		-0.3/-0.7	-0.5	-0.4/-0.4	-0.4	
HCFC-123	14.6	14.6	14.5		79.3/79.6	79.5	4.0		0.8/0.9	0.9	5.8/6.2	6.0	
HCFC-142b	6.3	6.3	6.1		25.5/25.3	25.4	2.5		-0.2/0.1	-0.1	0.5/0.8	0.7	
HFC-134	0.3	0.8	-0.6		4.1/3.6	3.9	0.3/0.2	0.3	-0.5/-0.6	-0.6	0.5/0.6	0.6	56/57 A
AB	28.5	-	35.6/37.1	36.4	149/148	148			37.0/36.4	36.7	149/149	149	
MO	32.0	-	41.7/42.6	42.2	188/188	188					183/184	184	
PEMA	2.6	-	3.2/3.2	3.2	10.6/10.6	10.6			2.3/1.8	2.1	8.1/8.2	8.2	
PEBA	2.2	-	3.4/3.3	3.4	11.1/10.9	11.0					9.0/8.9	9.0	
PPGD	0.5	-	-0.6/-0.1	-0.4	0.3/0.6	0.5					0.1/0.1	0.1	
PPGBM	0.5	-	-0.3/0.6	0.2	2.2/2.4	2.3			-0.2/-0.3	-0.3	1.0/1.1	1.1	
MPG	0.3	-	0.2/0.2	0.2	0.8/0.7	0.8			-0.1/-0.5	-0.3	0.2/0.2	0.2	55/56 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 82		
	EPDM	100.00
	Zinc Oxide	5.00
	Sulfur	1.50
	Stearic Acid	1.00
	TMTD	1.00
	MBT	0.50

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.4	4.9	4.5		19.0/18.5	18.8	2.5/4.2	3.4	-0.5/-0.3	-0.4	-1.9/-1.8	-1.9	
HFC-32	0.9	1.0	0.7		2.4/2.4	2.4	-0.6/-0.6	-0.6	-0.6/-0.6	-0.6	0.4/-0.3	-0.1	72/73 A
HCFC-124	2.2	2.5	2.5		12.5/12.1	12.3	1.7/2.3	2.0	-0.2/-0.2	-0.2	2.2/1.9	2.1	
HFC-134a	0.3	0.3	0.2		2.9/2.9	2.9	0.2/0.5	0.4	-0.5/-0.3	-0.4	0.4/0.1	0.3	
HFC-125	2.6	3.5	3.3		10.6/9.5	10.1	3.3		2.5/1.1	1.8	7.5/6.3	6.9	
HFC-143a	0.8	0.7	0.6		3.4/3.4	3.4	-0.2		0.1/-0.9	-0.4	0/-0.4	-0.2	
HFC-152a	1.3	1.3	1.3		4.0/5.2	4.6	0.2		-1.0/-0.2	-0.6	-1.0/-0.8	-0.9	
HCFC-123	10.0	9.8	9.6		56.4/56.2	56.3	4.1		0.7/0.6	0.7	4.5/3.4	4.0	
HCFC-142b	4.9	5.0	5.1		19.5/19.1	19.3	2.6		0.1/-0.3	-0.1	-0.5/-0.3	-0.4	
HFC-134	0.6	0.9	0.6		2.9/2.6	2.8	-0.2/0.1	-0.1	1.1/-0.6	0.3	0.1/0.1	0.1	70/71 A
AB	28.4	-	35.1/34.9	35.0	143/143	143			36.4/35.3	36.0	138/138	138	
MO	35.9	-	41.9/41.8	41.9	184/186	185					180/181	181	
PEMA	2.8	-	2.4/2.3	2.4	7.4/7.4	7.4			1.0/1.5	1.3	5.9/5.9	5.9	
PEBA	1.5	-	2.2/2.3	2.3	8.0/8.0	8.0					6.6/6.3	6.5	
PPGD	0.2	-	0.2/-0.4	-0.1	0.1/0	0.1					-0.1/-0.1	-0.1	
PPGBM	0.4	-	-0.5/1.1	0.5	1.6/1.6	1.6			-0.3/0.5	0.1	0.5/0.7	0.6	
MPG	0.2	-	0.1/-0.1	0	0.2/0.1	0.2			-0.5/-0.8	-0.7	-0.3/-0.3	-0.3	64/65 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 83		
	EPDM	100.00
	Zinc Oxide	5.00
	Sulfur	1.50
	Stearic Acid	1.00
	TMTD	1.00
	MBT	0.50
	N330 Carbon Black	40.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	3.1	3.4	2.8		11.3/11.2	11.3	1.5		-0.2/-0.5	-0.4	-1.0/-1.0	-1.0	
HFC-32	0.9	1.0	0.4		1.2/1.1	1.2	0.1/-0.3	-0.1	0.3/-0.2	-0.1	-0.6/-0.6	-0.6	89/90 A
HCFC-124	1.3	1.8	1.5		7.1/7.1	7.1	0.6/1.9	1.3	-0.2		2.0/1.9	2.0	
HFC-134a	0.2		0.7		1.5/1.7	1.6	0.2		0.6/0.2	0.4	0.1/0	0.1	
HFC-125	1.7	2.6	2.5		7.4/7.4	7.4	1.5		5.8/1.1	3.5	0.7/10.2	5.5	
HFC-143a	0.8	0.6	0.4		2.1/1.9	2.0	-0.2		0/0.8	0.4	0/-0.1	-0.1	
HFC-152a	1.0	1.0	0.8		3.5/2.6	3.1	0.6		-0.4/-0.5	-0.5	-0.7/-0.5	-0.6	
HCFC-123	6.5	6.3	6.5		32.6/32.4	32.5	2.6		0.6/0.4	0.5	3.3/3.9	3.6	
HCFC-142b	3.8	3.8	3.4		11.1/10.9	11.0	1.0		0.3/-0.8	-0.3	0.2/0.3	0.3	
HFC-134	0.3	-0.3	0.7		1.4/2.0	1.7	0.3/-0.1	0.2	0.1/-0.2	-0.1	0.2/0.3	0.3	86/87 A
AB	20.6	-	26.8/25.3	26.1	85.8/85.6	85.7			24.0/23.6	23.8	77.7/77.3	77.5	
MO	25.9	-	29.4/29.8	29.6	113/112	113					110/109	110	
PEMA	0.6	-	1.3/1.5	1.4	5.3/5.3	5.3			0.8/1.1	1.0	4.3/4.3	4.3	
PEBA	1.5	-	1.8/1.5	1.7	5.4/5.7	5.6					4.3/4.7	4.5	
PPGD	0.3	-	0.4/0.5	0.5	0.3/0.2	0.3					0.1/0.1	0.1	
PPGBM	0.6	-	1.1/0	0.6	1.3/1.2	1.3			0.4/-0.2	0.1	0.6/0.7	0.7	
MPG	0.1	-	0.2/0.1	0.2	0.1/0.2	0.2			-0.4/-0.2	-0.3	-0.3/-0.3	-0.3	86/87

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 84		
	EPDM	100.00
	Zinc Oxide	5.00
	Stearic Acid	1.00
	Sicumyl Peroxide	1.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.3	4.3	4.0		19.7/19.8	19.8	0.9/1.3	1.1	-1.3/-0.7	-1.0	-0.5/-0.2	-0.4	
HFC-32	0.7	0.5	0.5		2.5/2.3	2.4	-0.4/-0.4	-0.4	-0.6/-0.5	-0.6	-0.3/-0.3	-0.3	73/74 A
HCFC-124	2.4	2.5	2.4		12.8/12.3	12.6	0.7/0.8	0.8	-0.4/-0.2	-0.3	1.0/-0.2	0.4	
HFC-134a	0.5	0.6	0.6		2.2/2.2	2.2	0.5/1.2	-0.4	0.5/1.0	-0.3	0.1/0	0.1	
HFC-125	2.6	3.1	2.7		9.8/8.7	9.3	1.1/1.6	1.4	1.6/1.8	1.7	6.6/5.7	6.2	
HFC-143a	0.7	0.8	0.8		3.2/3.1	3.2	-0.6/0	0.3	-1.6/-0.3	-1.0	-0.2/-0.2	-0.2	
HFC-152a	1.3	1.1	1.2		4.5/4.2	4.4	0.1/0.3	0.2	-0.7/-0.8	-0.8	-0.8/0.8	0	68/67 A
HCFC-123	9.9	10.1	9.9		55.4/55.5	55.5	3.2		-0.6/15.8	7.6	2.8/2.9	2.9	67/68 A
HCFC-142b	4.7	4.7	4.4		19.1/18.6	18.9	2.2/2.5	2.4	-1.2/-1.2	-1.2	0.5/0.6	0.6	
HFC-134	0.6	0.9	0.8		3.3/3.2	3.3	0.3/0.2	0.3	-0.1/-0.1	-0.1	0.4/0.5	0.5	69/70 A
AB	48.5	-	59.0/59.5	59.3	285/286	286			54.7/56.6	55.7	278/280	279	17/18 A
MO	61.8	-	72.8/72.3	72.6	412/403	408			71.4/70.5	71.0	410/402	406	13/14 A
PEMA	3.0	-	2.6/2.5	2.6	8.7/6.8	7.8			1.6/1.0	2.3	8.3/6.3	7.3	64/65 A
PEBA	0.5	-	2.6/2.6	2.6	9.8/9.8	9.8			2.6/1.9	2.3	9.0/9.1	9.1	64/65 A
PPGD	0.8	-	0.5/1.0	0.7	1.9/1.8	1.9			-1.1/-1.0	-1.1	1.4/1.5	1.5	66/67 A
PPGBM	1.0	-	0.7/0.9	0.8	2.5/2.4	2.5			0/0	0	2.3/2.2	2.3	66/67 A
MPG	0.5	-	0.1/0.2	0.2	0.9/0.8	0.9			0.2/-0.9	-0.4	0.7/0.6	0.7	67/68 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 85	Butyl/Polypropylene TPE	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	-0.4	-2.2	-2.8		-3.2/-2.7	-3.0	-5.5/-4.2	-4.9	-5.7/-5.4	-5.6	-17.5/-16.9	-17.2	70/71 A
HFC-32*	1.1	0.9	0.9		3.2/3.9	3.6	-0.2/-0.2	-0.2	-0.5/-0.8	-0.7	-0.1/0.2	0.1	63/64 A
HCFC-124	0.4	-0.2	-1.8		-0.7/0.7	0	-2.9/-2.4	-2.7	-3.5/-2.8	-3.2	-7.8/-6.4	-7.1	
HFC-134a	0.2	0.3	0.3		2.7/2.7	2.7	-0.7/2.4	0.9	-0.7/3.1	1.2	1.1/1.2	1.2	
HFC-125	1.8	2.0	2.3		10.0/8.3	9.2	1.0/0.9	1.0	1.6/0.9	1.3	7.3/6.0	6.7	
HFC-143a	0.3	0.3	0.5		3.2/3.8	3.5	0.2/0	0.1	-0.3/-0.2	-0.3	-0.1/0.4	0.2	
HFC-152a	-0.3	-0.7	-1.4		-1.5/0.1	-0.8	-1.7/1.5	-0.1	-2.2/1.9	-0.2	-6.0/-4.9	-5.5	66/67 A
HCFC-123	2.1	1.9	2.4		33.7/33.7	33.7	-3.5/-3.5	-3.5	-5.7/-5.7	-5.7	-12.6/-12.4	-12.5	70/71 A
HCFC-142b	0.3	-1.2	-2.4		-1.2/-0.8	-1.0	-3.3/-3.9	-3.6	-5.3/-6.0	-5.7	-15.4/-14.8	-15.1	
HFC-134	0.4	0.8	0.7		3.4/3.2	3.3	0.5/-0.2	0.2	-0.1/-0.3	-0.2	1.1/1.1	1.1	62/63 A
AB	11.9	-	20.5/20.9	20.7	87.4/85.1	86.3			22.0/18.5	20.3	87.1/84.6	85.9	36/37 A
MO	16.7	-	25.7/25.1	25.4	114/112	113			22.5/26.3	24.4	113/111	112	36/37 A
PEMA	-2.6	-	-2.9/-2.9	-2.9	-6.4/-6.1	-6.3			-2.7/-3.3	-3.0	-7.0/-6.9	-7.0	64/65 A
PEBA	-2.0	-	-3.2/-3.5	-3.4	-6.4/-6.1	-6.2			-3.7/-3.1	-3.4	-7.4/-7.0	-7.2	63/64 A
PPGD	-2.8	-	-5.7/-5.5	-5.6	-15.9/-15.7	-15.8			-6.2/-5.8	-6.0	-16.4/-16.1	-16.3	68/69 A
PPGBM	-2.4	-	-5.8/-5.4	-5.6	-15.7/-14.5	-15.1			-5.6/-5.5	-5.6	-15.8/-14.5	-15.2	68/69 A
MPG	-1.6	-	-4.9/-4.8	-4.9	-14.7/-14.9	-14.8			-5.6/-5.3	-5.5	-15.1/-15.1	-15.1	68/69 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 86	Precision Rubber Products #2167		Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	0.3	-0.6	-0.8		2.1/2.3	2.2			-4.6/-4.7	-4.7	-10.8/-10.2	-10.5	84/85 A
HFC-32	-1.6	-1.9	-3.2		-5.1/-4.2	-4.7	-3.3/-4.0	-3.7	-4.1/-4.1	-4.1	-8.3/-7.5	-7.9	83/84 A
HCFC-124	1.3	0.8	-1.3		2.6/3.0	2.8	-2.7/2.3	-2.5	-3.8/-4.0	-3.9	-3.8/-4.0	-3.9	79/80 A
HFC-134a	-0.6	-1.5	-2.6		-4.8/-4.8	-4.8	-2.4/-2.5	-2.5	-2.9/-2.8	-2.9	-7.6/-7.4	-7.5	
HFC-125	-0.3	-0.9	-2.2		-4.0/-4.0	-4.0	-2.4/-2.2	-2.3	-2.7/-2.5	-2.6	-5.0/-4.8	-4.9	75/76 A
HFC-143a	-0.8	-1.6	-2.5		-5.2/-5.2	-5.2			-3.4/-3.1	-3.3	-6.6/-6.5	-6.6	80/81 A
HFC-152a	-1.3	-2.0	-3.1		-5.2/-5.2	-5.2	-3.6/-3.3	-3.5	-4.9/-5.8	-5.4	-9.1/-8.9	-9.0	86/87 A
HCFC-123	5.7	5.5	4.9		24.1/23.7	23.9	-0.4/-0.4	-0.4	-4.0/-4.2	-4.1	-6.9/-7.4	-7.2	80/81 A
HCFC-142b	0.1	-1.2	-1.5		92.2/107	99.4			-3.2/-5.5	-4.4	-7.8/-9.9	-8.9	81/82 A
HFC-134	-0.9	-1.2	-2.0		-1.9/-1.4	-1.7	-2.3/-2.1	-2.2	-2.8/-3.0	-2.9	-4.2/-4.6	-4.4	78/79 A
AB	2.3	-	3.4/3.6	3.5	6.1/6.1	6.1			2.7/3.2	3.0	6.3/6.2	6.3	63/64 A
MO	2.8	-	5.8/3.7	4.8	12.1/12.0	12.1			5.7/5.0	5.4	11.5/11.1	11.3	60/61 A
PEMA	6.4	-	8.7/8.9	8.8	21.1/21.0	21.1			9.0/8.8	8.9	20.9/20.9	20.9	58/59 A
PEBA	1.7	-	6.2/6.4	6.3	14.9/14.8	14.8			5.8/5.0	5.4	15.2/15.2	15.2	60/61 A
PPGD	-0.7	-	-0.6/-0.6	-0.6	-0.2/-0.2	-0.2			-0.3/-0.7	-0.5	0.4/0.5	0.5	72/73 A
PPGBM	-0.7	-	1.3/1.3	1.3	2.9/3.0	3.0			1.8/0.4	1.1	2.7/2.7	2.7	68/69 A
MPG	-2.4	-	0.7/-1.9	-0.6	-3.5/-3.0	-3.3			-2.2/-2.3	-2.3	-3.5/-3.2	-3.4	77/78 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 87	Precision Rubber Products #7507	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	23.8	23.7	23.9		118/106	112			-1.7/-2.1	-1.9	-5.5/-5.1	-5.3	73/74 A
HFC-32	2.7	3.0	2.9		10.1/10.2	10.2	-0.5/-0.9	-0.7	-2.3/-1.4	-1.9	-3.1/-2.6	-2.9	78/79 A
HCFC-124	21.1	21.1	20.5		111/101	106	5.0/4.5	4.8	-0.5/-1.0	-0.8	-0.5/-1.0	-0.8	70/71 A
HFC-134a	1.7	1.6	1.3		6.7/7.1	6.9	0.6/0.4	0.5	-0.3/-0.6	-0.5	-2.6/-2.1	-2.4	
HFC-125	1.9	2.5	2.1		8.2/8.9	8.5	1.4/2.1	1.8	0.5/0.6	0.6	4.0/4.0	4.0	70/71 A
HFC-143a	0.7	1.3	1.3		2.6/2.7	2.7			0.3/-0.1	0.1	0.2/0.2	0.2	69/70 A
HFC-152a	3.3	2.8	2.6		8.0/8.0	8.0	1.2/0.4	0.8	-1.4/-2.2	-1.8	-4.6/-4.2	-4.4	74/75 A
HCFC-123	42.5	40.7	39.9		239/237	238	7.0/7.2	7.1	-0.4/-0.4	-0.4	4.2/3.5	3.9	70/71 A
HCFC-142b	5.1	3.9	3.8		16.4/17.0	16.7			-1.1/-1.0	-1.1	-2.6/-1.9	-2.3	70/71 A
HFC-134	7.1	7.1	6.8		29.6/30.0	29.8	3.1/3.3	3.2	-0.3/-0.6	-0.5	1.1/1.5	1.3	73/74 A
AB	-0.3	-	0.1/0.1	0.1	-0.7/-0.9	-0.8			2.0/-0.6	0.7	-0.3/-0.3	-0.3	74/75 A
MO	0.4	-	1.0/1.2	1.1	1.7/2.0	1.9			0.6/1.1	0.9	1.4/1.6	1.5	71/72 A
PEMA	1.5	-	4.0/4.1	4.1	11.3/11.2	11.3			3.5/4.4	4.0	11.0/11.0	11.0	68/69 A
PEBA	0.9	-	3.1/3.0	3.1	8.0/7.9	8.0			3.2/2.6	2.9	8.3/8.3	8.3	68/69 A
PPGD	1.2	-	1.9/1.6	1.8	4.3/4.3	4.3			1.4/1.3	1.4	5.1/5.2	5.2	70/71 A
PPGBM	-0.6	-	-0.6/-0.8	-0.7	-2.6/-2.3	-2.5			-0.6/-0.7	-0.7	-3.0/-2.7	-2.9	72/73 A
MPG	-0.7	-	-1.5/-1.7	-1.6	-4.7/-4.5	-4.6			-1.5/-1.8	-1.7	-4.8/-4.6	-4.7	74/75 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 88	Garlock 2930	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	-0.5	0	-0.6		10.8/8.7	9.8			-0.3/0.1	-0.1	-0.3/-0.2	-0.3	65/66 A
HFC-32	-0.2	0	-0.6		6.0/2.6	4.3	-0.3/0	-0.2	0.1/0.2	0.2	-0.4/-0.4	-0.4	70/71 D
HCFC-124	0	0	0.2		13.0/7.7	10.4	-0.3/0.4	0.1	-0.3/0.9	0.3	-0.3/-0.1	-0.2	64/65 D
HFC-134a	0	-0.3	-0.4		11.5/8.4	10.0	0.1/-0.1	0	-0.6/0.3	-0.2	-0.1/-0.1	-0.1	
HFC-125	0.3	0.4	-0.1		9.1/7.1	8.1	0.7/0.4	0.6	0.2/0.1	0.2	3.0/3.1	3.1	65/66 D
HFC-143a	0.2	0	-0.5		5.4/3.7	4.6			-0.2/0.3	0.1	1.3/0.9	1.1	65/66 D
HFC-152a	-0.4	-0.2	-0.4		7.5/4.9	6.2	0.6/-0.7	-0.1	0.5/-0.1	0.2	-0.2/-0.1	-0.2	66/67 D
HCFC-123	1.3	0.7	1.1		17.7/17.5	17.6	1.2/-0.8	0.2	-0.4/0.2	-0.1	-0.4/-0.4	-0.4	66/67 D
HCFC-142b	-0.1	-0.3	-0.4		11.9/7.2	9.6			0.3/-0.2	0.1	-0.2/-0.1	-0.1	67/68 D
HFC-134	-0.1	0.5	0.3		12.0/10.5	11.3	-0.3/-0.2	-0.3	-0.5/0.1	-0.2	-0.1/-0.1	-0.1	65/66 D
AB	0.6	-	0.8/-0.1	0.4	10.0/10.6	10.3			-0.2/0.2	0	10.3/10.7	10.5	56/57 D
MO	-0.3	-	0.1/0.6	0.4	12.7/12.9	12.8			0.3/0.9	0.6	12.3/12.6	12.5	53/54 D
PEMA	0.8	-	1.1/0.1	0.6	16.6/16.0	16.3			1.0/0.9	1.0	16.2/15.8	16.0	44/45 D
PEBA	0.2	-	1.3/0.1	0.7	13.6/13.3	13.4			-1.1/0.2	-0.4	13.9/13.5	13.7	50/51 D
PPGD	-1.0	-	-0.1/0.6	0.3	11.6/11.2	11.4			0.2/0.2	0.2	12.0/11.7	11.9	53/54 D
PPGBM	2.2	-	1.5/8.3	4.9	11.1/11.0	11.1			8.4/6.0	7.2	11.0/11.0	11.0	53/54 D
MPG	0.3	-	0.3/-0.1	0.1	10.8/11.2	11.0			-0.4/0.3	-0.1	10.8/11.1	10.9	55/56 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 89	Armstrong N-8092	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	0	-0.1	-0.4		58.1/31.8	44.9	0.5/0.7	0.6	0.6/0.8	0.7	-0.5/-0.5	-0.5	
HFC-32	-0.2	-0.2	-0.1		3.3/0.5	1.9	-0.1/-1.0	-0.6	-0.3/-0.9	-0.6	-0.7/-0.7	-0.7	62/63 D
HCFC-124	0.1	0.2	0.2		69.6/28.1	48.9	0.8/-0.4	0.2	0.8/0.2	0.5	1.7/-2.1	-0.2	57/58 D
HFC-134a	0.3	0.3	-0.1		37.3/19.0	28.2	-0.1/0.1	0	0.4/0.6	0.5	-0.1/-0.1	-0.1	
HFC-125	0.2	0.2	0.2		3.7/2.0	2.9	-0.3/0.1	-0.1	-0.2/-0.8	-0.5	0.8/1.4	1.1	54/55 D
HFC-143a	-0.3	0.4	0.2		13.5/2.4	8.0	-0.3/0.3	0	-0.3/0.3	0	-0.2/-0.2	-0.2	
HFC-152a	0.2	0.4	0.2		23.5/9.4	16.5	-0.1/0.1	0	-0.2/-0.1	-0.2	-2.6/1.1	-0.8	63/64 D
HCFC-123	0.4	0.5	0		95.6/95.6	95.6	0.2/0.2	0.2	0.2/0.3	0.3	-1.0/-1.0	-1.0	57/58 D
HCFC-142b	0.4	-0.1	-0.1		35.7/29.4	32.6	0.8/0.2	0.5	0.1/0.4	0.3	-0.4/-0.3	-0.4	58/59 D
HFC-134	0.3	0.1	0.1		48.8/30.7	39.8	0.4/0.1	0.3	-0.1/-0.8	-0.5	-0.3/-0.4	-0.4	57/58 D
AB	2.5	-	2.1/0.4	1.3	22.2/20.9	21.6			2.4/0.4	1.4	20.4/19.7	20.1	55/56 D
MO	-0.2	-	-0.4/0.1	-0.2	24.3/23.6	24.0			-0.4/-0.1	-0.2	22.1/19.7	20.9	54/55 D
PEMA	-0.2	-	-0.1/0.2	-0.1	27.9/26.8	27.4			0.8/-0.7	0.1	27.6/26.7	27.2	49/50 D
PEBA	0.2	-	-0.2/-0.2	-0.2	27.2/27.9	27.6			-0.1/-0.1	-0.1	26.5/27.5	27.0	49/50 D
PPGD	-0.6	-	0.1/-0.2	-0.1	33.9/34.6	34.3			0.4/-0.1	0.2	30.2/30.4	30.3	46/47 D
PPGBM	-0.4	-	-0.2/-0.1	-0.1	26.4/27.7	27.1			-0.1/0.1	0	26.0/27.4	26.7	47/48 D
MPG	-0.4	-	-0.5/-0.2	-0.4	29.1/27.1	28.1			0.1/-0.1	0	28.7/26.2	27.5	50/51 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, ie. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 90	Specialty Paperboard NI-2085G	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	0.1	0.1	-0.6		70.4/21.4	45.9	-0.1/-0.7	-0.4	0.5/-0.4	0.1	-2.0/-2.0	-2.0	
HFC-32	0.2	0.1	-0.2		0.8/0.2	0.4	-0.4/-0.3	-0.4	-0.9/-0.5	-0.7	-0.8/-0.8	-0.8	59/60 D
HCFC-124	0.6	1.0	0.8		39.4/17.6	28.5	0/-0.1	-0.1	0.3/-0.1	0.1	-8.6/-0.1	-4.4	54/55 D
HFC-134a	0	0.1	-0.1		17.5/0.6	9.1	-0.5/-0.1	-0.3	0.1/-0.1	0	-0.3/-0.2	-0.3	
HFC-125	-0.1	-0.1	0.1		13.7/2.2	8.0	-0.6/-0.4	-0.5	-0.7/-0.2	-0.5	1.1/1.0	1.1	54/55 D
HFC-143a	-0.1	0.1	-0.3		7.2/0.8	4.0	-0.6/0.5	-0.1	-0.4/0.4	0	-0.3/-0.3	-0.3	
HFC-152a	0.3	0.3	0.1		27.2/-1.2	13.0	-0.1/-0.5	-0.3	-0.3/-0.2	-0.3	6.4/-2.5	2.0	62/63 D
HCFC-123	0.5	0	0.6		121/135	128	0.3/0	0.2	0/0.2	0.1	-3.4/-3.6	-3.5	50/51 D
HCFC-142b	-0.3	0.2	0.1		20.1/14.1	17.1	-0.1/0.2	0.1	-0.1/0.1	0	-0.9/-0.6	-0.8	58/59 D
HFC-134	0.5	-	-0.2		32.0/9.1	20.6	0.1/0.1	0.1	-0.5/-0.9	-0.7	-0.5/-0.6	-0.6	54/55 D
AB	-0.1	-	-0.5/0.1	-0.2	17.6/12.3	15.0			-0.8/-0.2	-0.5	16.7/16.4	16.6	56/57 D
MO	-0.4	-	-0.2/-0.1	-0.1	17.9/22.2	20.1			0.1/-0.1	0	17.6/21.8	19.7	53/54 D
PEMA	-0.2	-	0.1/-0.2	-0.1	26.7/28.8	27.8			0.2/-0.2	0	24.0/27.1	25.6	49/50 D
PEBA	0.1	-	-0.2/-0.3	-0.3	23.6/23.7	23.7			0.2/-0.5	-0.2	23.0/22.7	22.9	49/50 D
PPGD	0.1	-	0.1/-0.1	0	22.8/27.8	25.3			0.2/0.6	0.4	22.8/28.1	25.5	49/50 D
PPGBM	-0.4	-	-0.1/-0.2	-0.1	22.8/19.6	21.2			-0.6/0.4	-0.1	22.1/19.6	21.0	48/49 D
MPG	-1.0	-	-0.5/0.1	-0.2	22.6/22.0	22.3			-0.8/0.3	-0.3	22.3/21.5	21.9	53/54 D

* Indicates that material shows some foam of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 91	Victopac 69	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	23.0	23.1	23.0		11.9/4.4	8.2	22.6/0.2	11.4	22.3/0.2	11.3	-0.2/-0.3	-0.3	
HFC-32	0.2	0.2	0		6.1/0.8	3.5	-0.8/-0.5	-0.7	-0.3/-0.7	-0.5	-0.3/-0.3	-0.3	66/67 D
HCFC-124	-2.8	-2.1	-2.9		7.9/15.7	11.8	-2.7/2.3	-0.2	-3.2/2.4	-0.4	-5.3/4.7	-0.3	64/65 D
HFC-134a	-0.1	-0.1	-0.2		9.3/5.3	7.3	-0.5/-0.2	-0.4	-1.5/-0.1	-0.8	-0.1/-0.1	-0.1	
HFC-125	0.1	0.3	0.1		1.9/1.0	1.5	-0.6/-0.9	-0.8	-0.6/-0.7	-0.7	0.8/0.8	0.8	63/64 D
HFC-143a	-0.2	0	-0.2		7.0/1.9	4.5	0.3/-0.4	-0.1	-1.0/-0.2	-0.6	-0.1/-0.1	-0.1	
HFC-152a	2.9	3.1	2.6		15.2/-0.4	7.4	2.0/-2.8	-0.4	2.4/-3.0	-0.3	5.2/-4.8	2.0	63/64 D
HCFC-123	0.5	0.7	0.7		19.0/19.1	19.1	0.1/-0.1	0	-0.1/-0.1	-0.1	-0.2/-0.2	-0.2	64/65 D
HCFC-142b	0.5	0.4	0.4		12.1/11.4	11.8	-0.1/-0.3	-0.2	-0.3/-0.6	-0.5	-0.2/-0.2	-0.2	64/65 D
HFC-134	0.1	0.5	0.1		13.5/11.4	12.4	-0.7/-0.8	-0.8	13.5/-0.4	6.6	-0.1/0.1	0	65/66 D
AB	0.5	-	0.5/0.5	0.5	12.4/12.1	12.3			0.3/0.2	0.3	11.6/11.4	11.5	56/57 D
MO	0.7	-	0.7/0.5	0.6	13.2/13.7	13.5			0.4/0.4	0.4	12.8/13.4	13.1	56/57 D
PEMA	0.4	-	0.7/0.5	0.6	14.8/14.6	14.7			0.4/0.5	0.5	14.3/14.4	14.4	53/54 D
PEBA	0.9	-	0.6/4.1	2.4	14.1/14.4	14.2			0.7/0.5	0.6	13.6/13.7	13.6	52/53 D
PPGD	0.5	-	0.4/0.5	0.5	13.1/12.6	12.9			0.4/-0.1	0.2	12.6/12.4	12.5	55/56 D
PPGBM	1.0	-	0.6/6.2	3.4	13.5/13.4	13.5			0.1/5.9	3.0	12.8/12.6	12.7	53/54 D
MPG	0.5	-	0.3/0.5	0.4	12.0/12.4	12.2			0.4/0.5	0.5	11.5/11.9	11.7	54/55 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 92	Klingersil C-4401	100.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	4.0	2.8	1.9		30.3/13.2	21.8	-0.1/-0.1	-0.1	-0.5/-0.9	-0.7	-0.5/-0.5	-0.5	
HFC-32	0.6	0.8	0.5		2.7/0.6	1.7	-0.6/-0.7	-0.7	-0.8/-0.6	-0.7	-0.2/-0.2	-0.2	65/66 D
HCFC-124	1.8	1.9	1.8		30.2/16.5	23.4	-0.4/-0.4	-0.4	-0.6/-0.1	-00.4	-0.8/-0.5	-0.7	63/64 D
HFC-134a	-0.1	0.5	0.1		8.5/4.5	6.5	-0.6/-0.5	-0.6	-0.1/-0.5	-0.3	-0.2/-0.1	-0.2	
HFC-125	0.5	0.4	0.1		2.5/1.7	2.1	0.1/-1.1	-0.5	-0.1/-0.7	-0.4	0.7/0.8	0.8	62/63 D
HFC-143a	0.6	0.2	0.4		3.8/1.4	2.6	-0.4/-0.3	-0.4	-0.2/-0.1	-0.2	-0.1/-0.1	-0.1	
HFC-152a	0.9	0.9	0.8		8.8/3.2	6.0	0.4/-0.6	-0.1	-0.3/-0.7	-0.5	0.1/-0.1	0	63/64 D
HCFC-123	5.0	0.4	4.4		53.5/54.9	54.2	0.4/-0.3	0.1	1.0/-0.1	0.5	-0.6/-0.6	-0.6	62/63 D
HCFC-142b	7.2	7.0	1.0		11.8/11.1	11.5	-0.4/-0.3	-0.4	-0.2/-0.9	-0.6	-0.4/-0.3	-0.4	64/65 D
HFC-134	0.4	1.0	0.8		14.2/11.9	13.0	-0.6/-0.8	-0.7	-0.6/-0.3	-0.5	-0.8/0.4	-0.2	66/67 D
AB	0.6	-	0.2/0.5	0.4	7.5/6.9	7.2			-0.1/-0.3	-0.2	6.6/6.7	6.7	59/60 D
MO	0.5	-	0.4/0.6	0.5	10.6/10.5	10.6			-0.1/0.7	0.3	8.3/8.7	8.5	57/58 D
PEMA	1.1	-	-0.8/1.2	0.2	11.7/11.5	11.6			0.5/0.7	0.6	10.8/10.7	10.8	47/48 D
PEBA	0.5	-	0.7/0.5	0.6	10.2/10.3	10.3			-0.1/-0.3	-0.2	9.7/9.6	9.7	53/54 D
PPGD	0.8	-	0.7/-1.0	-0.2	9.9/10.3	10.1			-0.1/0.1	0	9.8/10.0	9.9	50/51 D
PPGBM	0.3	-	0.1/0.1	0.1	9.7/9.1	9.4			0.1/-0.4	-0.2	9.0/8.7	8.9	52/53 D
MPG	0.7	-	0.3/0.2	0.3	8.8/9.0	8.9			-0.1/-0.2	-0.2	8.3/8.6	8.5	55/56 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula #93	Specialty Paperboard NI-2099	100.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	0.6	0.6	0.6		22.1/0.8	11.5	-0.1/-0.2	-0.2	-0.6/-0.6	-0.6	-0.9/-0.8	-0.9	
HFC-32	-0.2	0.3	-2.1		2.6/0.6	2.6	-0.8/-0.6	-0.7	-0.8/-0.6	-0.7	-0.5/-0.4	-0.5	62/63 D
HCFC-124	0.4	0.4	0.4		36.0/14.0	25.0	-0.5/-0.1	-0.3	-0.4/-0.1	-0.3	-0.8/1.2	0.2	60/61 D
HFC-134a	-0.1	0.3	0.1		15.1/1.2	8.2	-0.8/-0.9	-0.9	-0.2/-0.5	-0.4	-0.2/-0.2	-0.2	
HFC-125	0.3	0.4	0.1		1.8/1.2	1.5	-0.4/-0.6	-0.5	-0.4/-0.3	-0.4	0.5/0.9	0.7	62/63 D
HFC-143a	-0.4	-2.7	-0.3		1.2/0.6	0.9	-0.7/-0.1	-0.4	-0.6/-0.8	-0.7	-0.2/-0.2	-0.2	
HFC-152a	-0.3	-0.1	0.1		16.0/1.9	8.9	-0.3/-0.2	-0.3	-0.7/-0.5	-0.6	-0.3/-2.1	-1.2	62/63 D
HCFC-123	0.5	0.2	0.5		60.2/60.2	60.2	-0.6/-0.2	-0.4	-0.5/-0.1	-0.3	-1.3/-1.3	-1.3	58/59 D
HCFC-142b	-0.4	-0.1	-0.4		18.0/15.8	16.9	-0.6/-0.4	-0.5	-1.0/0.1	-0.5	-0.7/-0.6	-0.7	62/63 D
HFC-134	0.1	0.3	0.4		26.8/7.0	16.9	0.1/-1.2	-0.6	-0.4/-0.6	-0.5	-0.4/-0.4	-0.4	57/58 D
AB	-0.1	-	-0.1/-0.1	-0.1	16.0/15.9	16.0			0.1/-0.2	-0.1	14.8/14.6	14.7	54/55 D
MO	0.2	-	-0.1/-0.1	-0.1	20.3/18.5	19.4			-0.1/0	-0.1	15.5/16.1	15.8	54/55 D
PEMA	0.4	-	0.1/0.2	0.2	20.2/18.7	19.5			0.4/-0.3	0.1	18.4/17.3	17.9	49/50 D
PEBA	-4.0	-	0.1/2.0	1.0	18.5/18.2	18.4			-0.4/-0.2	-0.3	17.2/17.2	17.2	52/53 D
PPGD	0.1	-	-0.1/0	-0.1	21.5/22.2	21.9			-0.7/-0.6	-0.7	20.2/21.0	20.6	48/49 D
PPGBM	0.5	-	0.1/2.2	1.2	19.0/21.2	20.1			-0.2/-0.3	-0.3	17.4/18.9	18.2	52/53 D
MPG	0.4	-	-0.1/0.3	0.1	19.7/18.7	19.2			0.6/0.7	0.7	19.1/17.9	18.5	51/52 D

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 94	Parker V747-75	100.00	Lubricant Legend Information	PEMA - Pentaerythritol Ester Mixed Acid
				PEBA - Pentaerythritol Ester Branched Acid
				PPGBM - Polypropylene Glycol Butyl Monoether
				MO - Mineral Oil
				MPG - Modified Polyglycol
				PPGD - Polypropylene Glycol Diol
				AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	25.8	24.2	23.4		68.6/65.0	66.8	3.6/4.4	4.0	1.1/1.7	1.4	3.4/3.6	3.5	
HFC-32	S9.4	20.5	19.3		39.7/34.0	36.9	1.5/1.6	1.6	0.4/0.4	0.4	1.3/1.4	1.4	71/72 A
HCFC-124	20.9	20.5	20.7		66.0/58.5	62.3	5.8/5.3	5.6	3.4/3.1	3.3	9.2/6.0	7.6	72/73 A
HFC-134a	19.1	20.7	20.3		53.0/51.0	52.0	6.3/5.3	5.8	2.8/1.7	2.3	6.2/6.3	6.3	
HFC-125	10.1	10.0	1.0		27.1/26.4	26.8	5.4/4.6	5.0	3.2/2.5	2.9	8.4/8.5	8.5	71/72 A
HFC-143a	11.7	12.2	11.8		25.6/25.5	25.6	4.1/5.3	4.7	1.7/1.7	1.7	5.5/5.6	5.6	
HFC-152a	29.1	28.8	30.2		57.9/54.7	56.3	3.6/3.5	3.6	1.5/1.6	1.6	2.3/5.3	3.8	73/74 A
HCFC-123	21.8	21.7	23.2		69.0/69.1	69.1	7.5/7.8	7.7	3.9/4.3	4.1	12.2/12.2	12.2	72/73 A
HCFC-142b	26.3	23.8	23.8		58.3/57.0	57.7	6.1/6.5	6.3	2.6/2.5	2.6	6.4/6.4	6.4	69/70 A
HFC-134	25.4	25.6	26.9		74.7/73.7	74.2	6.2/7.2	6.7	2.7/2.5	2.6	6.8/6.9	6.9	69/70 A
AB	0.1	-	0.1/0.1	0.1	0.5/0.3	0.4			-0.1/-0.1	-0.1	0.3/0.2	0.3	73/74 A
MO	-0.5	-	0.1/0.2	0.2	2.4/2.3	2.4			-0.4/-0.1	-0.2	0.9/1.5	1.2	74/75 A
PEMA	1.1	-	3.0/3.7	3.4	7.5/7.6	7.6			3.6/3.7	3.7	7.5/7.7	7.6	70/71 A
PEBA	1.5	-	7.3/9.3	8.3	14.6/14.8	14.7			7.8/8.2	7.9	14.7/14.6	14.7	46/45 A
PPGD	0.6	-	1.1/0.8	1.0	2.1/2.2	2.2			0.4/0.9	0.7	1.7/1.9	1.8	72/73 A
PPGBM	-0.1	-	-0.2/0.1	-0.1	0.8/0.8	0.8			-0.3-0.4	-0.4	0.9/0.7	0.8	73/74 A
MPG	0.2	-	0.1/0.1	0.1	0.5/0.3	0.4			-0.5/0.4	-0.1	0.2/0.3	0.3	74/75 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

Formula # 95	Green Tweed 956	100.00

Lubricant Legend Information
PEMA - Pentaerythritol Ester Mixed Acid
PEBA - Pentaerythritol Ester Branched Acid
PPGBM - Polypropylene Glycol Butyl Monoether
MO - Mineral Oil
MPG - Modified Polyglycol
PPGD - Polypropylene Glycol Diol
AB - Alkyl Benzene

Test Fluid	1 Day Diameter Change (%)	3 Day Diameter Change (%)	14 Day Diameter Change (%)		14 Day Weight Change (%)		Diameter/Weight After Removal From Test Fluid. Values Based On Original Sample Measurements.						1 Day Shore A/D Hardness
							2 hr. Diameter (%)		1 Day Diameter (%)		1 Day Weight (%)		
			values	mean	values	mean	values	mean	values	mean	values	mean	
HCFC-22	6.5	5.3	5.5		16.8/16.4	16.6	2.2/1.2	1.7	0.7/-1.7	-0.5	0.6/0.4	0.5	83/84 A
HFC-32	2.0	1.6	0.8		2.6/2.9	2.8	-0.7/0	-0.3	-1.6/-1.1	-1.4	-1.5/1.3	-1.4	86/87 A
HCFC-124	0.5	1.5	2.5		9.0/9.4	9.2	2.5/1.8	2.2	2.0/1.0	1.5	7.2/7.4	7.3	79/80 A
HFC-134a	0.1	0.1	0.3		1.0/1.2	1.1	0.1/-0.6	-0.3	0.1/-0.7	-0.3	0.6/0.6	0.6	83/84 A
HFC-125	-0.4	0.1	-0.2		0.2/0.6	0.4	-0.9/-0.4	-0.7	-0.6/-0.2	-0.4	-0.1/0.1	0	83/84 A
HFC-143a	0.1	0.2	0.1		0.3/0.2	0.3	0.2/-0.2	0	-0.2/-0.2	-0.2	0.1/0.2	0.2	83/84 A
HFC-152a	2.5	2.1	1.7		2.6/2.8	2.7	0.5/1.5	1.0	-0.6/0.1	-0.3	-0.6/-0.6	-0.6	85/86 A
HCFC-123	10.1	8.8	9.1		29.0/29.8	29.4	5.7/6.1	5.9	1.4/0.9	1.1	8.4/8.5	8.4	78/79 A
HCFC-142b	1.9	2.4	1.8		4.1/4.6	4.3	1.5/1.4	1.4	-0.6/0.2	-0.2	1.6/1.9	1.8	83/84 A
HFC-134	0.8	1.8	1.4		5.8/6.2	6.0	0.4/1.4	0.9	0.4/0.1	0.3	3.8/3.8	3.8	81/82 A
AB	-0.9	-	-0.6/-0.8	-0.7	-1.7/-1.9	-1.8			-1.4/-1.0	-1.2	-2.1/-2.0	-2.1	86/87 A
MO	-1.2	-	-1.4/-0.6	-1.0	-1.0/-0.8	-0.9			-1.1/-0.8	-1.0	-1.2/-1.0	-1.1	85/86 A
PEMA	2.0	-	11.8/12.0	11.9	26.6/26.5	26.6			11.7/11.8	11.8	26.2/25.9	26.1	62/63 A
PEBA	1.6	-	7.9/7.2	7.5	16.8/17.0	16.9			7.4/7.3	7.3	16.2/16.6	16.4	69/70 A
PPGD	2.5	-	8.4/7.4	7.9	17.0/17.6	17.3			8.1/8.3	8.2	16.7/17.2	17.0	67/68 A
PPGBM	0	-	-0.2/-0.1	-0.2	0.2/0.2	0.2			-0.2/-0.7	-0.5	-0.5/-0.3	-0.4	85/86 A
MPG	-0.7	-	-0.9/-0.8	-0.9	-1.8/-1.7	-1.8			-2.2/-1.3	-1.8	-2.1/-2.0	-2.1	86/87 A

* Indicates that material shows some form of deteriorative effect after removal from the test fluid, i.e. fracture due to outgassing of test fluid/extreme cavitation.

APPENDIX F

PERCENT ELASTOMER SAMPLE DIAMETER CHANGE IN TEST FLUIDS

Samples Tested In Refrigerants At Ambient Temperature For 14 Days

Samples Tested in Lubricants At 140°F (60°C) For 14 Days

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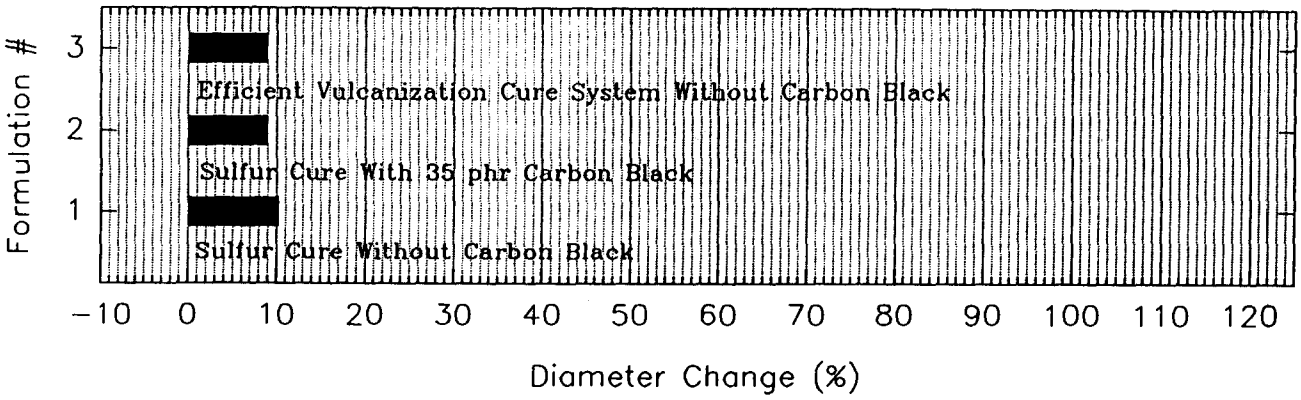
APPENDIX F - PERCENT ELASTOMER SAMPLE DIAMETER CHANGE

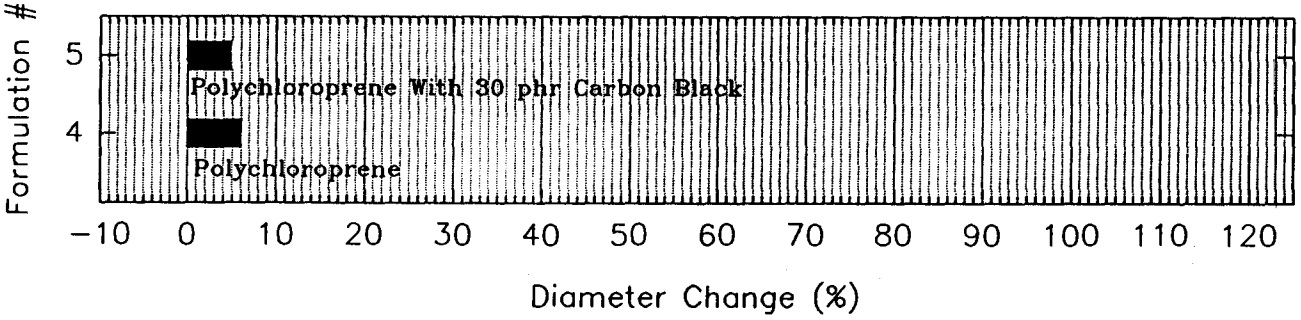
IN TEST FLUIDS

% Insitu Diameter Change In R-22

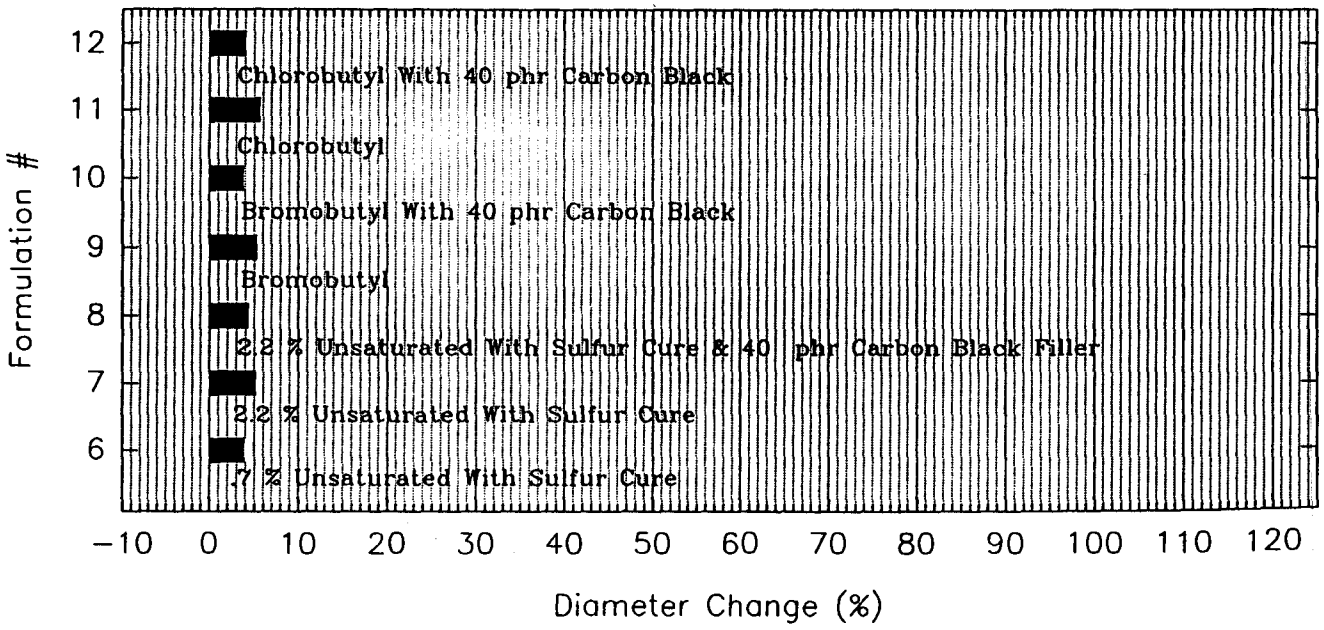
Polyisoprenes



Polychloroprenes

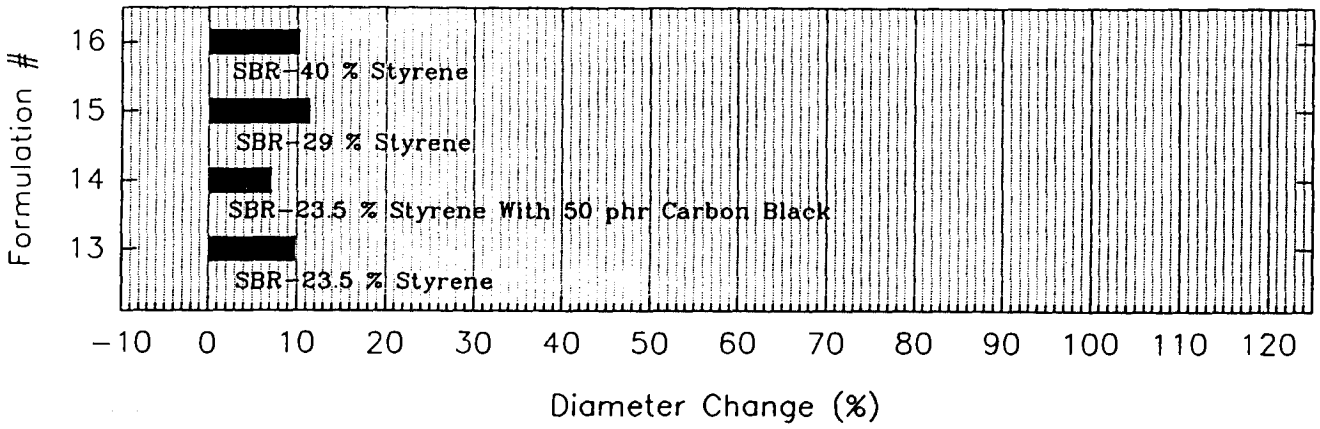


Butyl Rubbers

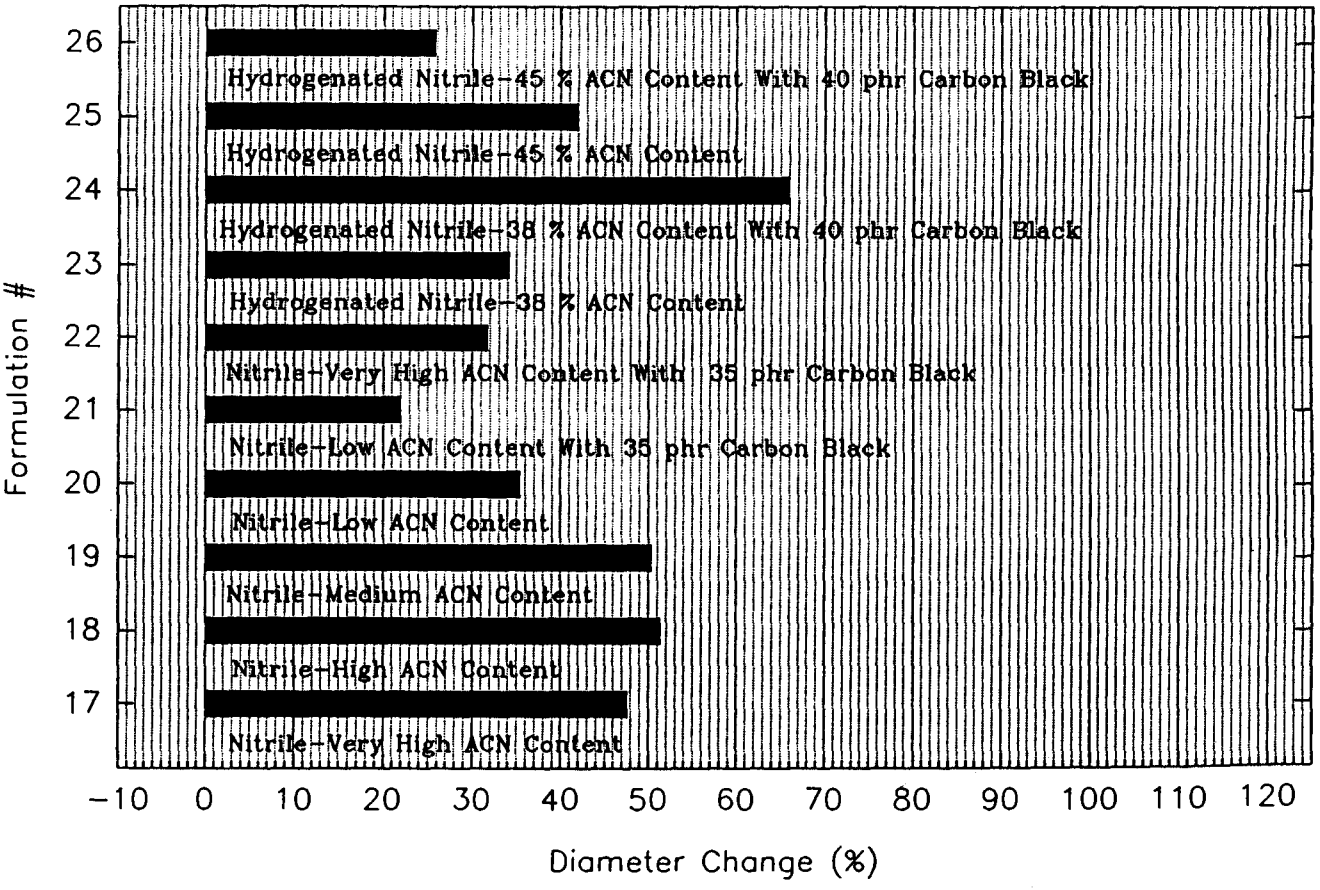


% Insitu Diameter Change In R-22

Styrene Butadiene Rubbers

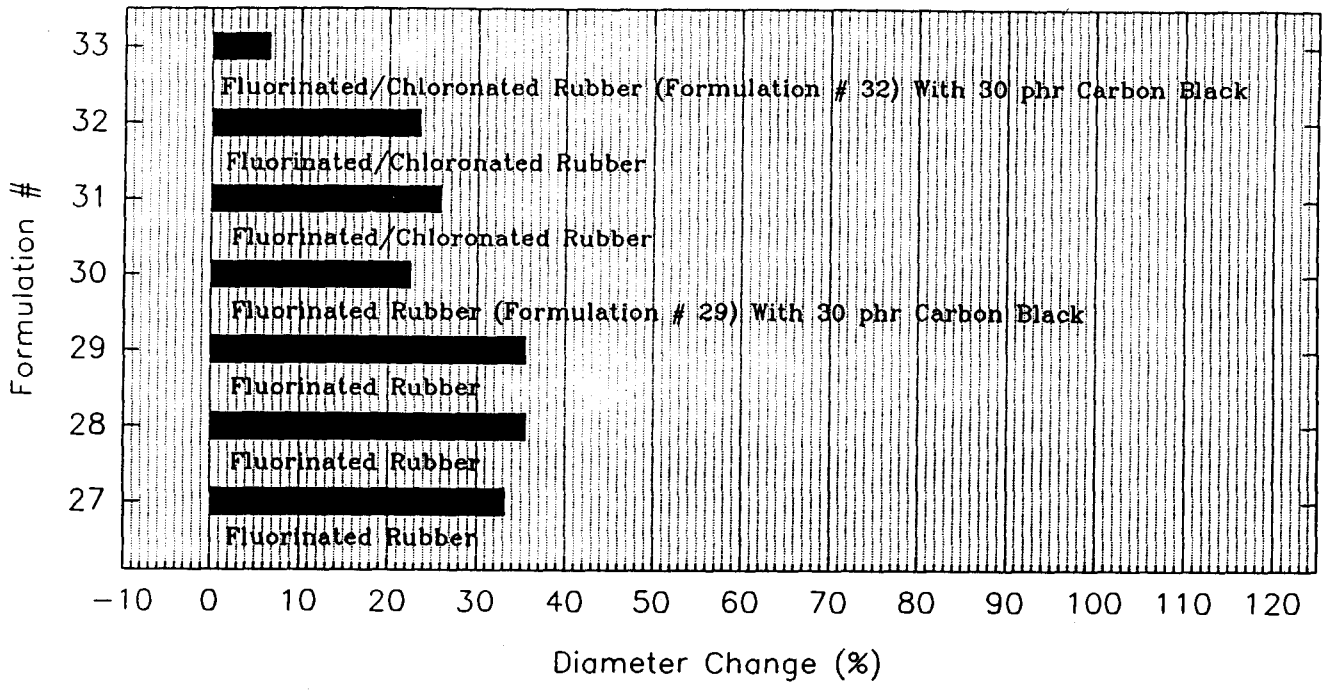


Nitrile Rubbers

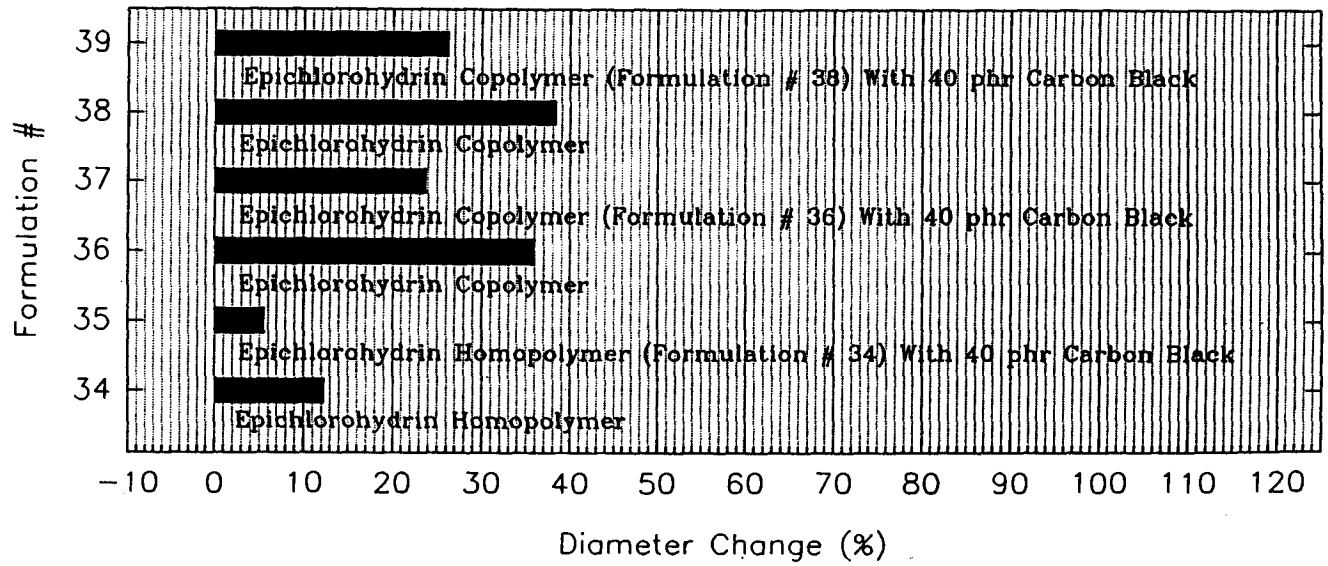


% Insitu Diameter Change In R-22

Fluorinated Rubbers

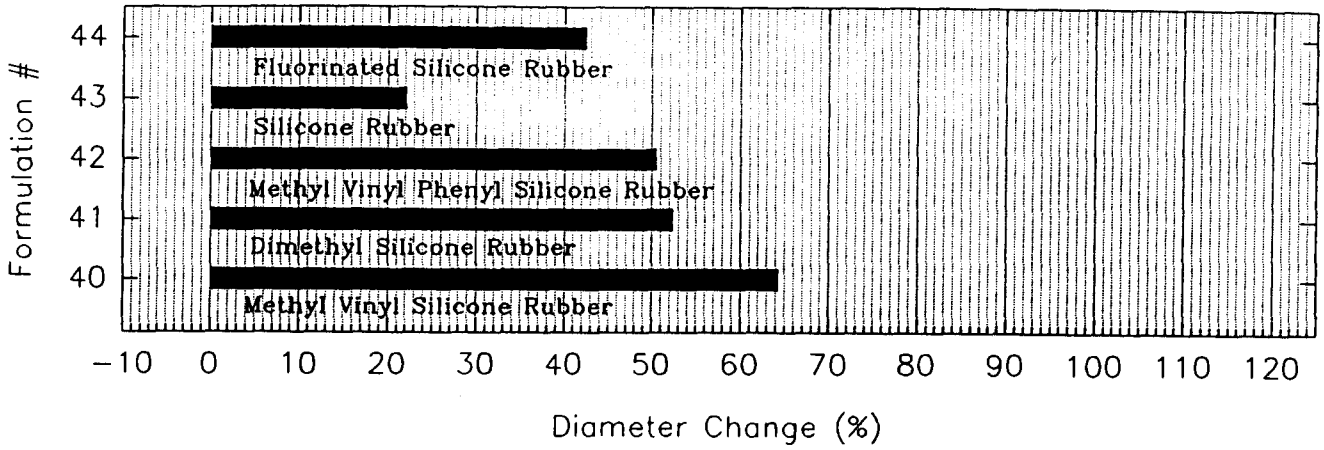


Epichlorohydrin Based Rubbers

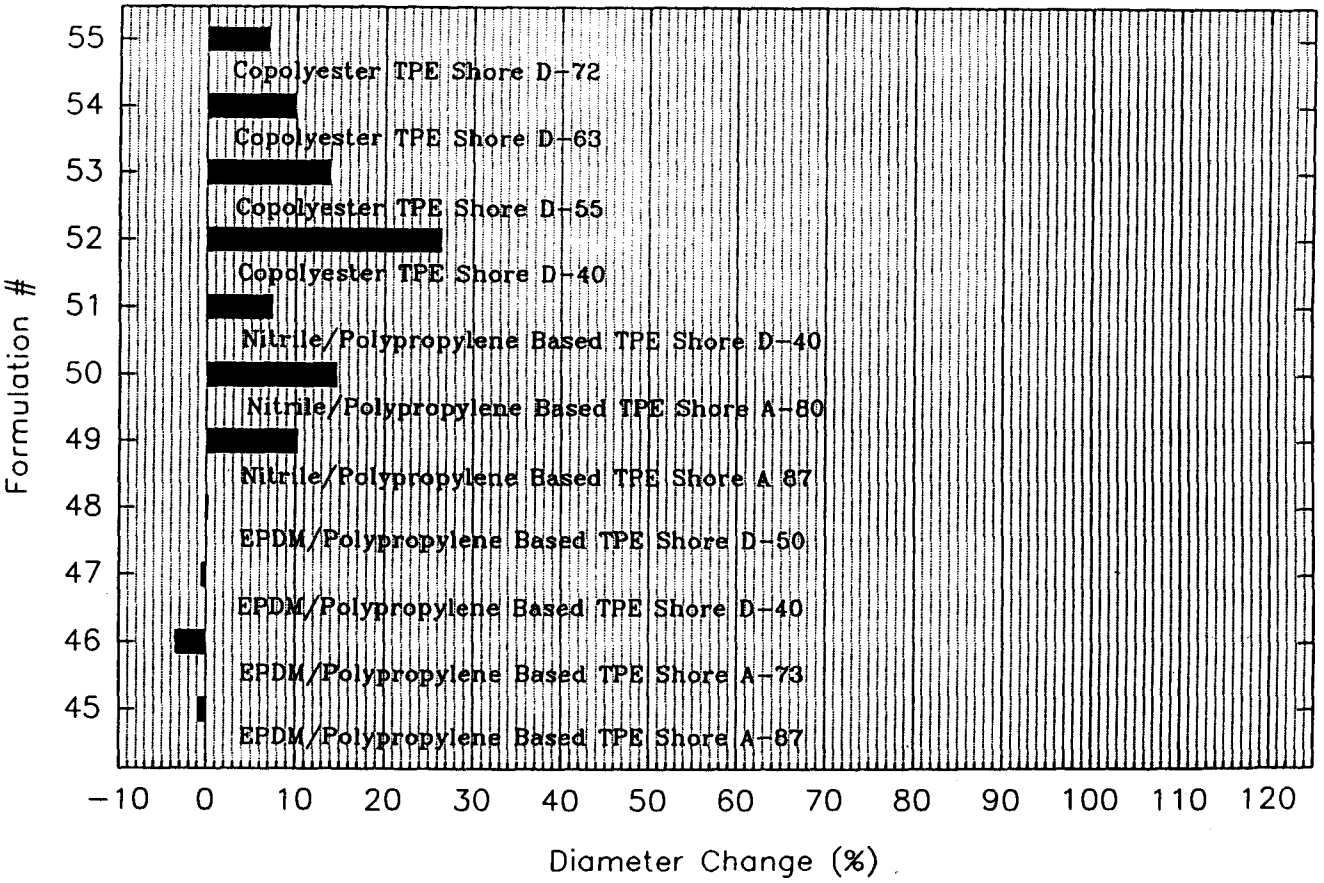


% Insitu Diameter Change In R-22

Silicones

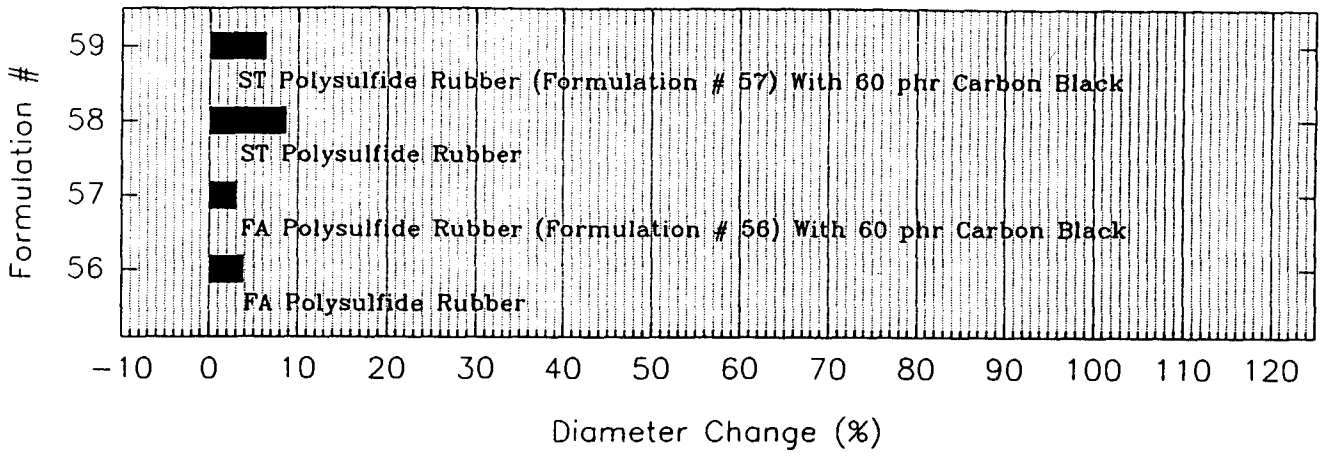


Thermoplastic Elastomers

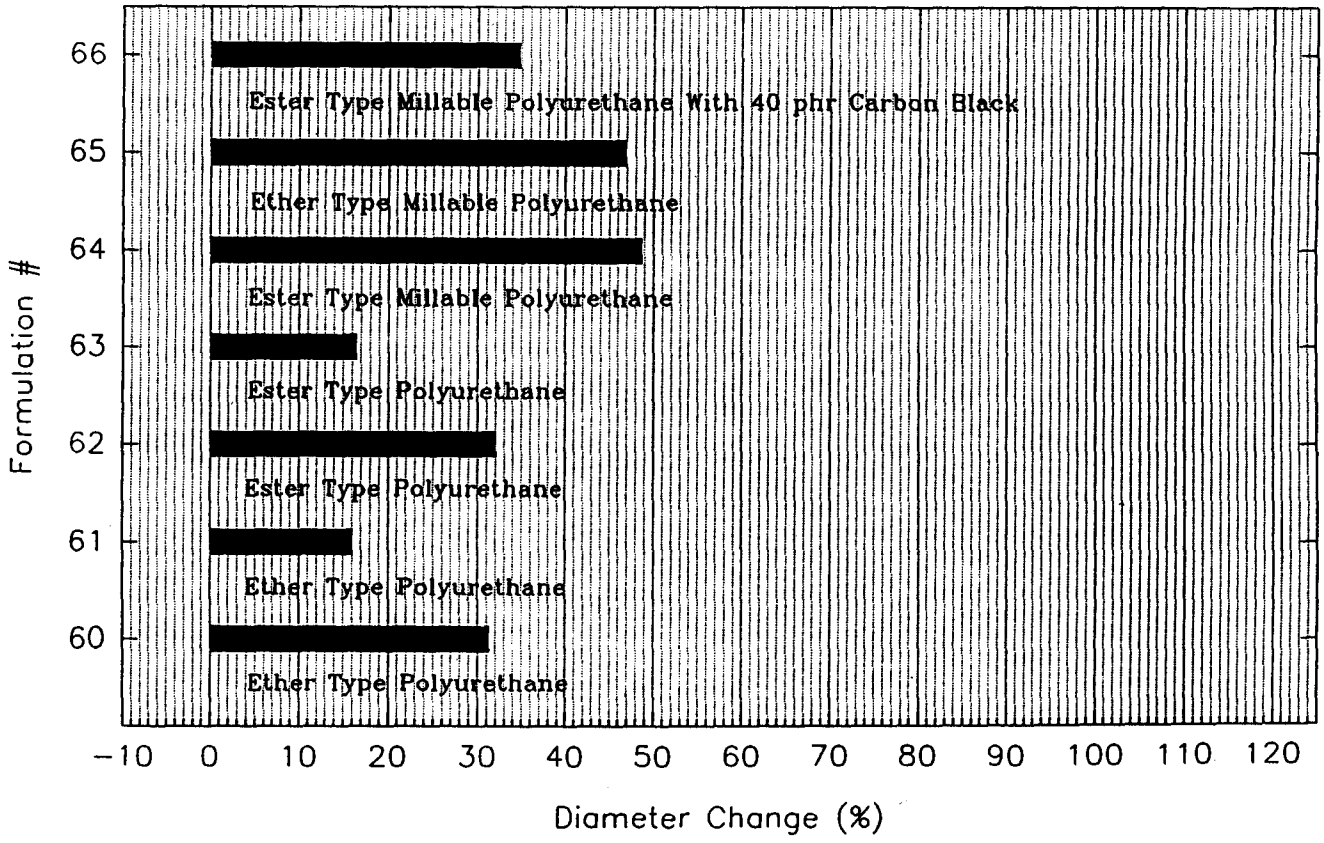


% Insitu Diameter Change In R-22

Polysulfide Rubbers

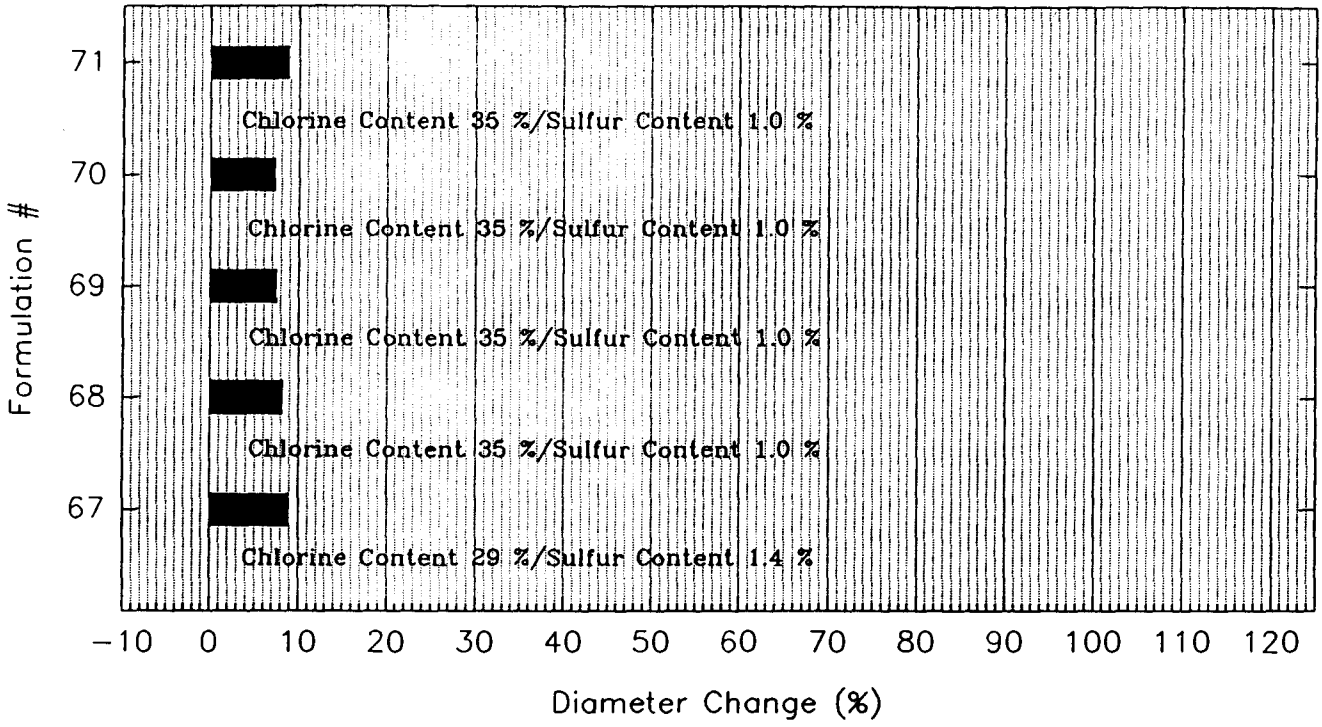


Polyurethanes

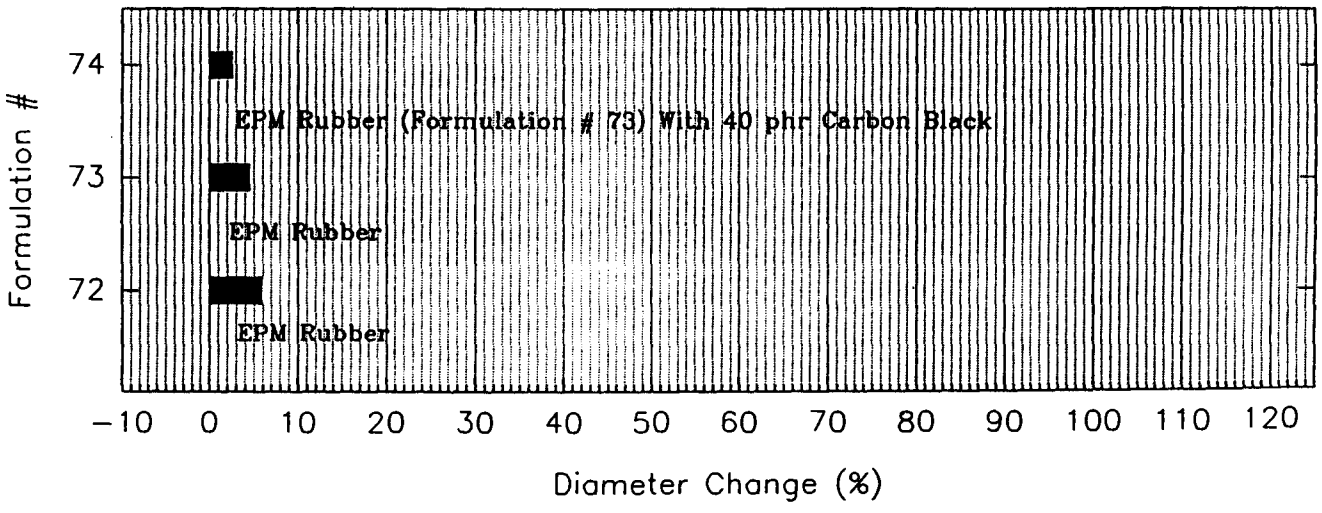


% Insitu Diameter Change In R-22

Chlorosulfonated Polyethylenes

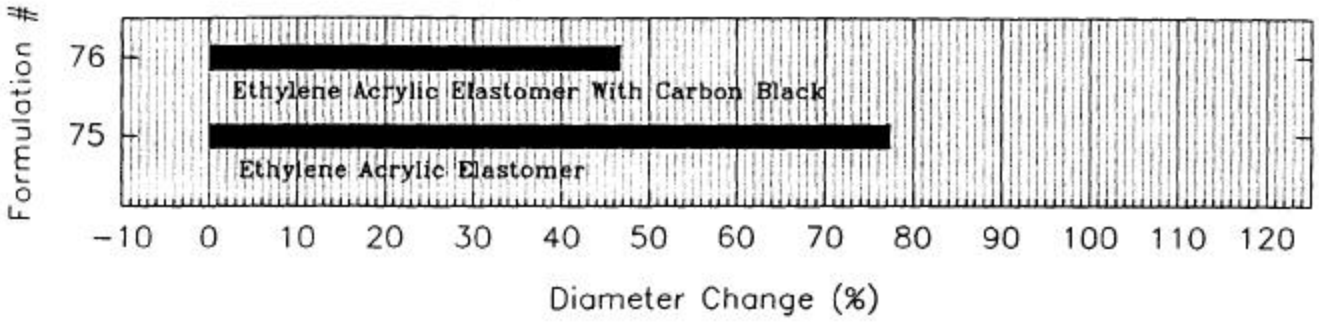


EPM Rubbers

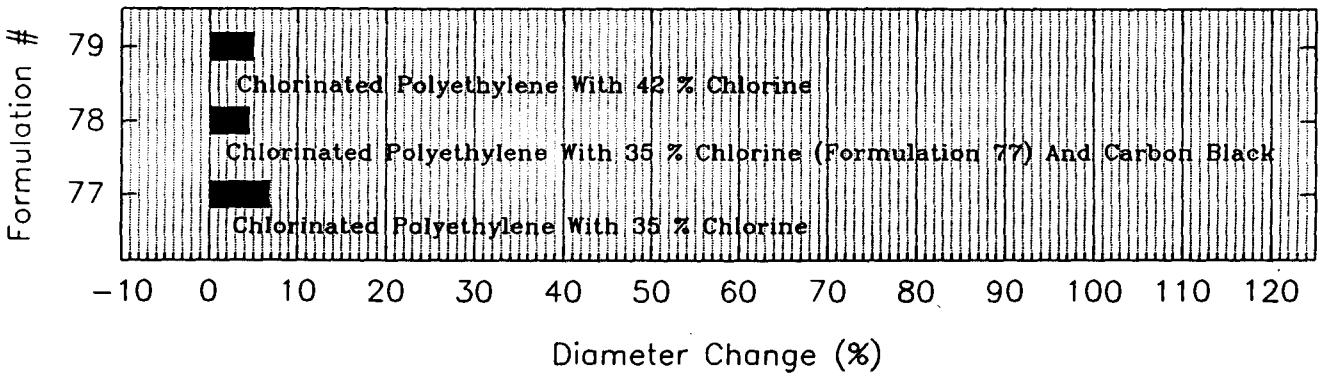


% Insitu Diameter Change In R-22

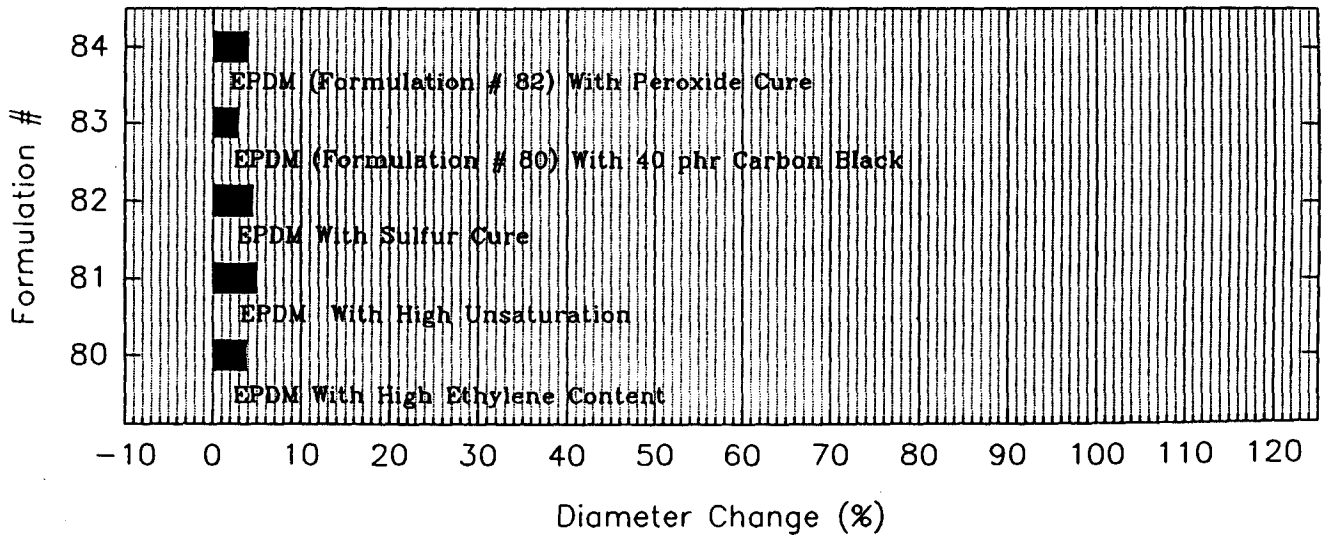
Ethylene Acrlic Elastomers



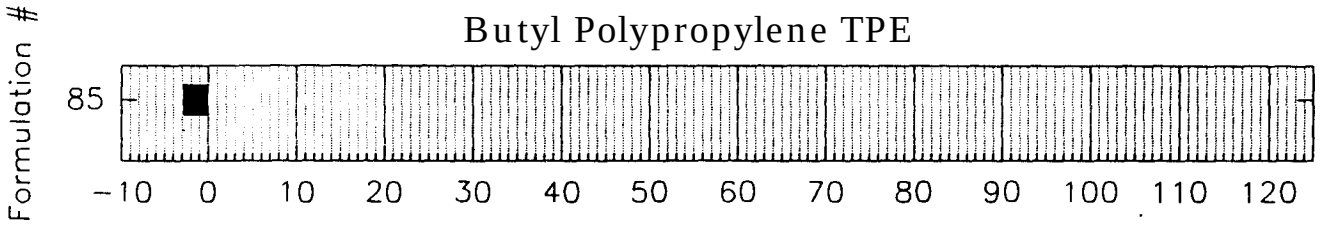
Chlorinated Polyethylenes

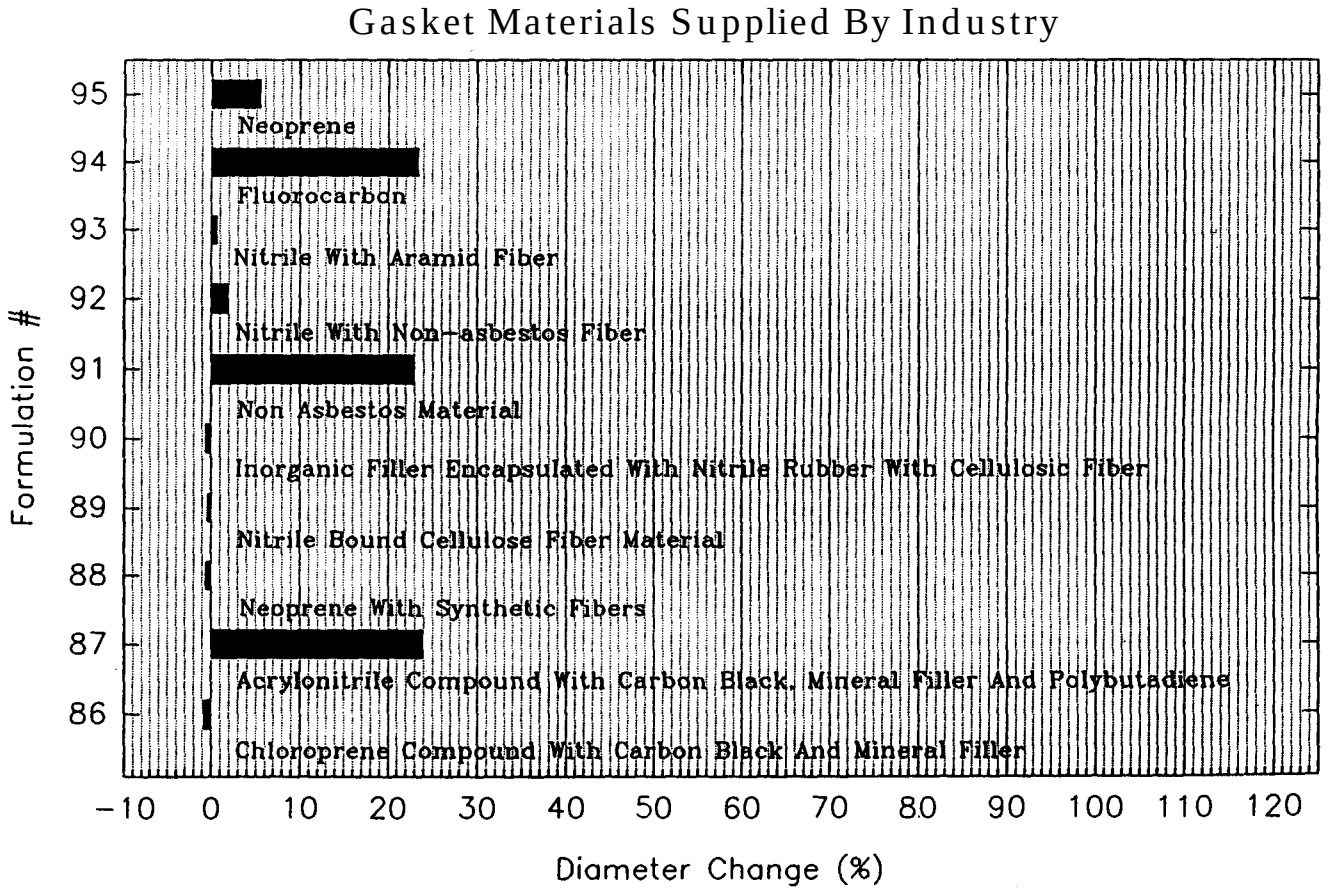


Ethylene Propylene Diene Rubbers



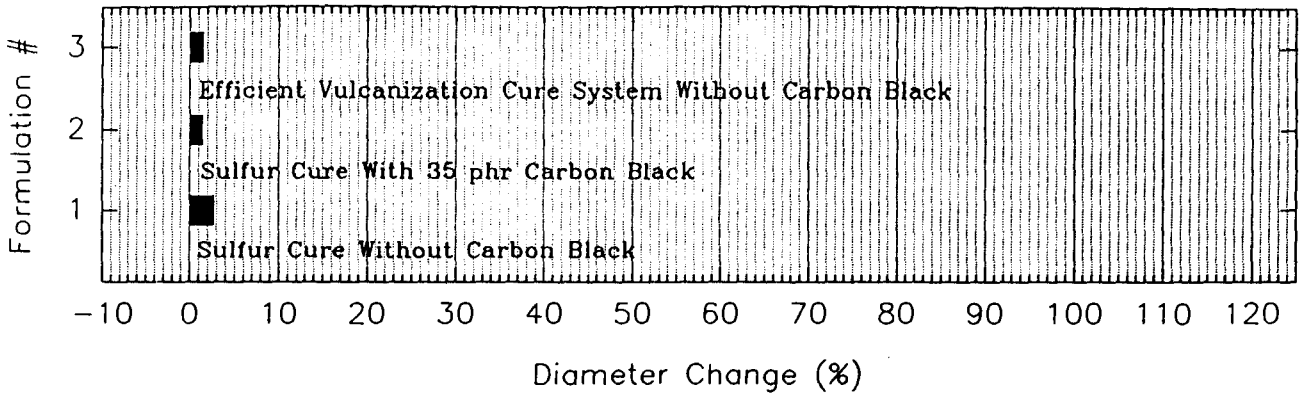
% Insitu Diameter Change In R-22



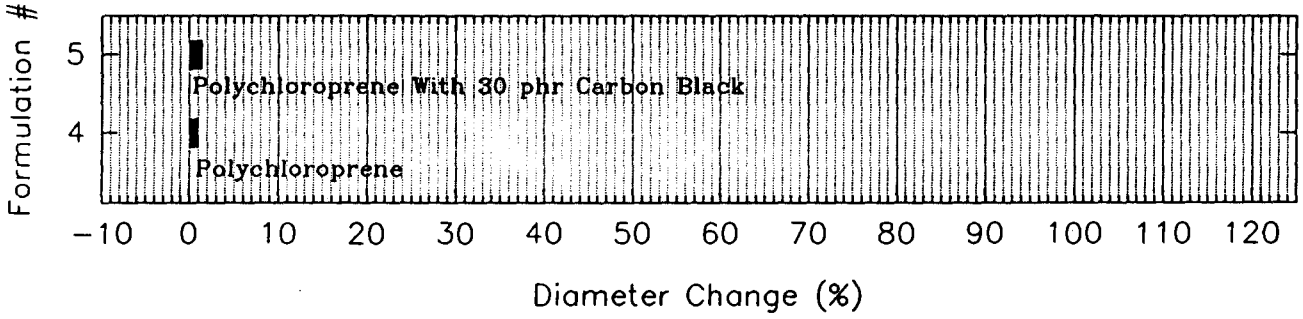


% Insitu Diameter Change In R-32

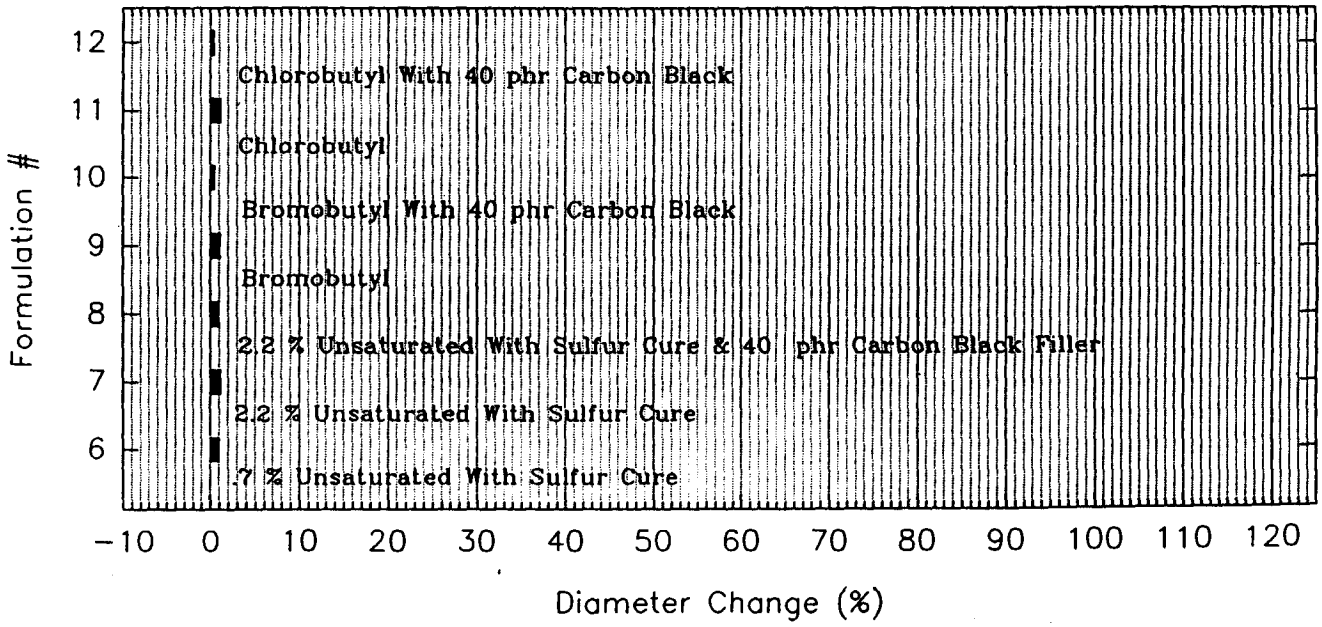
Polyisoprenes



Polychloroprenes

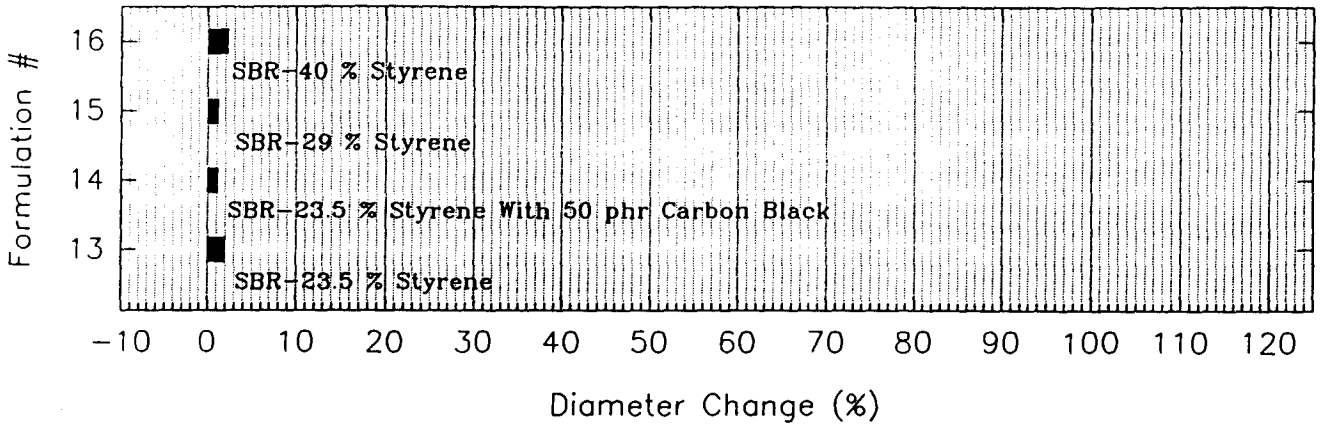


Butyl Rubbers

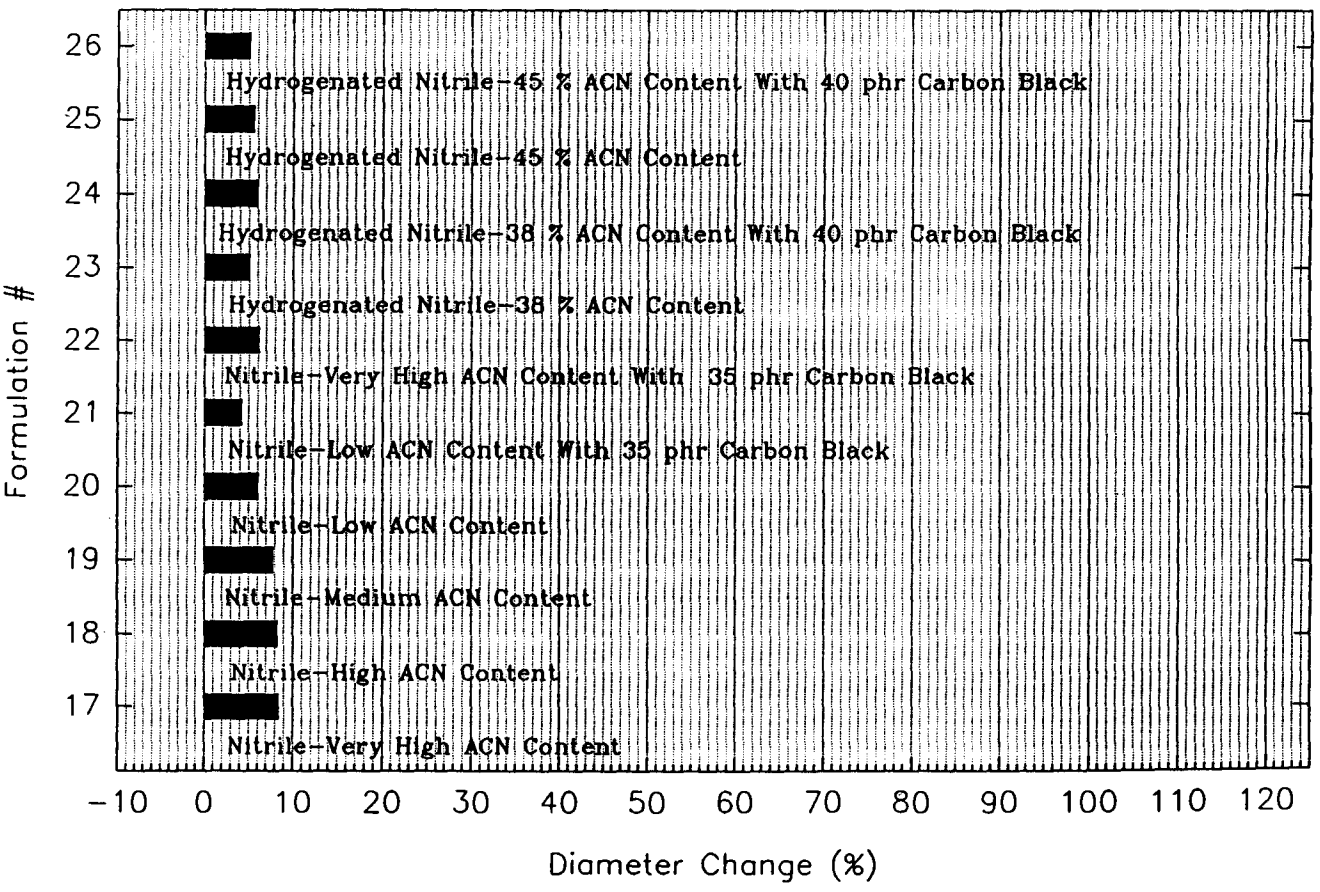


% Insitu Diameter Change In R-32

Styrene Butadiene Rubbers

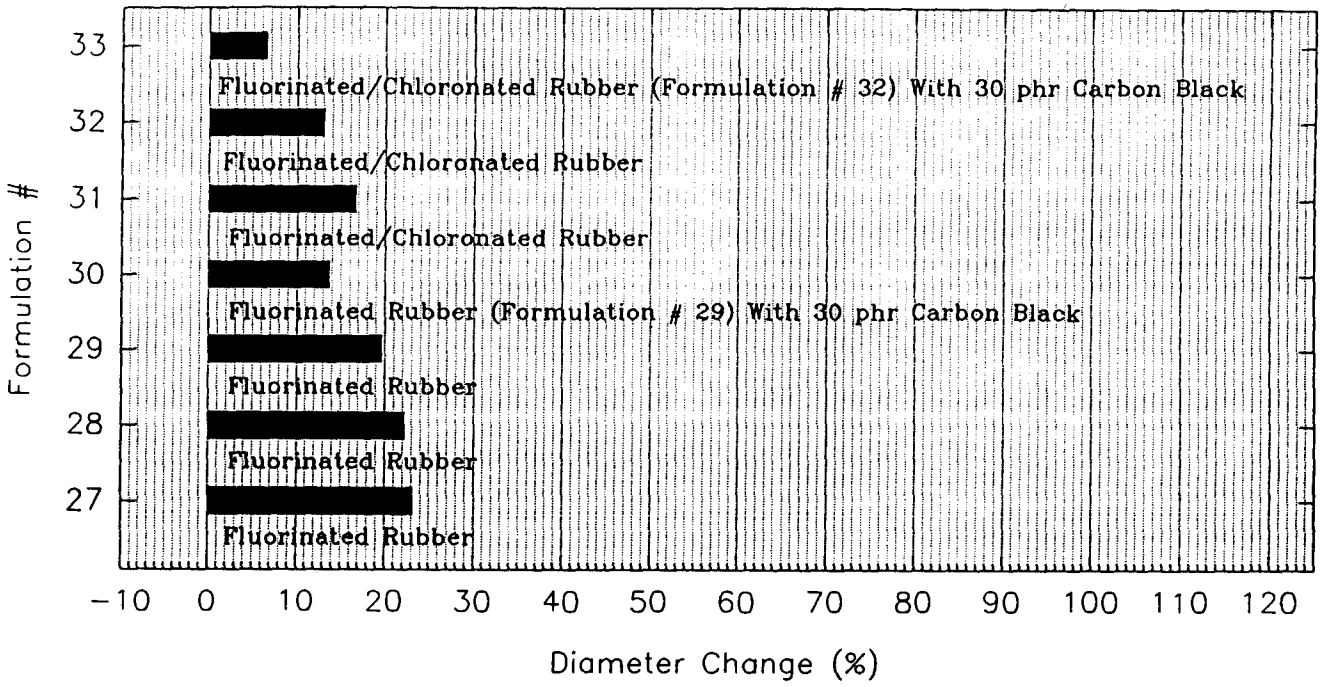


Nitrile Rubbers

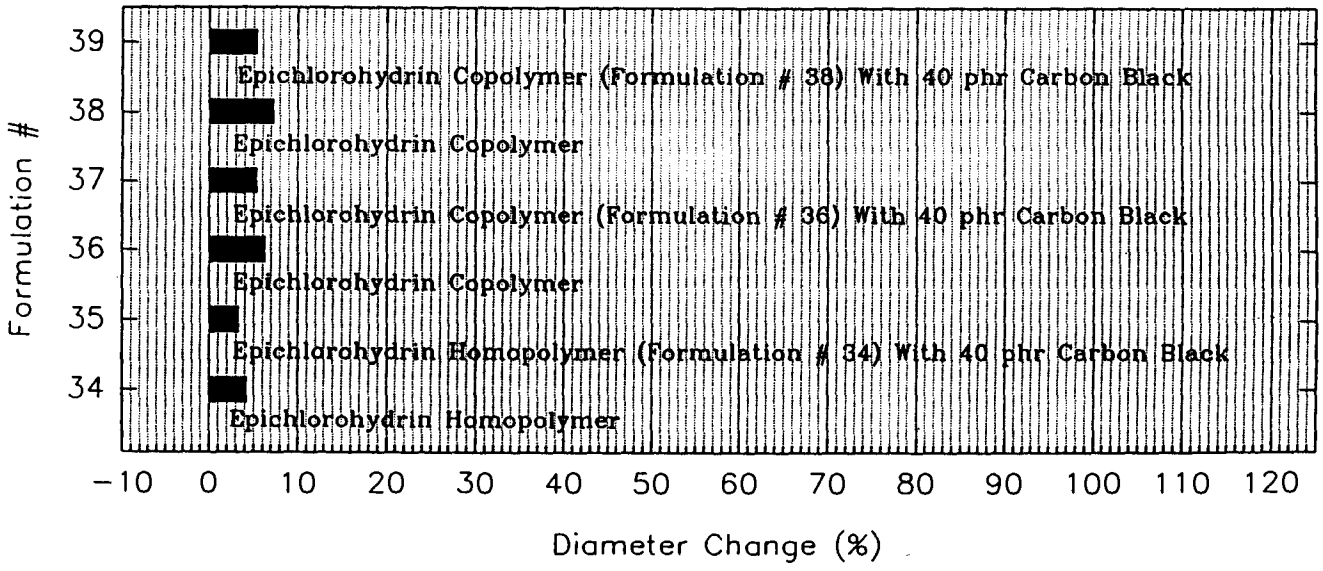


% Insitu Diameter Change In R-32

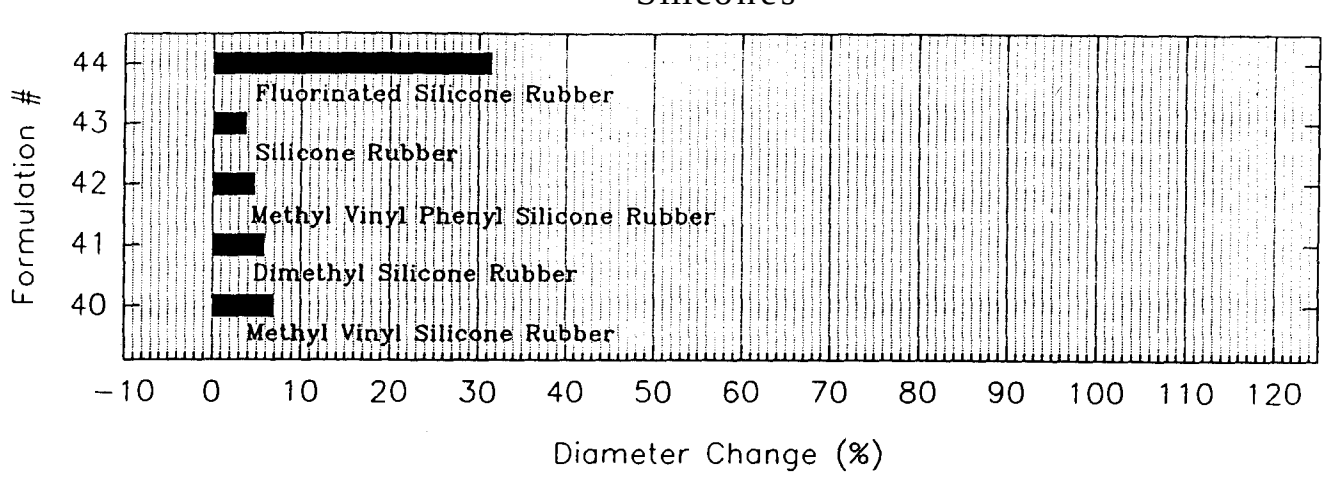
Fluorinated Rubbers

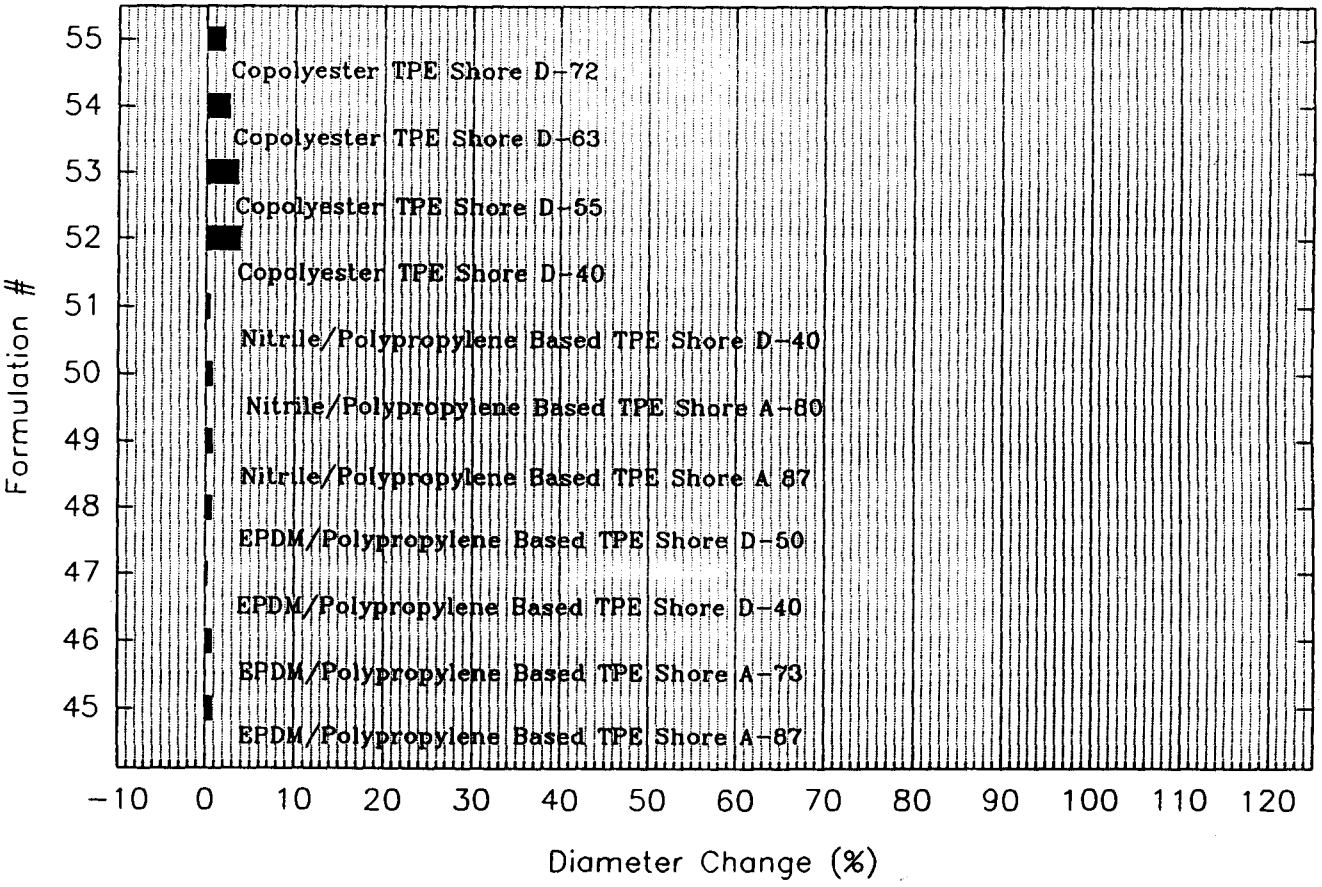


Epichlorohydrin Based Rubbers



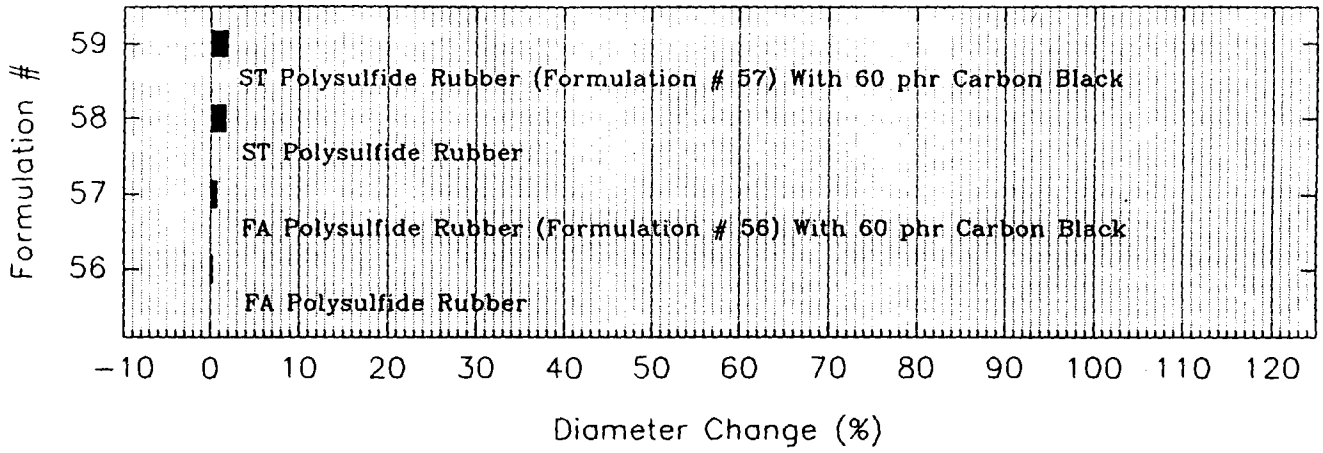
% Insitu Diameter Change In R-32



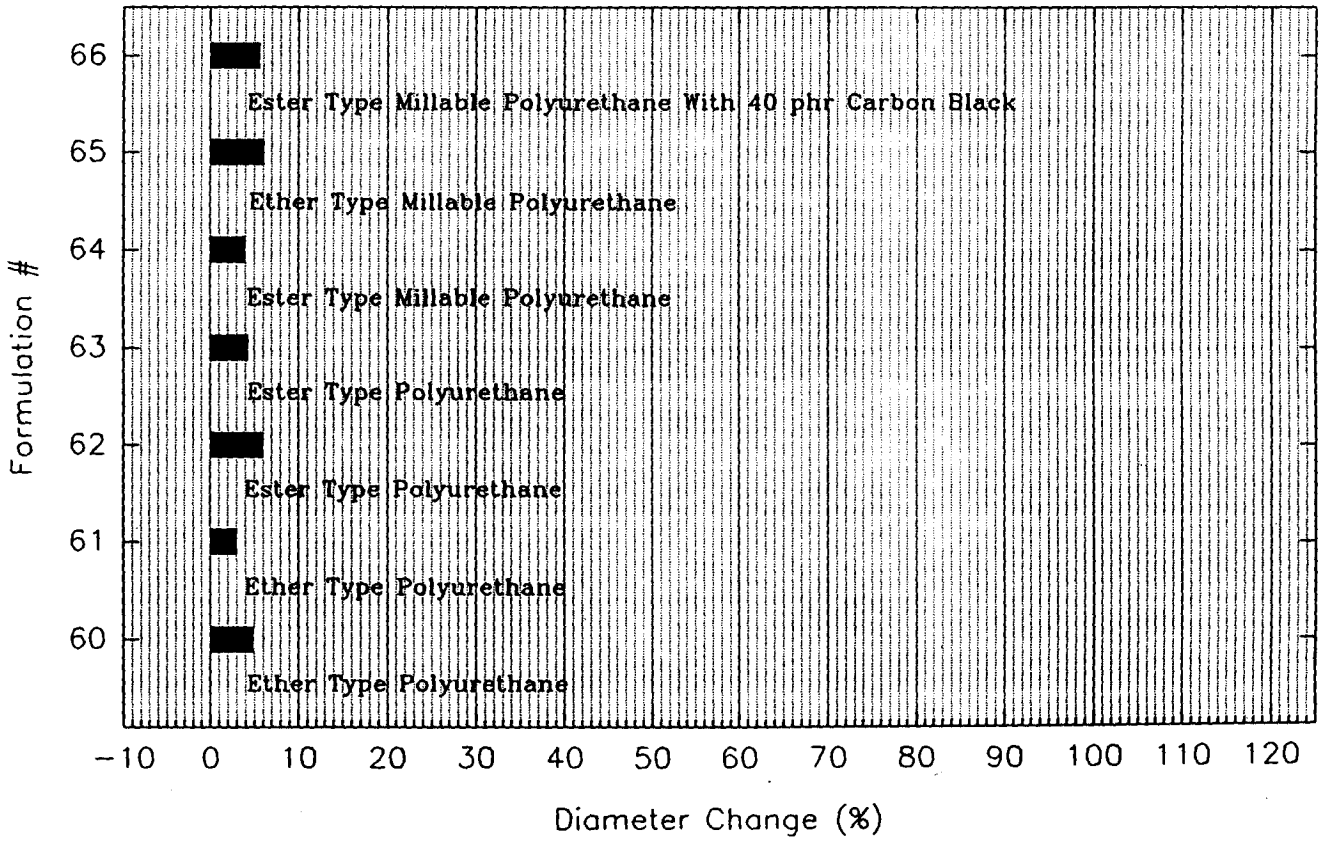


% Insitu Diameter Change In R-32

Polysulfide Rubbers

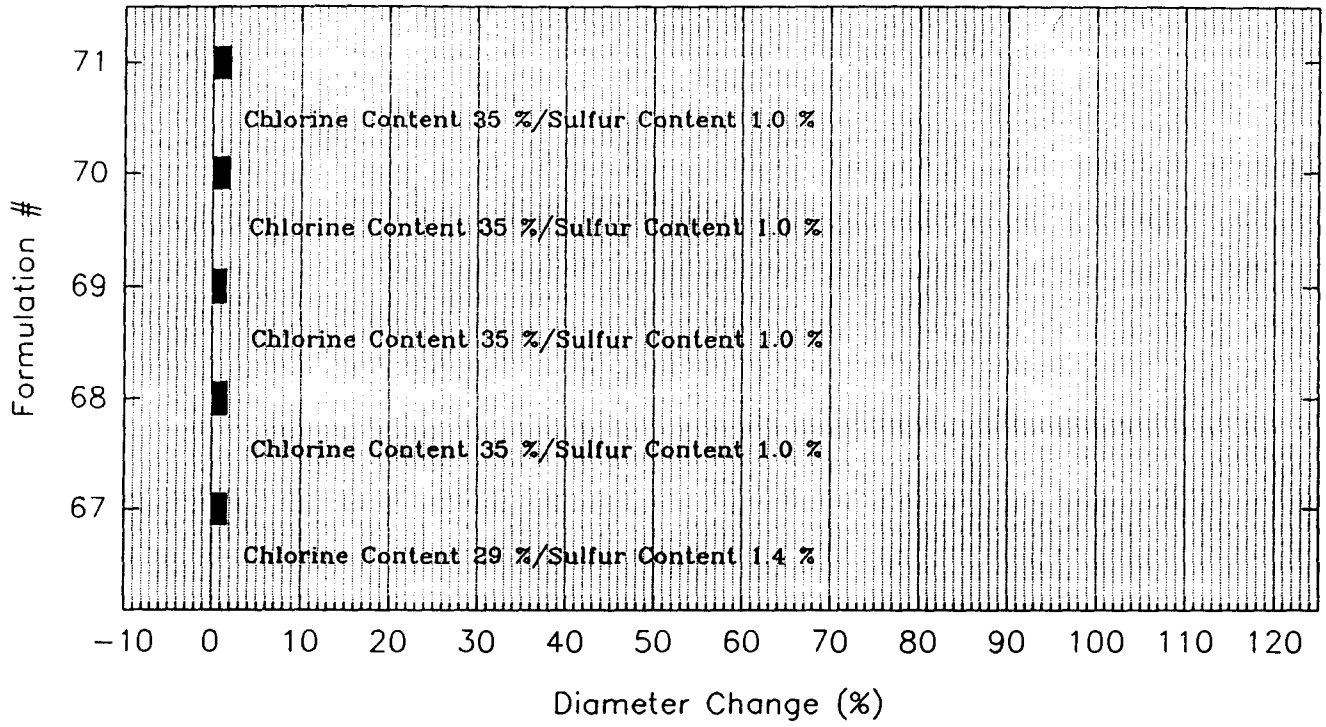


Polyurethanes

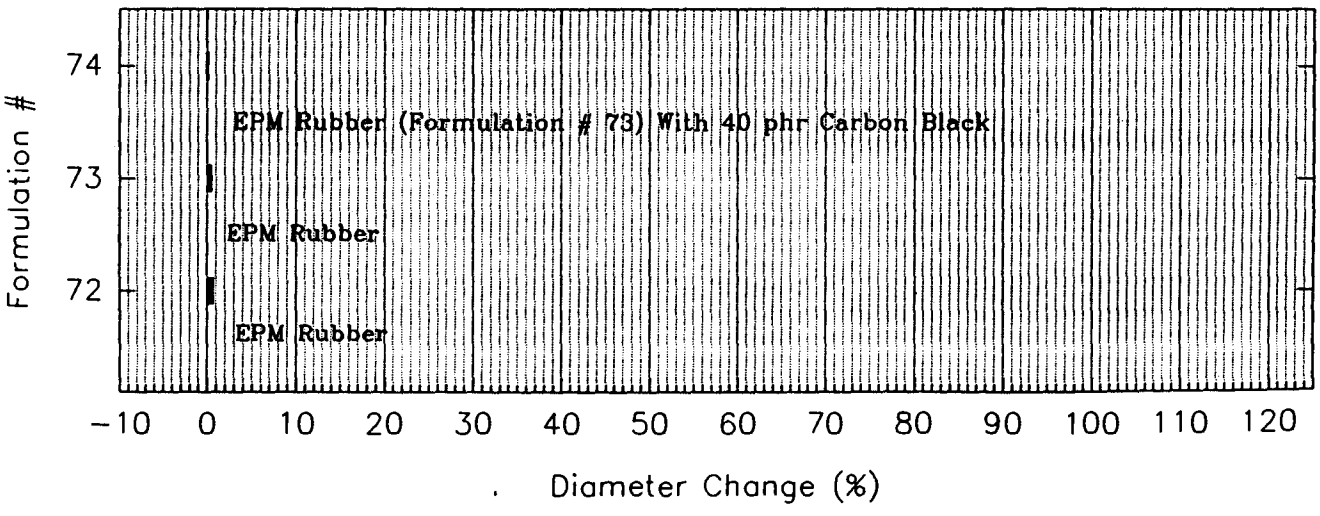


% Insitu Diameter Change In R-32

Chlorosulfonated Polyethylenes

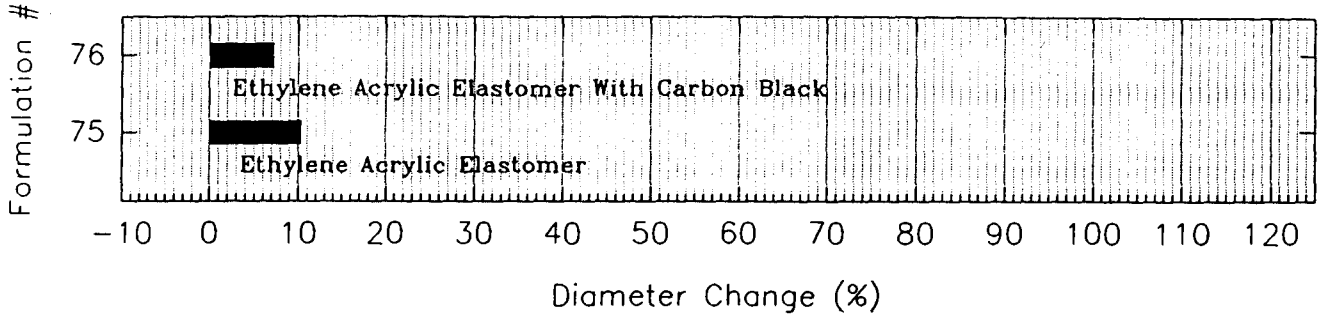


EPM Rubbers

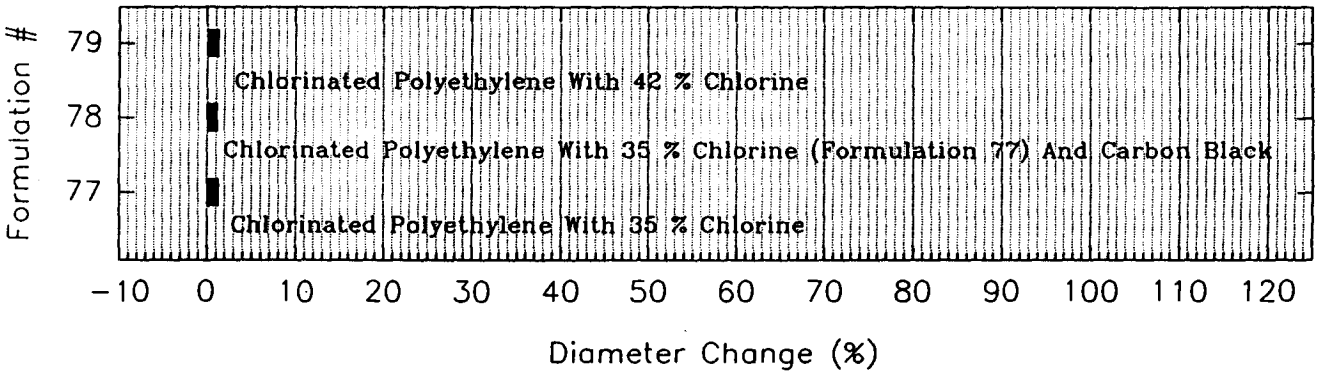


% Insitu Diameter Change In R-32

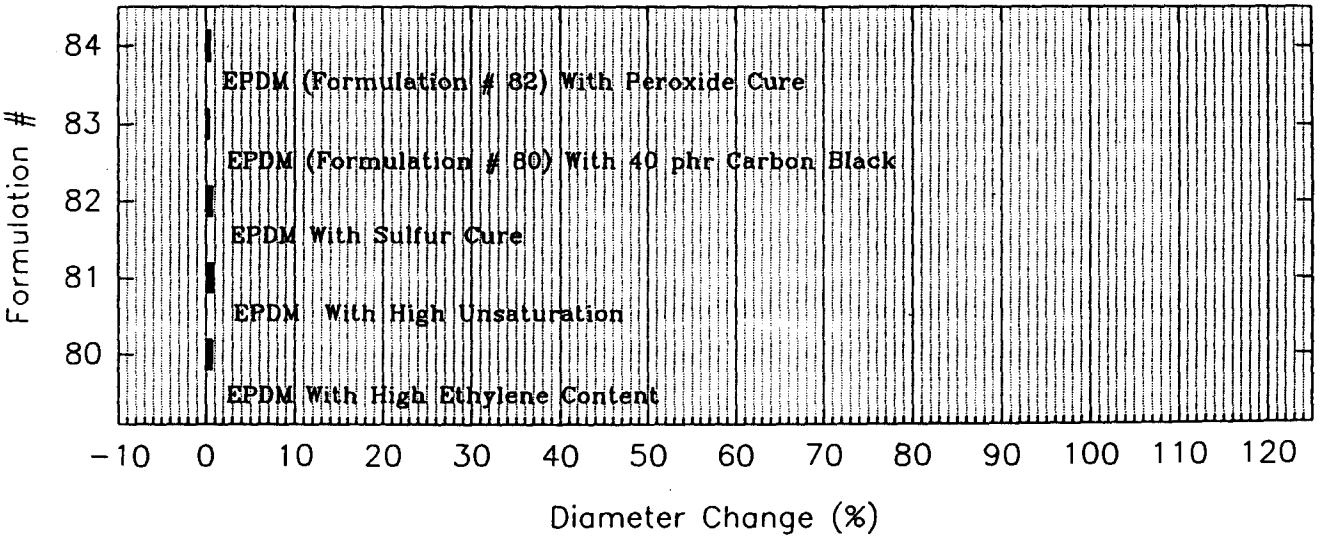
Ethylene Acrlic Elastomers



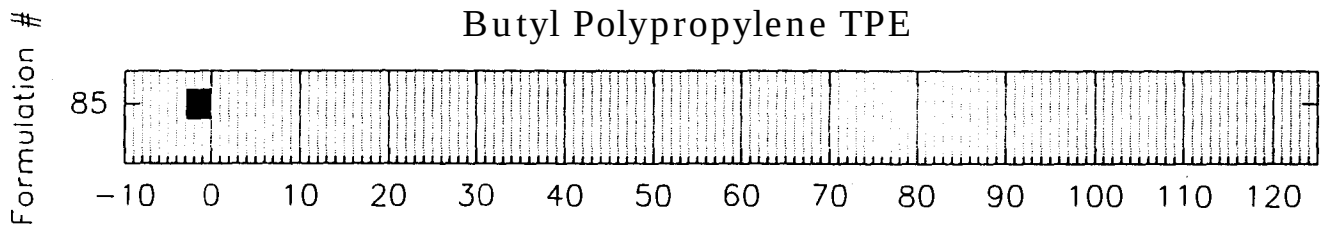
Chlorinated Polyethylenes

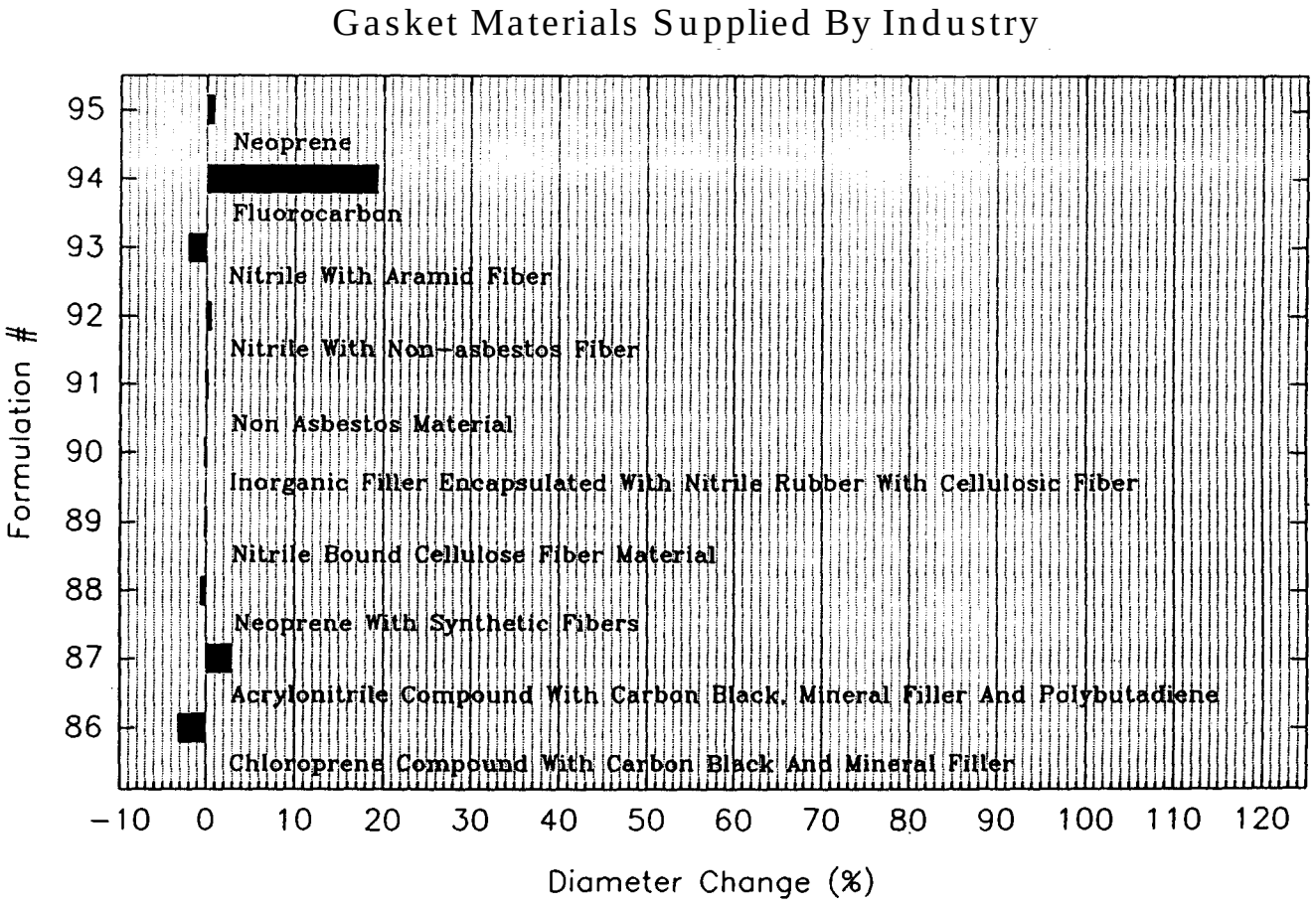


Ethylene Propylene Diene Rubbers



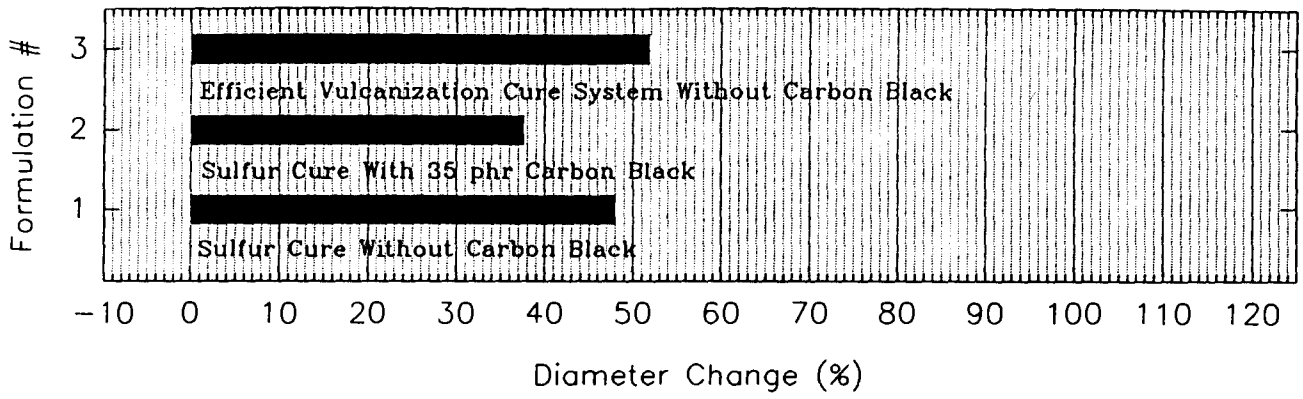
% Insitu Diameter Change In R-32



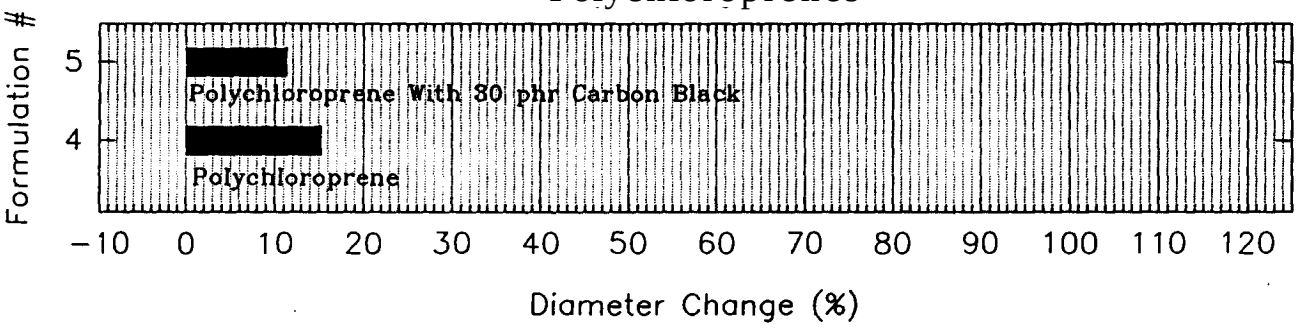


% Insitu Diameter Change In R-123

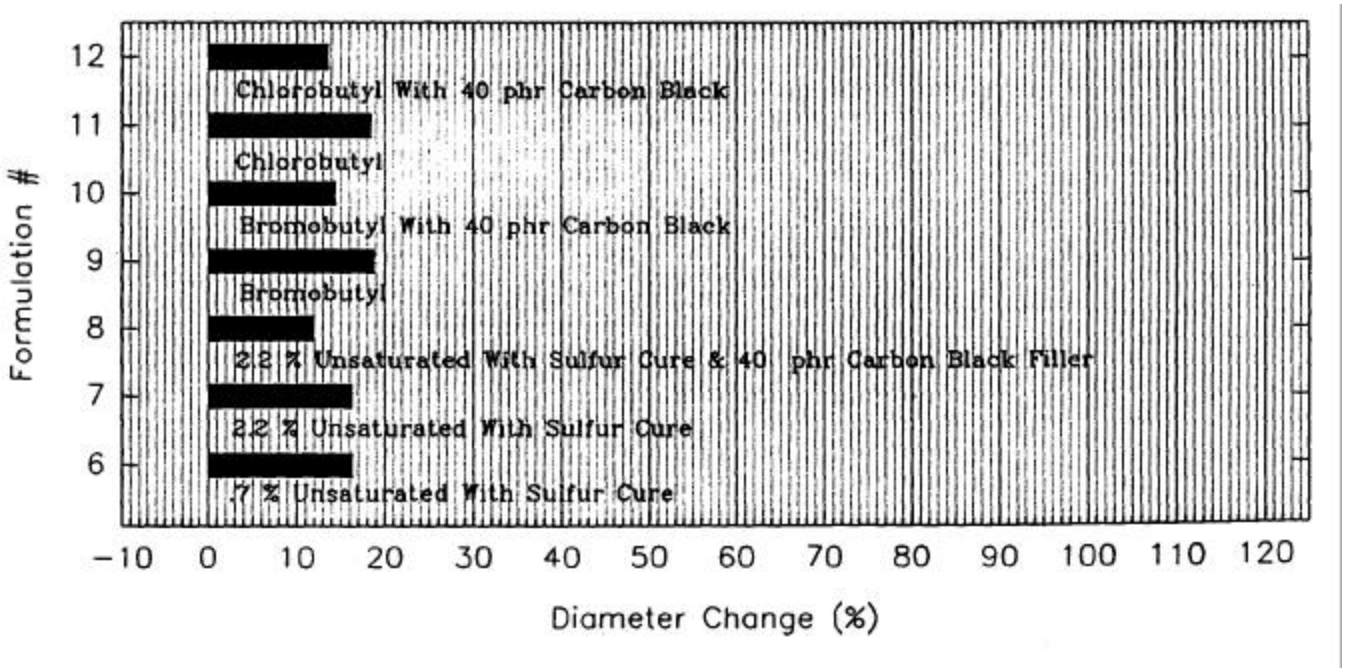
Polyisoprenes



Polychloroprenes

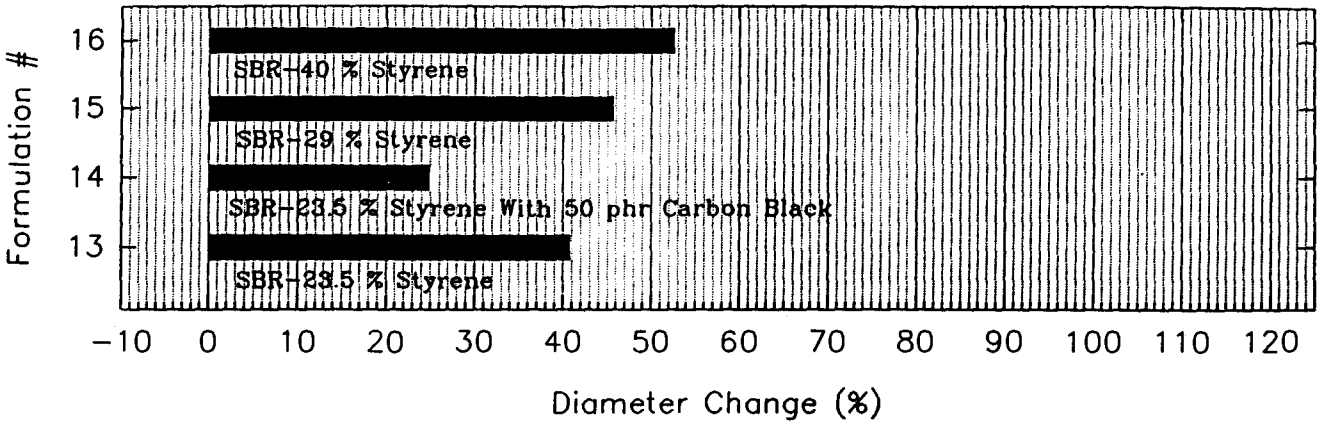


Butyl Rubbers

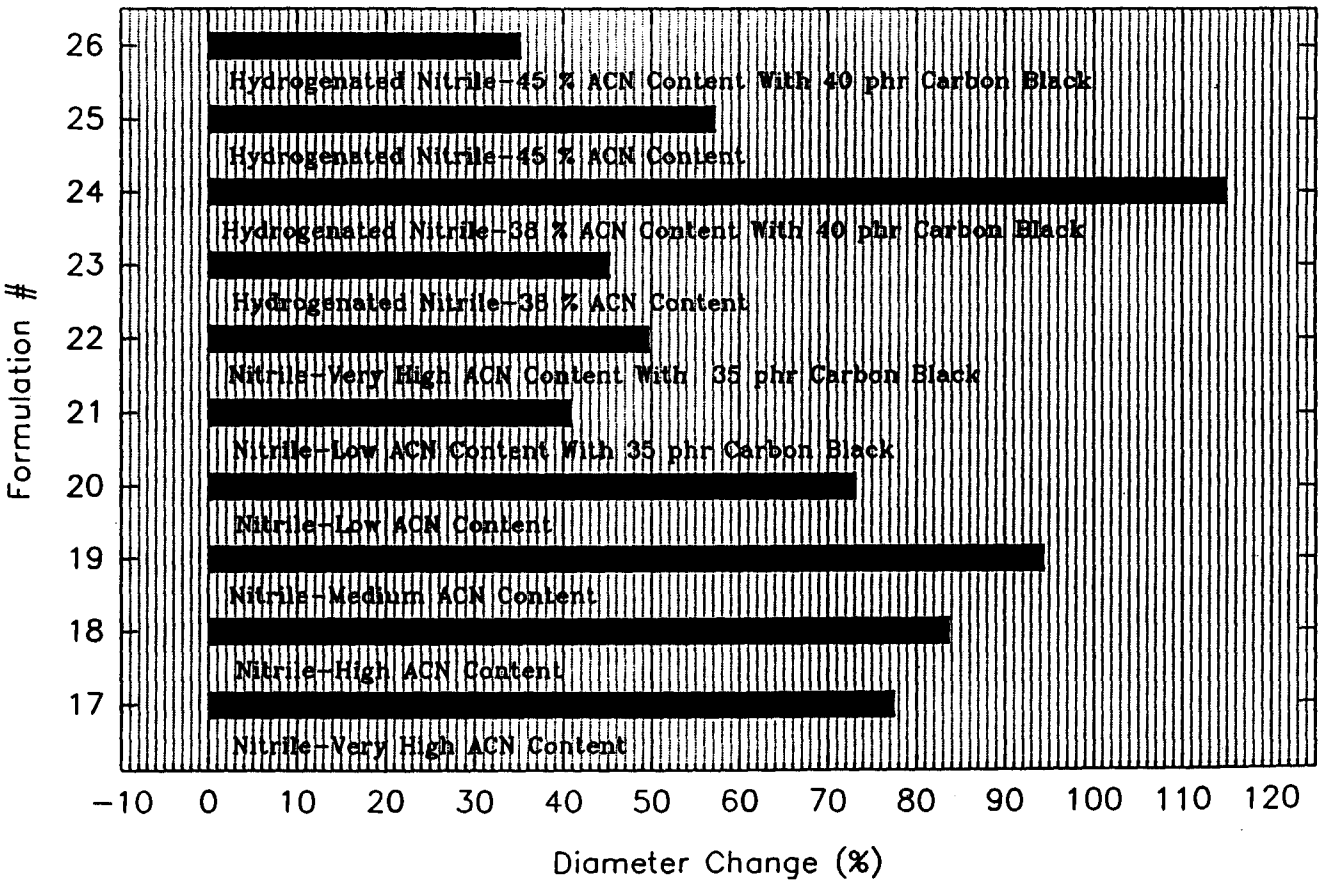


% Insitu Diameter Change In R-123

Styrene Butadiene Rubbers

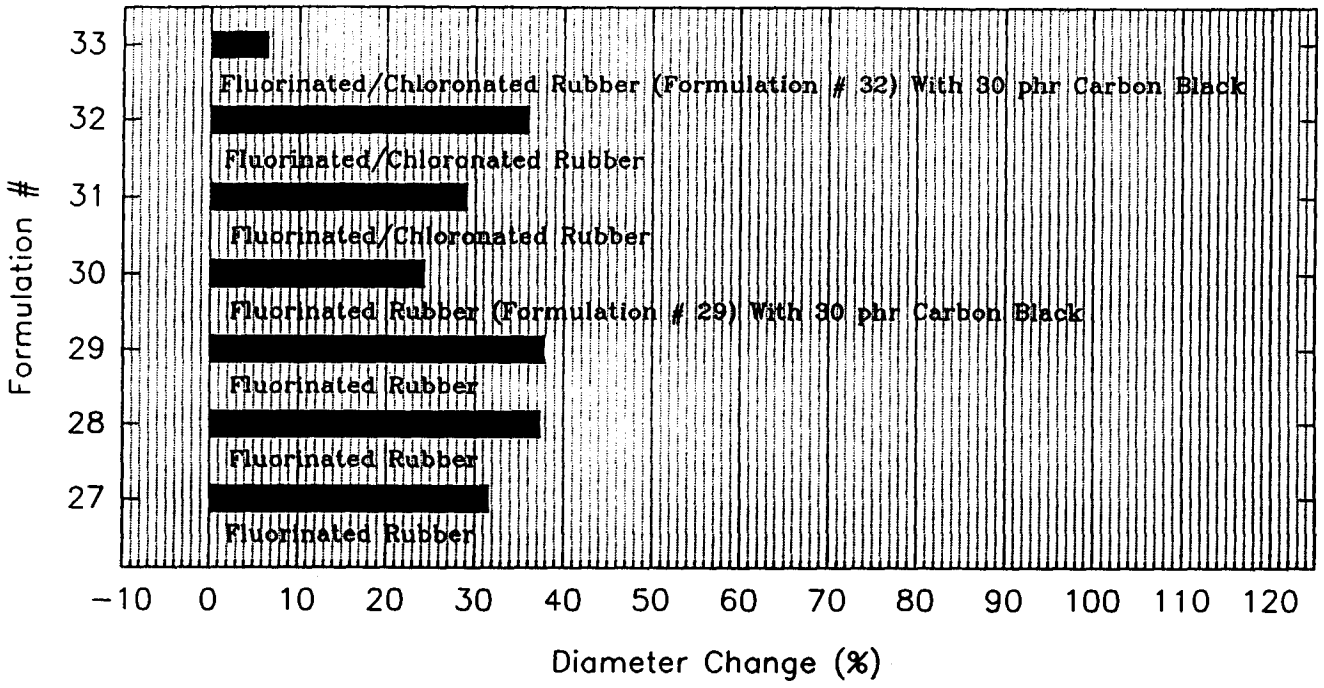


Nitrile Rubbers

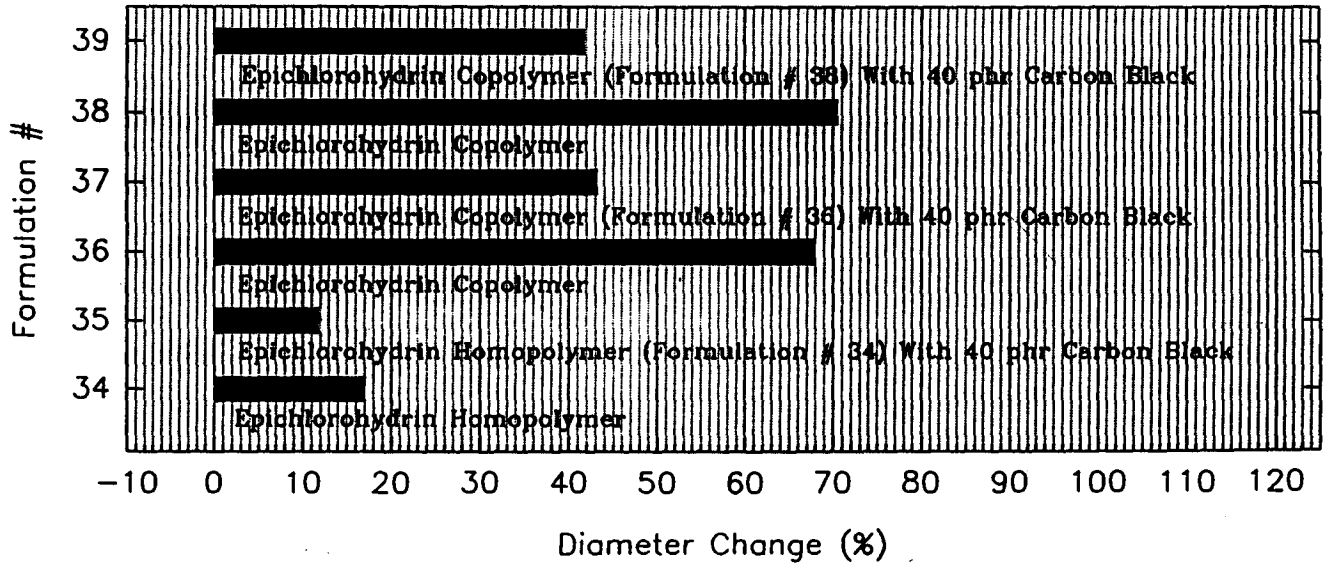


% Insitu Diameter Change In R-123

Fluorinated Rubbers

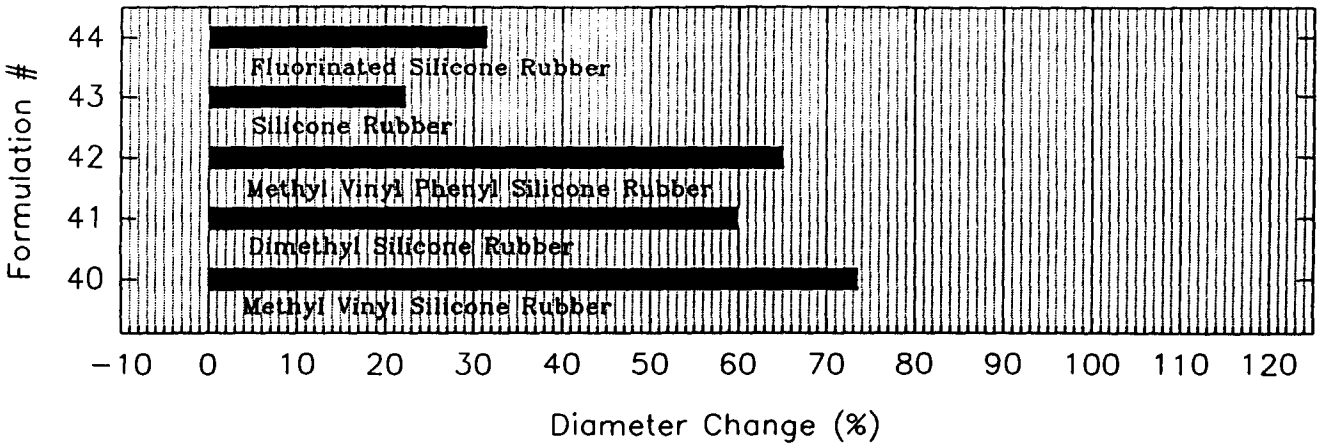


Epichlorohydrin Based Rubbers

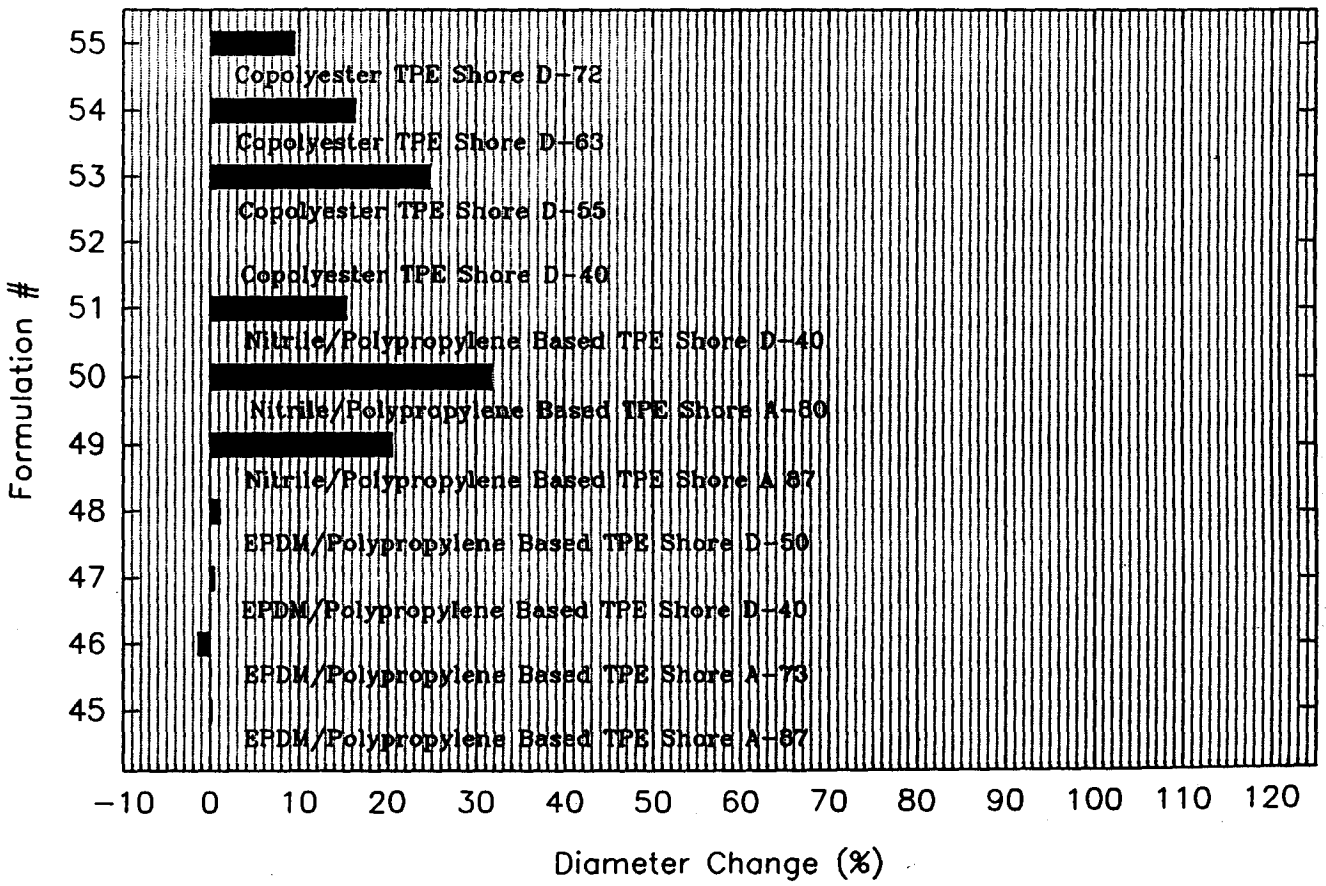


% Insitu Diameter Change In R-123

Silicones

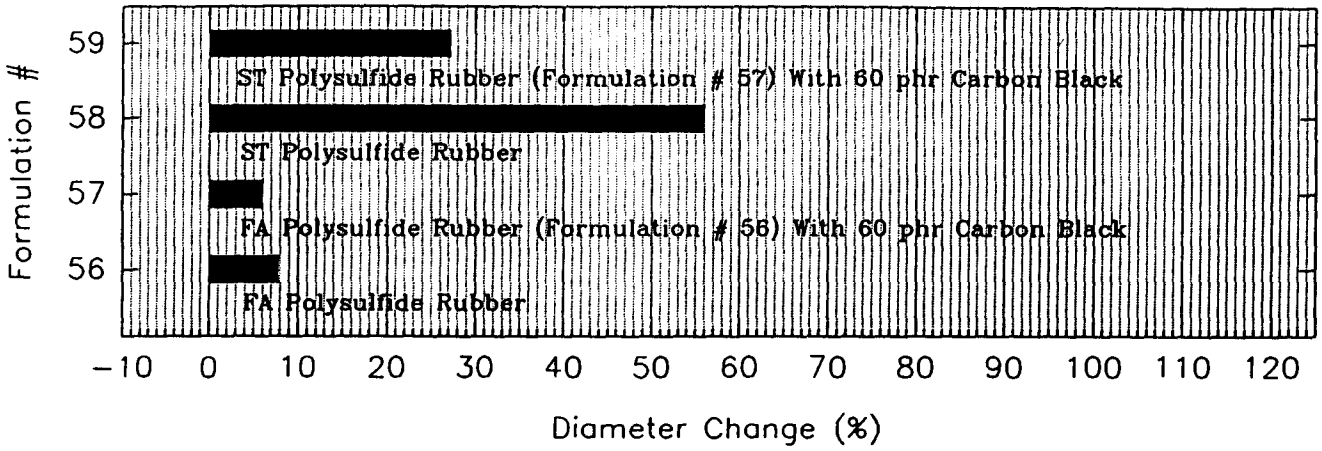


Thermoplastic Elastomers

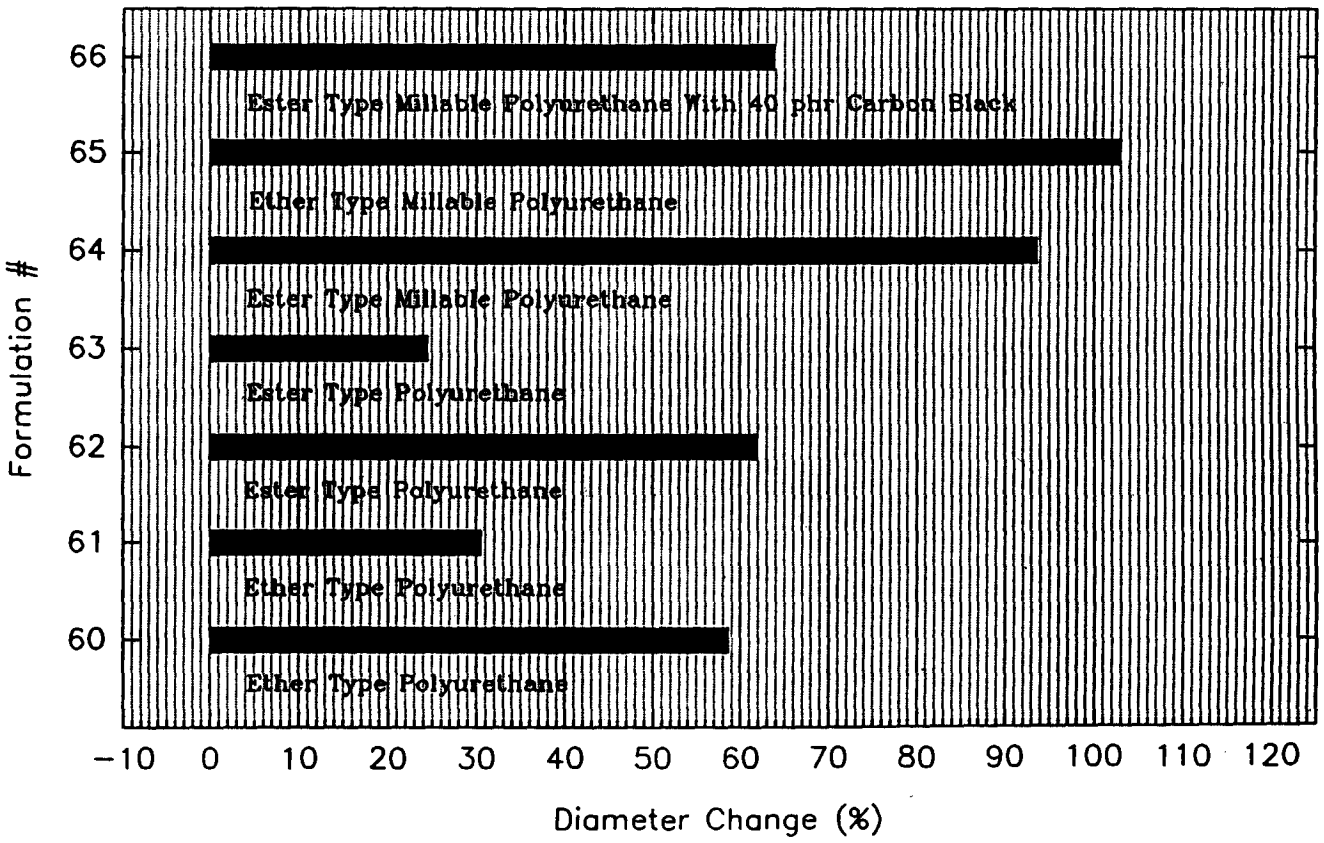


% Insitu Diameter Change In R-123

Polysulfide Rubbers

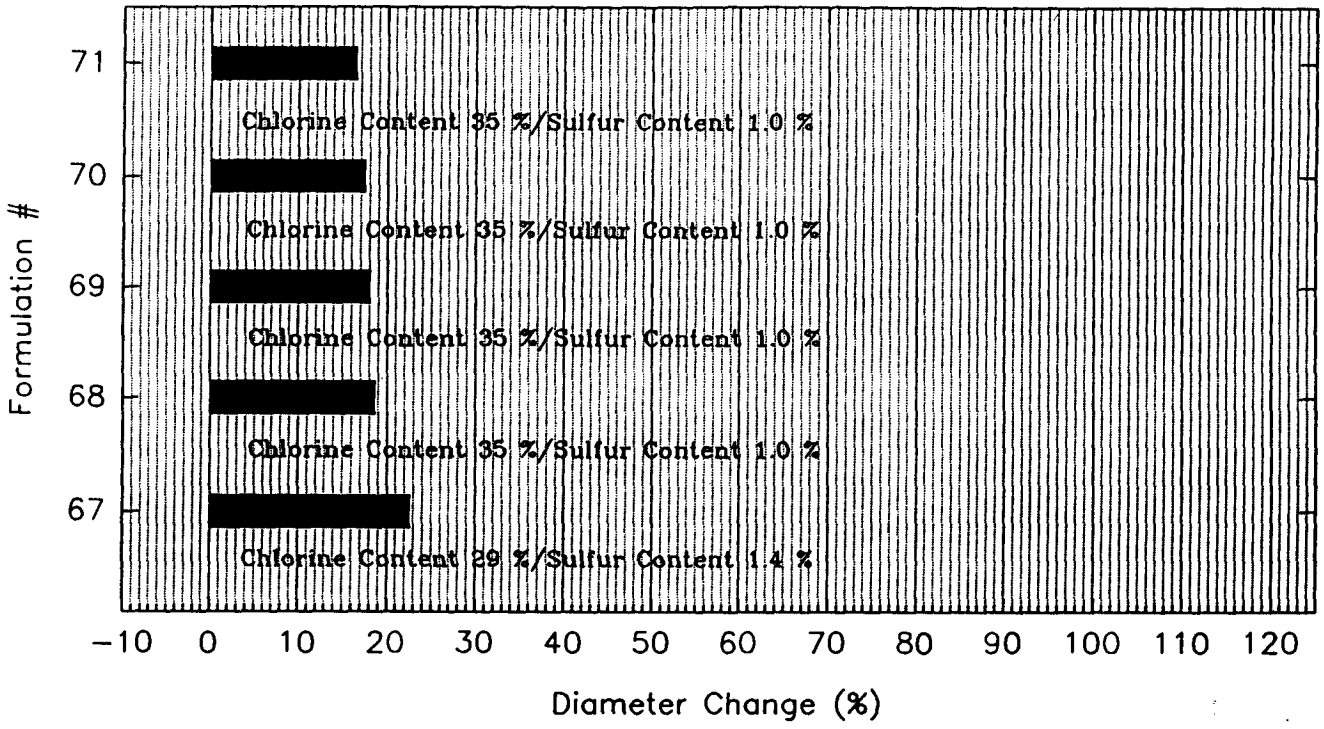


Polyurethanes

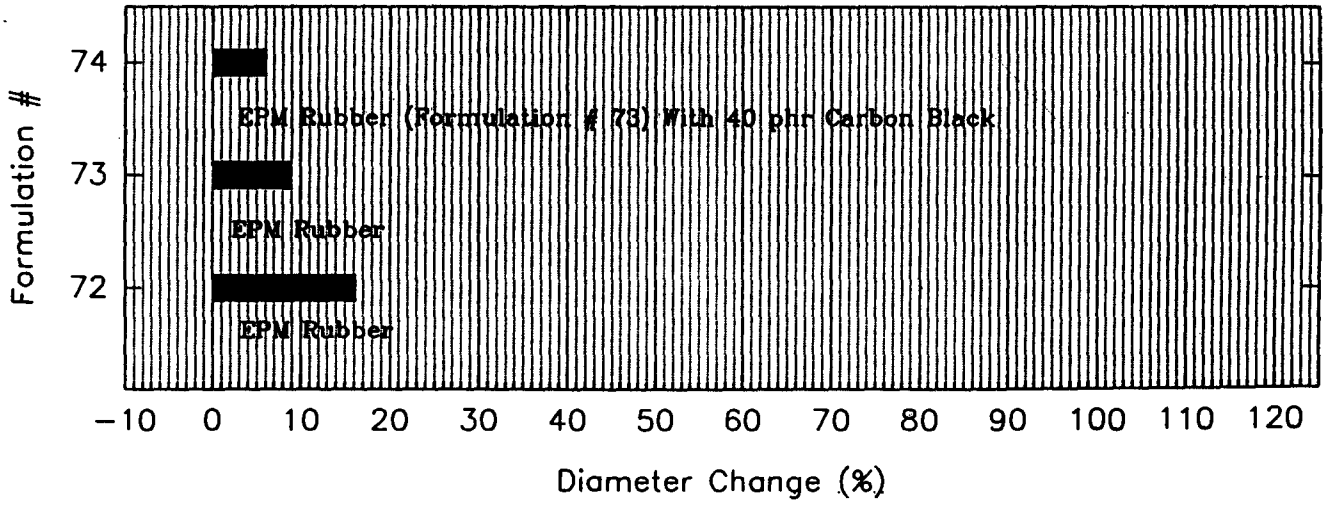


% Insitu Diameter Change In R-123

Chlorosulfonated Polyethylenes



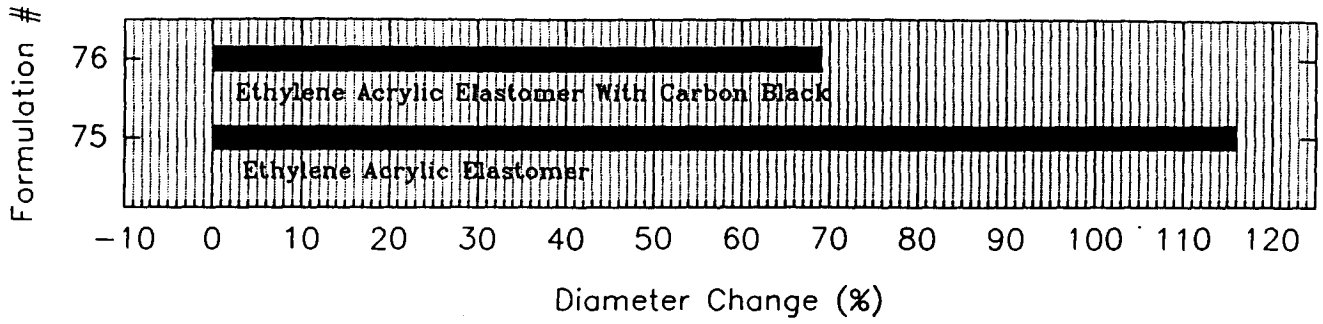
EPM Rubbers



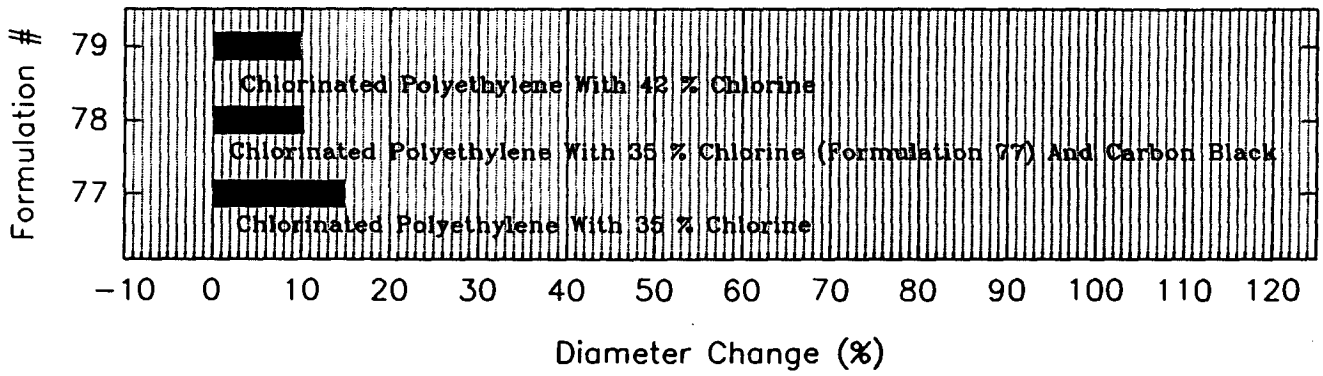
*rB

% Insitu Diameter Change In R-123

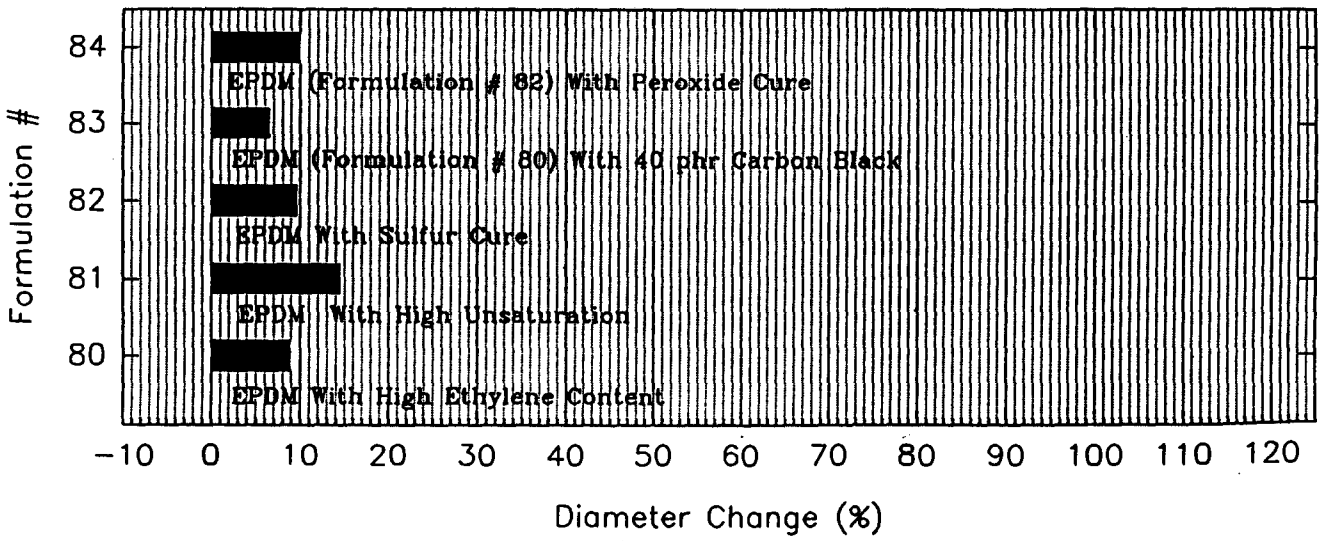
Ethylene Acrlic Elastomers



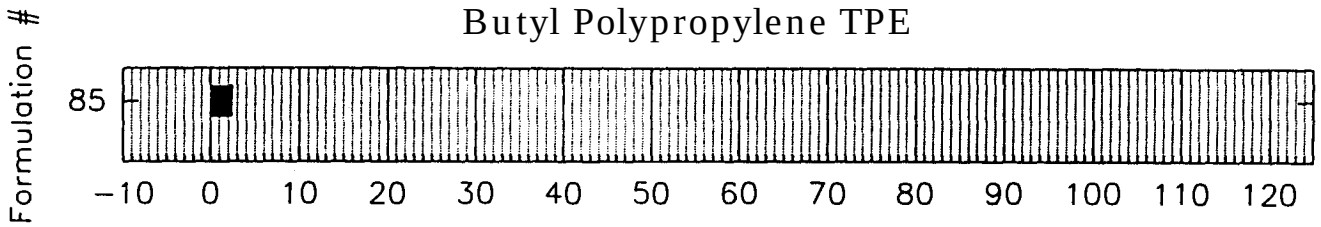
Chlorinated Polyethylenes

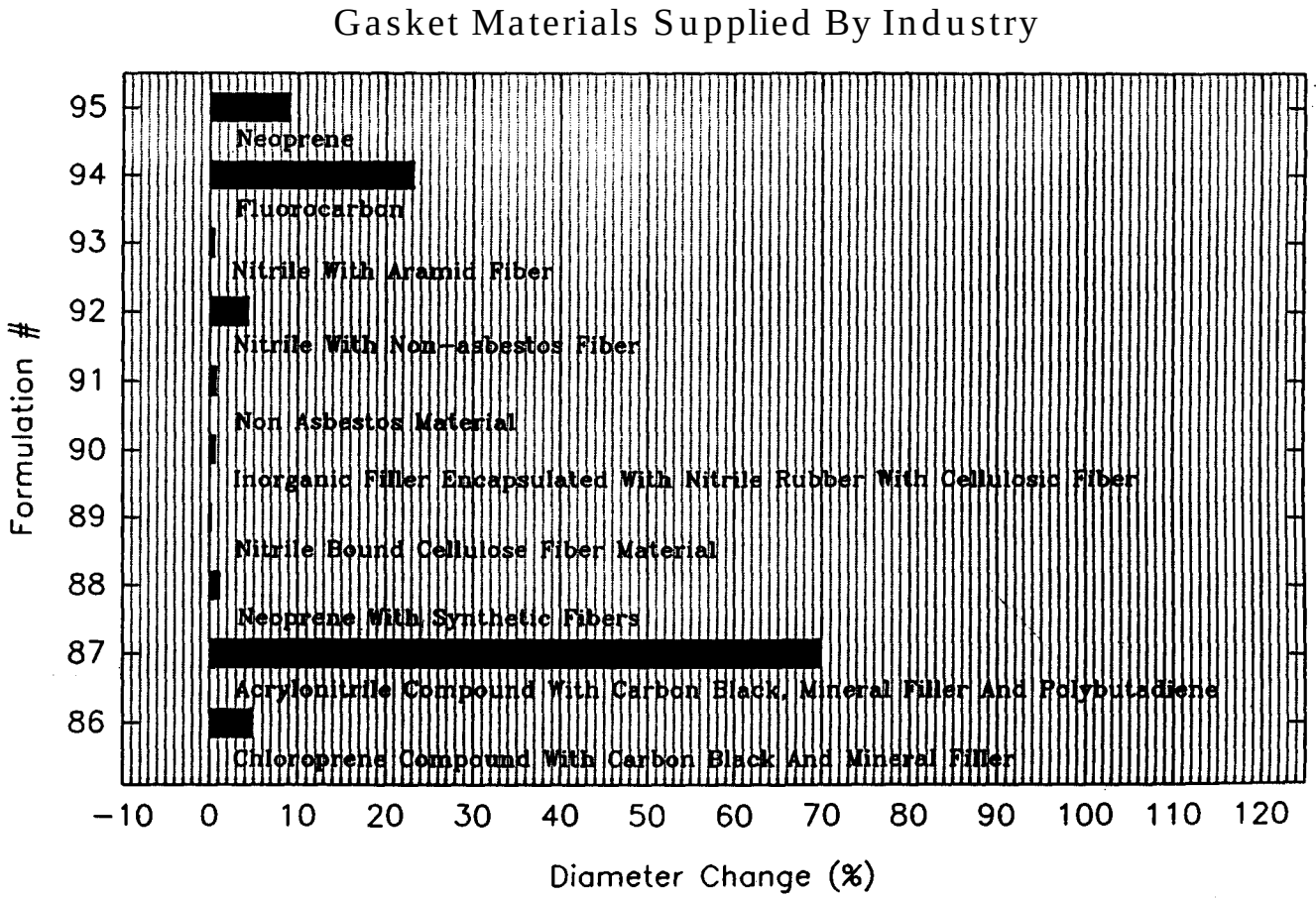


Ethylene Propylene Diene Rubbers



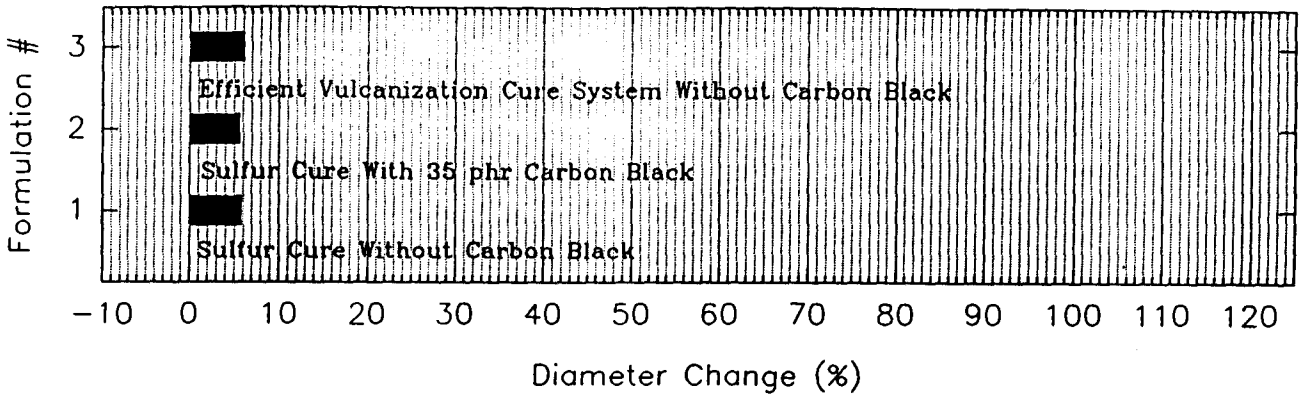
% Insitu Diameter Change In R-123



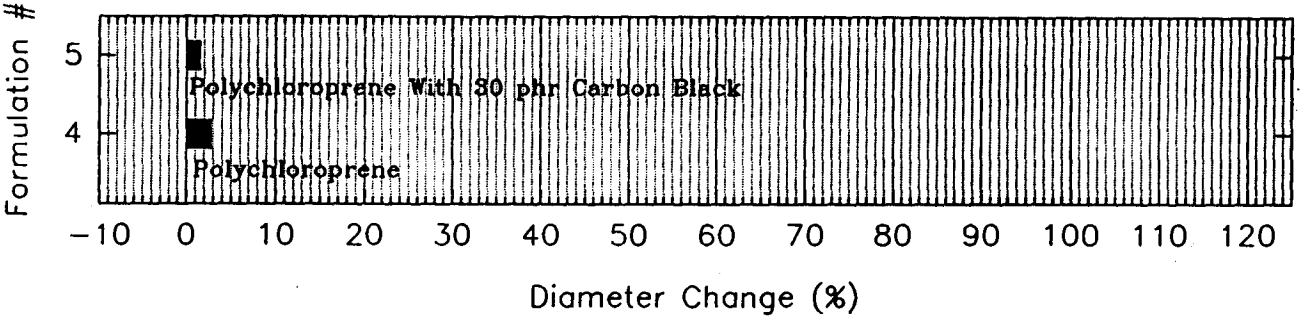


% Insitu Diameter Change In R-124

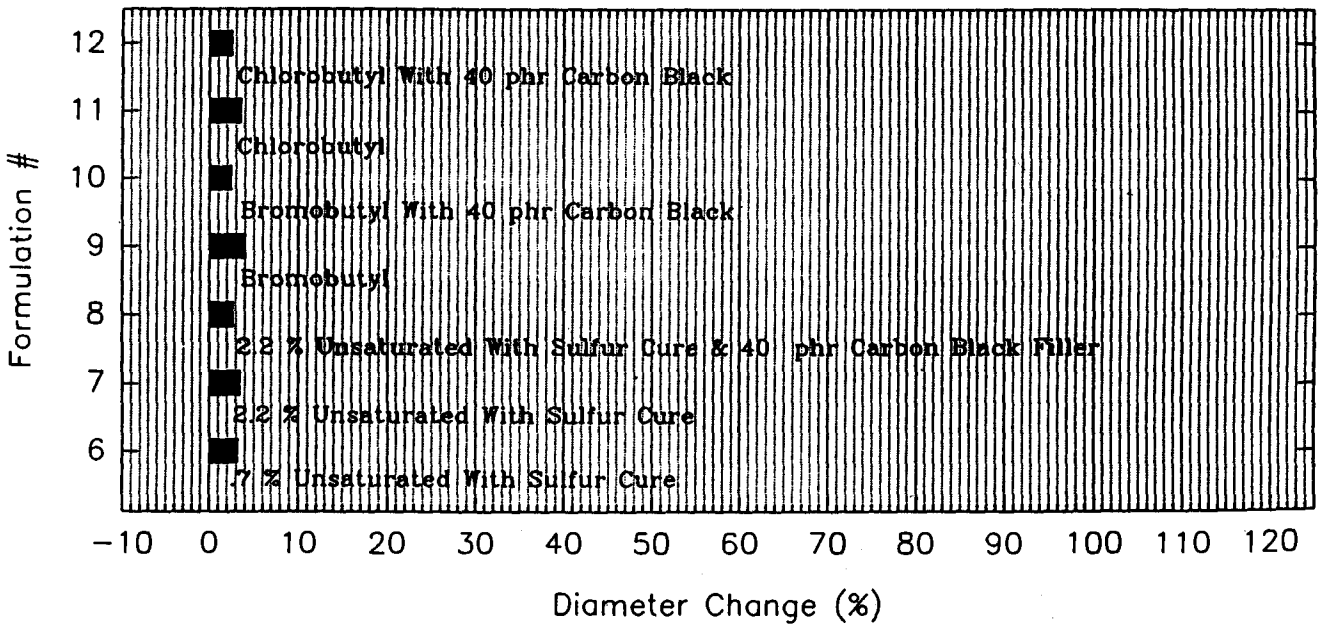
Polyisoprenes



Polychloroprenes

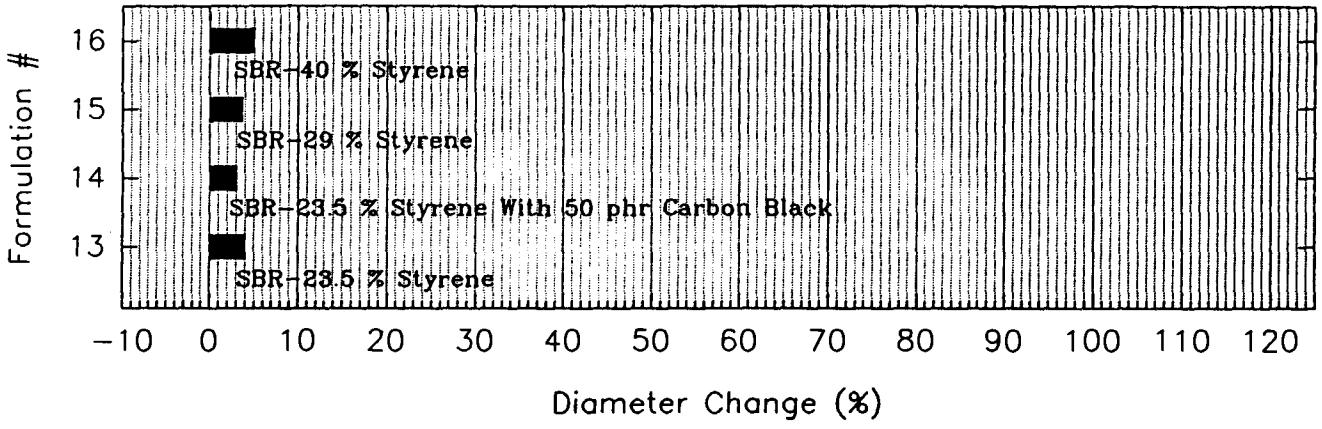


Butyl Rubbers

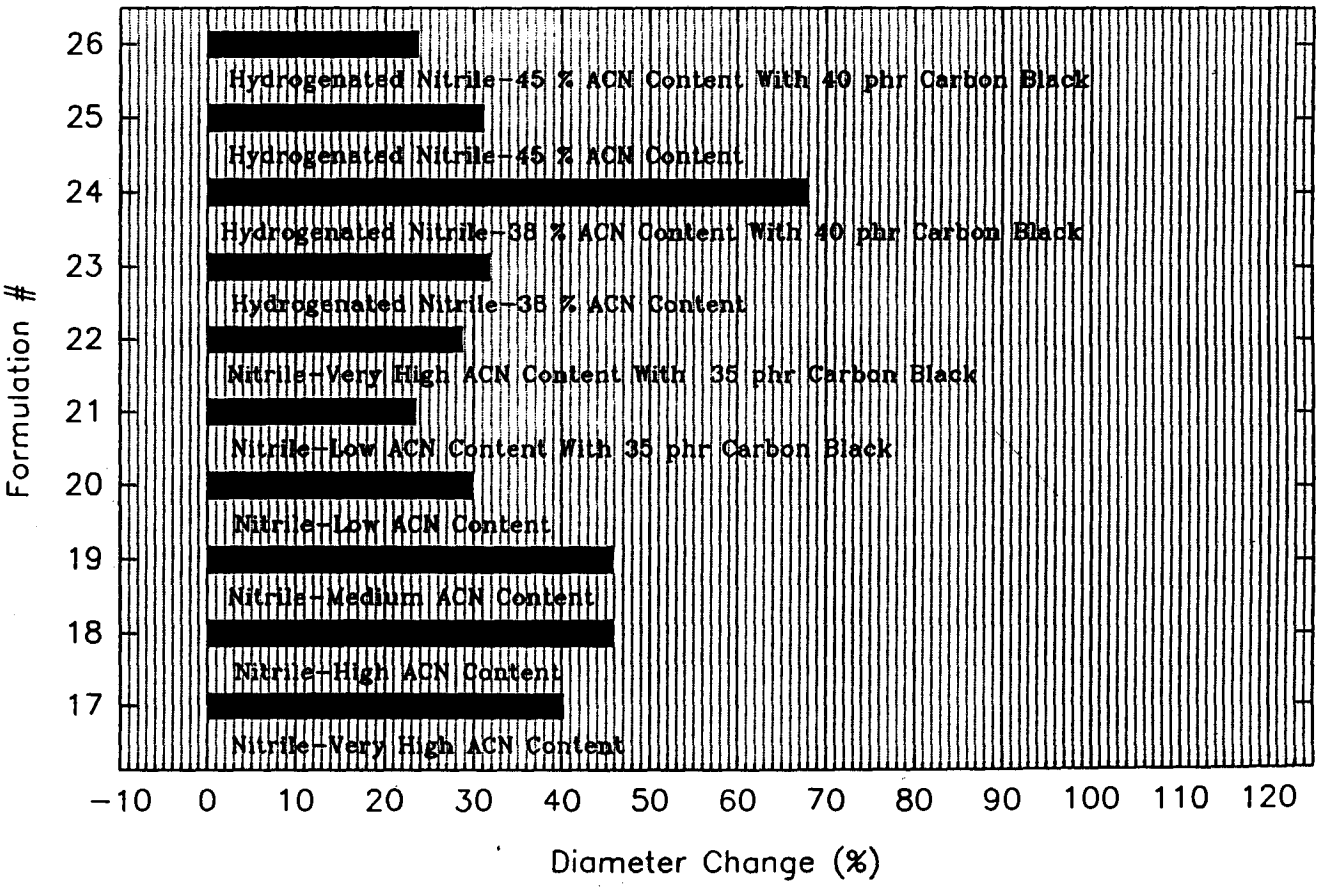


% Insitu Diameter Change In R-124

Styrene Butadiene Rubbers

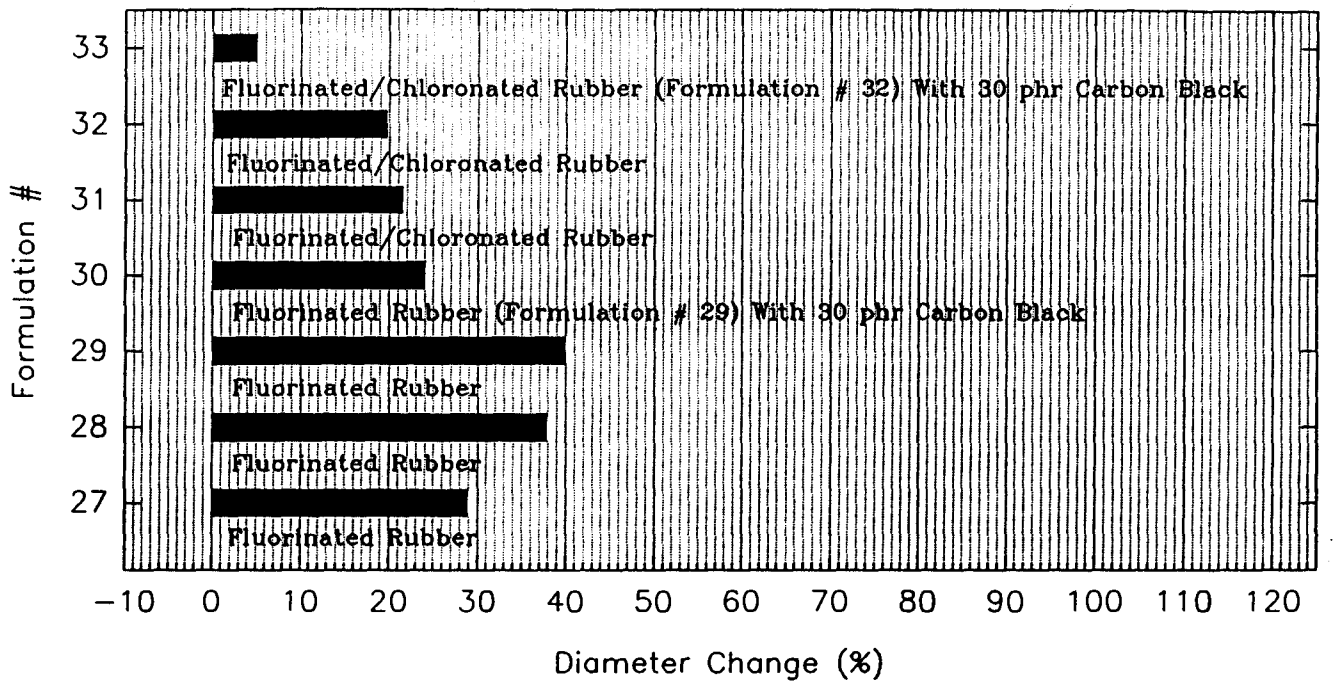


Nitrile Rubbers

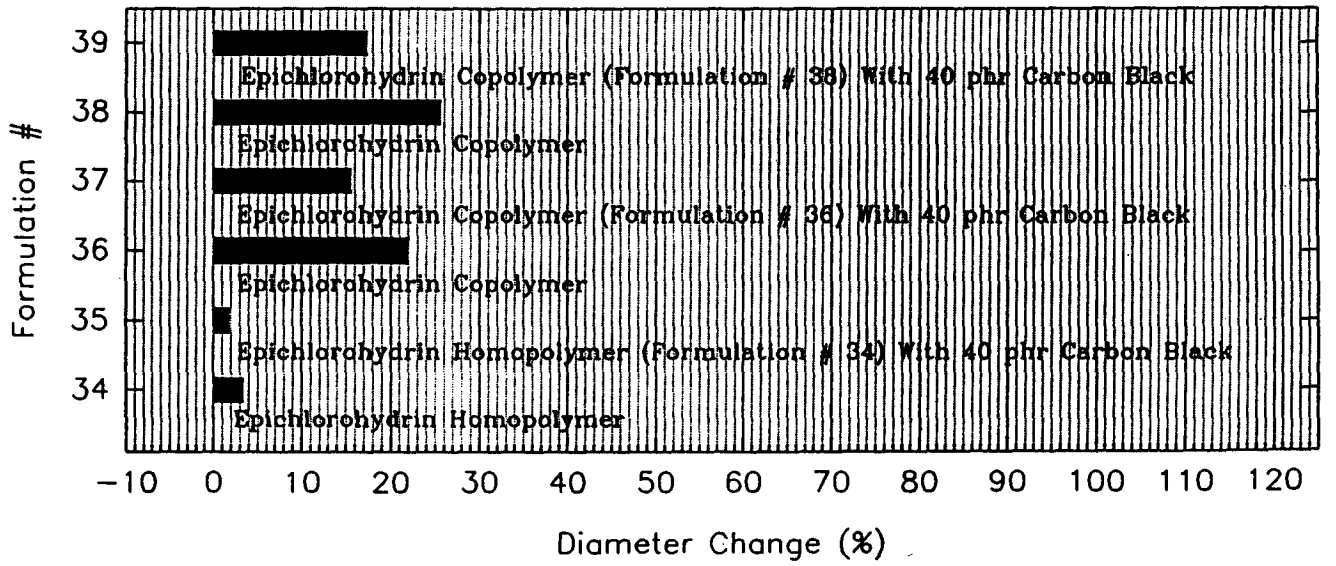


% Insitu Diameter Change In R-124

Fluorinated Rubbers

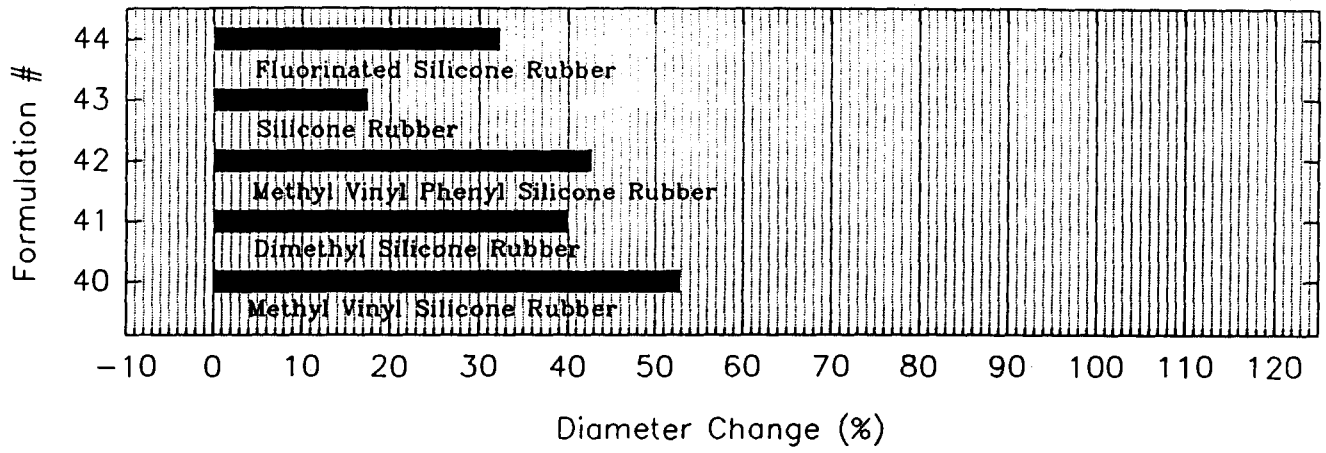


Epichlorohydrin Based Rubbers

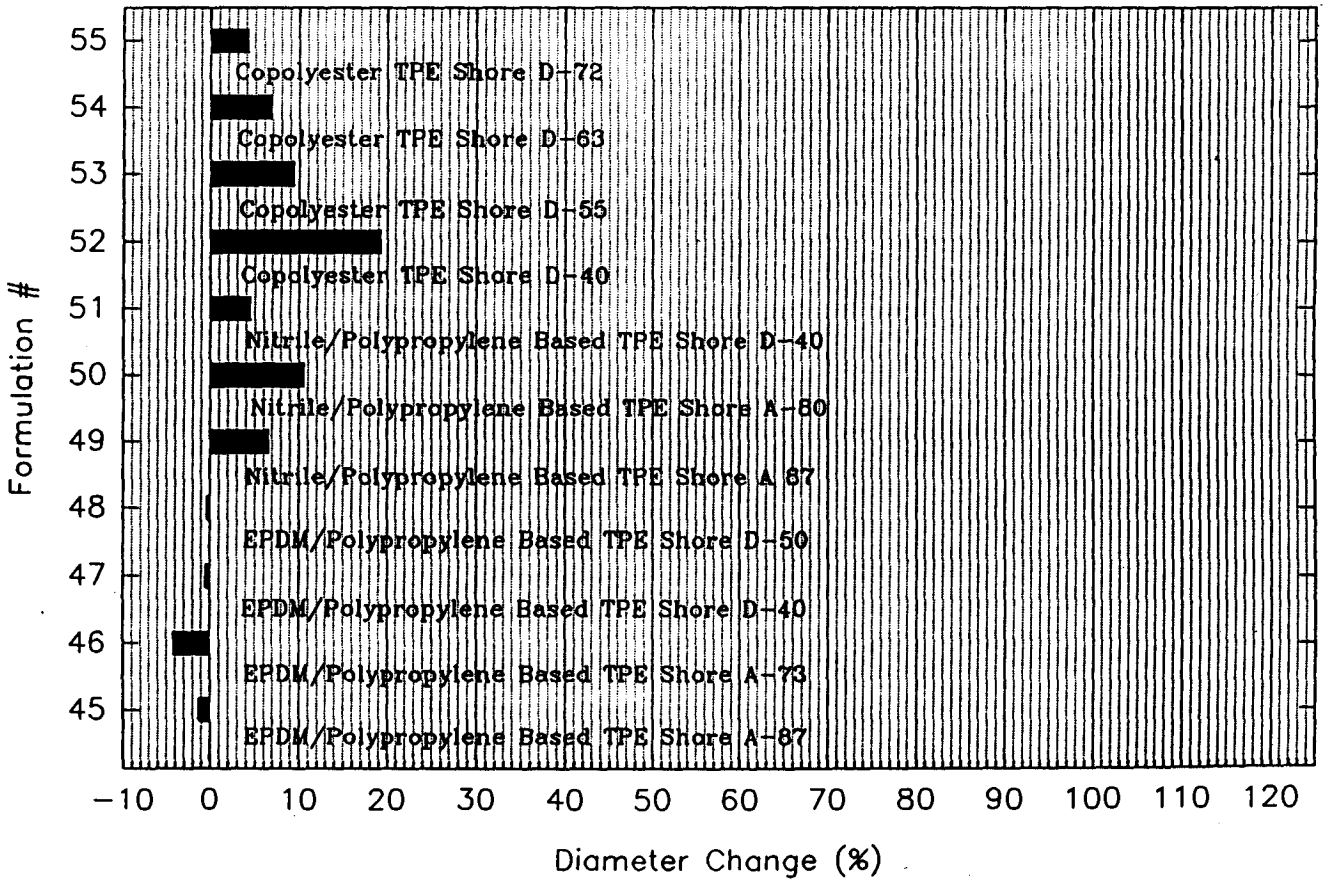


% Insitu Diameter Change In R-124

Silicones

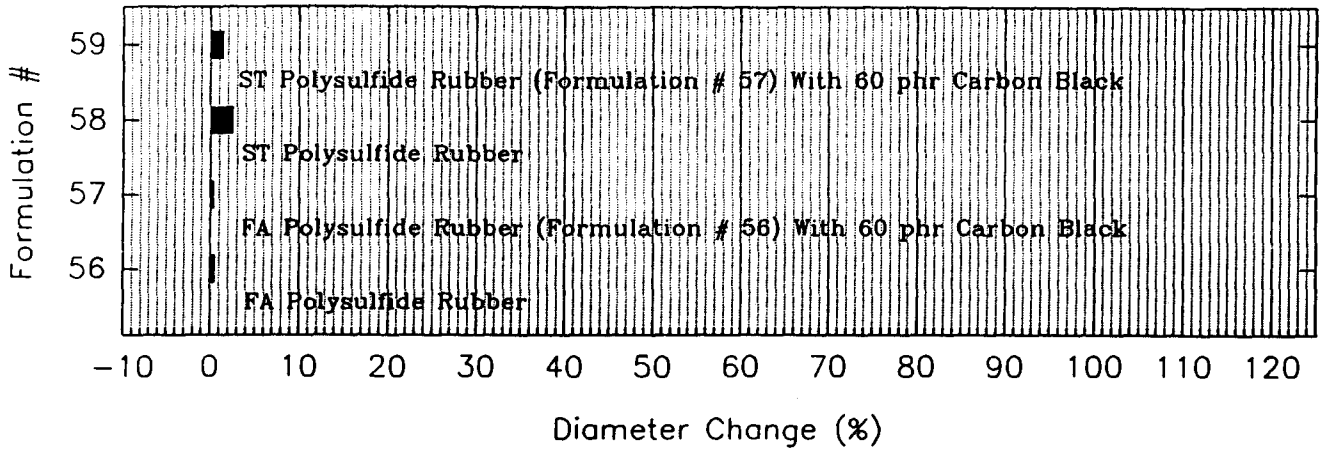


Thermoplastic Elastomers

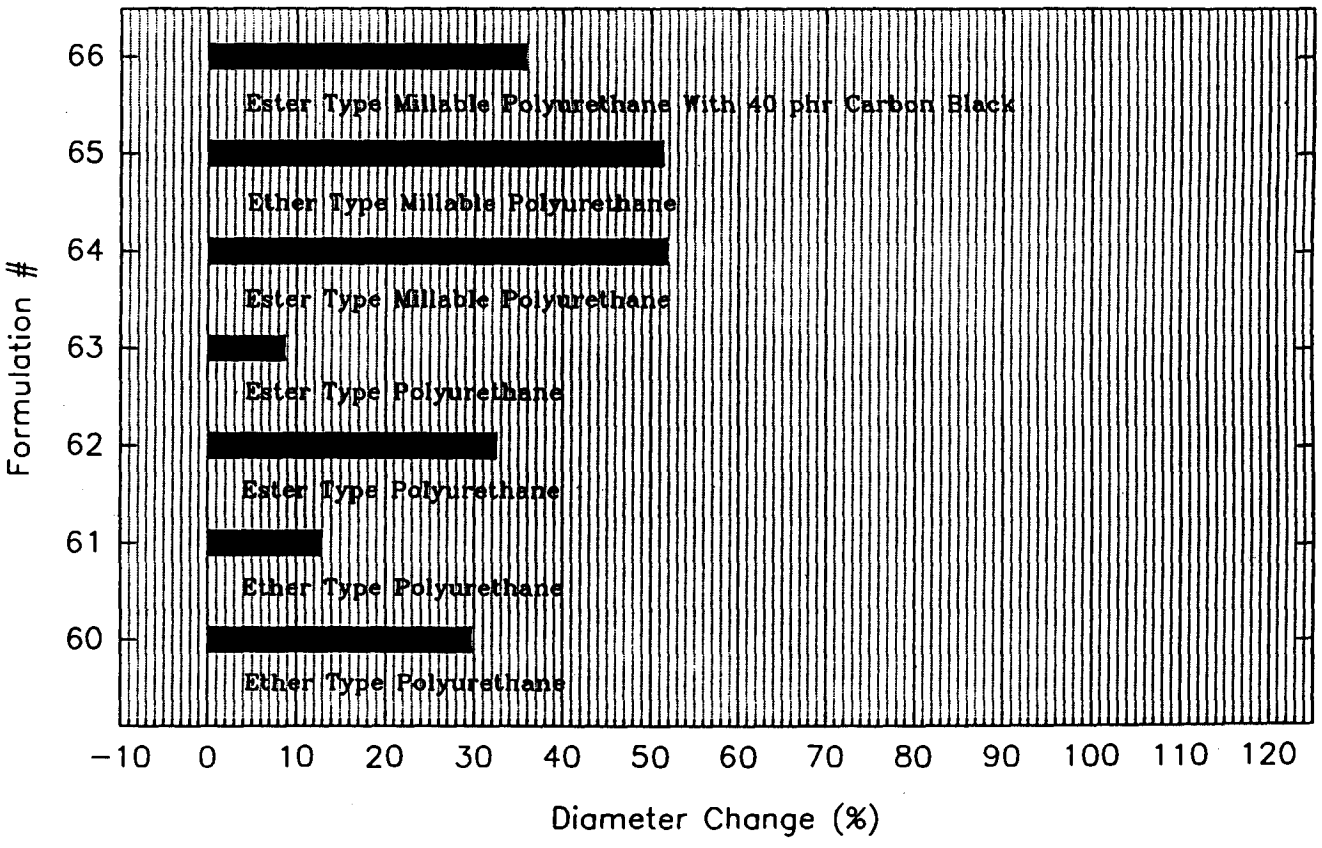


% Insitu Diameter Change In R-124

Polysulfide Rubbers

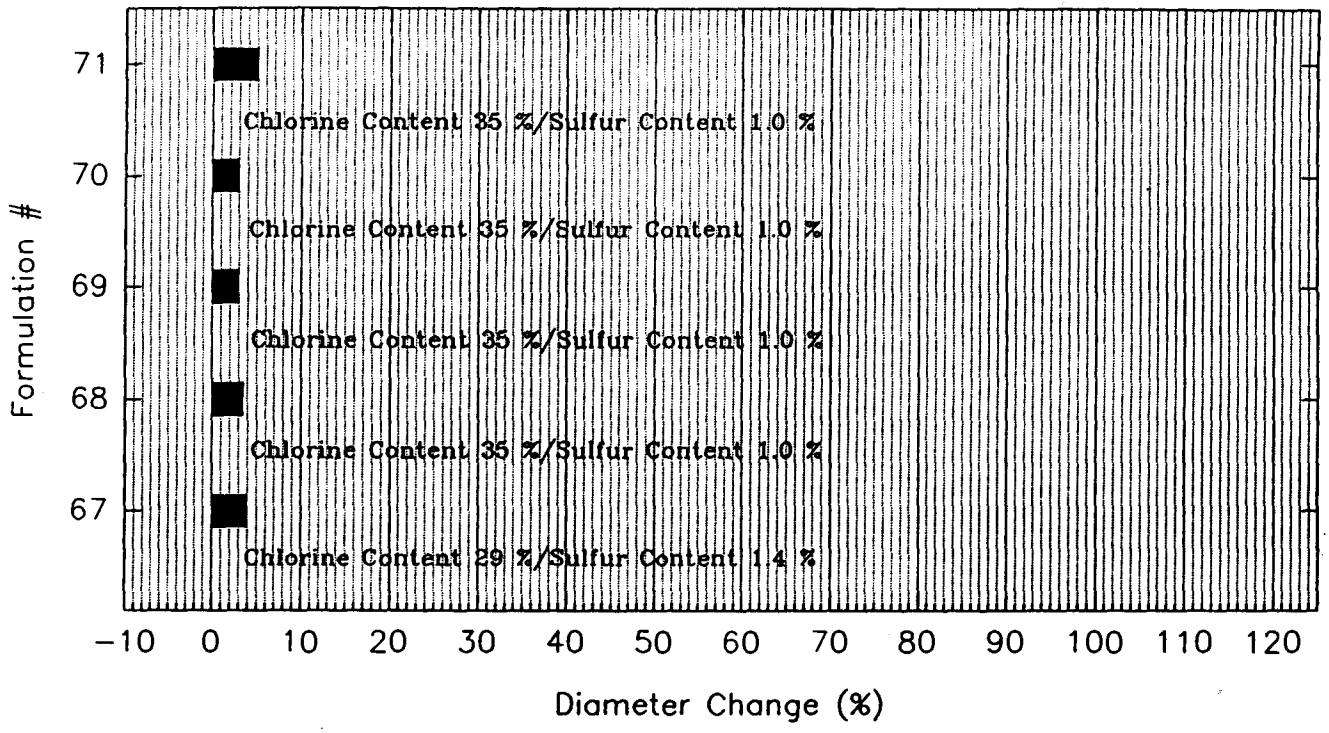


Polyurethanes

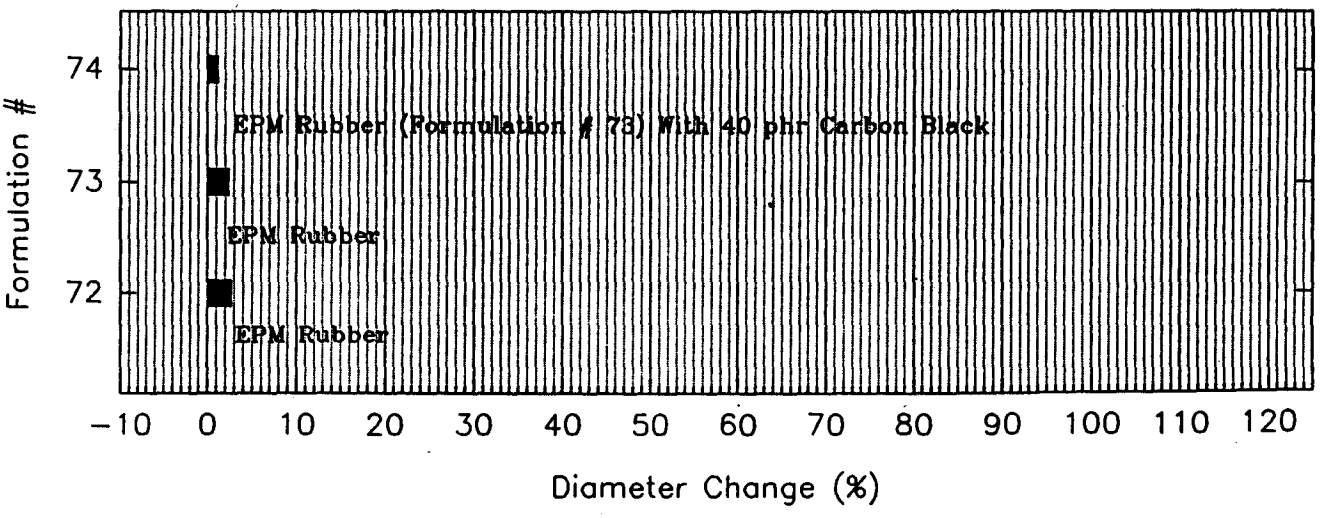


% Insitu Diameter Change In R-124

Chlorosulfonated Polyethylenes

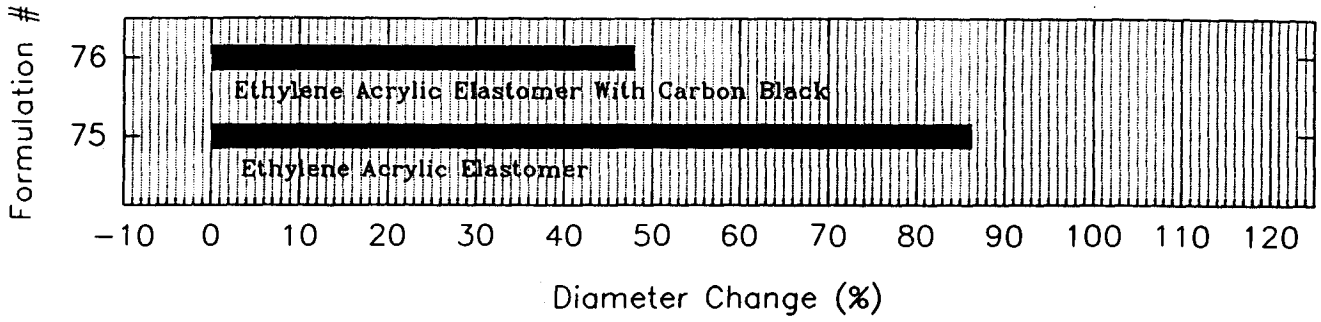


EPM Rubbers

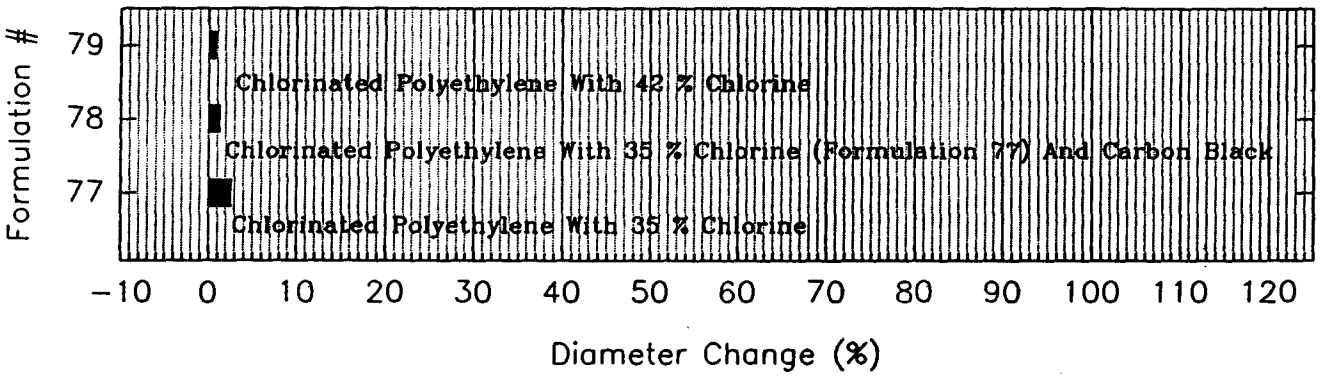


% Insitu Diameter Change In R-124

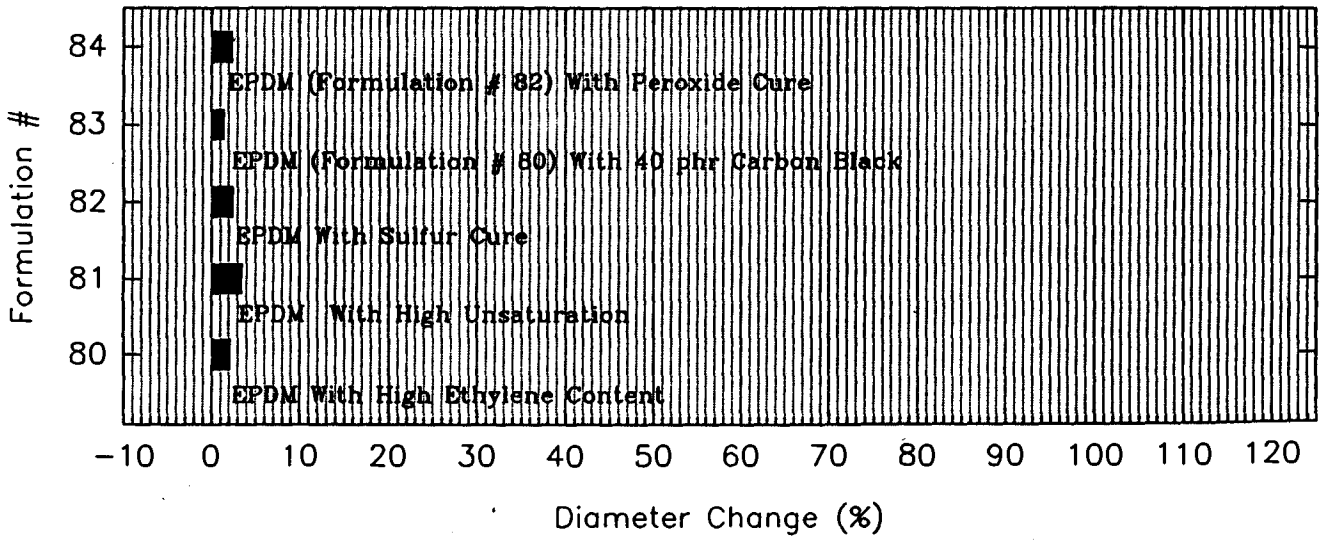
Ethylene Acrlic Elastomers



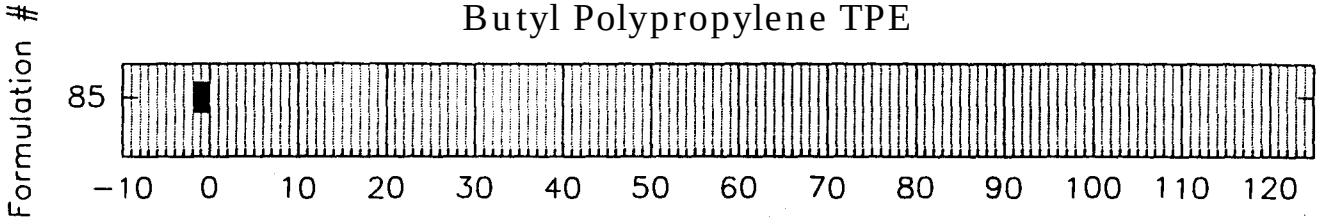
Chlorinated Polyethylenes

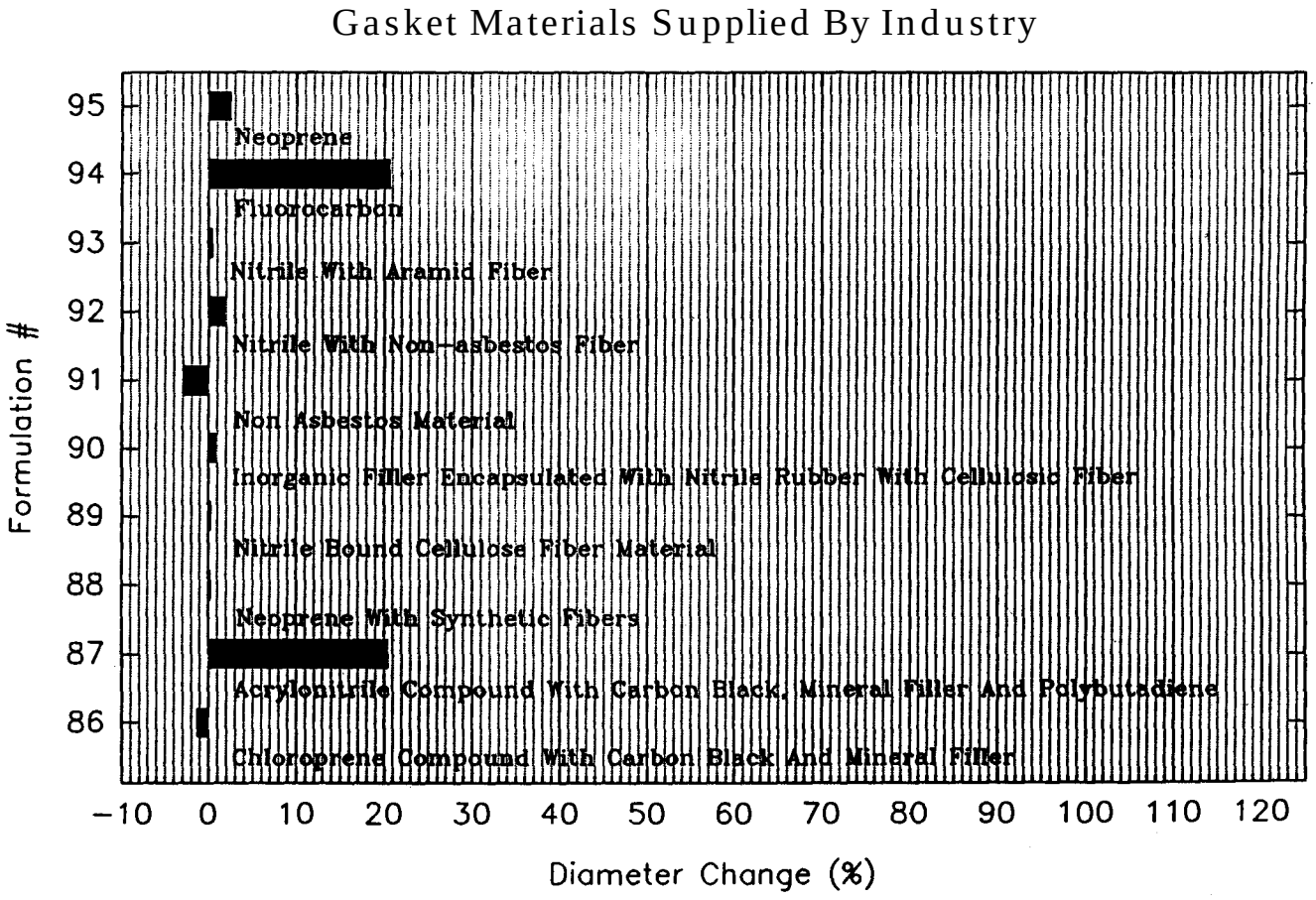


Ethylene Propylene Diene Rubbers

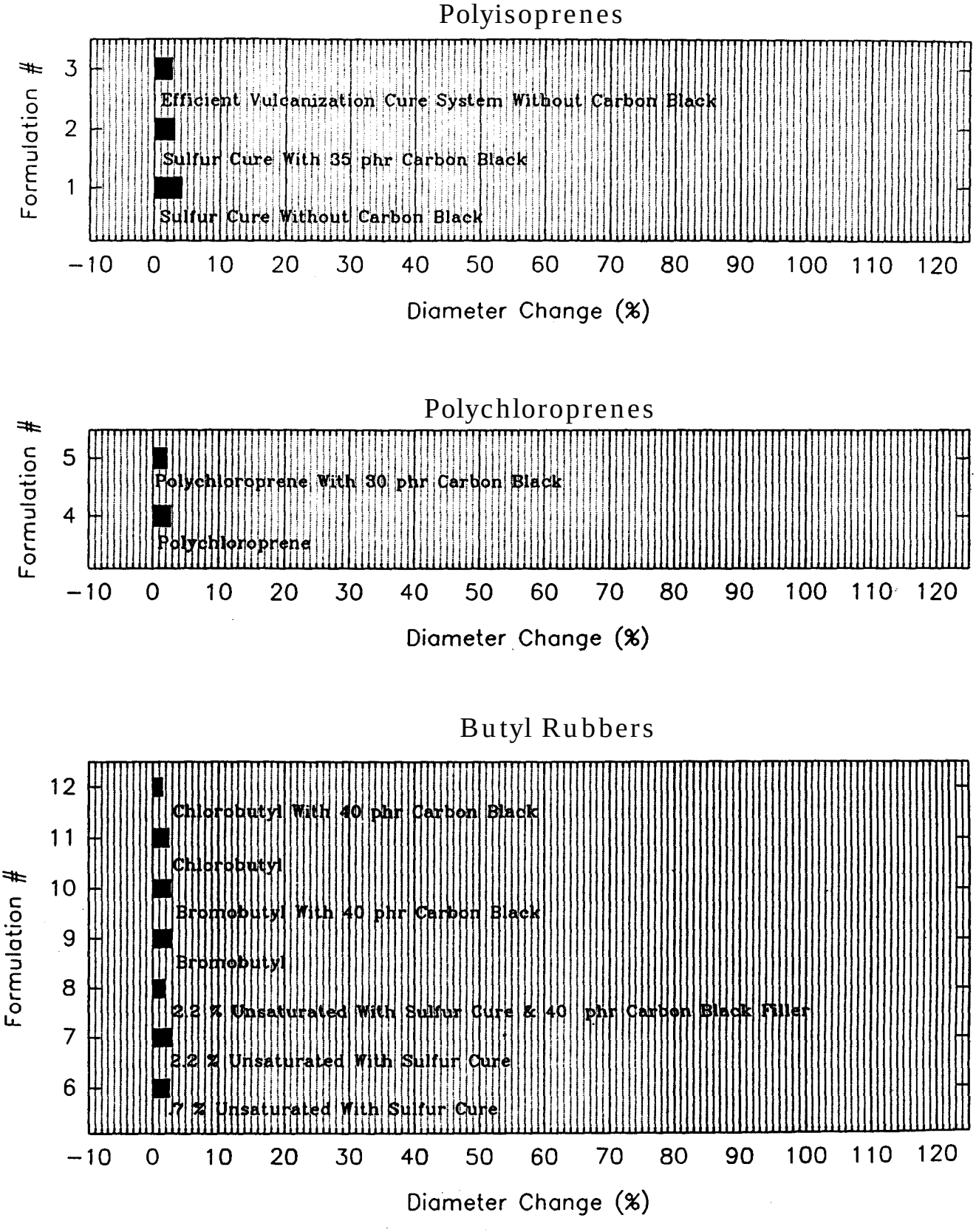


% Insitu Diameter Change In R-124



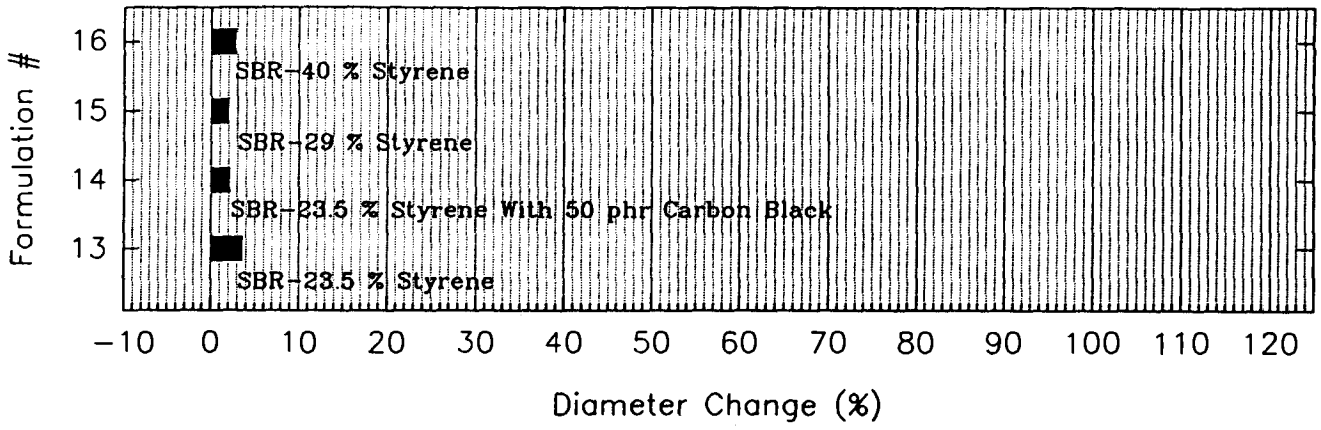


% Insitu Diameter Change In R-125

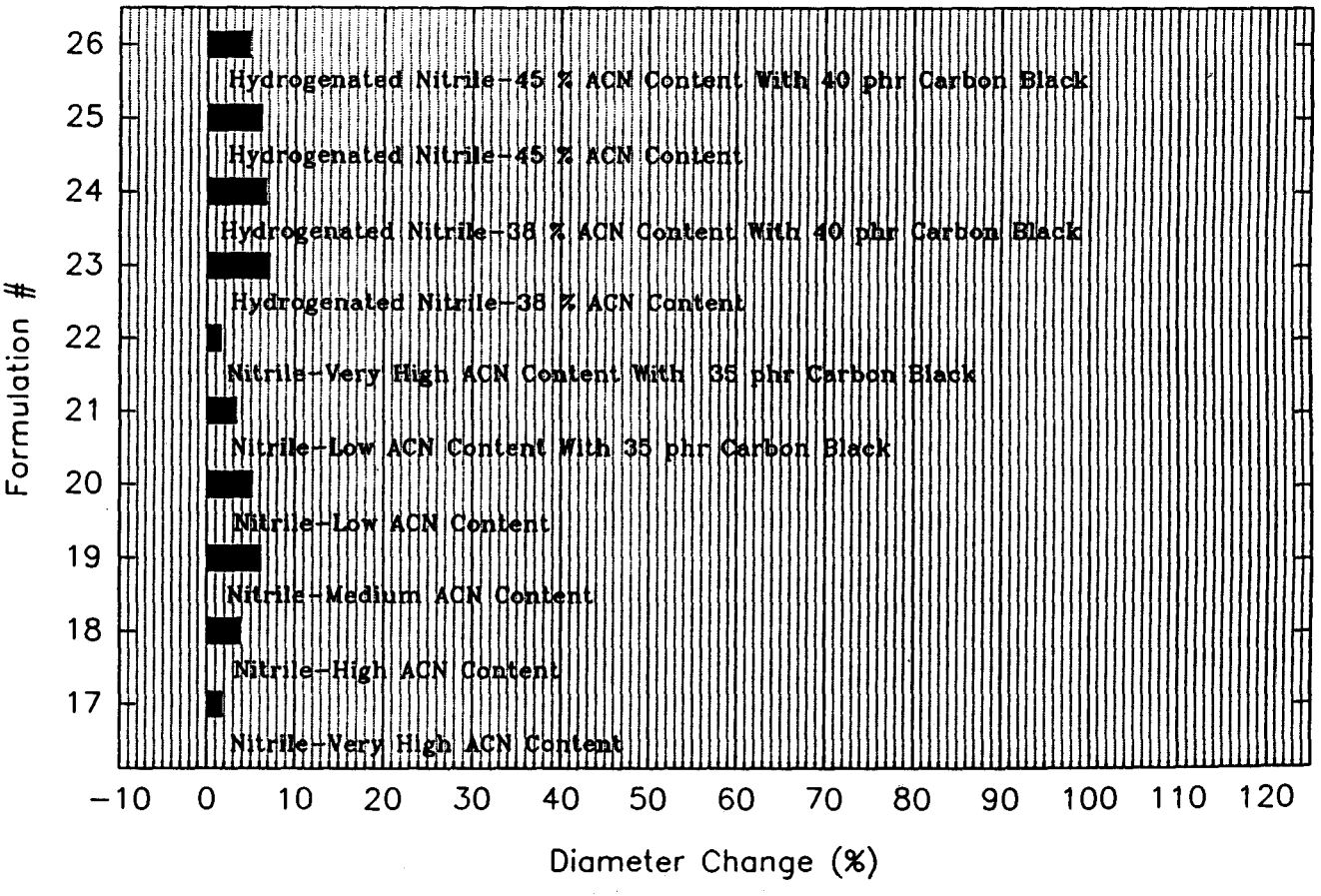


% Insitu Diameter Change In R-125

Styrene Butadiene Rubbers

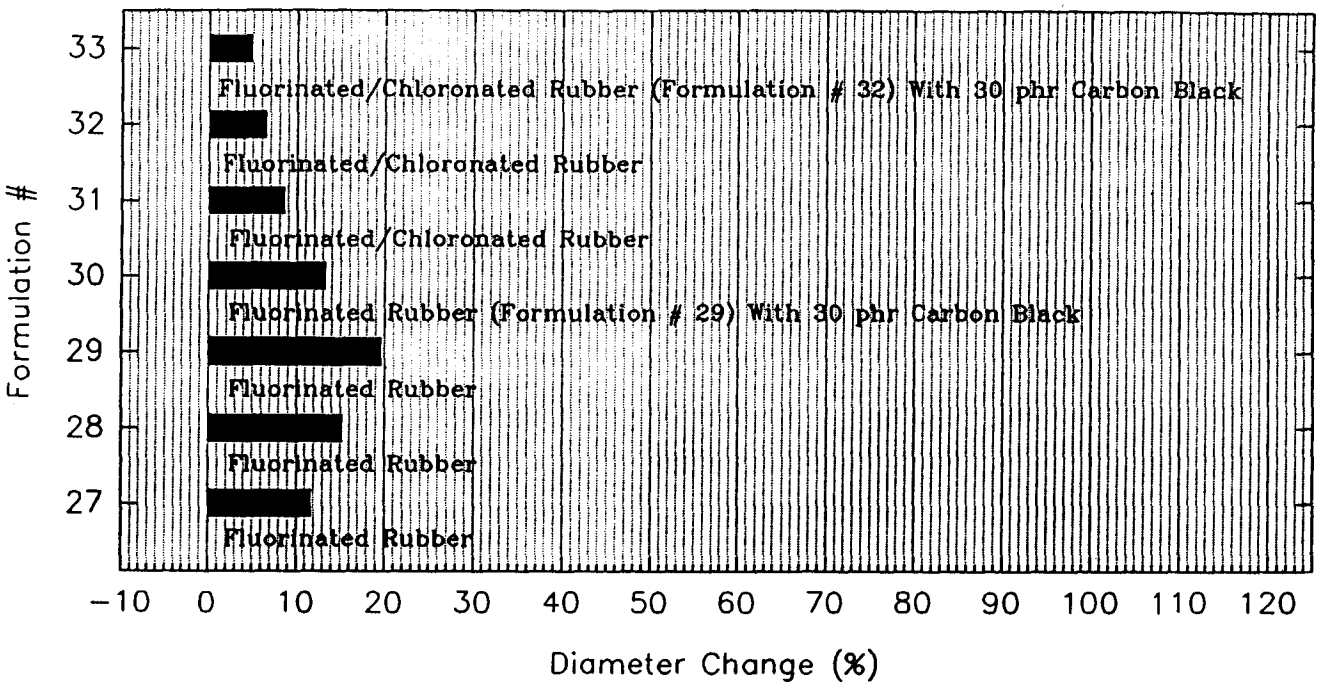


Nitrile Rubbers

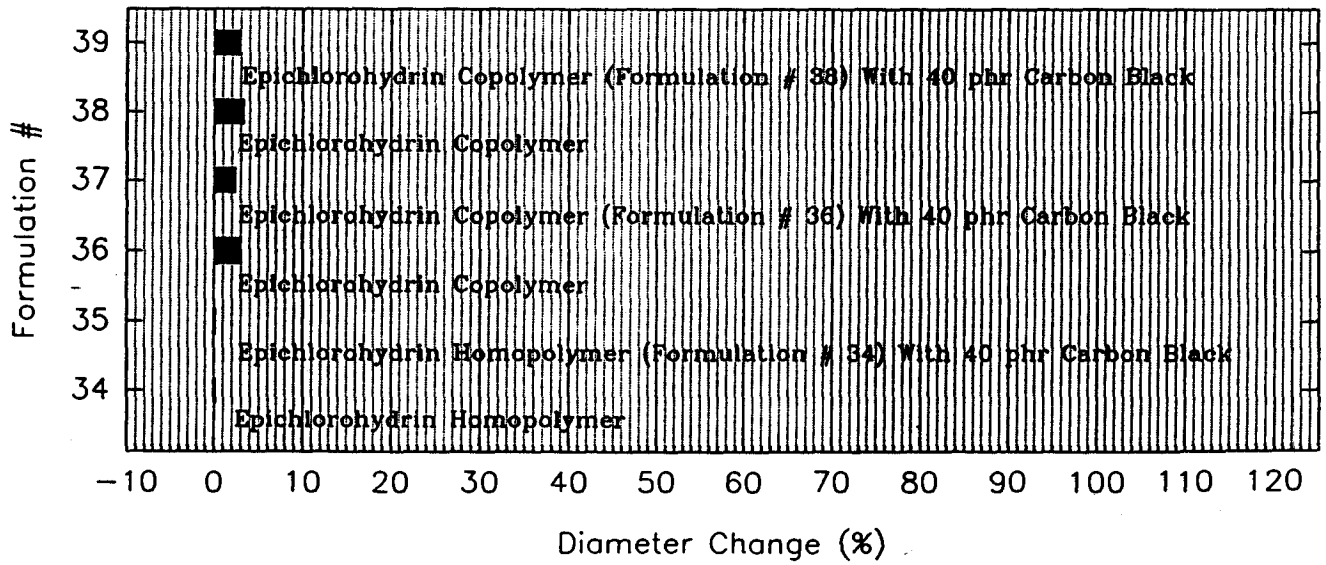


% Insitu Diameter Change In R-125

Fluorinated Rubbers

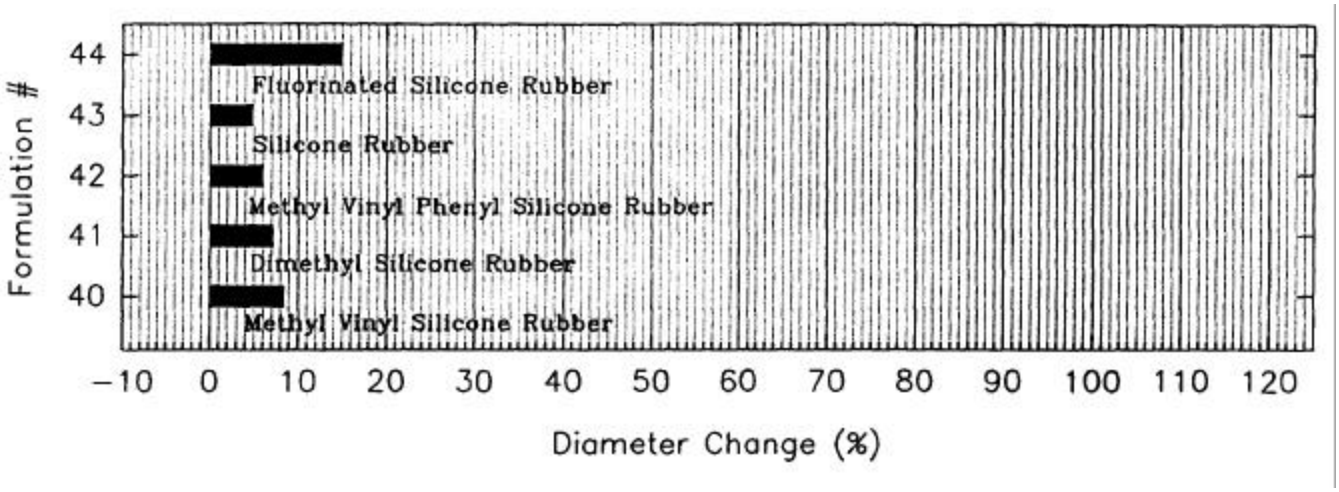


Epichlorohydrin Based Rubbers

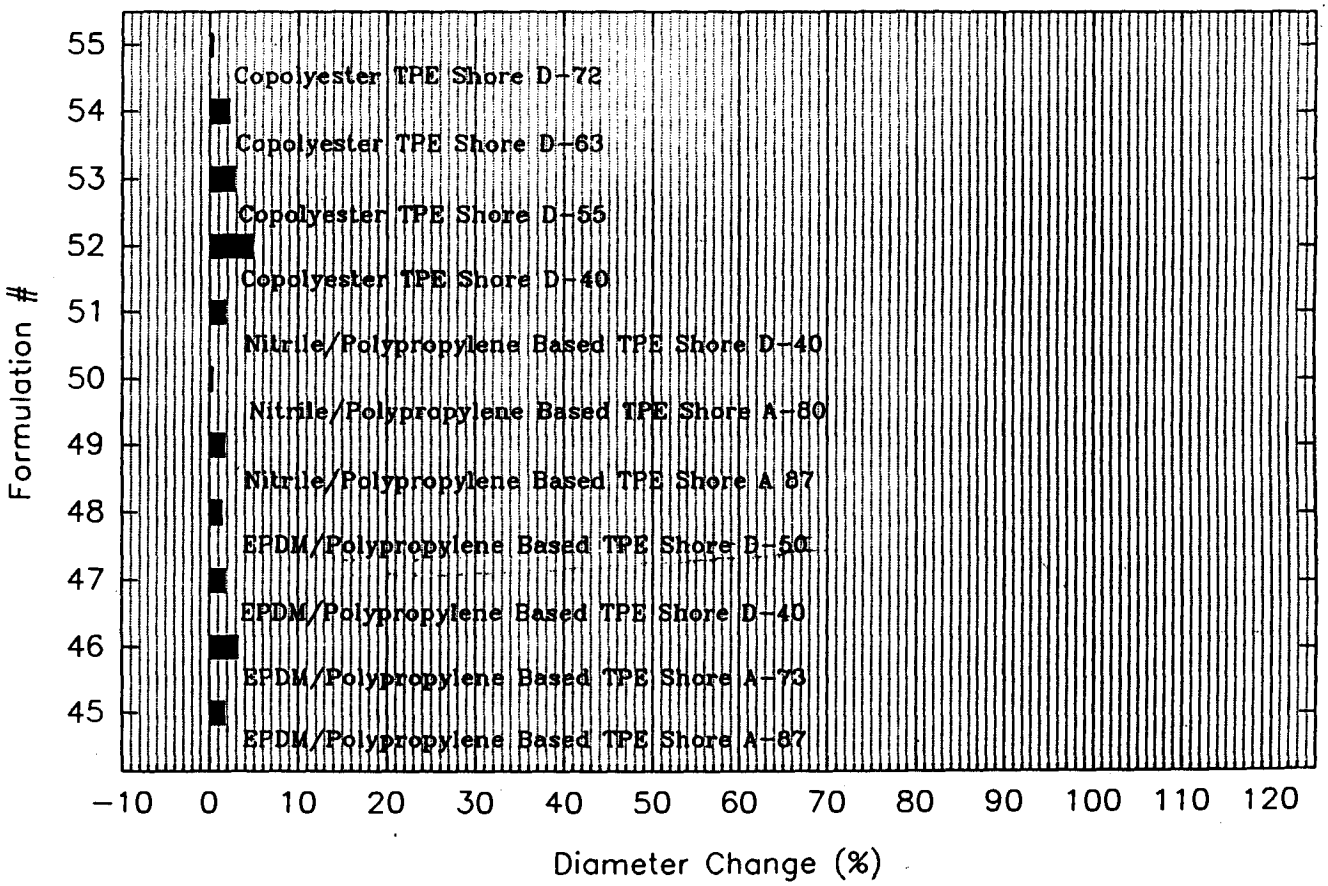


% Insitu Diameter Change In R-125

Silicones

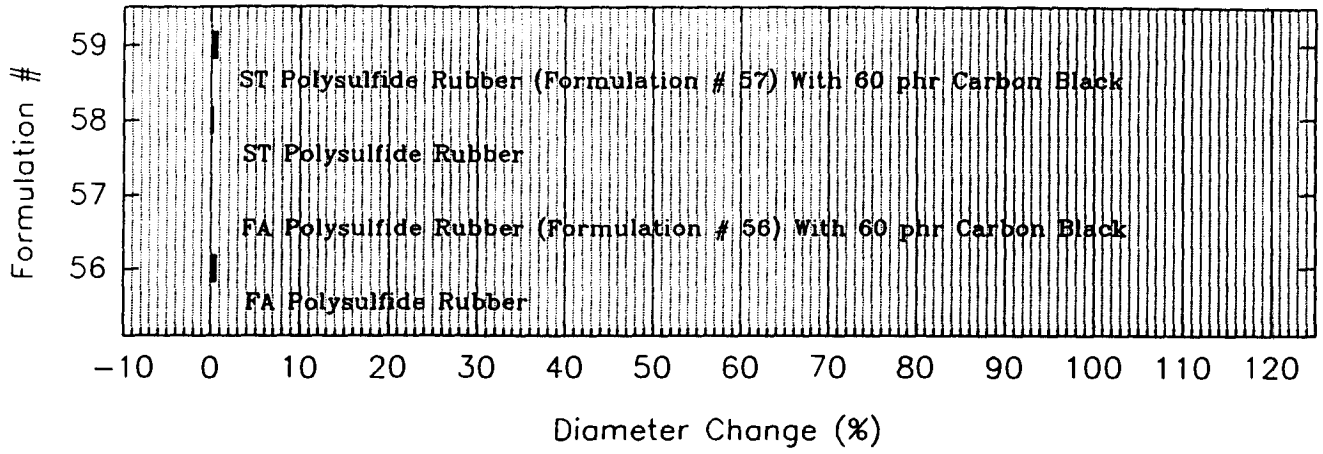


Thermoplastic Elastomers

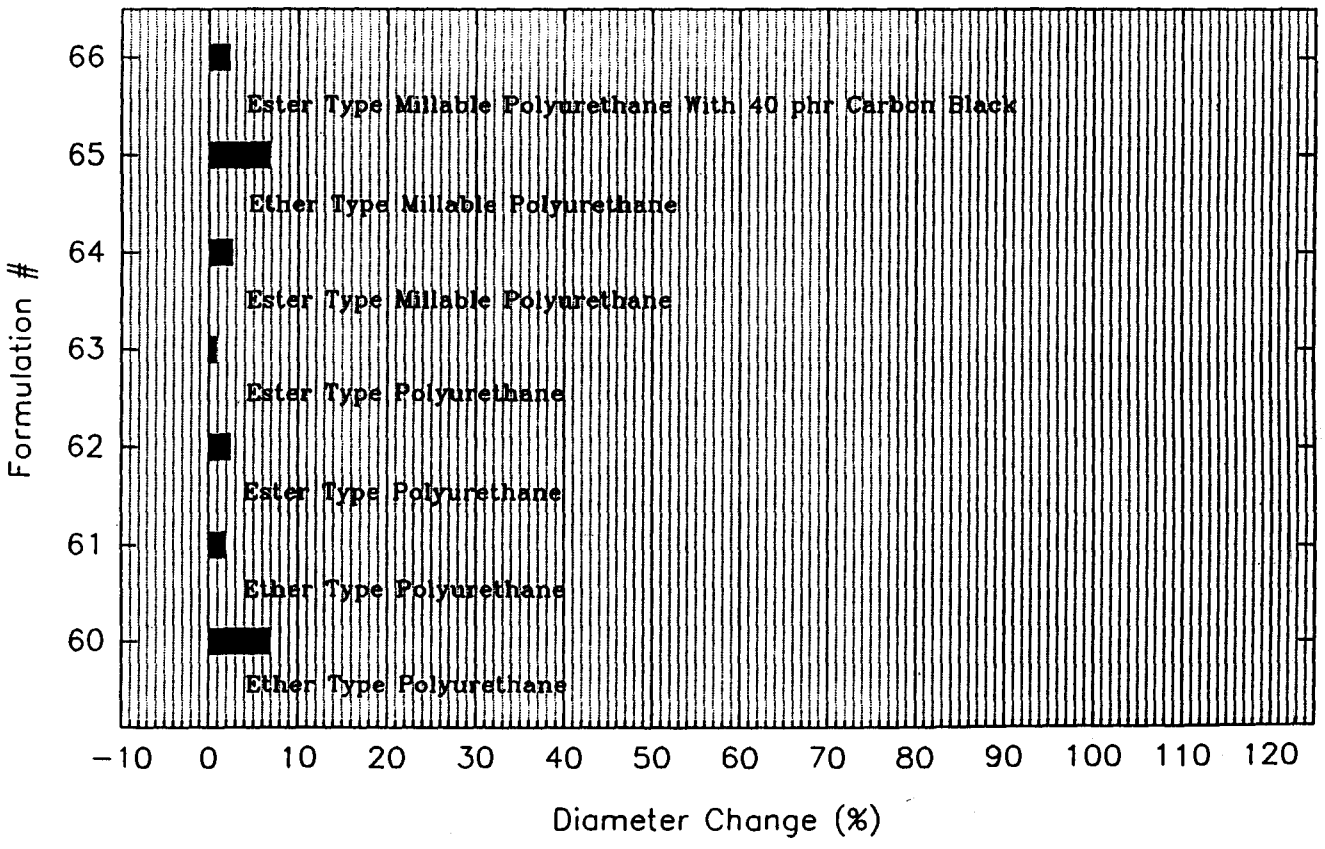


% Insitu Diameter Change In R-125

Polysulfide Rubbers

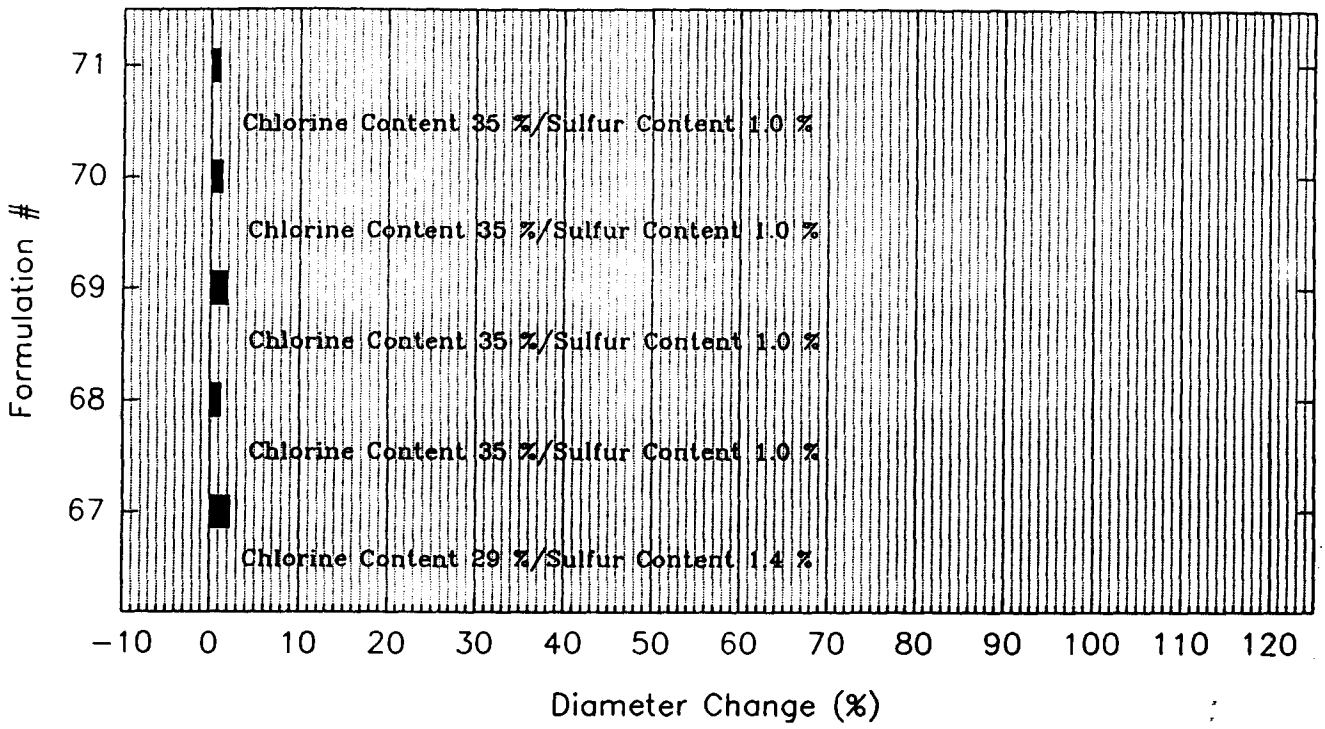


Polyurethanes

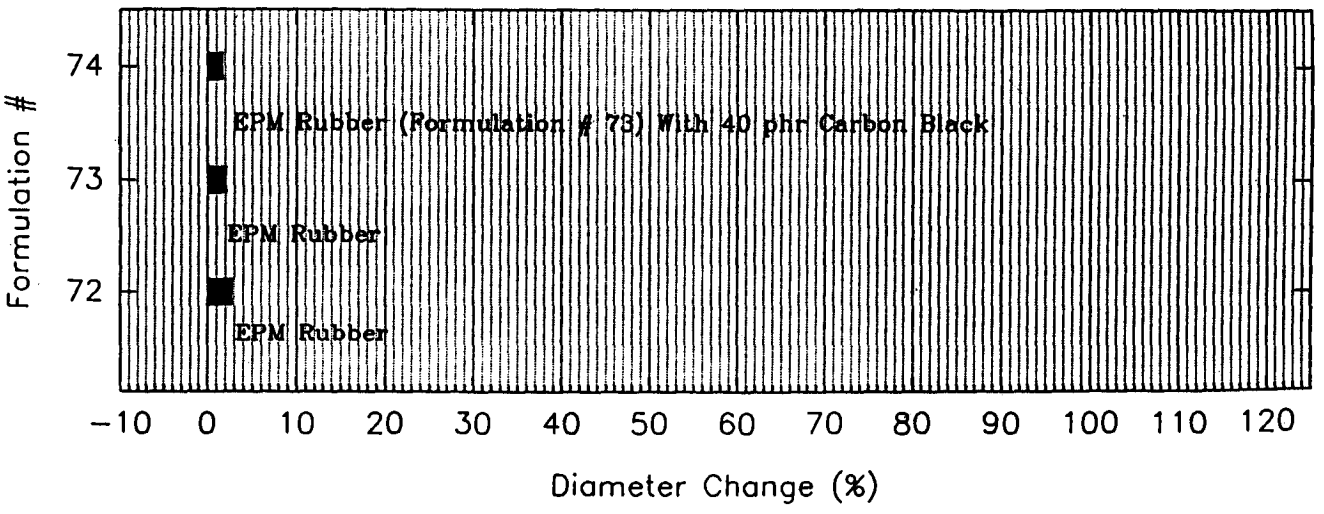


% Insitu Diameter Change In R-125

Chlorosulfonated Polyethylenes

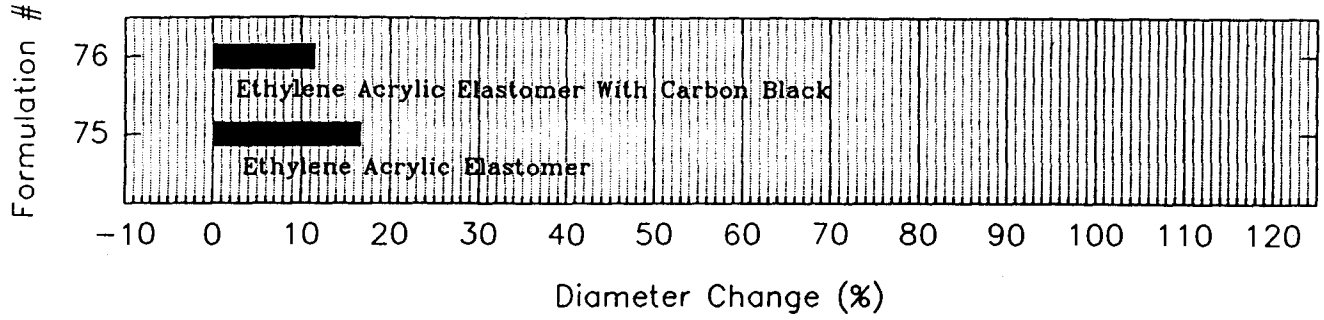


EPM Rubbers

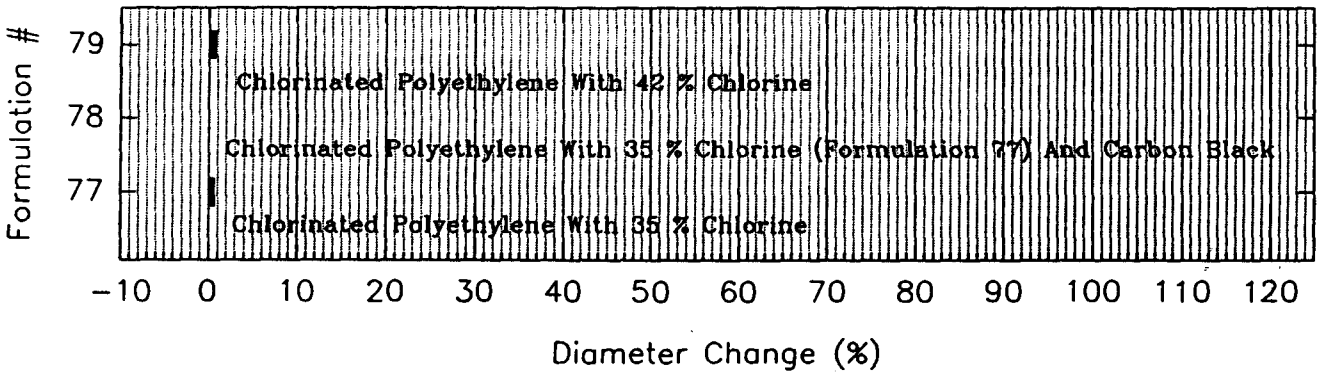


% Insitu Diameter Change In R-125

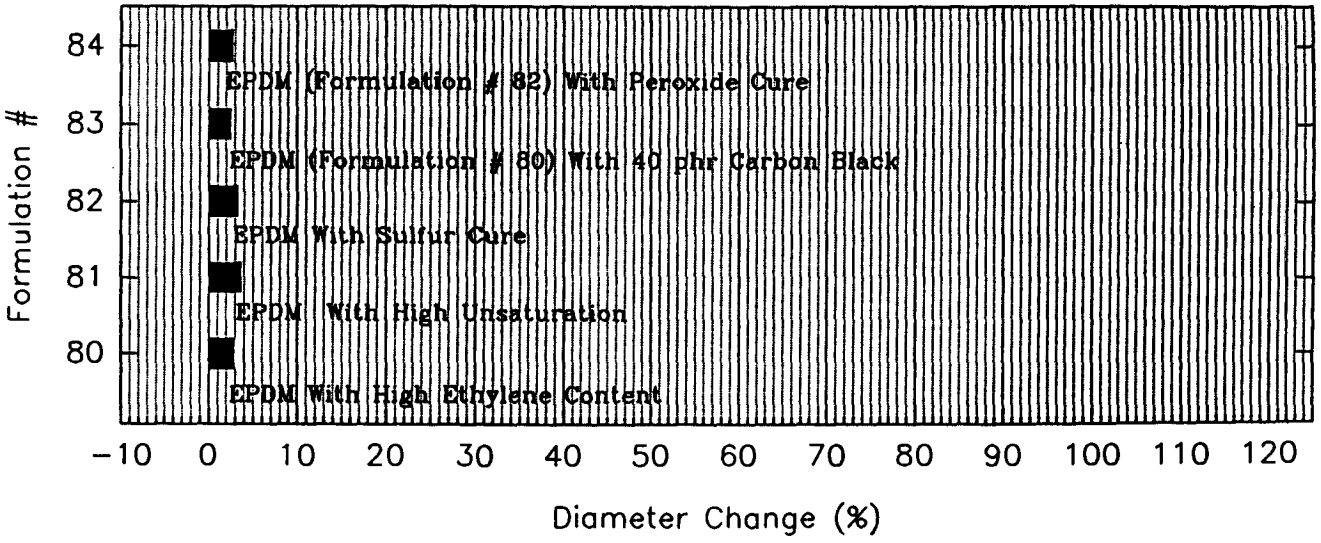
Ethylene Acrlic Elastomers



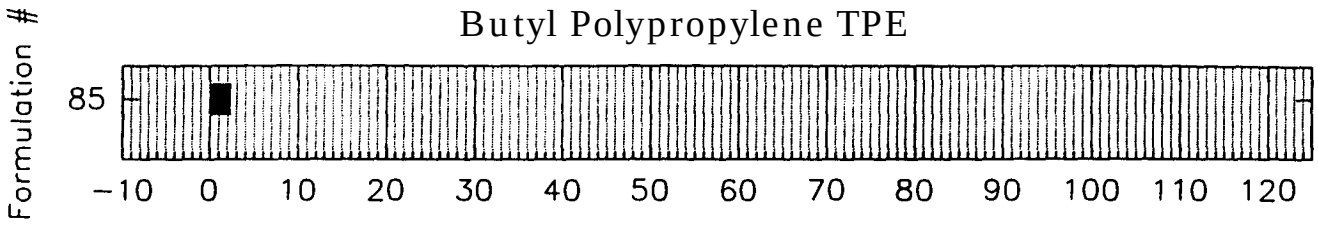
Chlorinated Polyethylenes

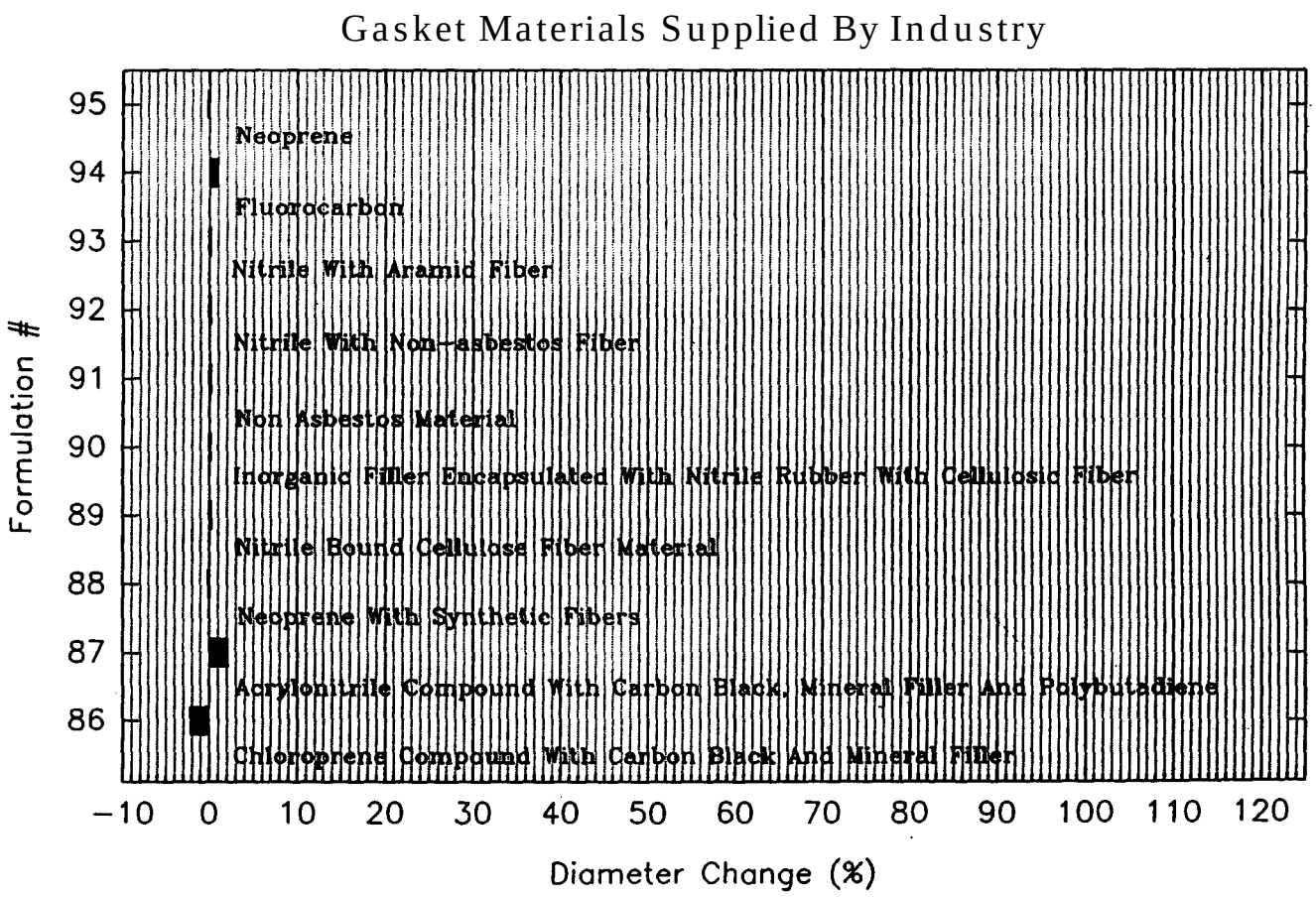


Ethylene Propylene Diene Rubbers



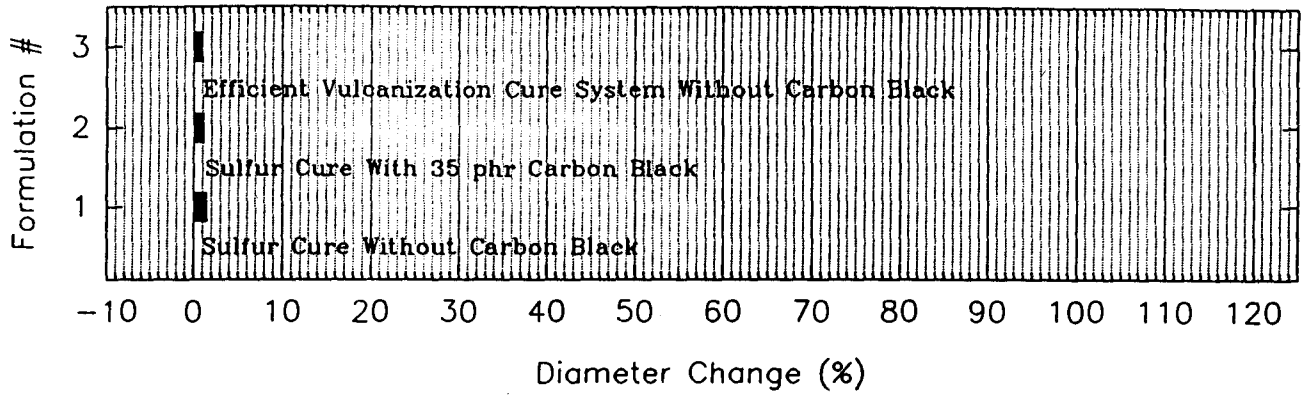
% Insitu Diameter Change In R-125



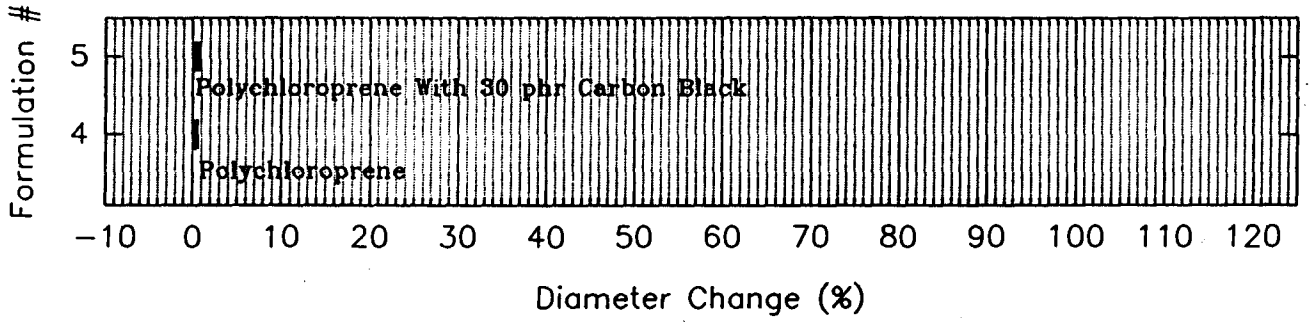


% Insitu Diameter Change In R-134

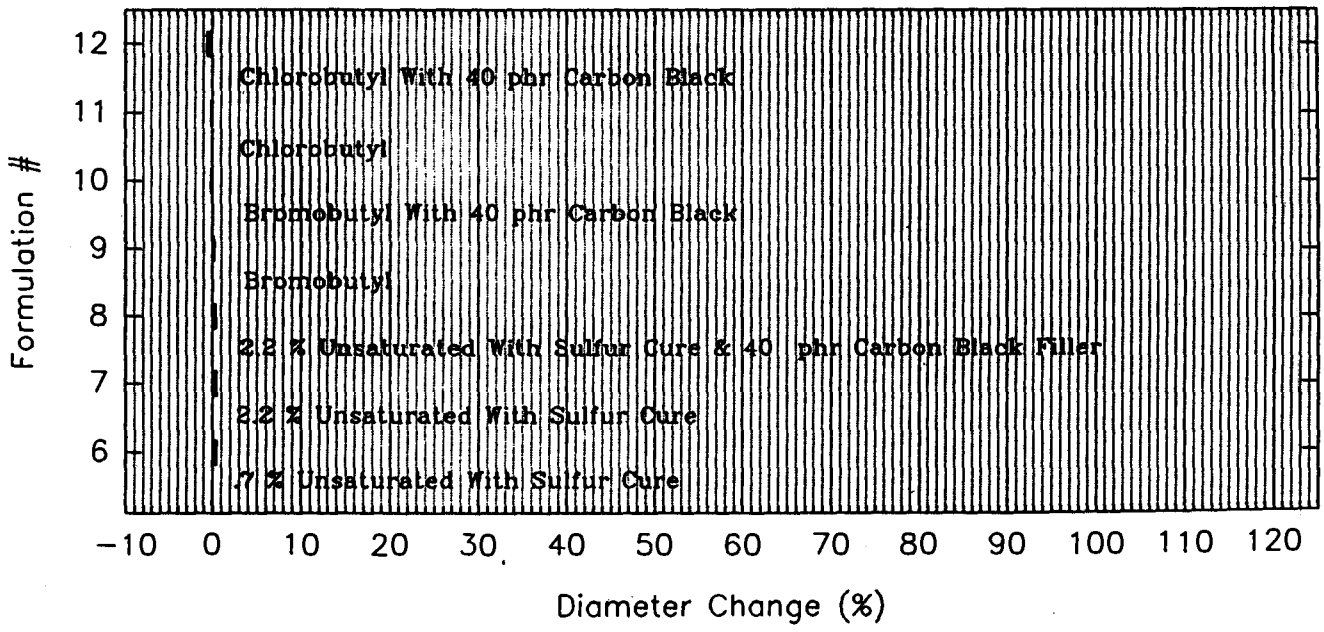
Polyisoprenes



Polychloroprenes

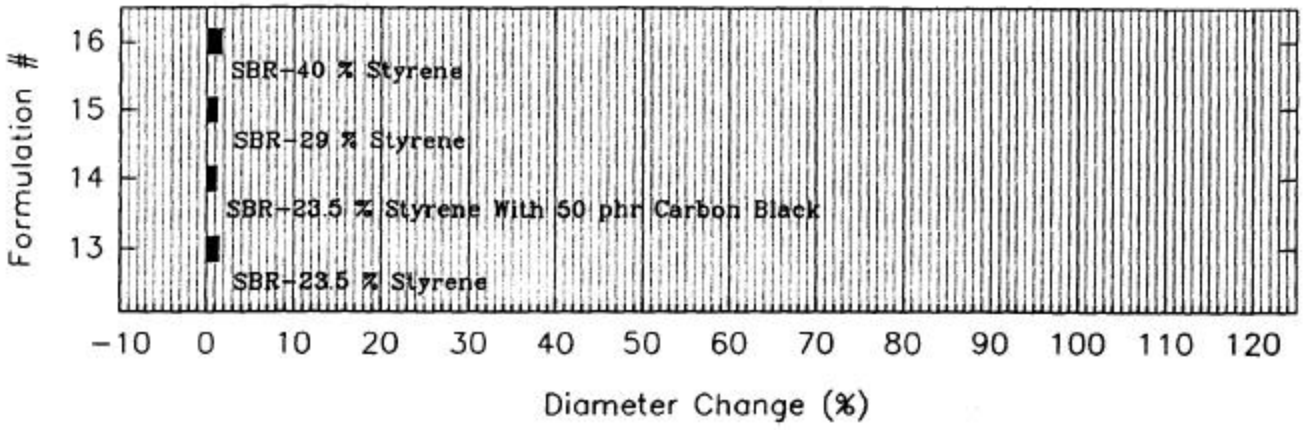


Butyl Rubbers

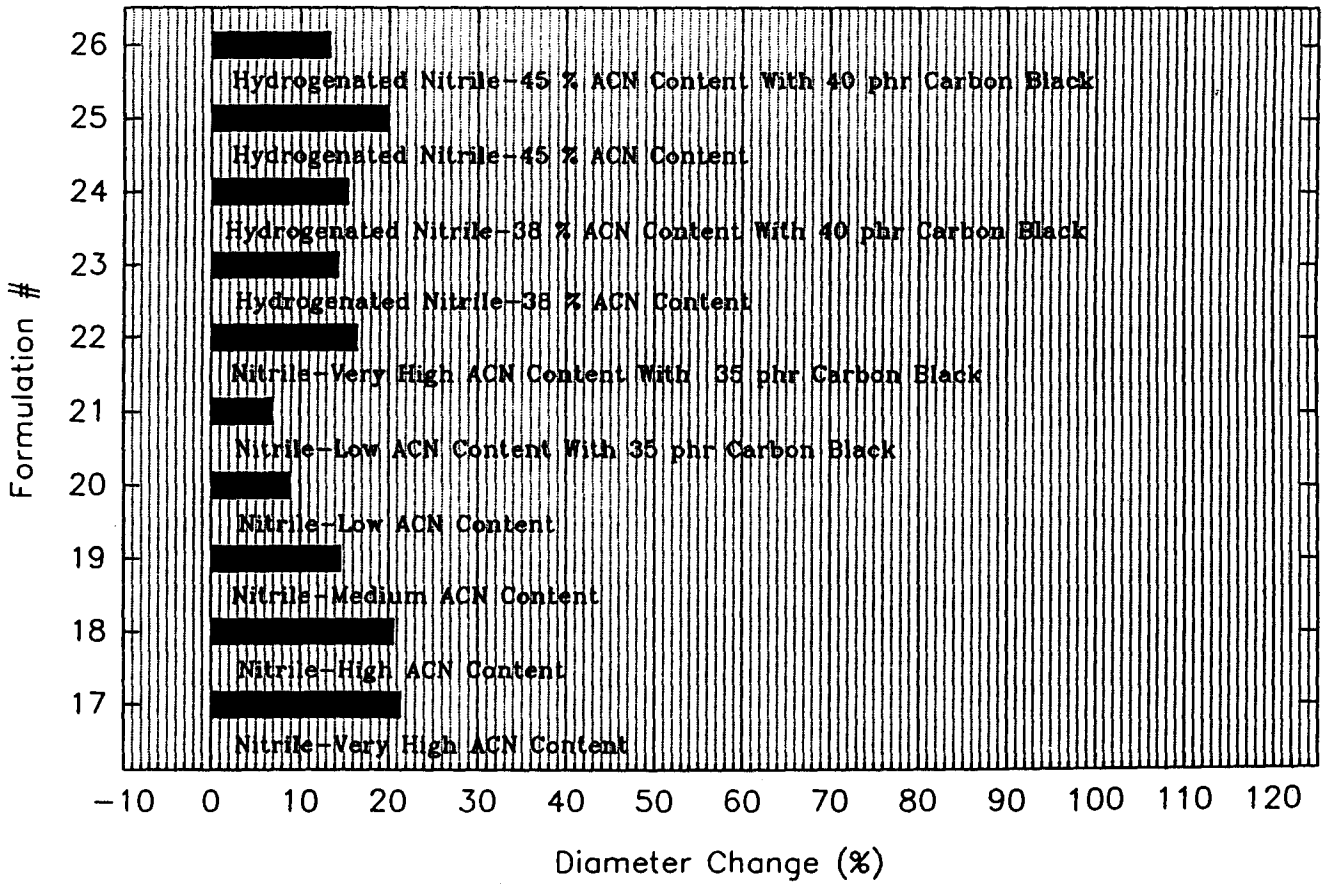


% Insitu Diameter Change In R-134

Styrene Butadiene Rubbers

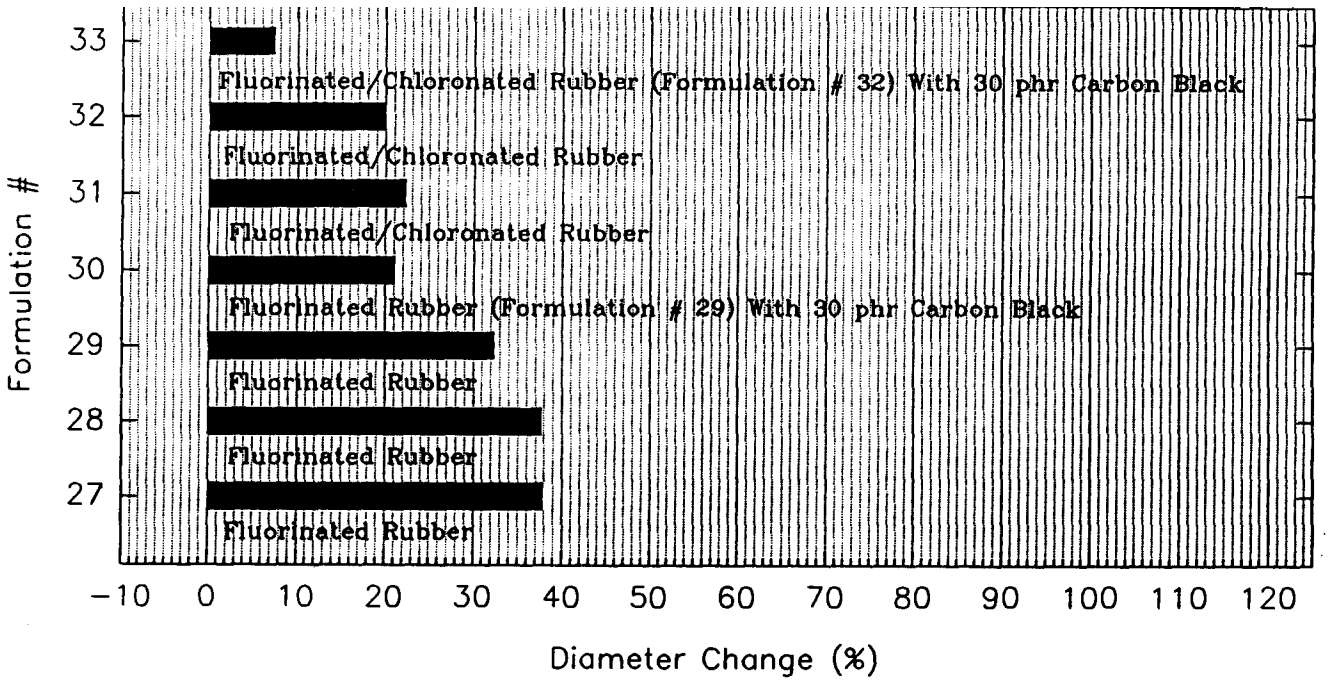


Nitrile Rubbers

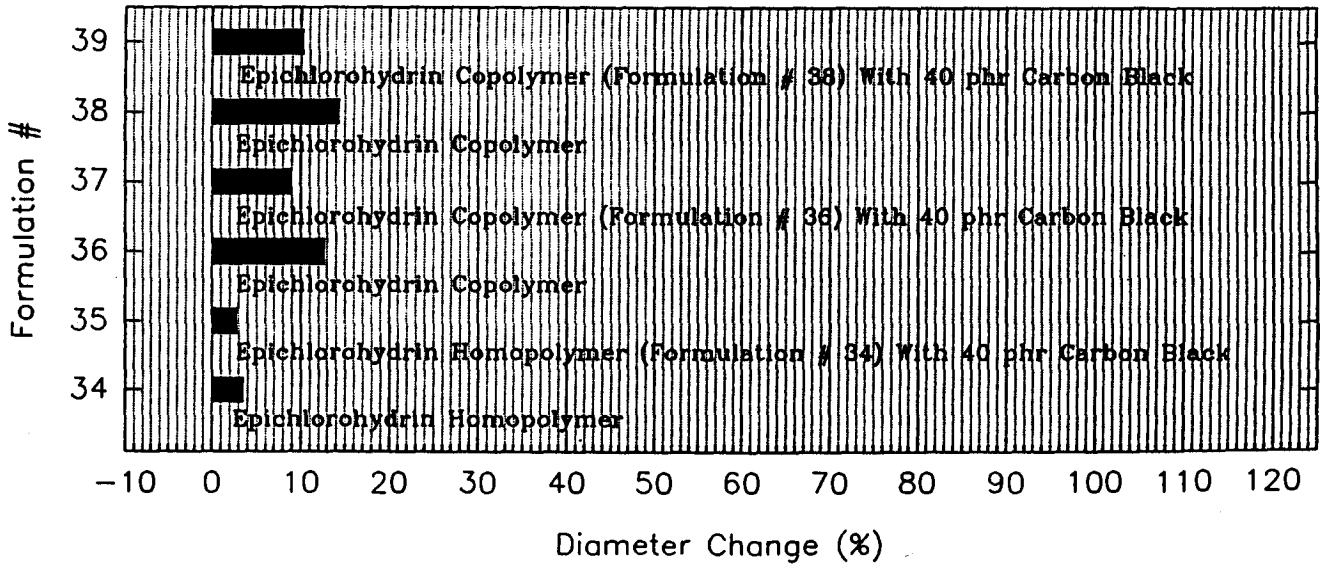


% Insitu Diameter Change In R-134

Fluorinated Rubbers

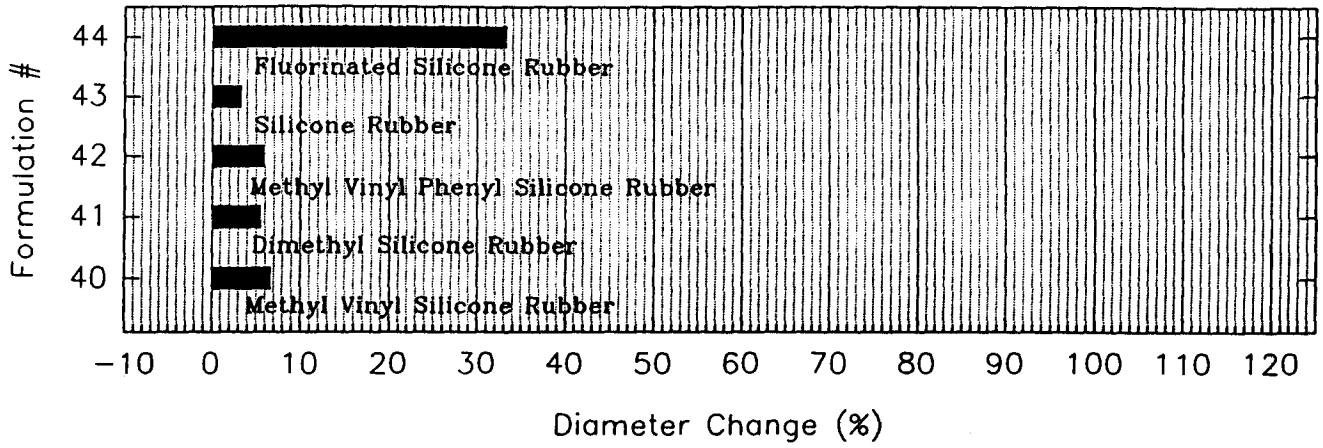


Epichlorohydrin Based Rubbers

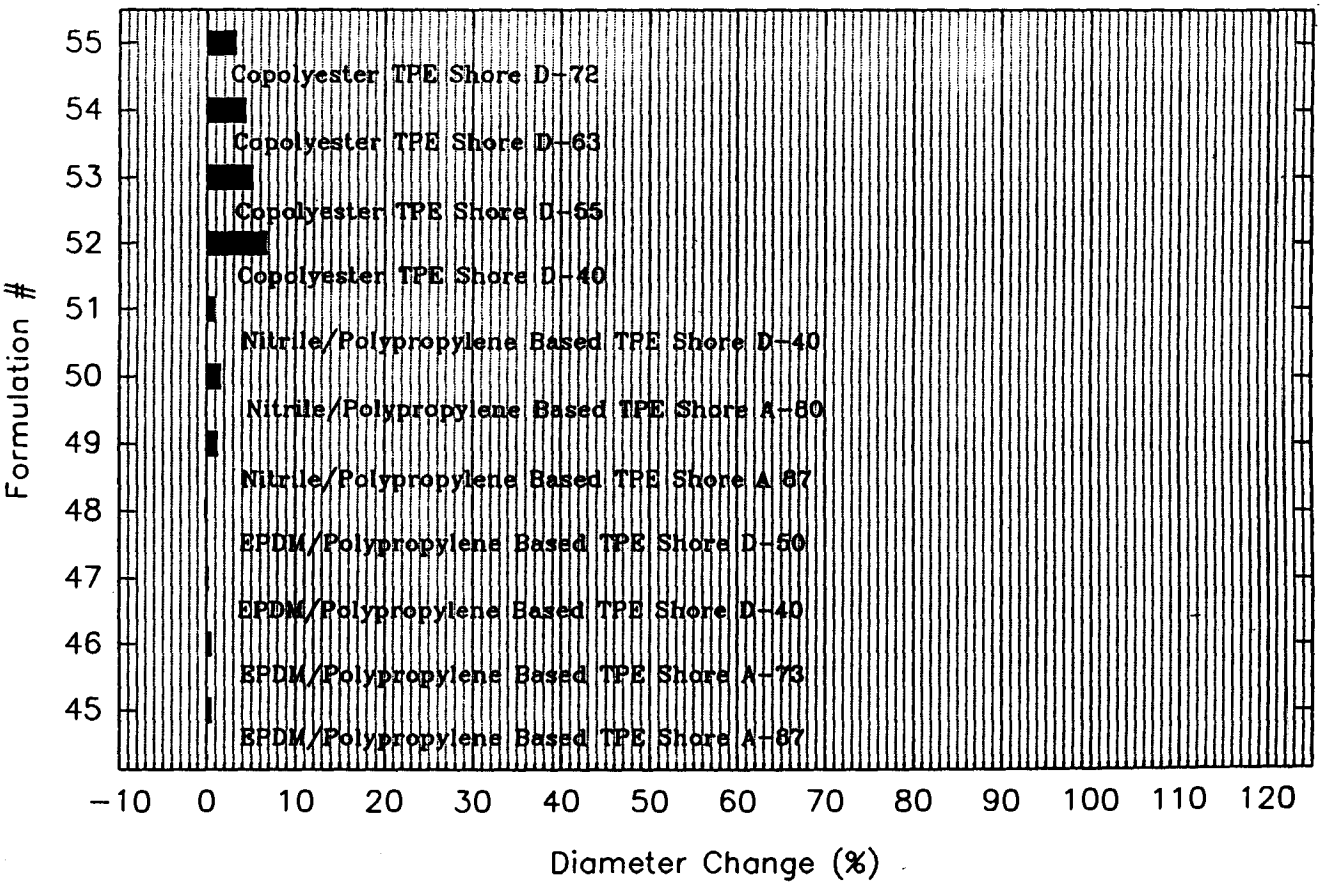


% Insitu Diameter Change In R-134

Silicones

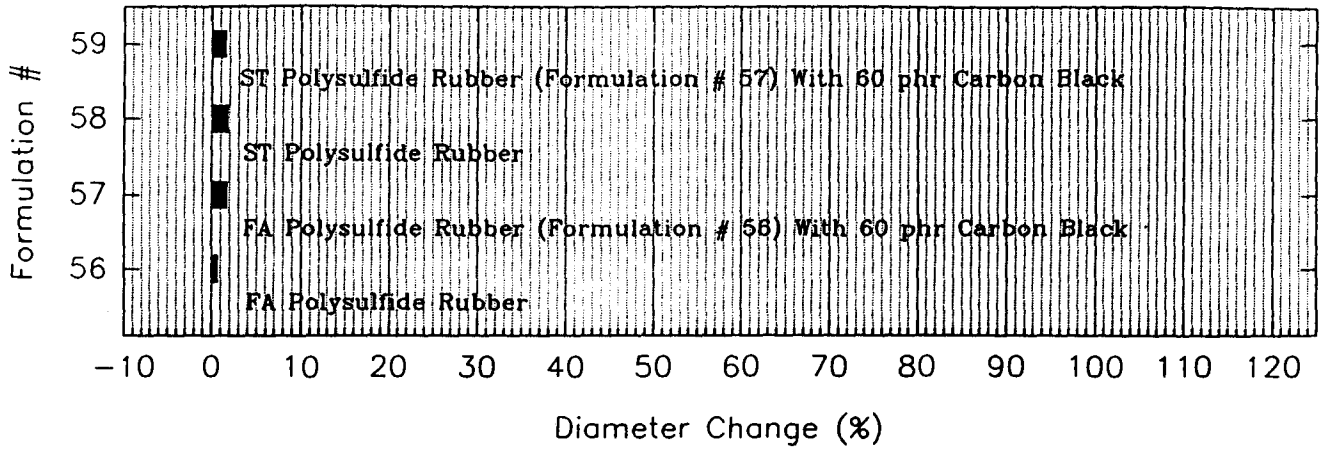


Thermoplastic Elastomers

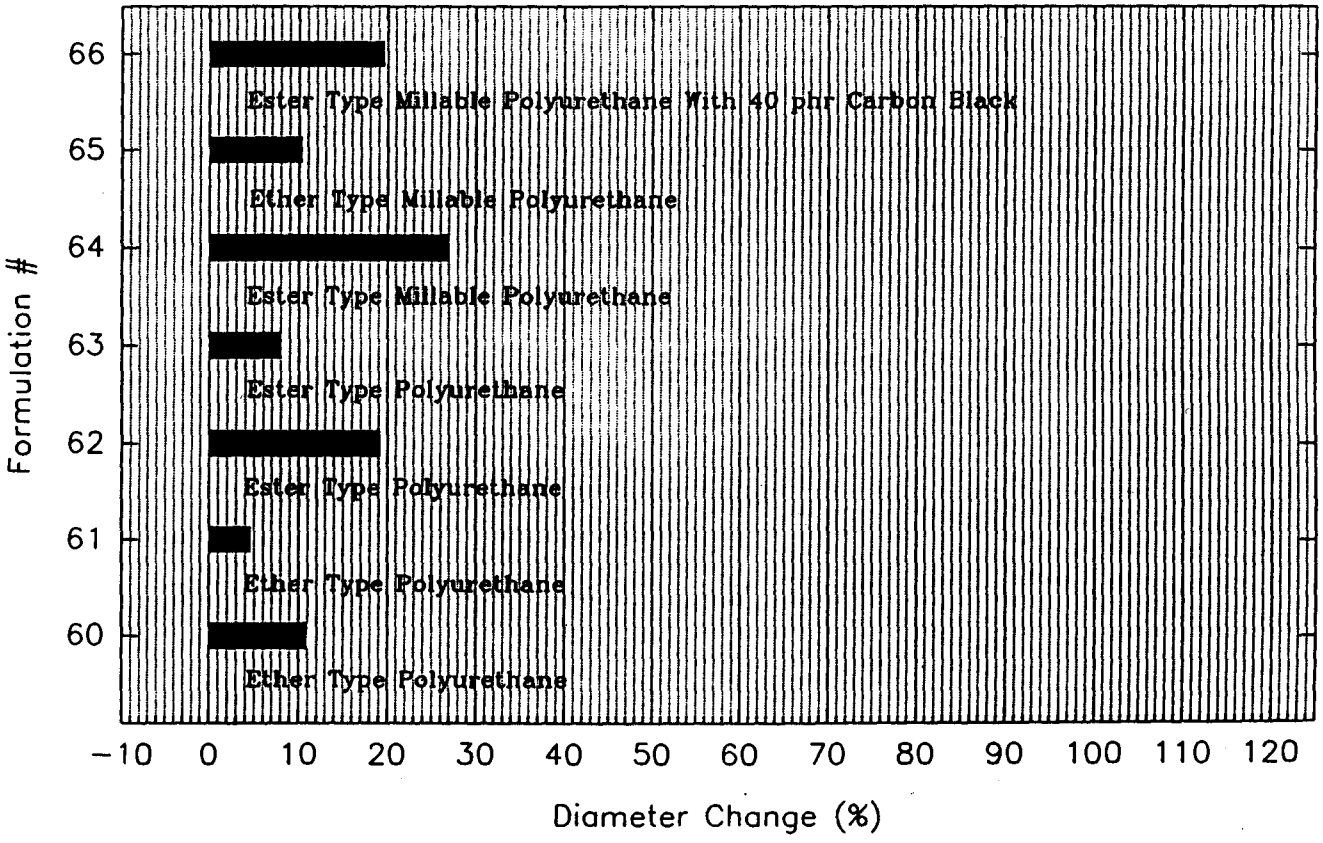


% Insitu Diameter Change In R-134

Polysulfide Rubbers

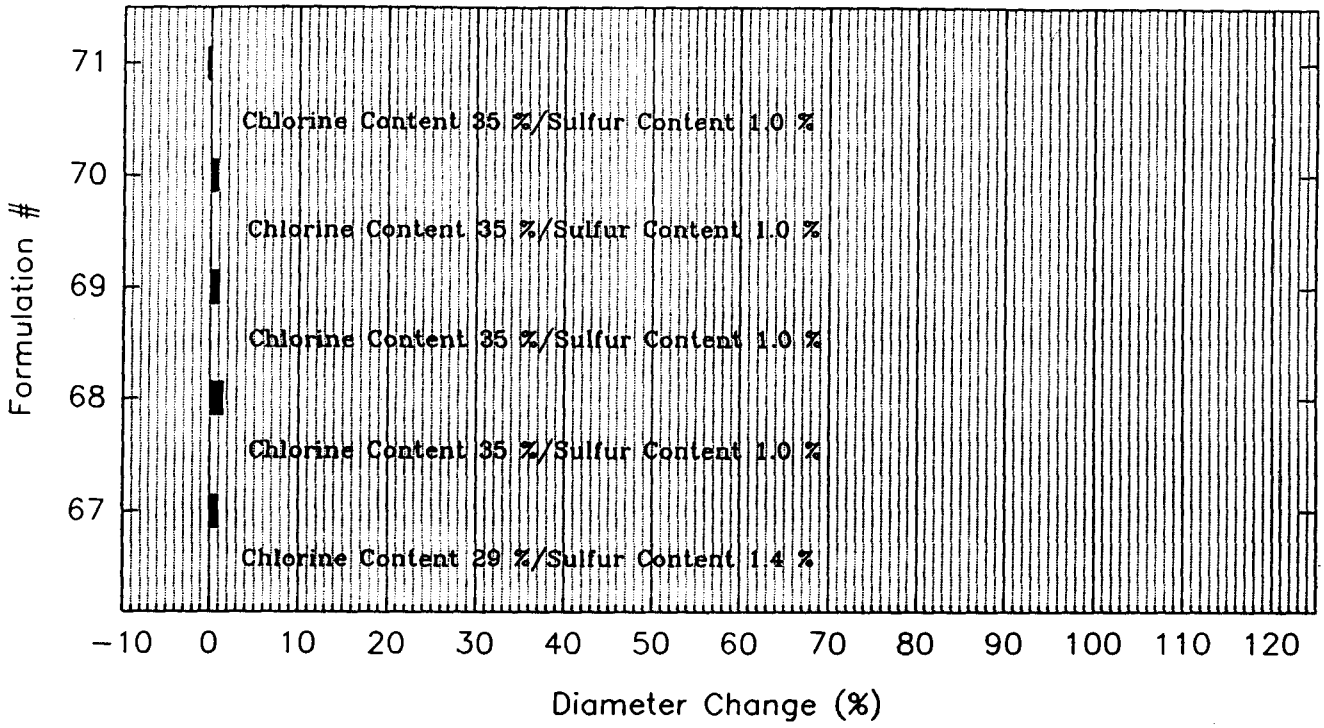


Polyurethanes

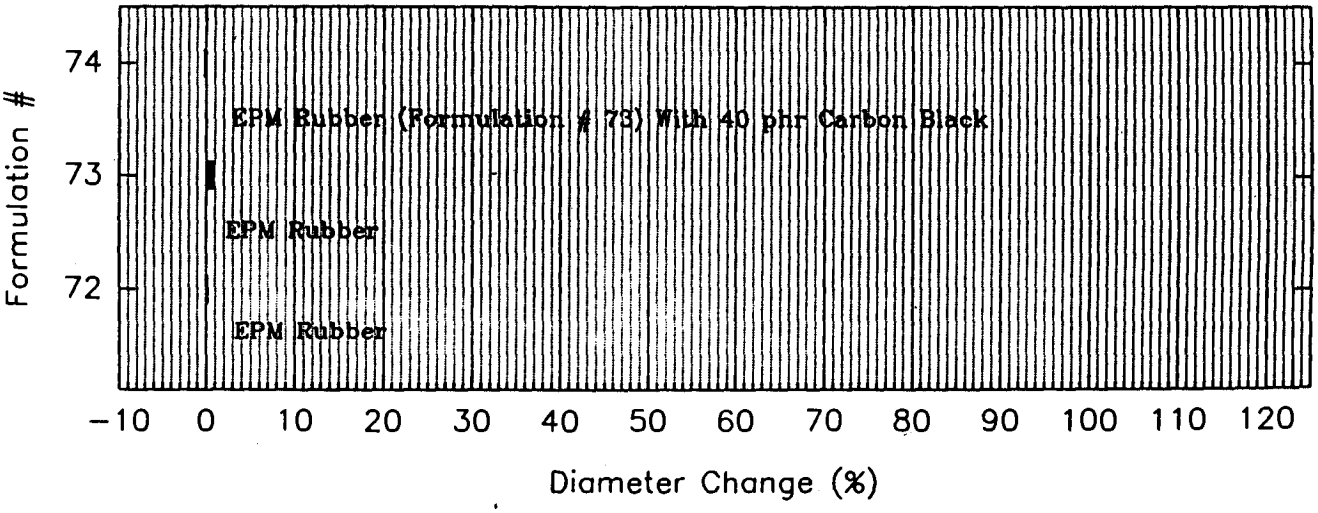


% Insitu Diameter Change In R-134

Chlorosulfonated Polyethylenes

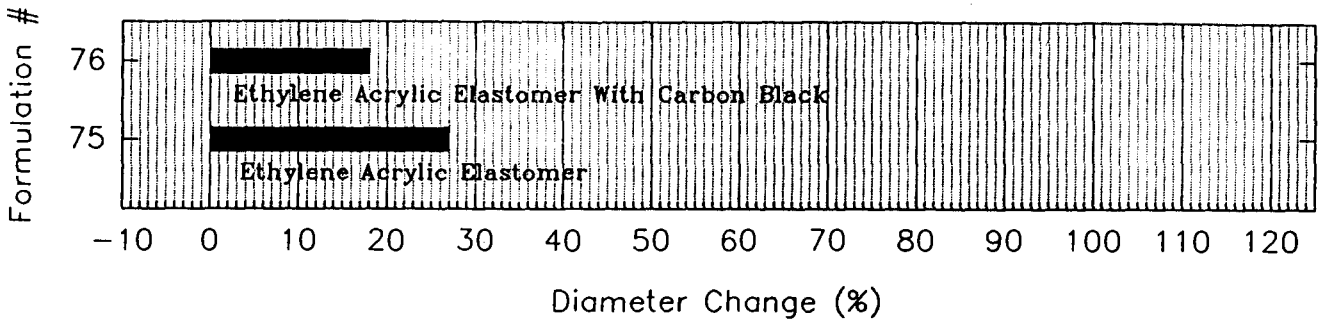


EPM Rubbers

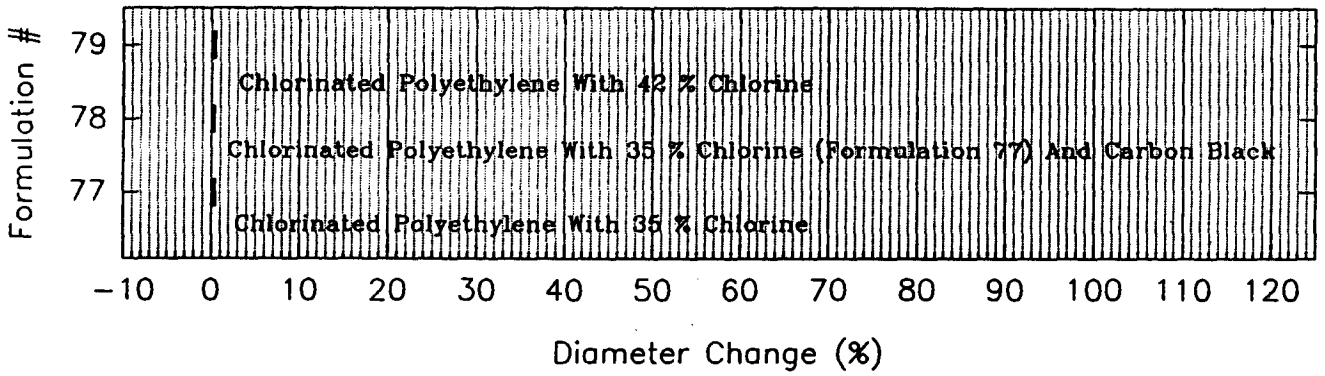


% Insitu Diameter Change In R-134

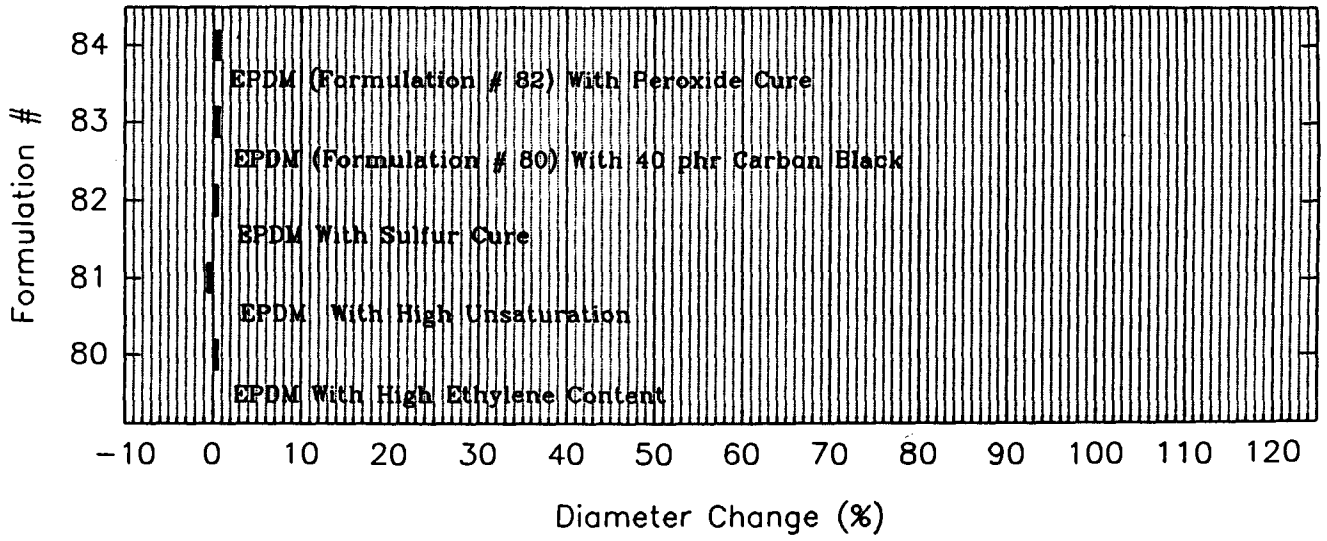
Ethylene Acrlic Elastomers



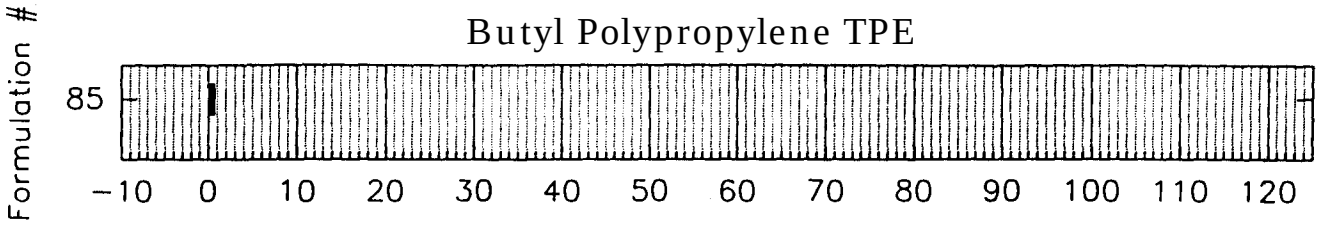
Chlorinated Polyethylenes

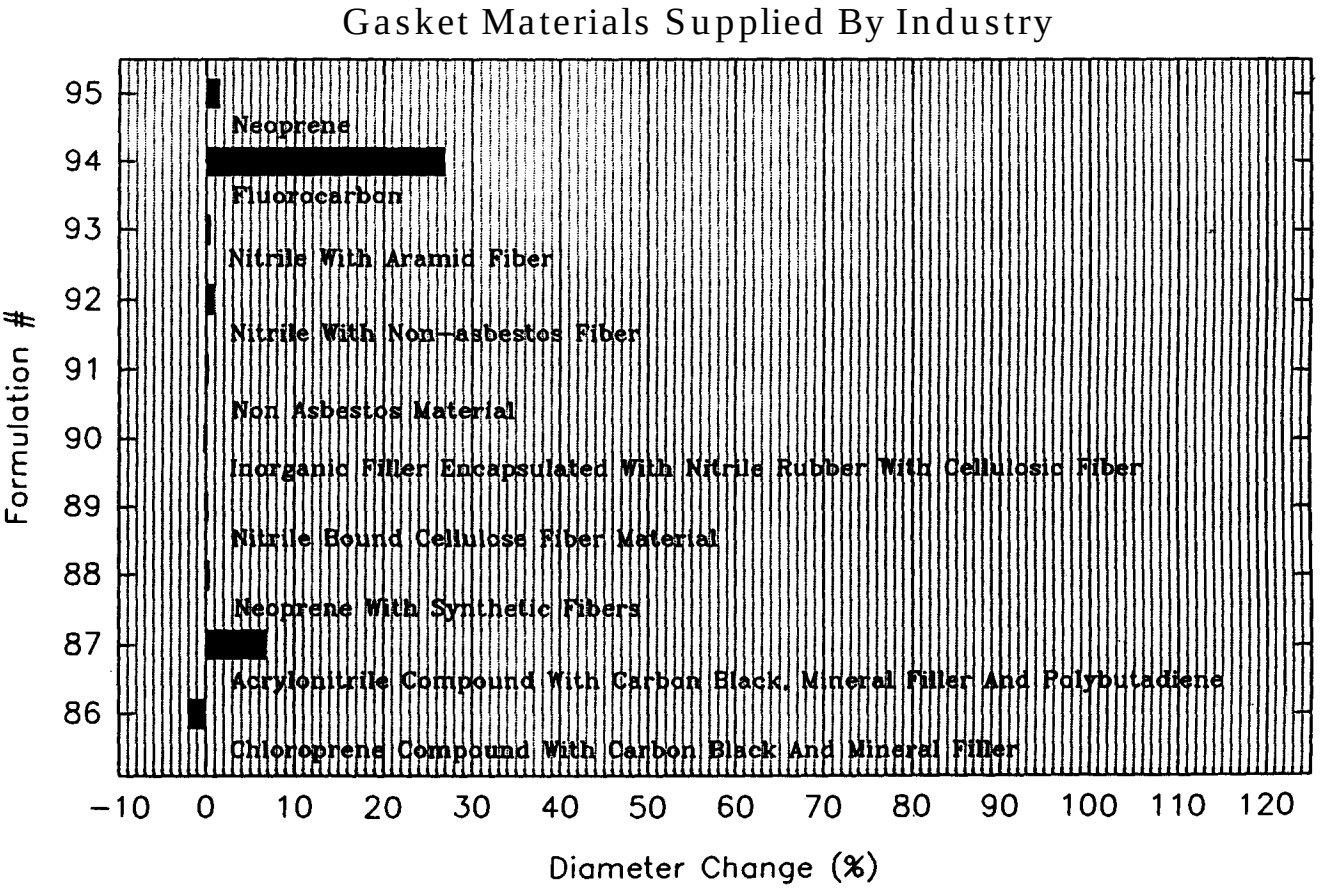


Ethylene Propylene Diene Rubbers



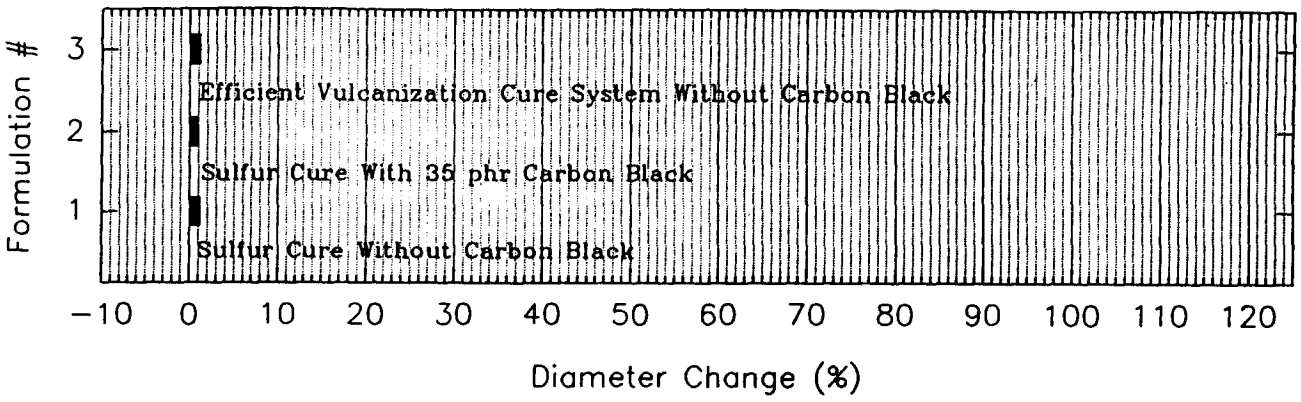
% Insitu Diameter Change In R-134



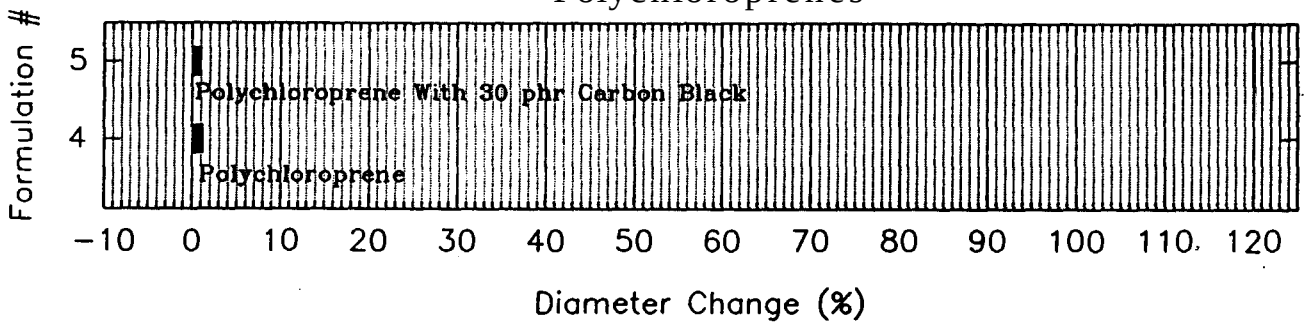


% Insitu Diameter Change In R-134a

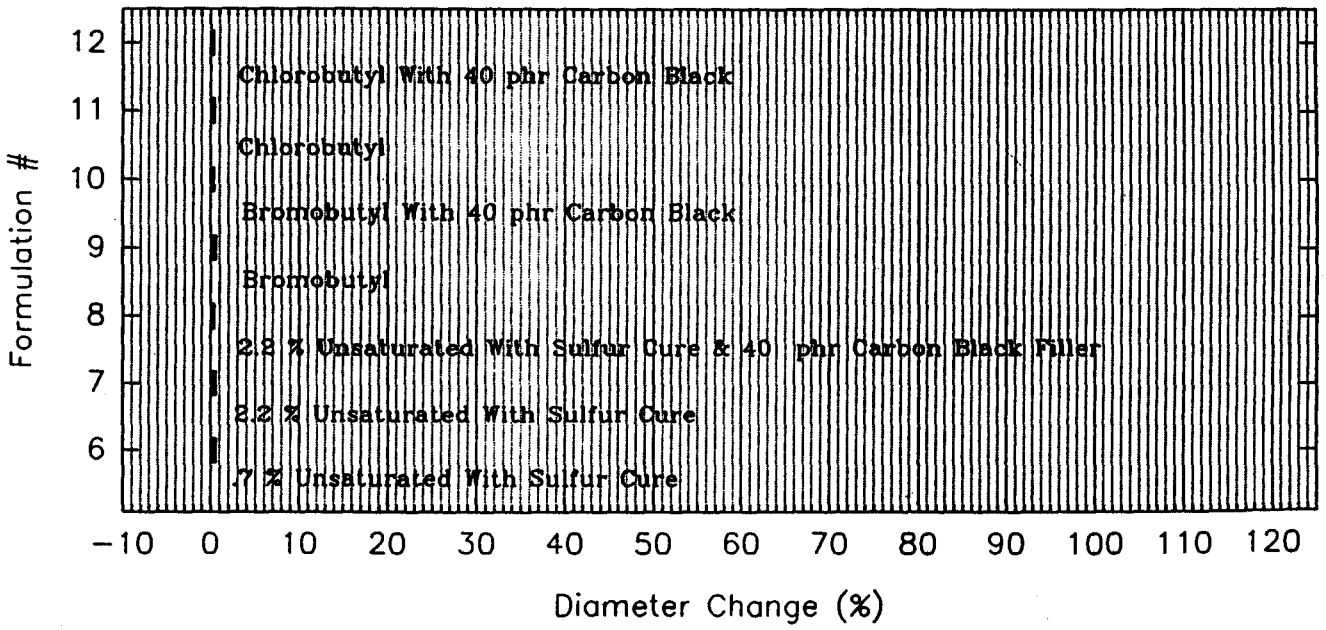
Polyisoprenes



Polychloroprenes

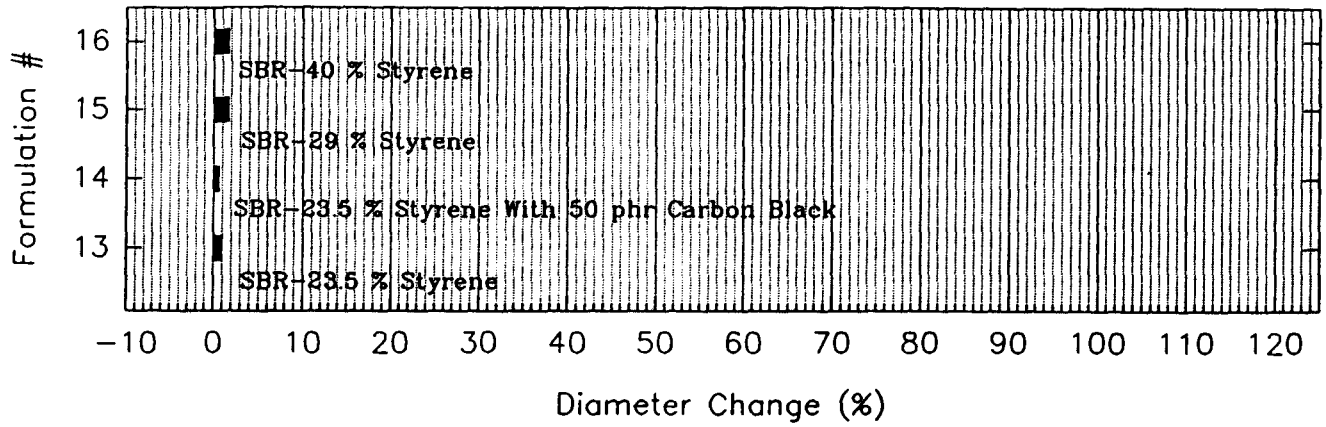


Butyl Rubbers

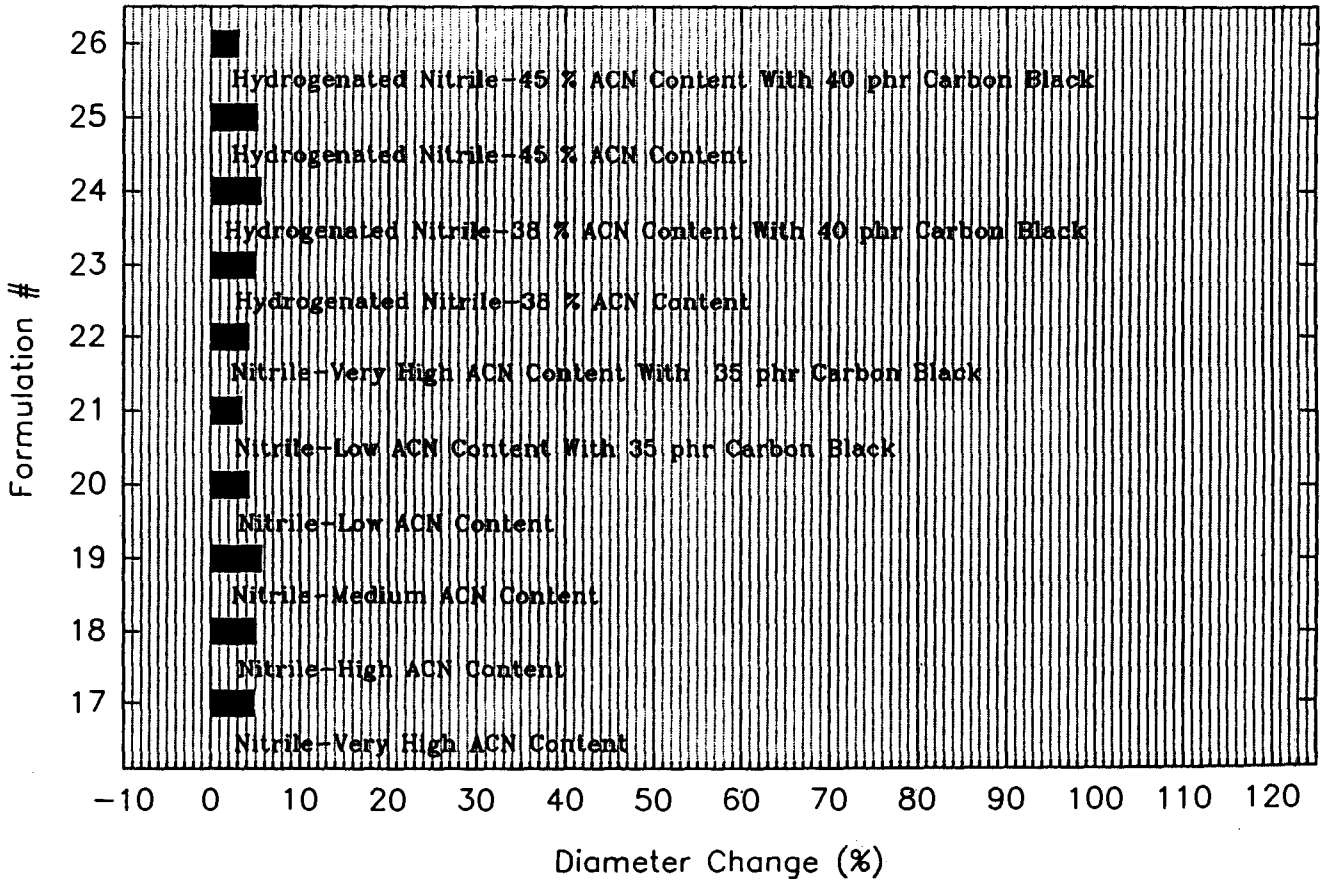


% Insitu Diameter Change In R-134a

Styrene Butadiene Rubbers

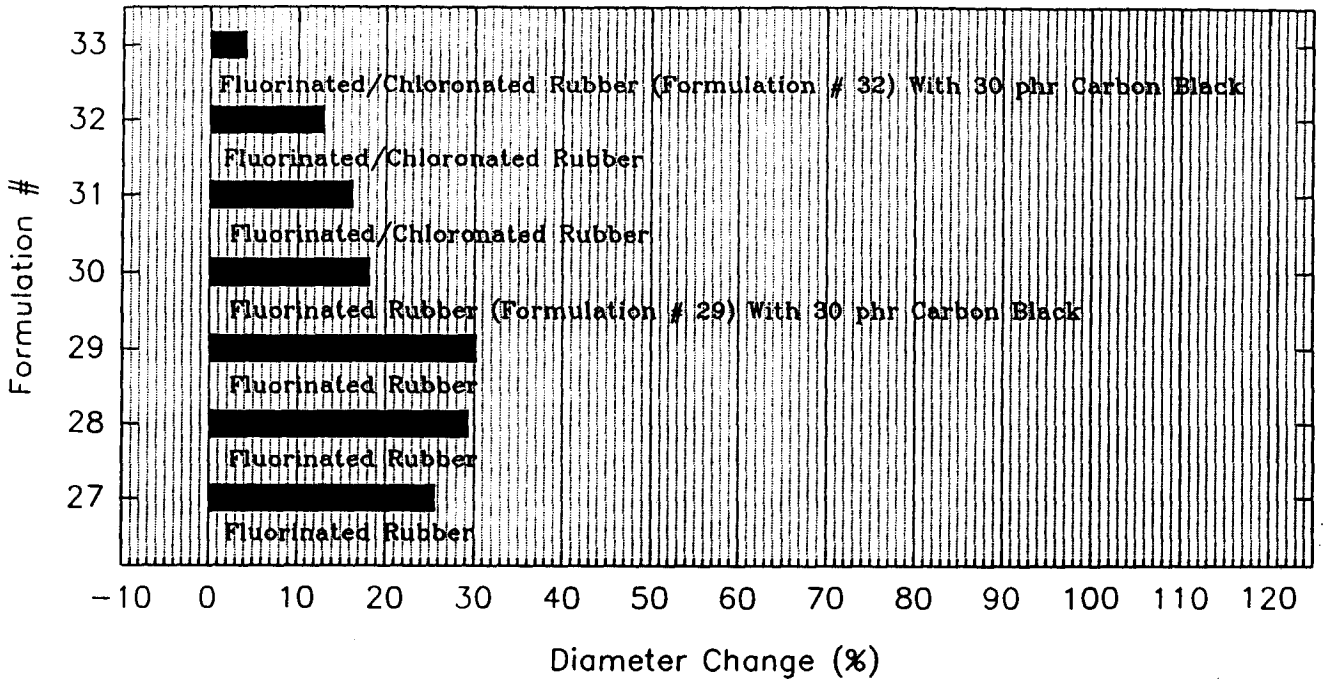


Nitrile Rubbers

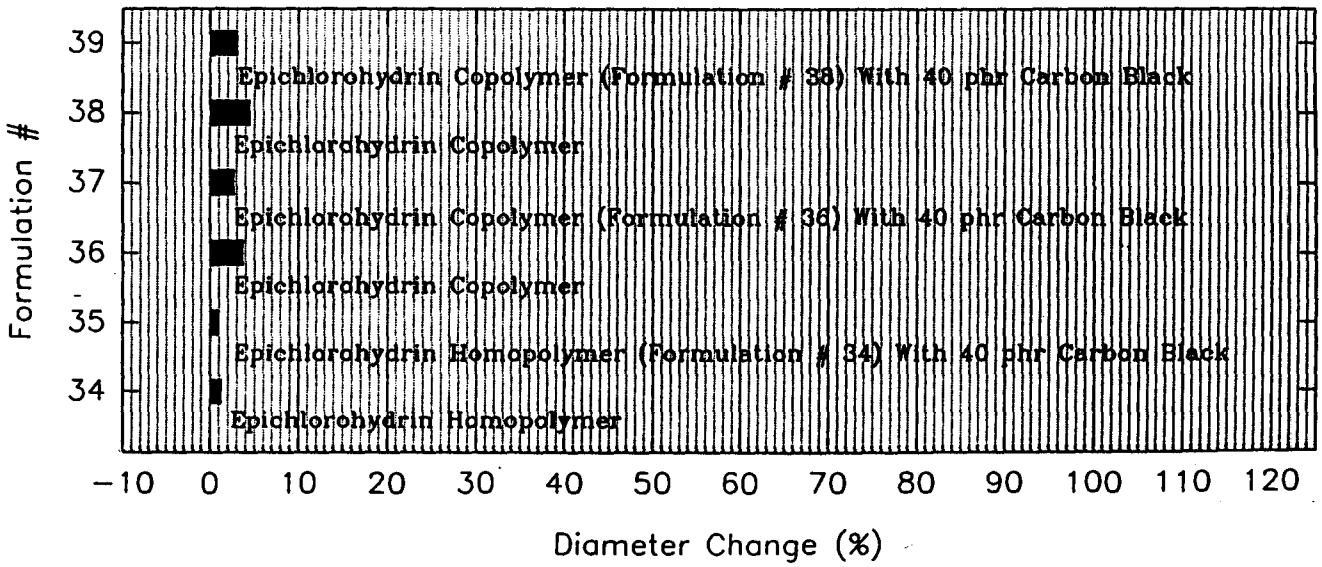


% Insitu Diameter Change In R-134a

Fluorinated Rubbers

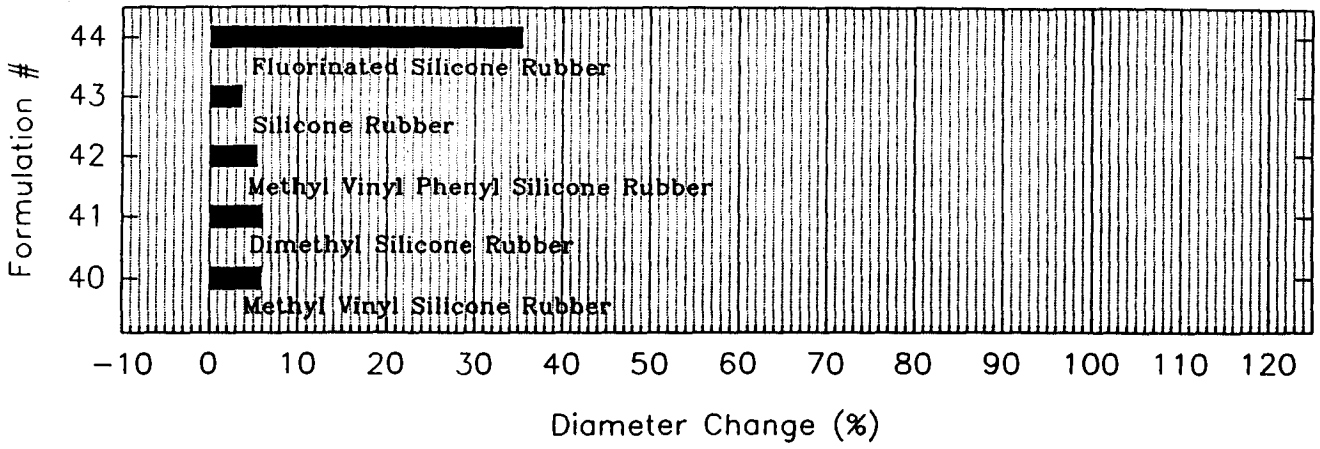


Epichlorohydrin Based Rubbers

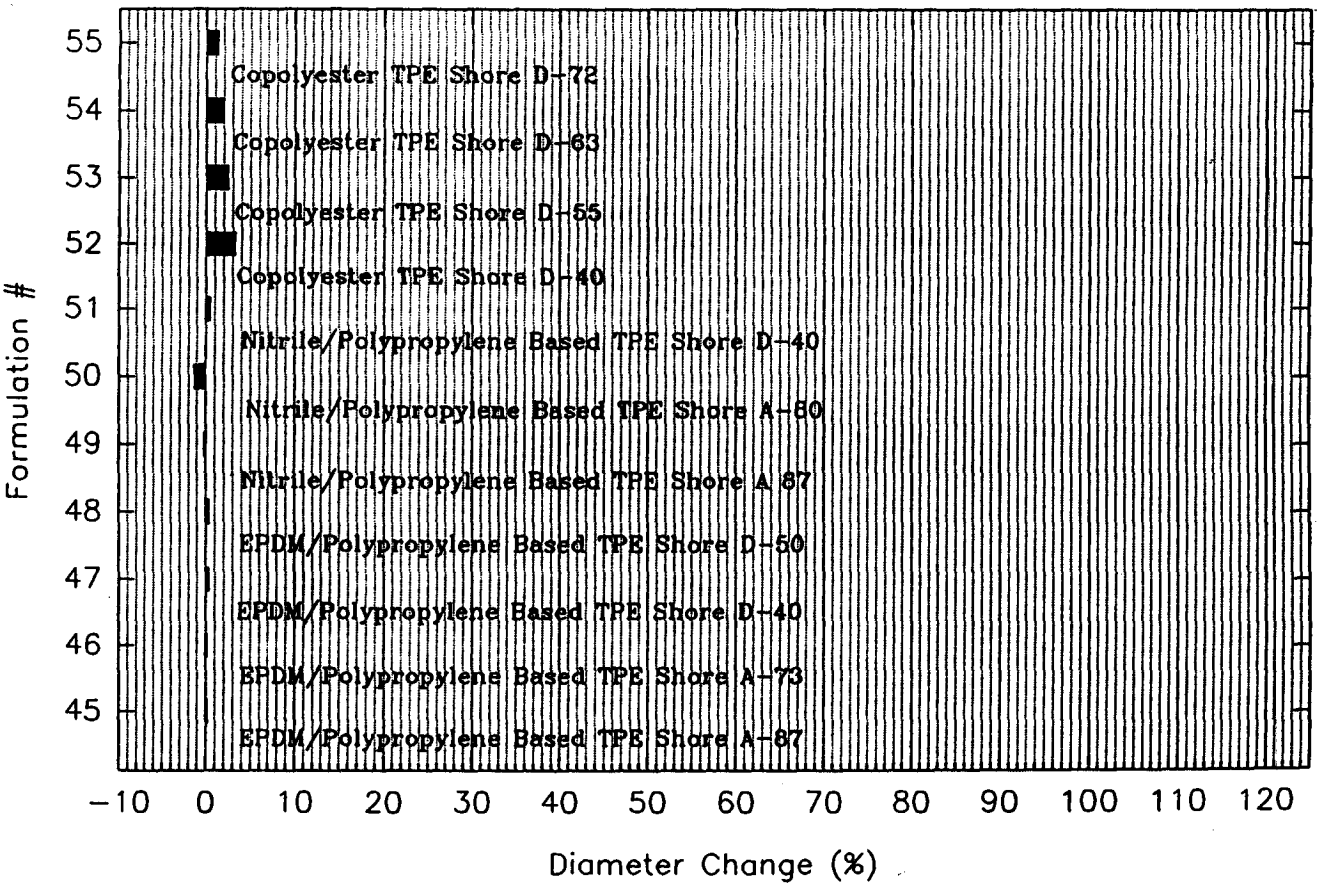


% Insitu Diameter Change In R-134a

Silicones

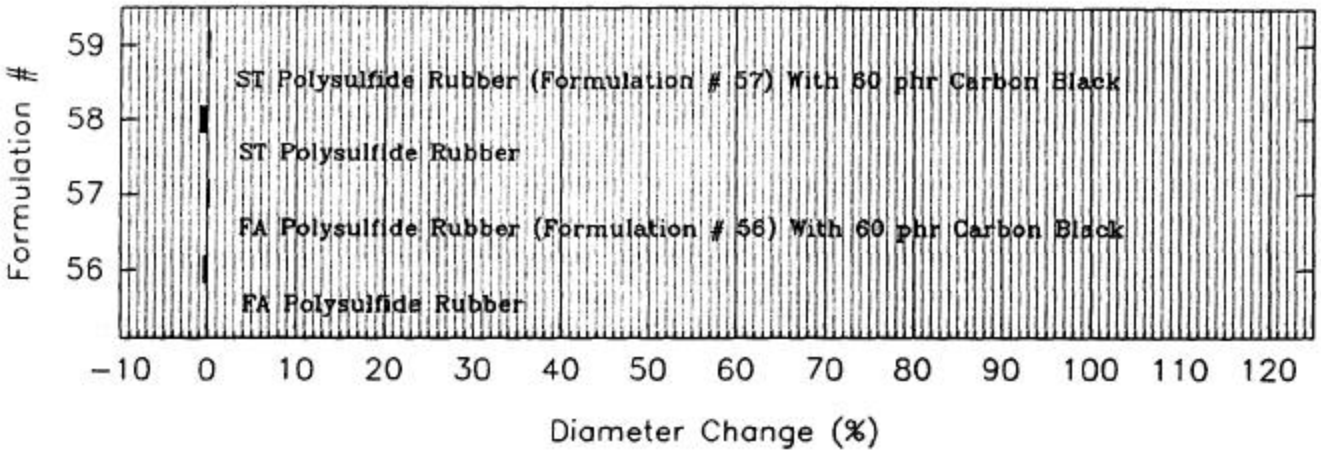


Thermoplastic Elastomers

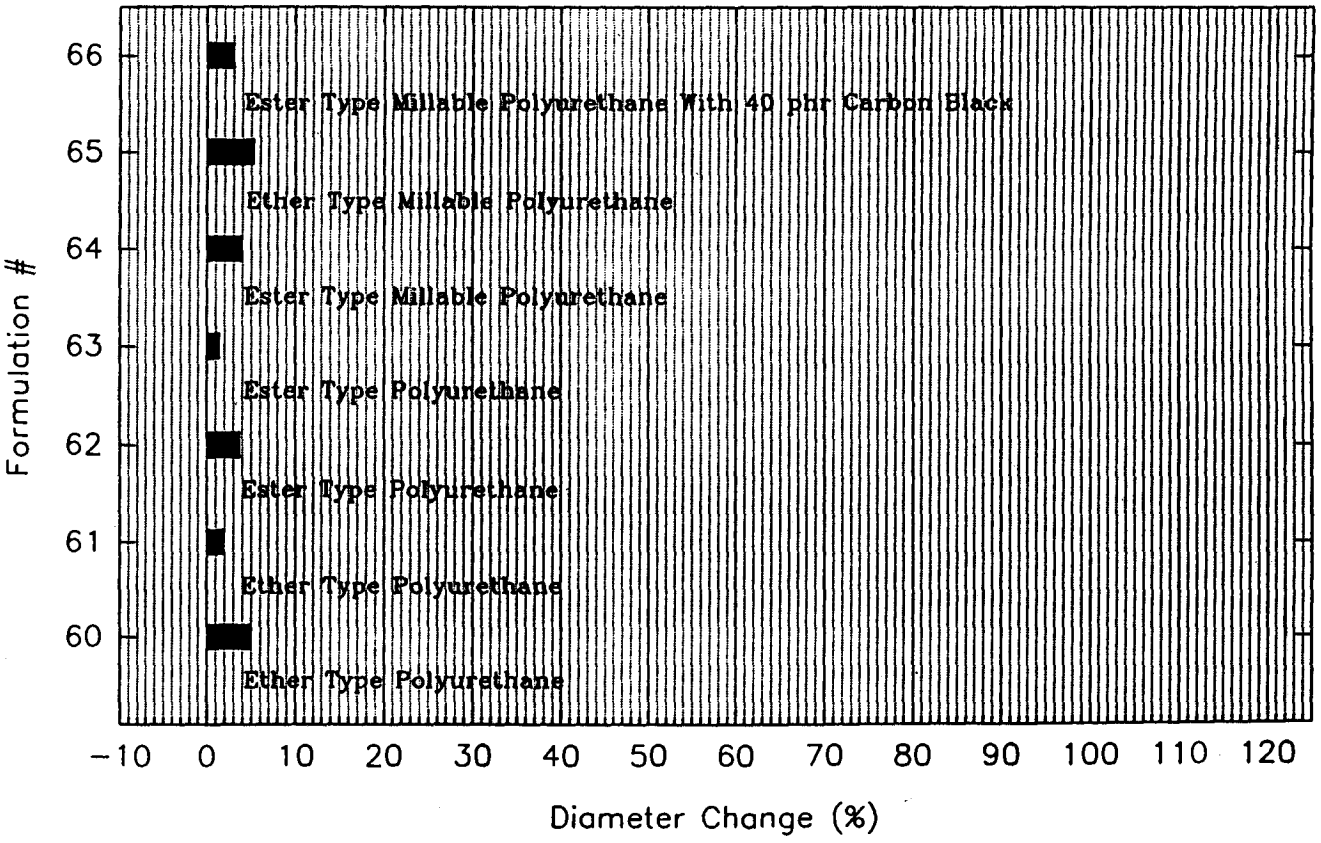


% Insitu Diameter Change In R-134a

Polysulfide Rubbers

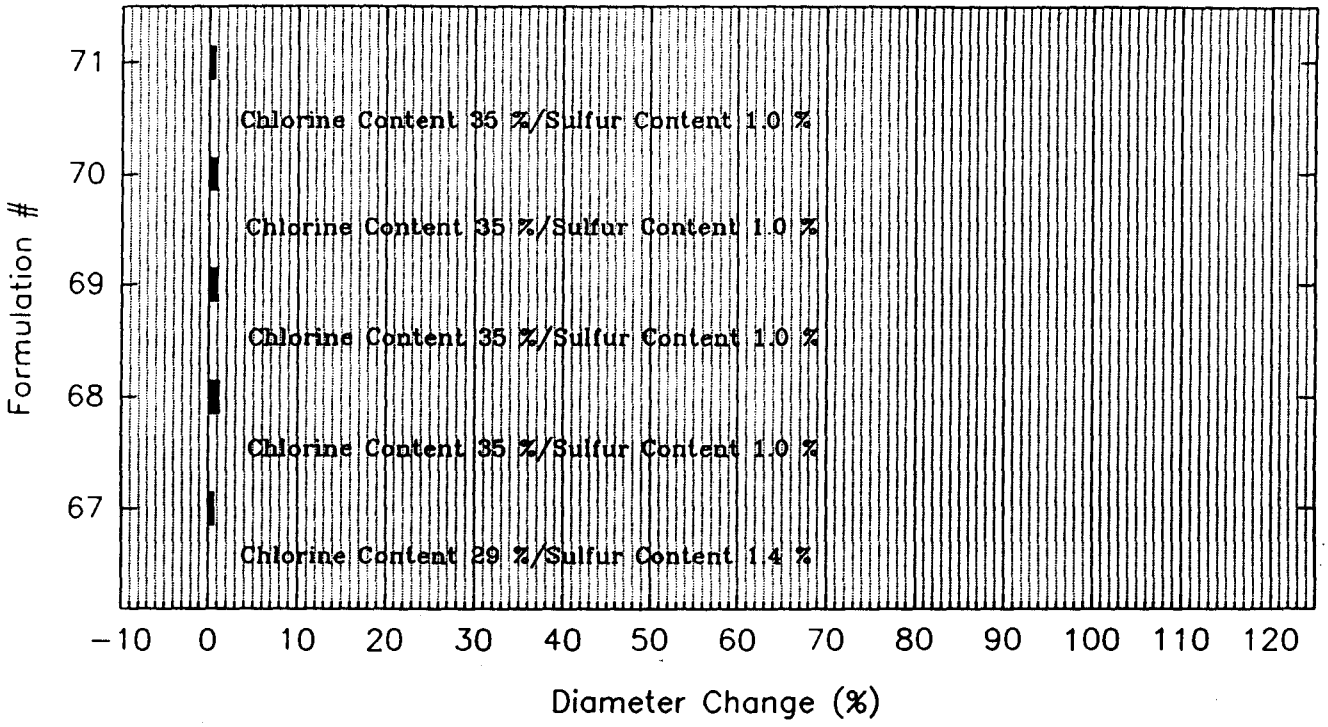


Polyurethanes

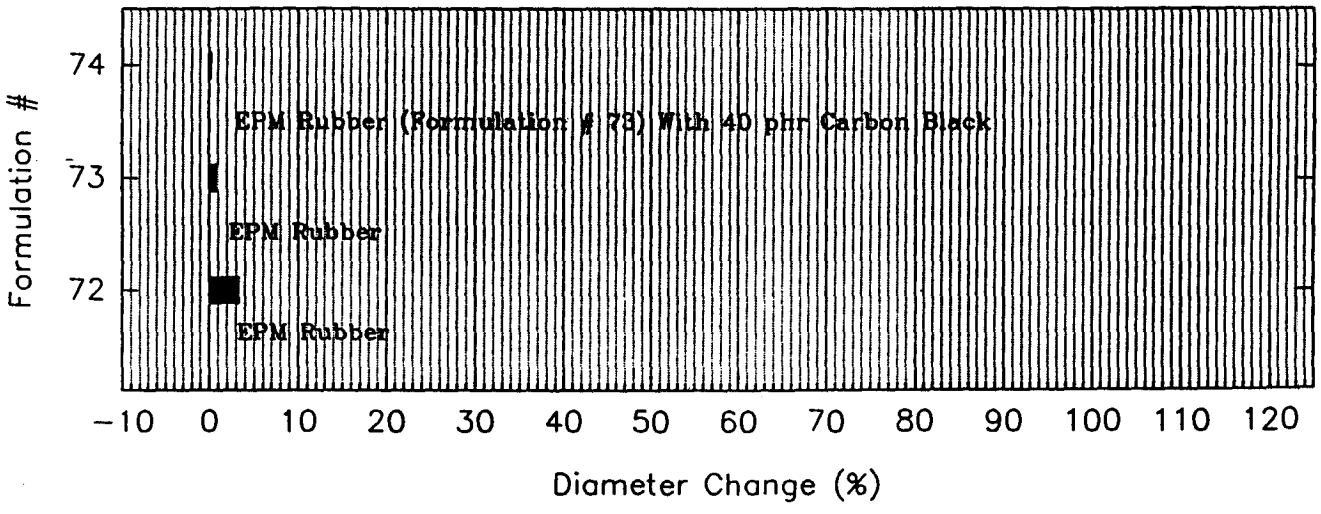


% Insitu Diameter Change In R-134a

Chlorosulfonated Polyethylenes

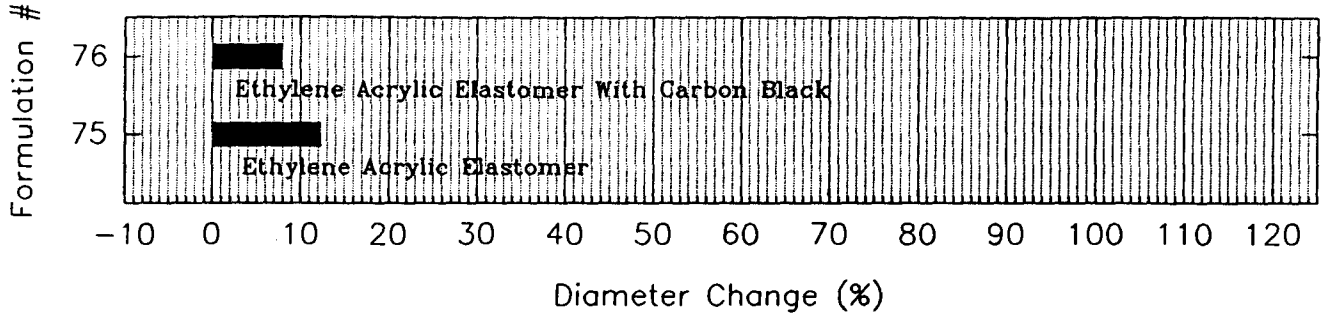


EPM Rubbers

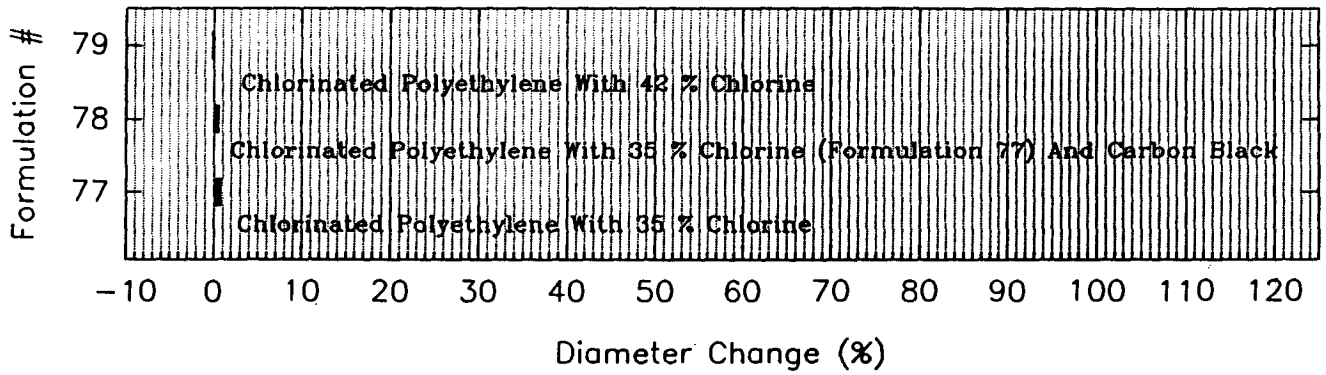


% Insitu Diameter Change In R-134a

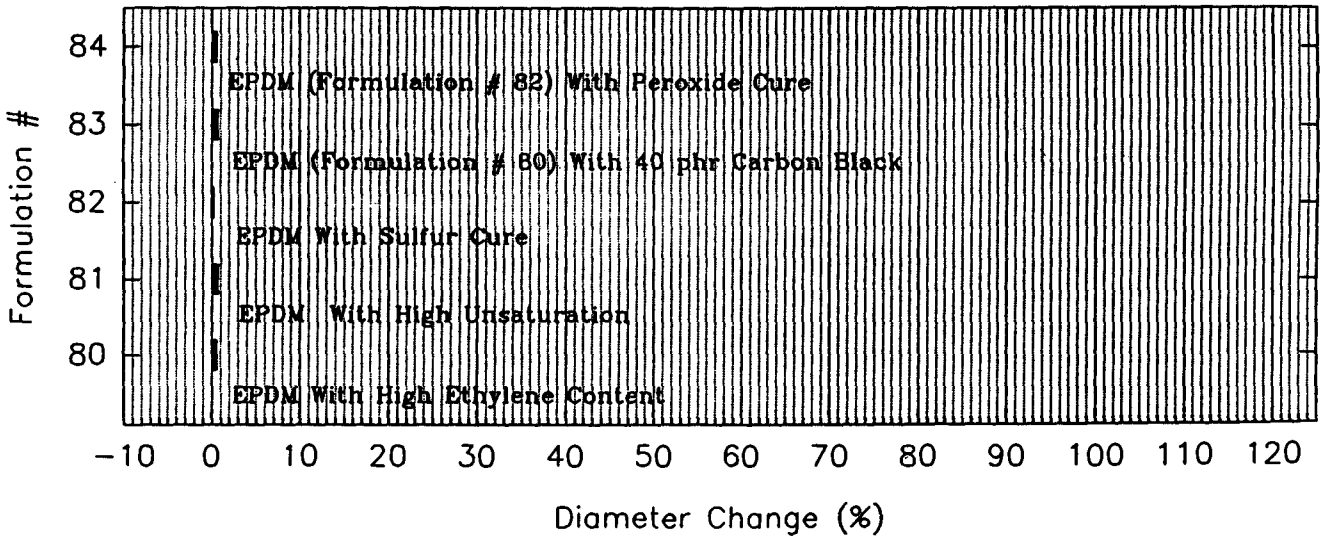
Ethylene Acrlic Elastomers



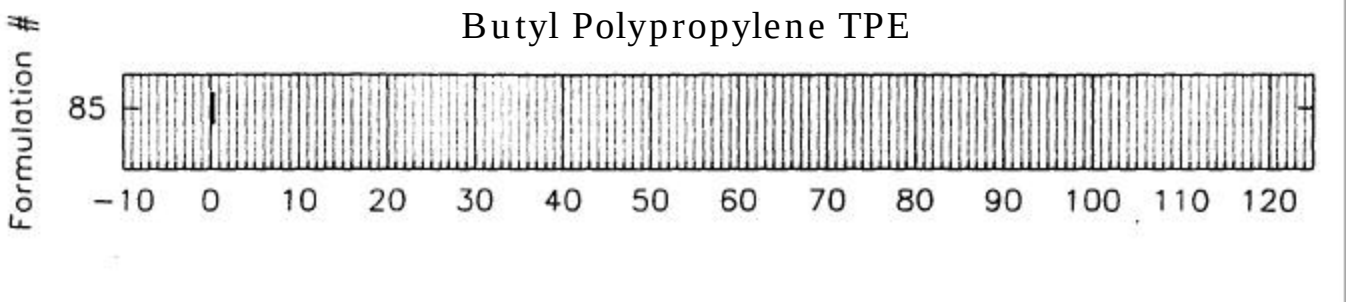
Chlorinated Polyethylenes

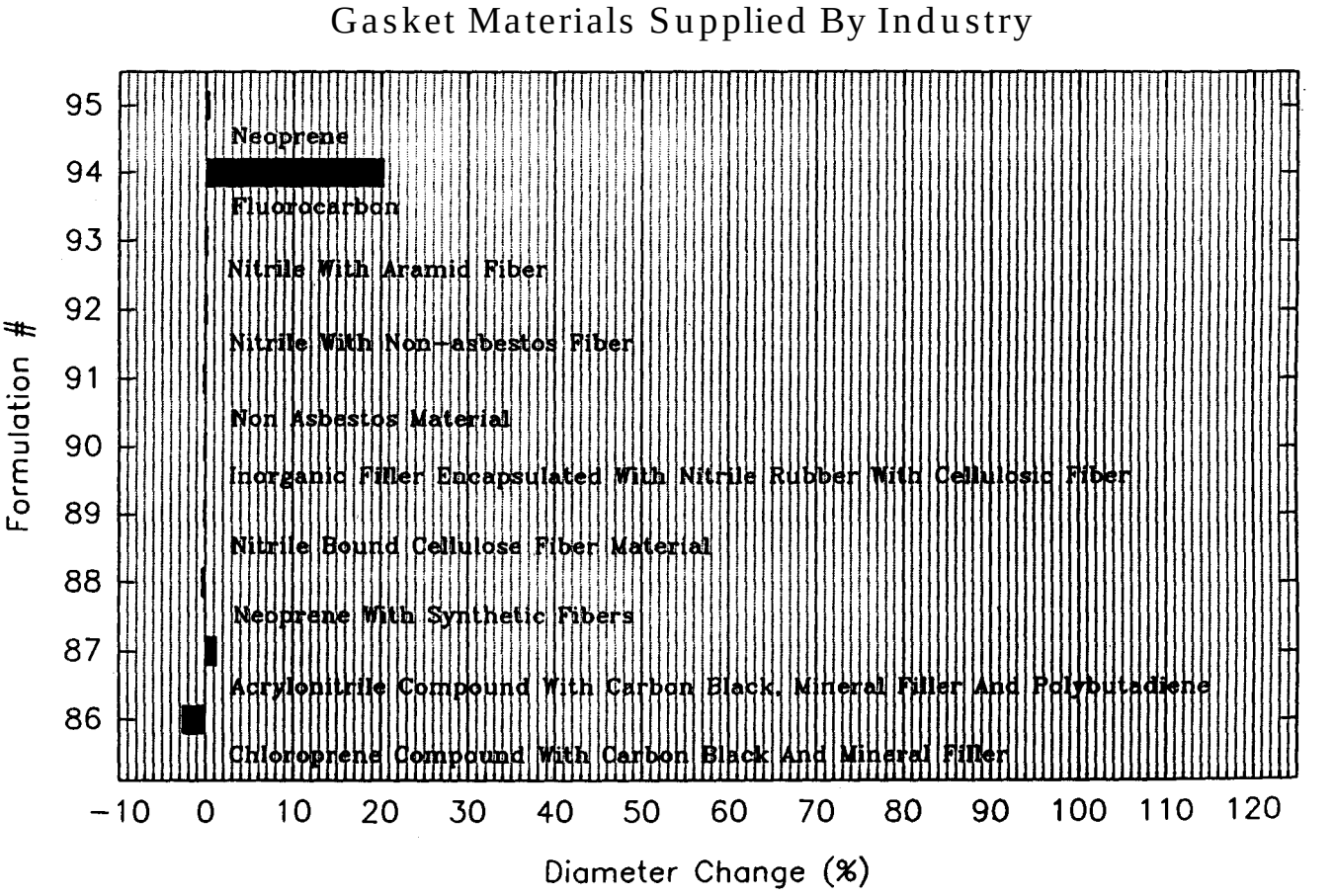


Ethylene Propylene Diene Rubbers



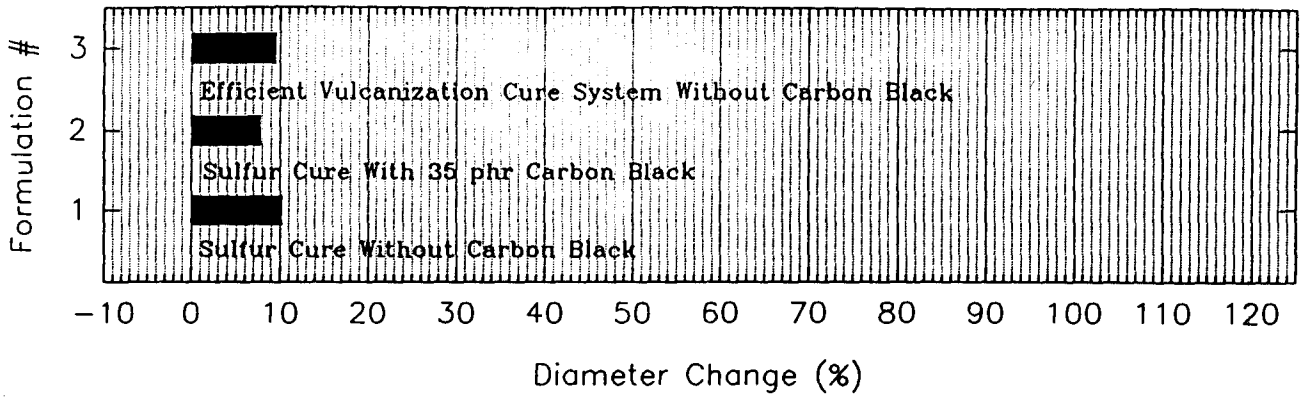
% Insitu Diameter Change In R-134a



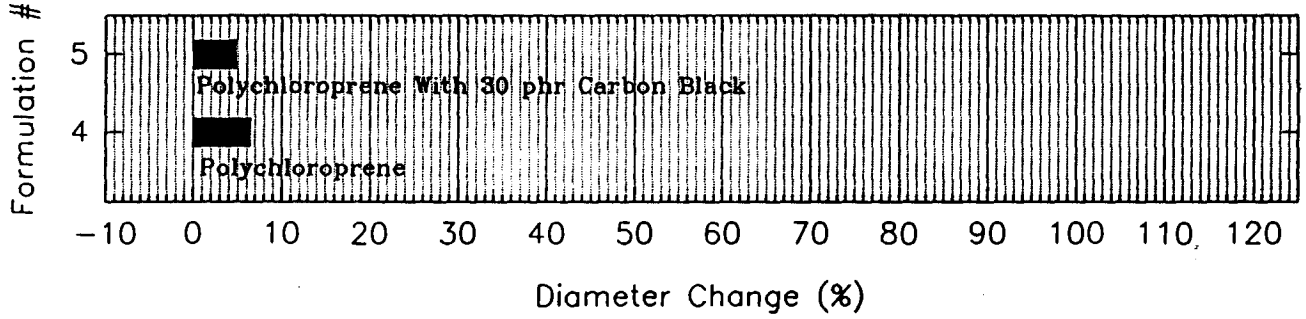


% Insitu Diameter Change In R-142b

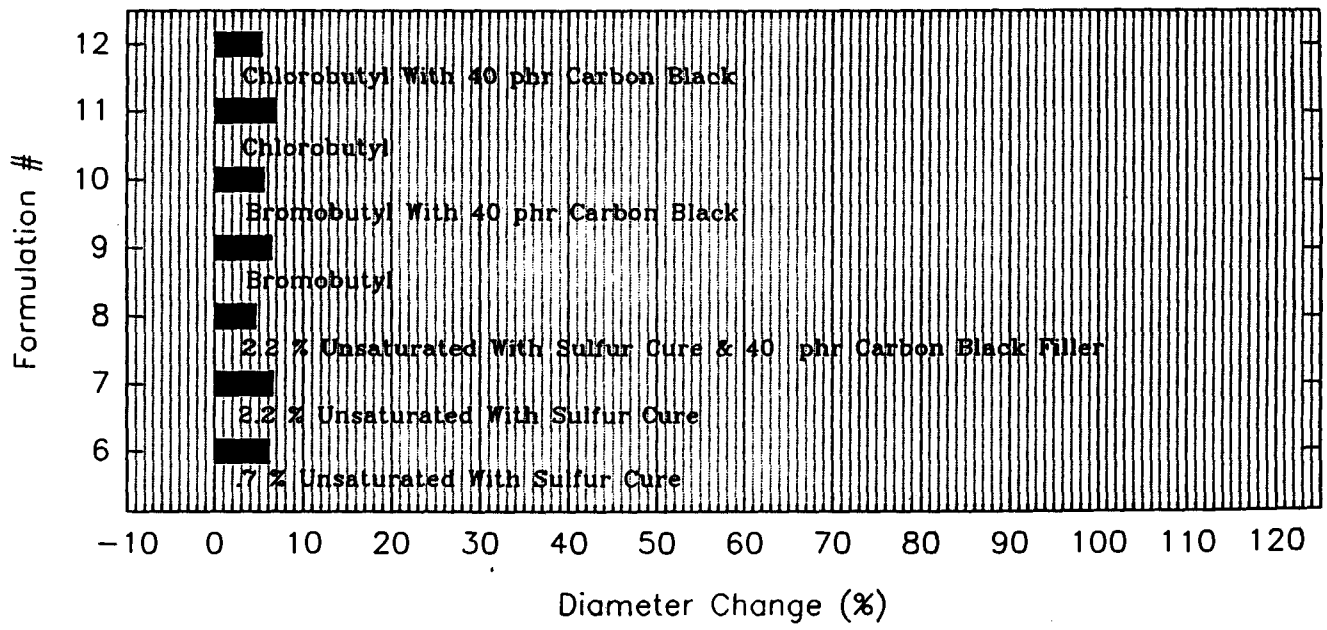
Polyisoprenes



Polychloroprenes

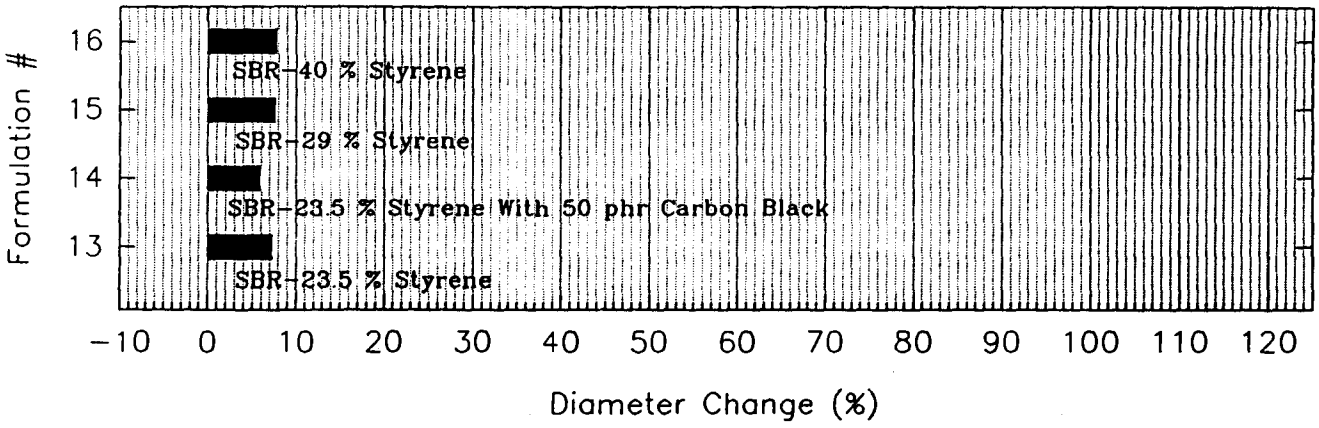


Butyl Rubbers

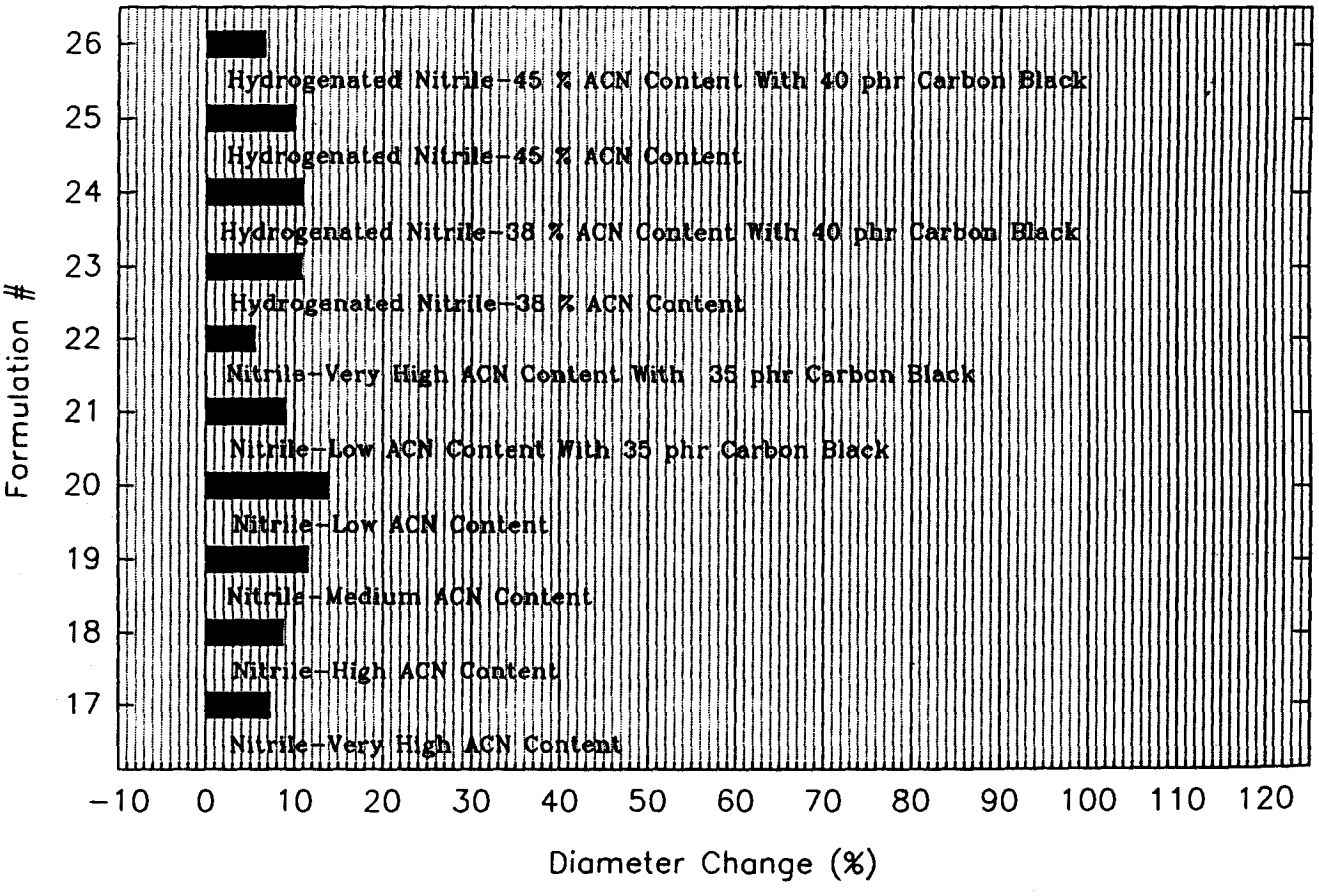


% Insitu Diameter Change In R-142b

Styrene Butadiene Rubbers

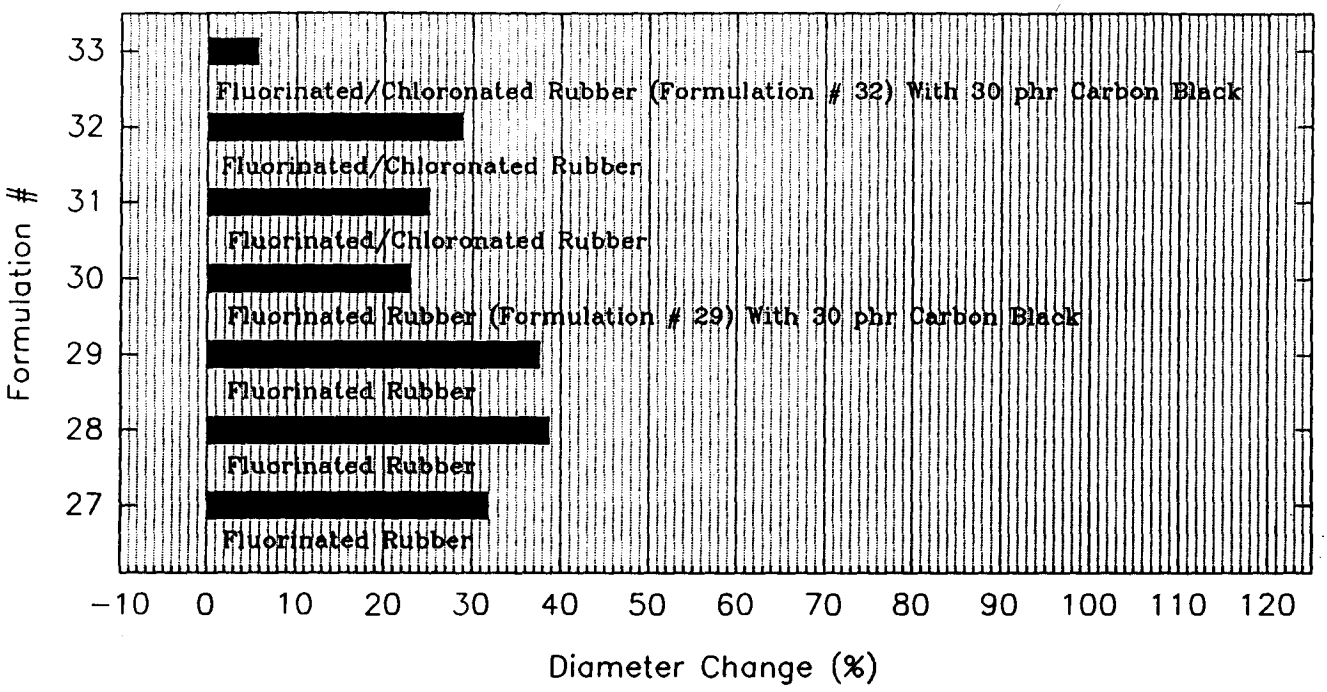


Nitrile Rubbers

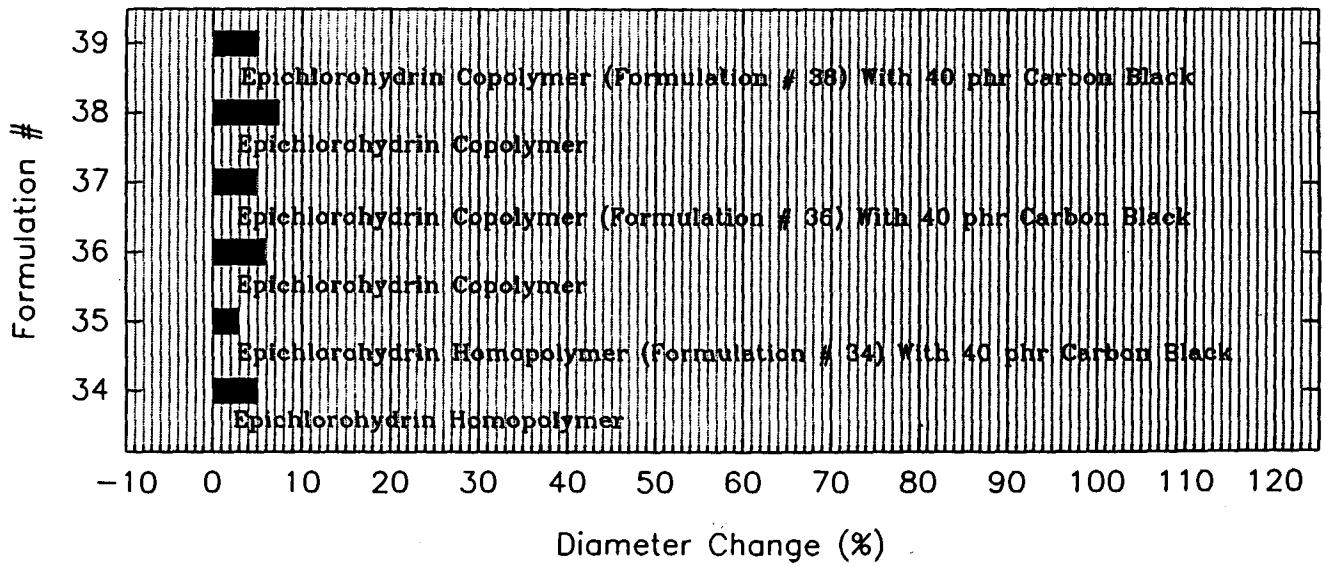


% Insitu Diameter Change In R-142b

Fluorinated Rubbers

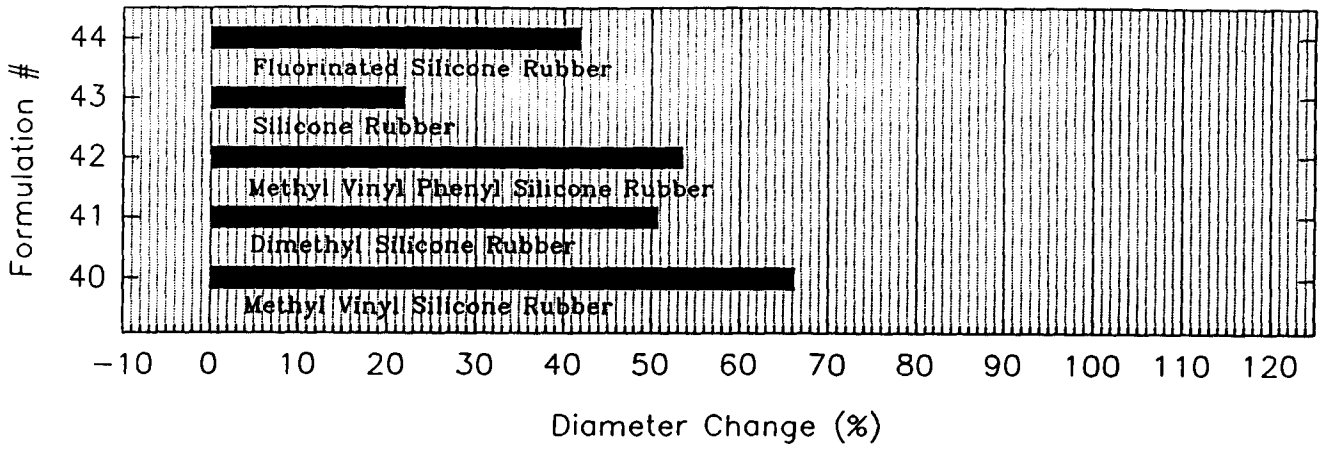


Epichlorohydrin Based Rubbers

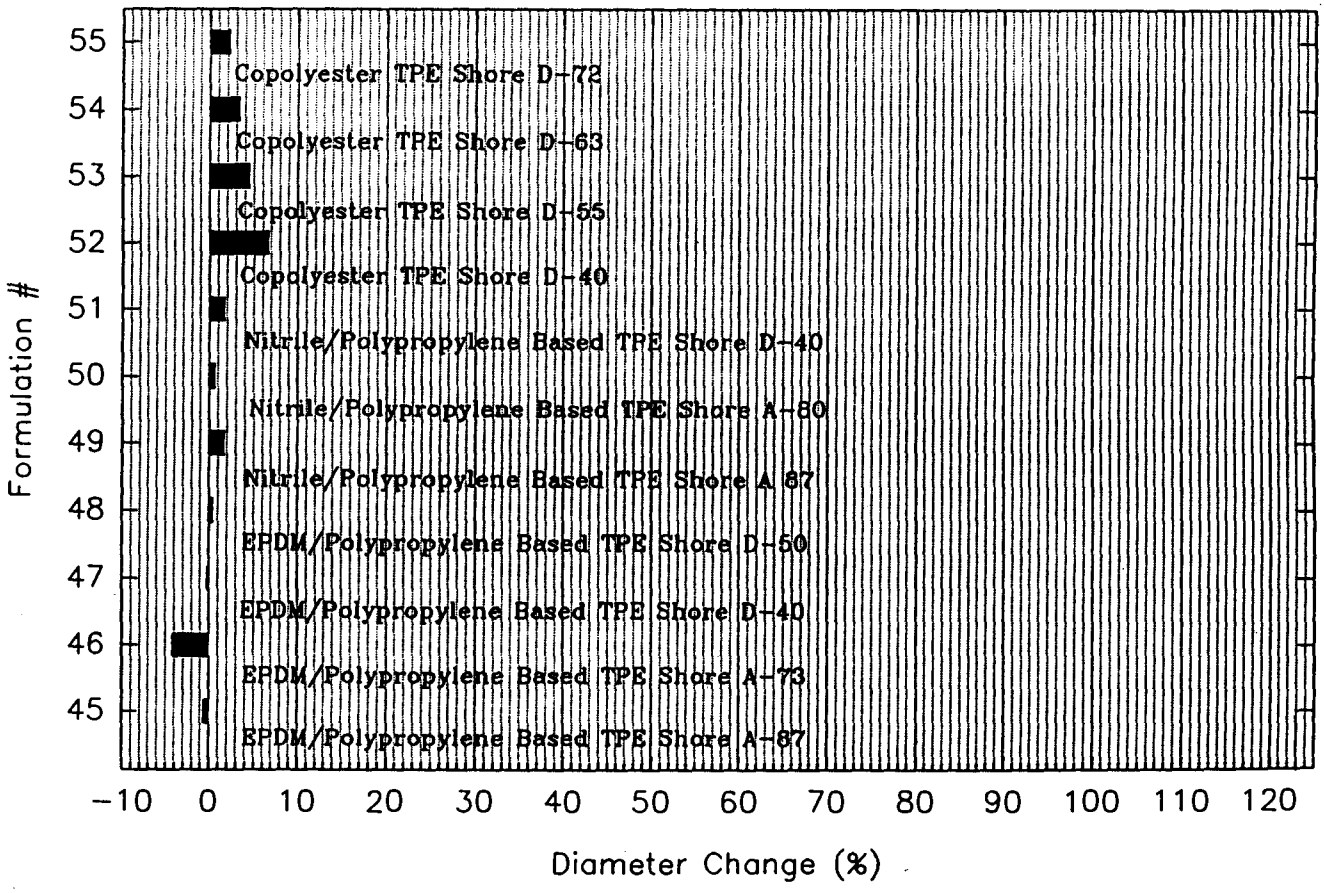


% Insitu Diameter Change In R-142b

Silicones

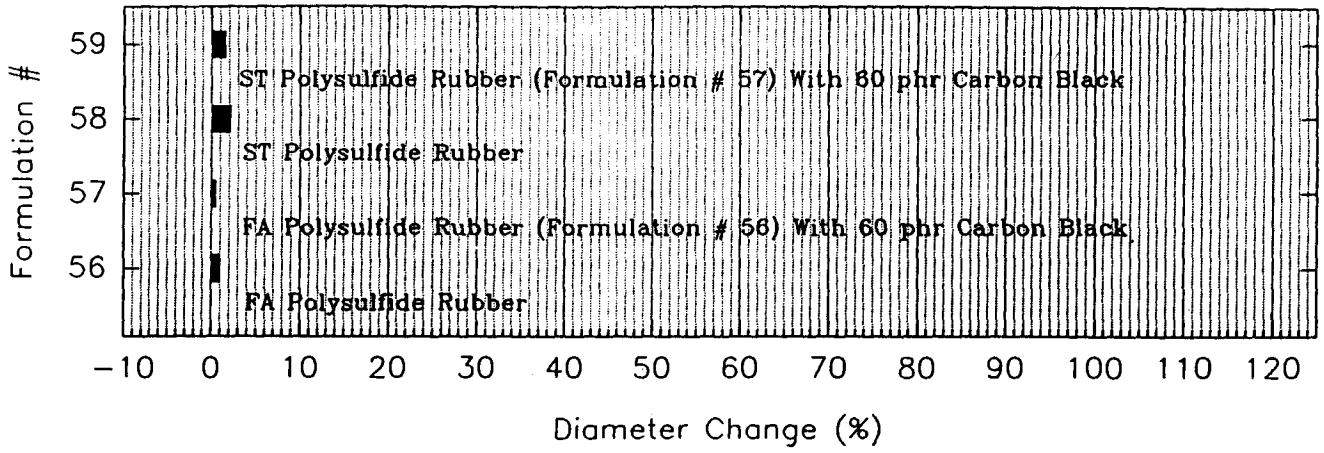


Thermoplastic Elastomers

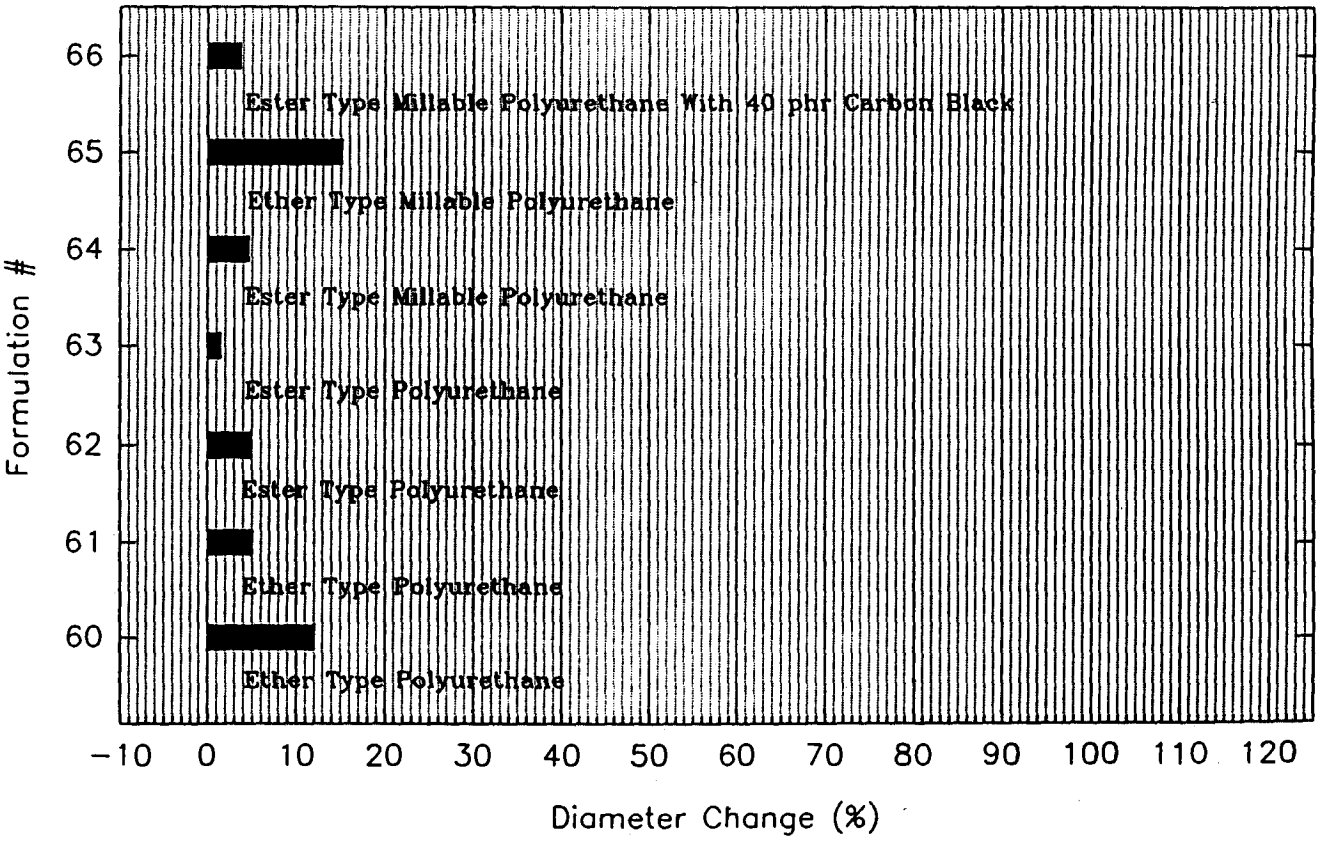


% Insitu Diameter Change In R-142b

Polysulfide Rubbers

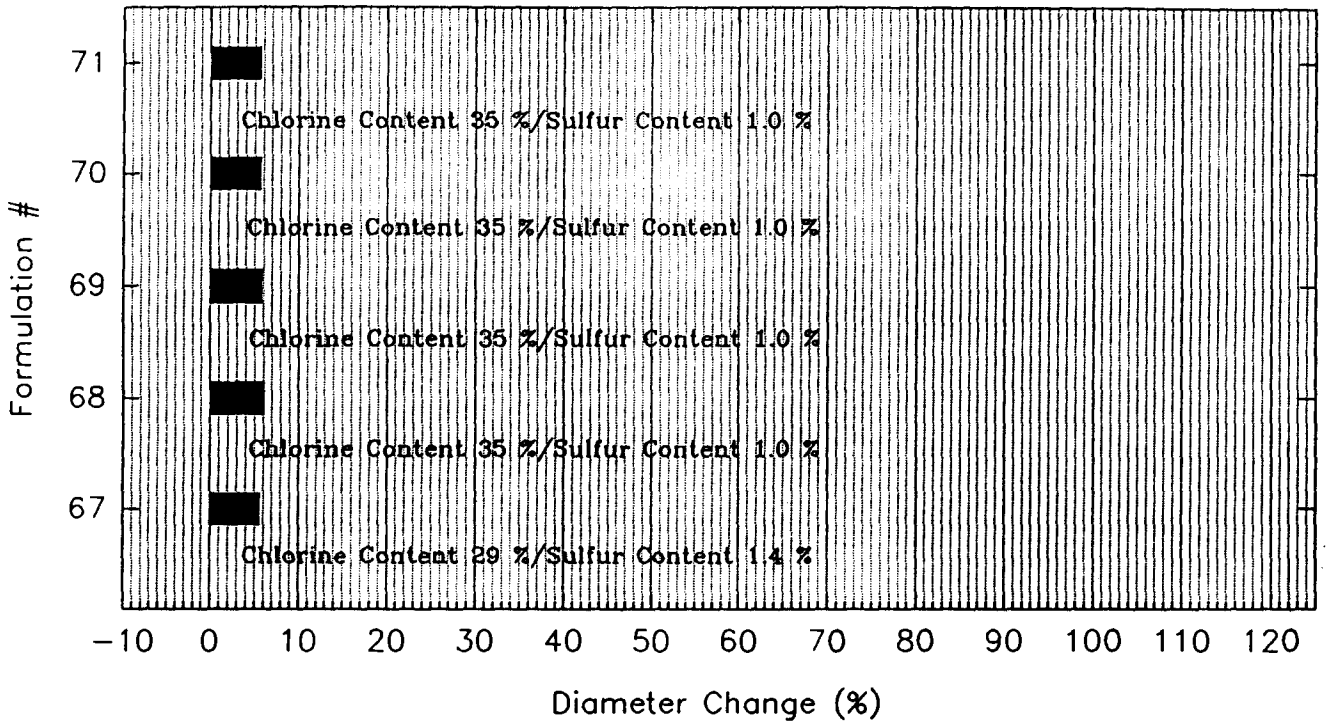


Polyurethanes

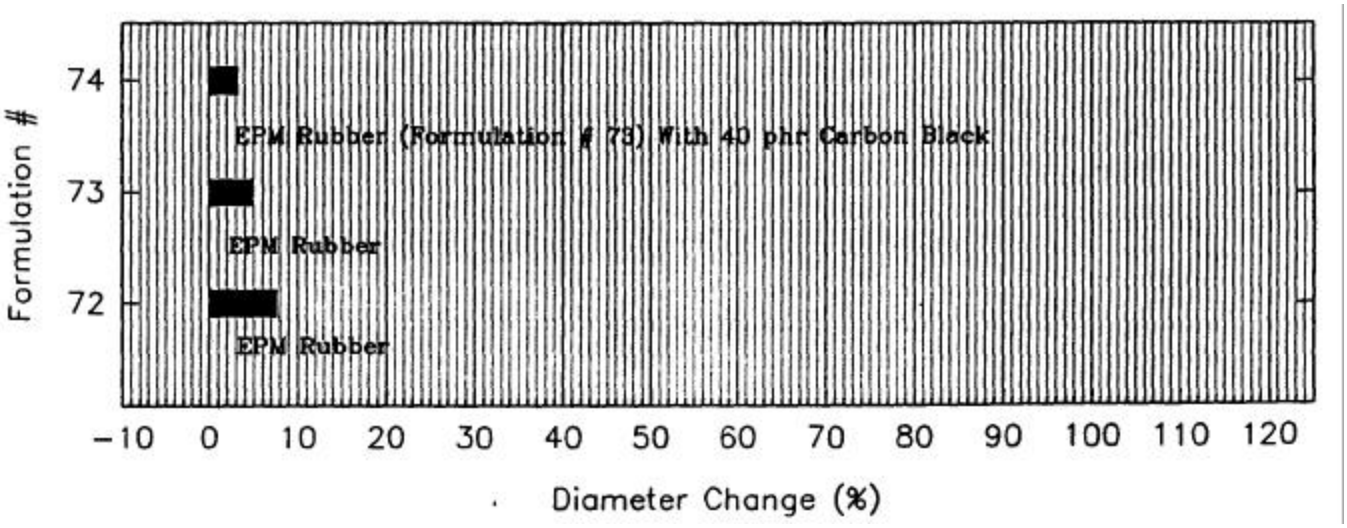


% Insitu Diameter Change In R-142b

Chlorosulfonated Polyethylenes

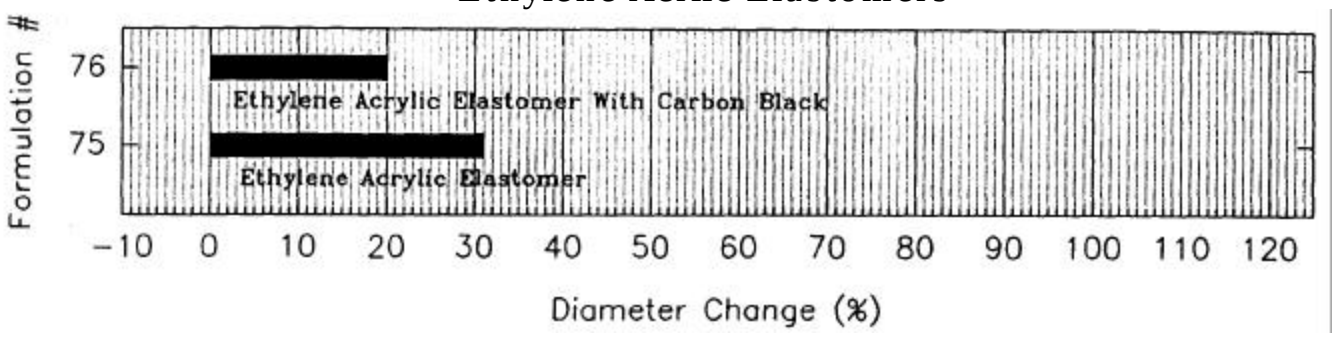


EPM Rubbers

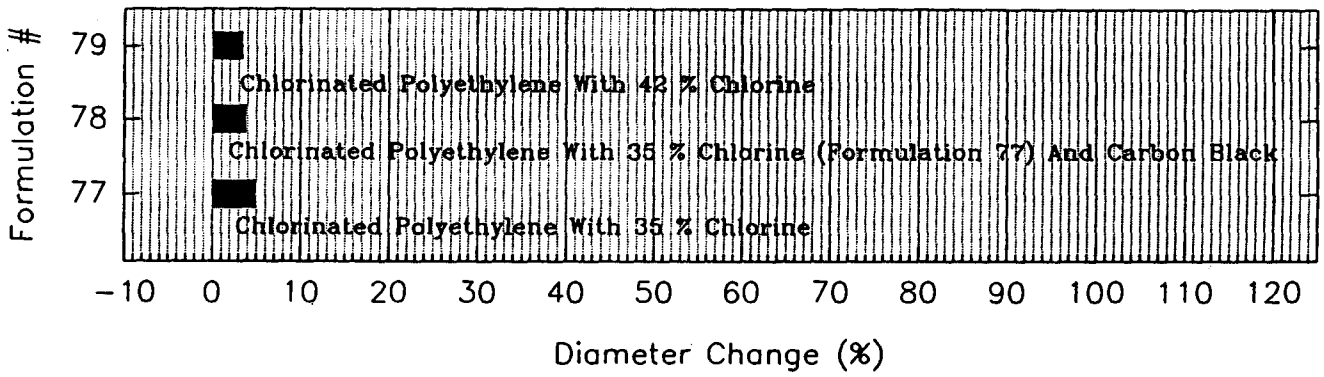


% Insitu Diameter Change In R-142b

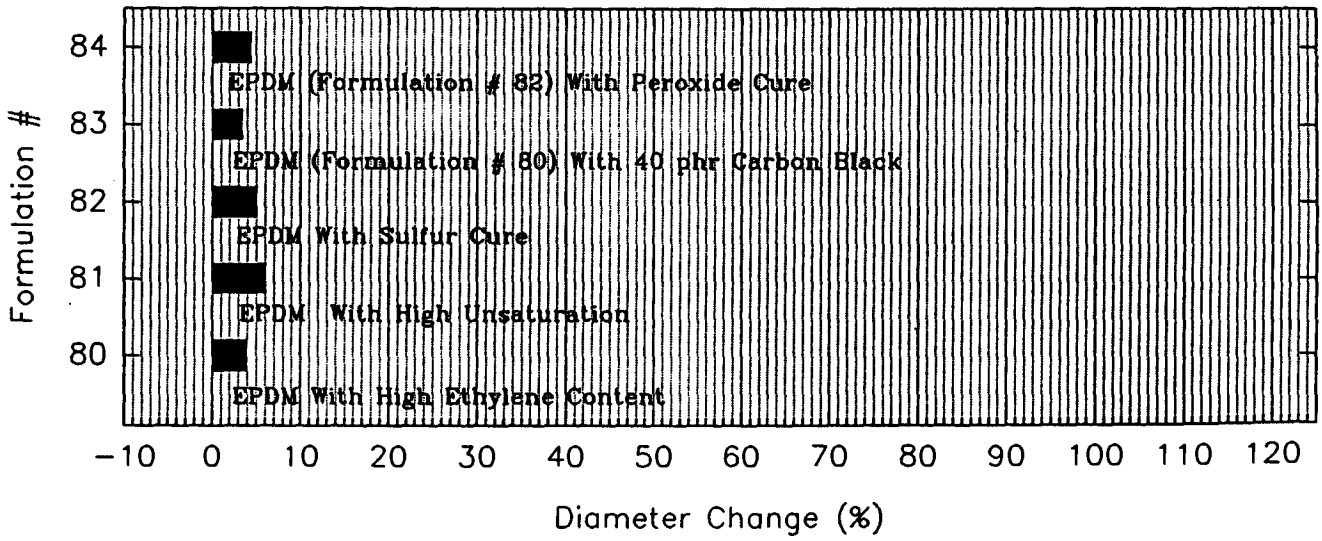
Ethylene Acrlic Elastomers



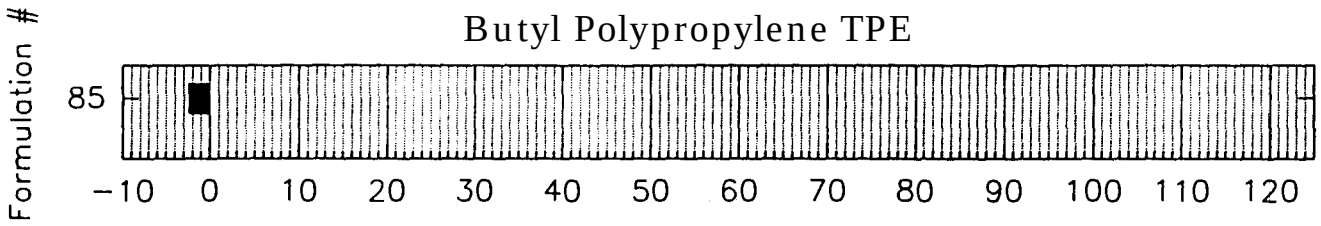
Chlorinated Polyethylenes

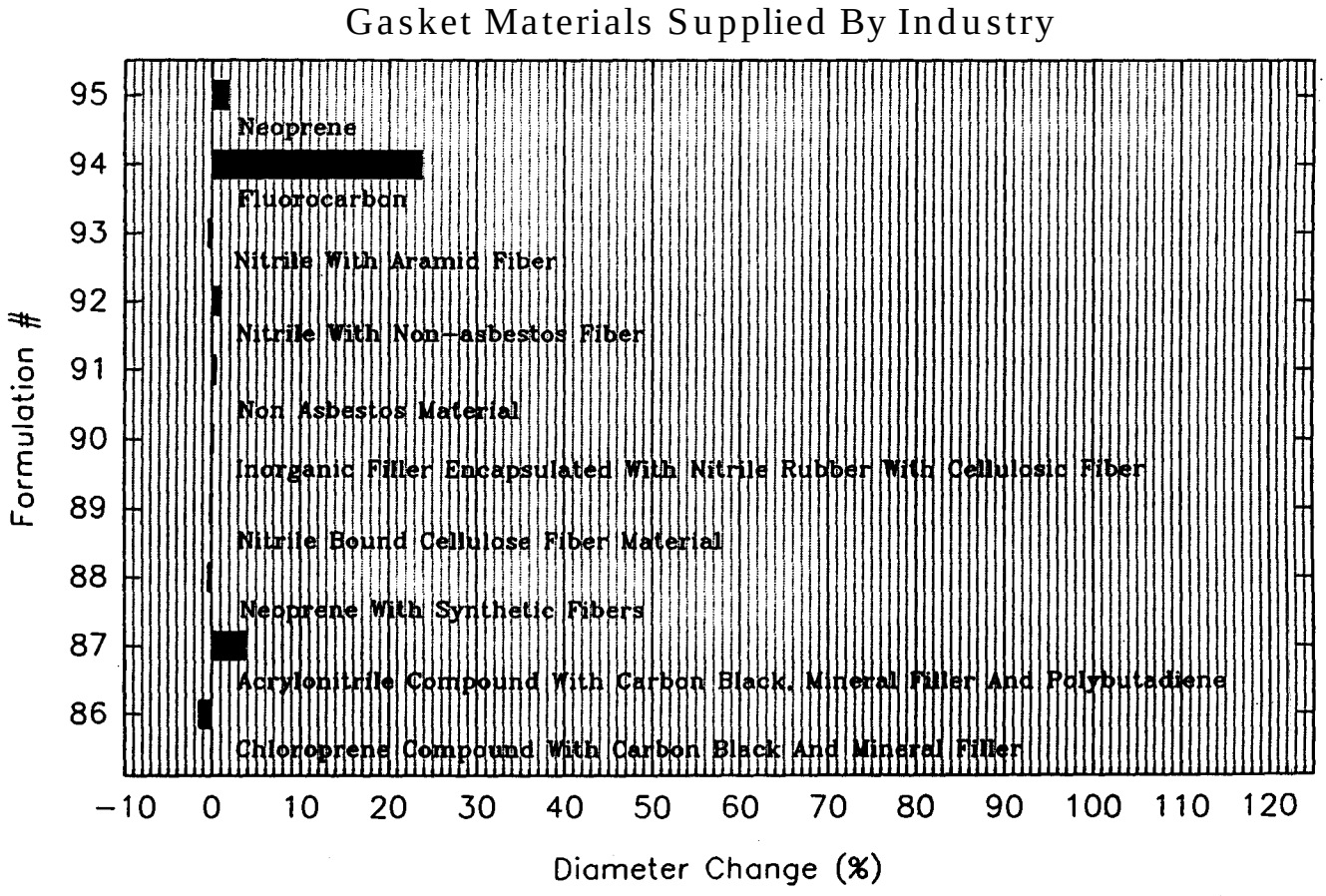


Ethylene Propylene Diene Rubbers



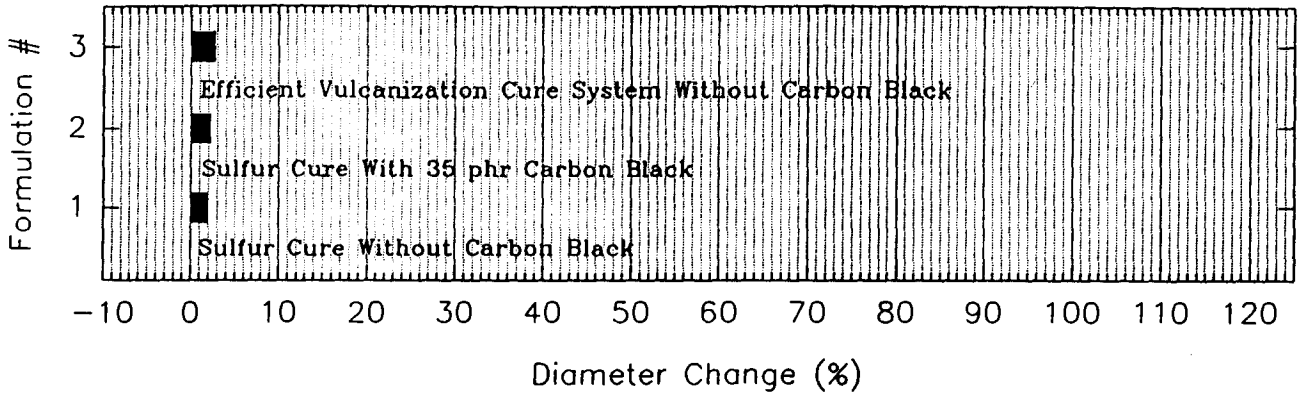
% Insitu Diameter Change In R-142b



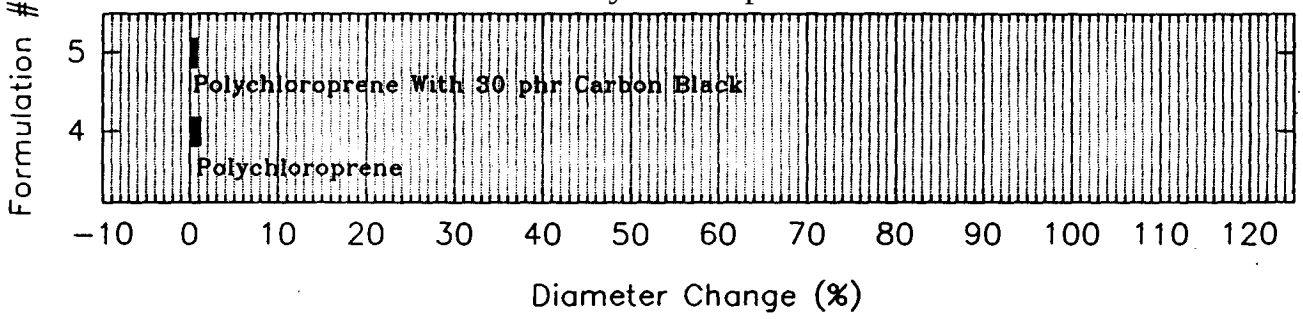


% Insitu Diameter Change In R-143a

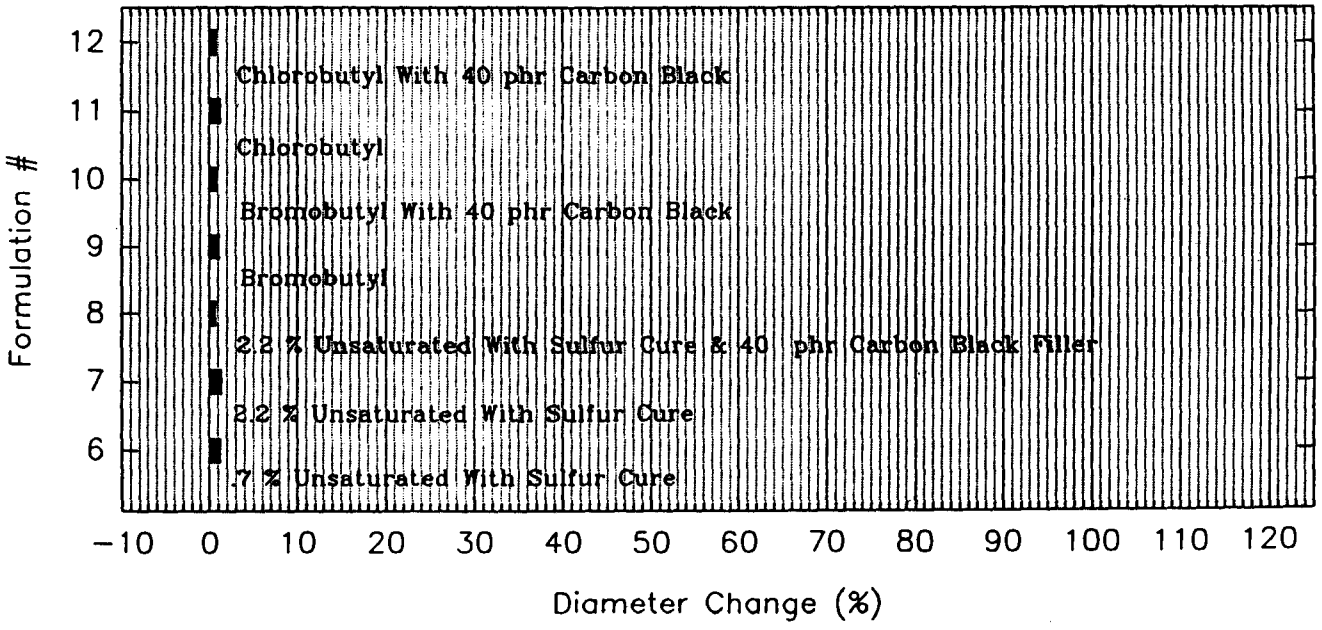
Polyisoprenes



Polychloroprenes

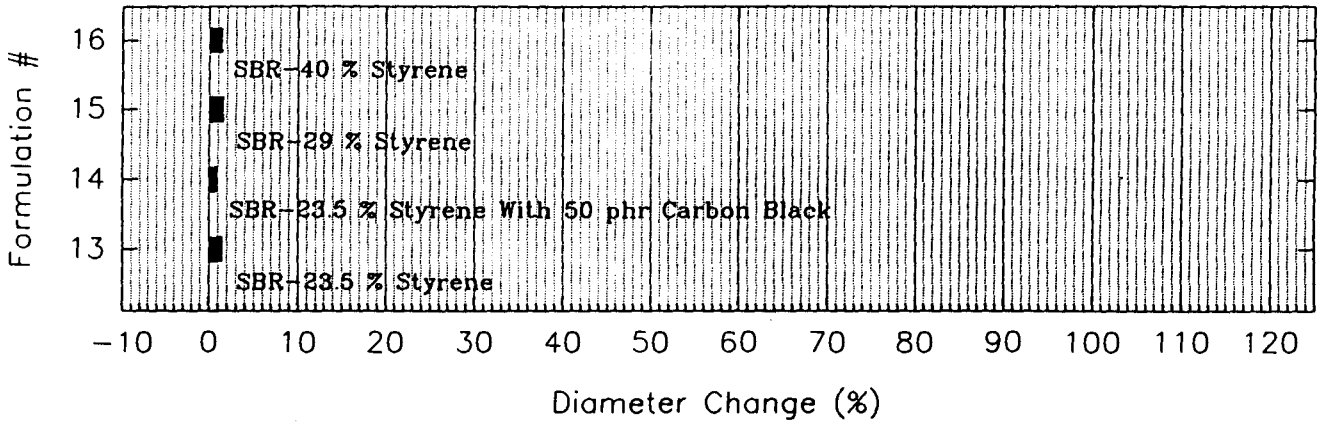


Butyl Rubbers

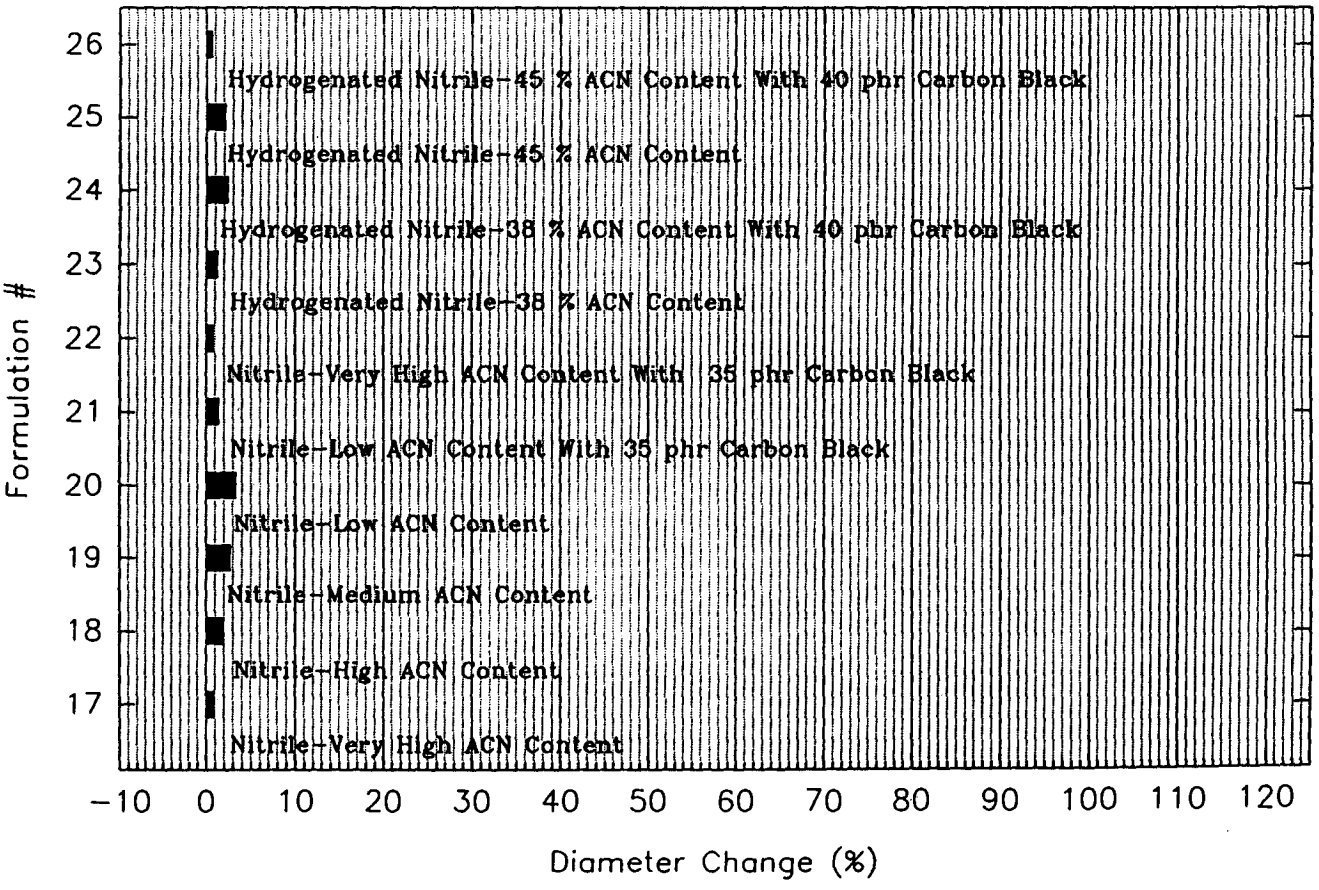


% Insitu Diameter Change In R-143a

Styrene Butadiene Rubbers

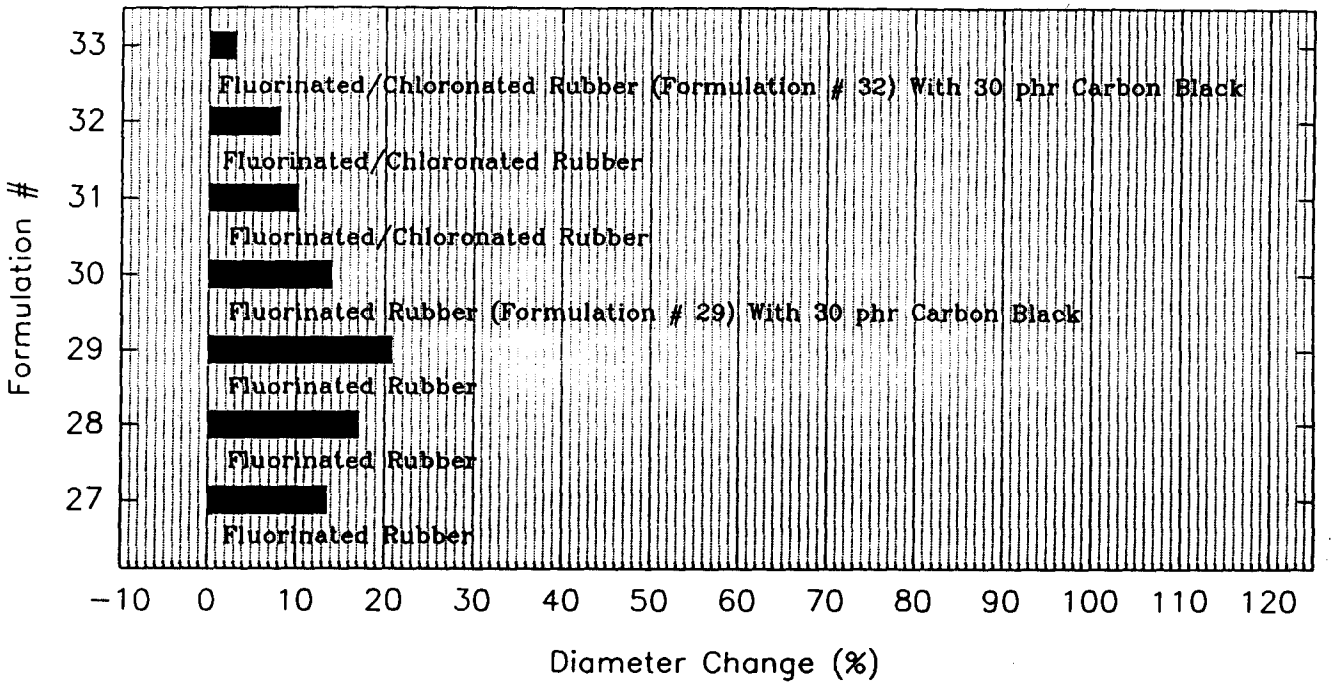


Nitrile Rubbers

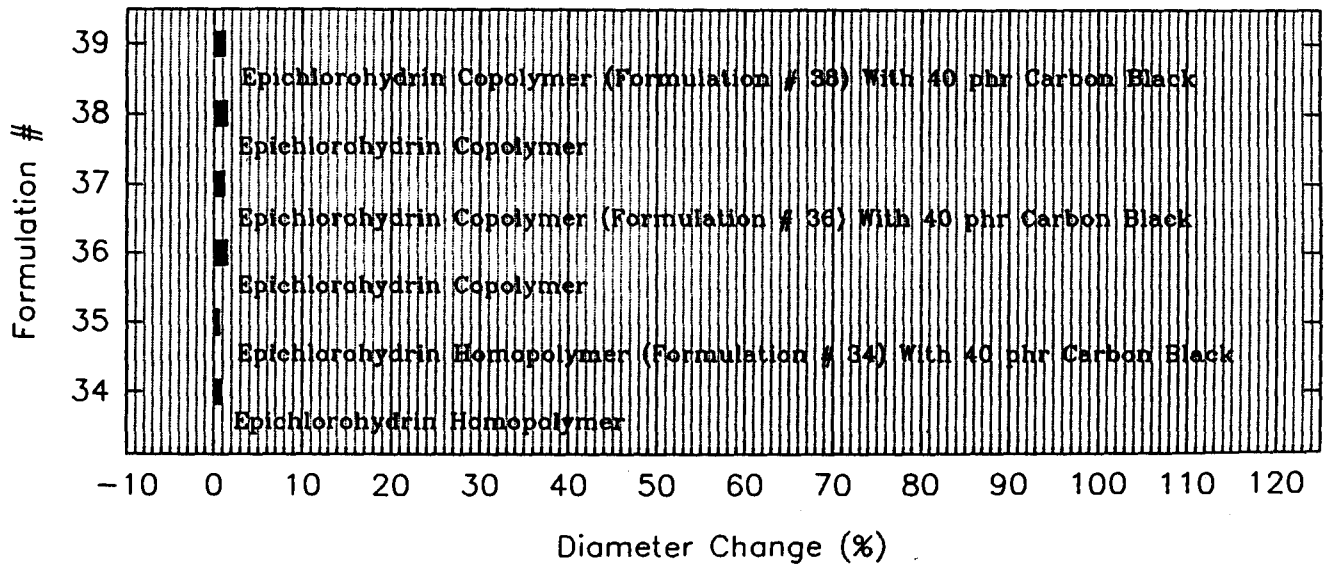


% Insitu Diameter Change In R-143a

Fluorinated Rubbers

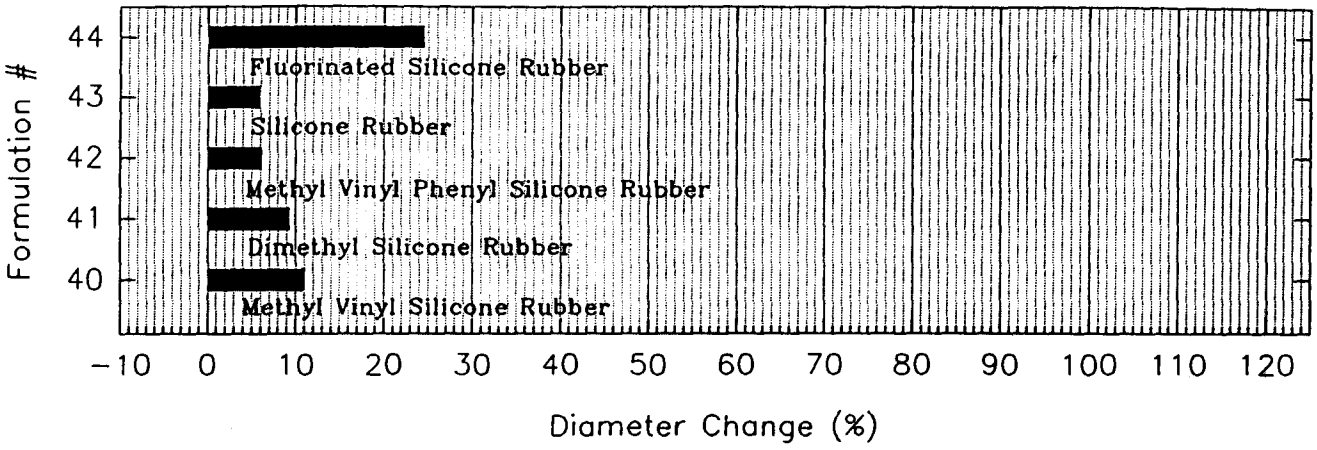


Epichlorohydrin Based Rubbers

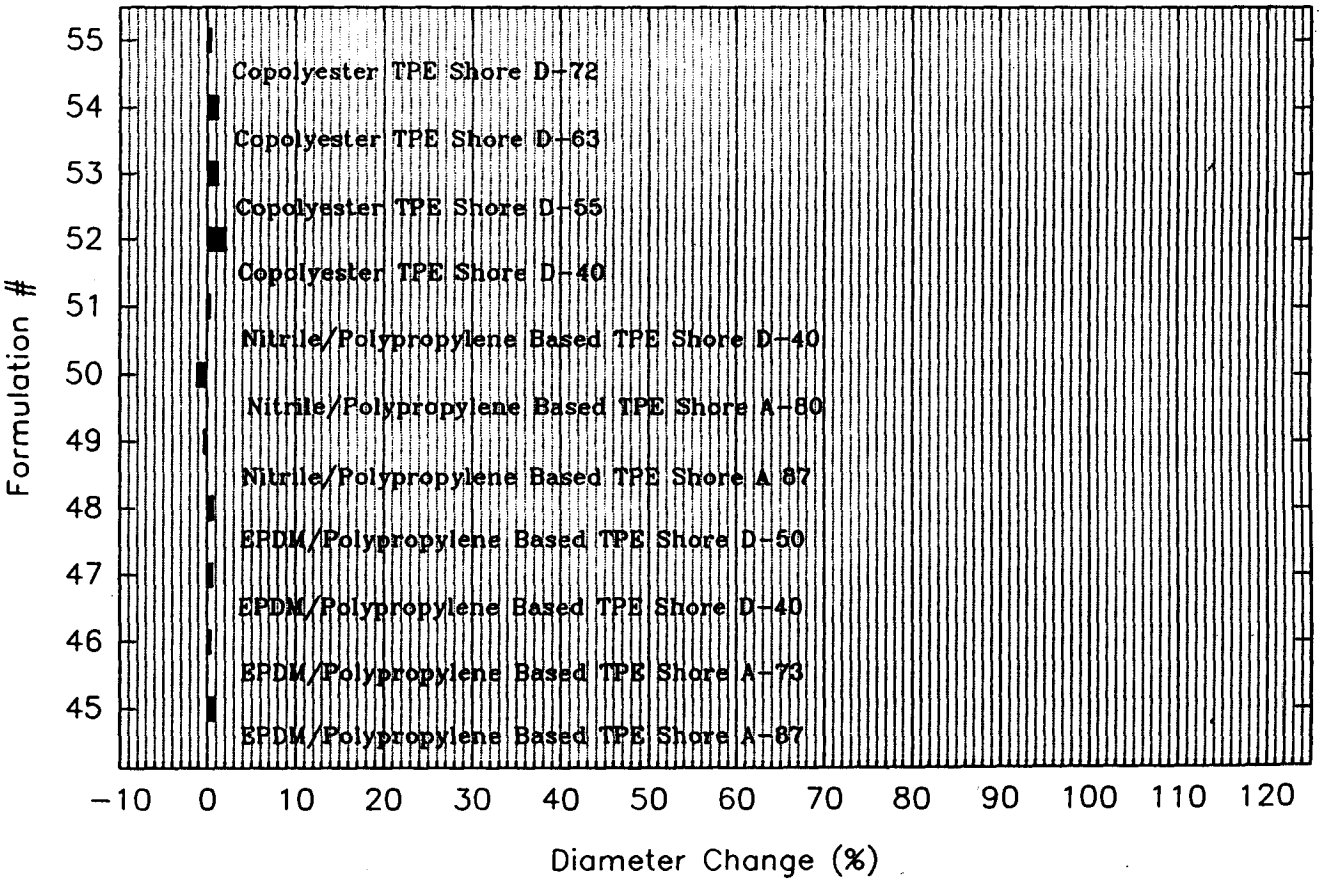


% Insitu Diameter Change In R-143a

Silicones

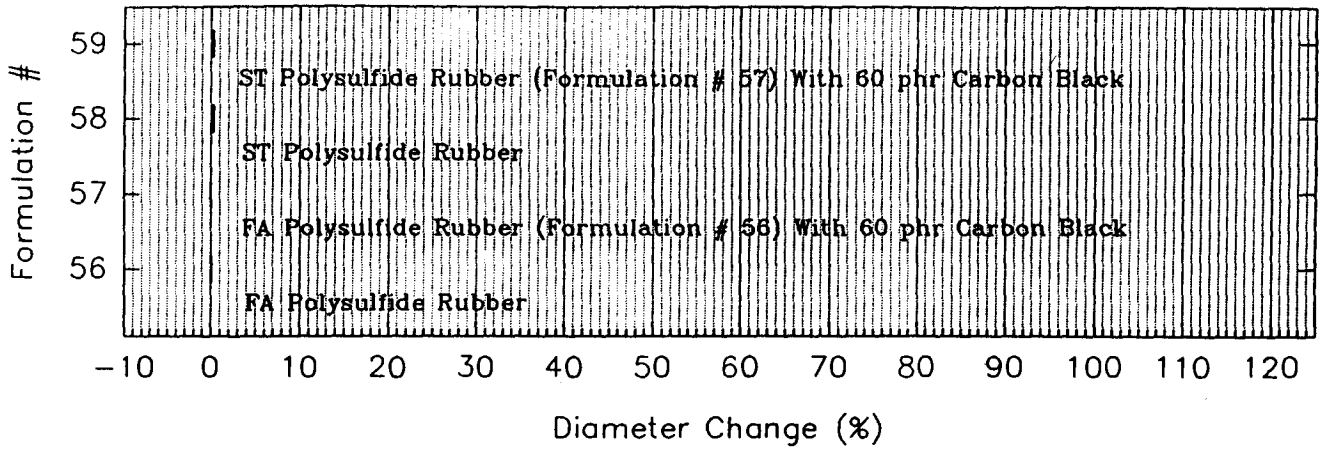


Thermoplastic Elastomers

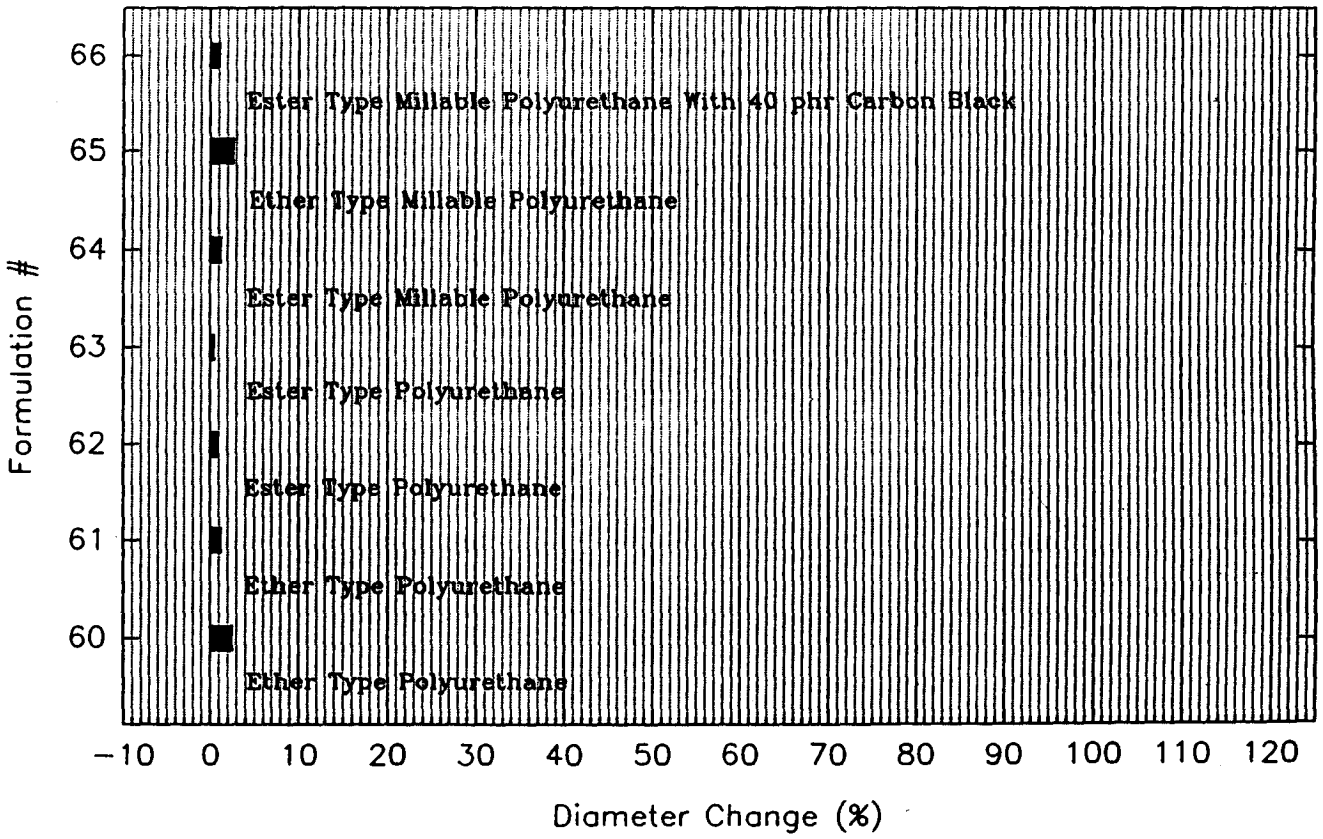


% Insitu Diameter Change In R-143a

Polysulfide Rubbers

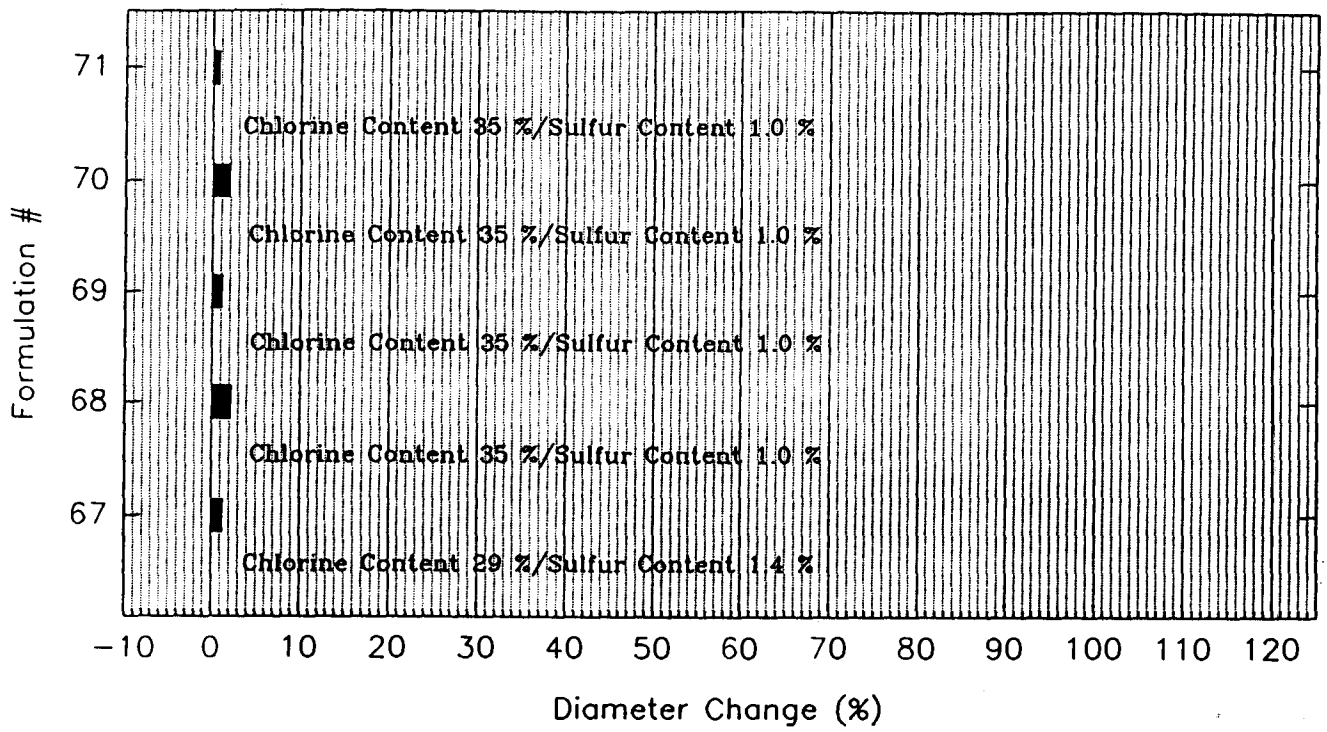


Polyurethanes

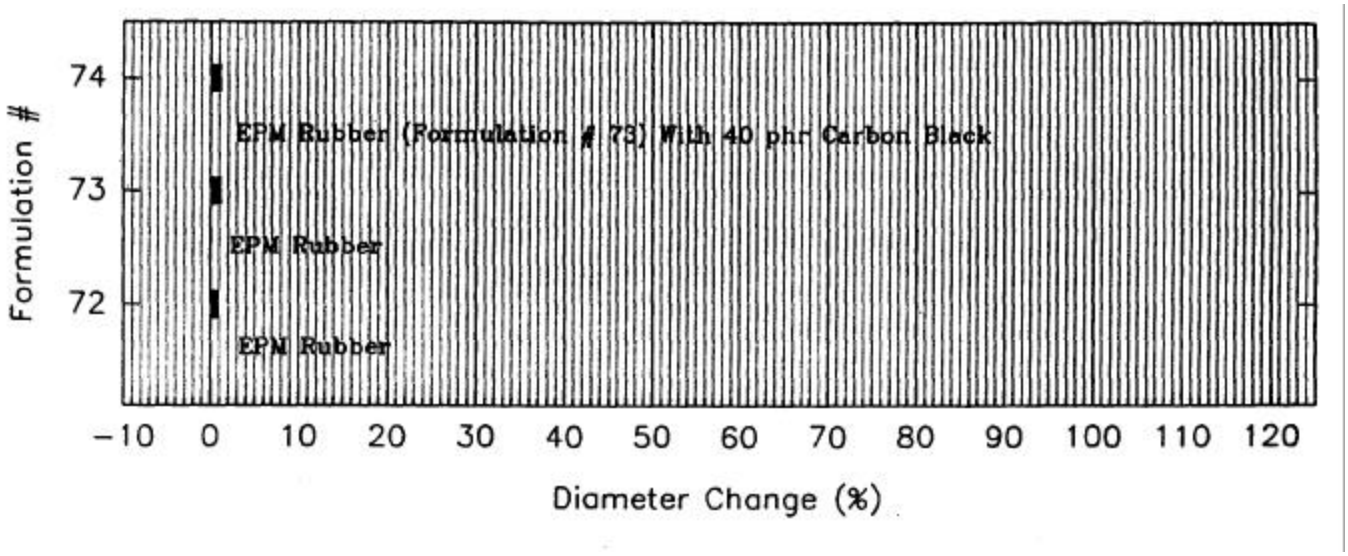


% Insitu Diameter Change In R-143a

Chlorosulfonated Polyethylenes

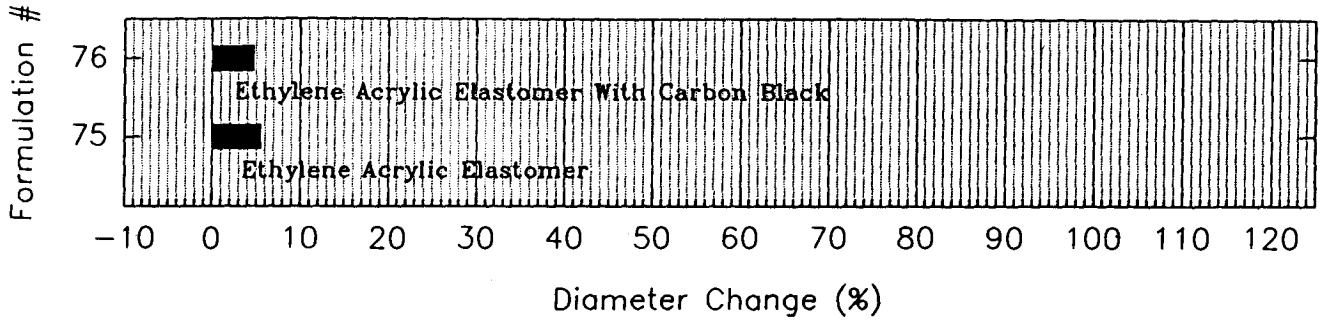


EPM Rubbers

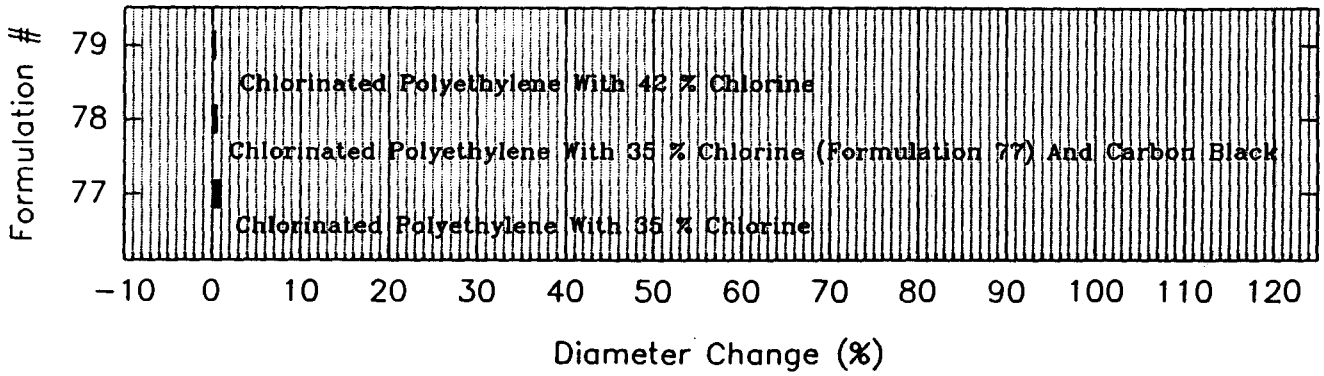


% Insitu Diameter Change In R-143a

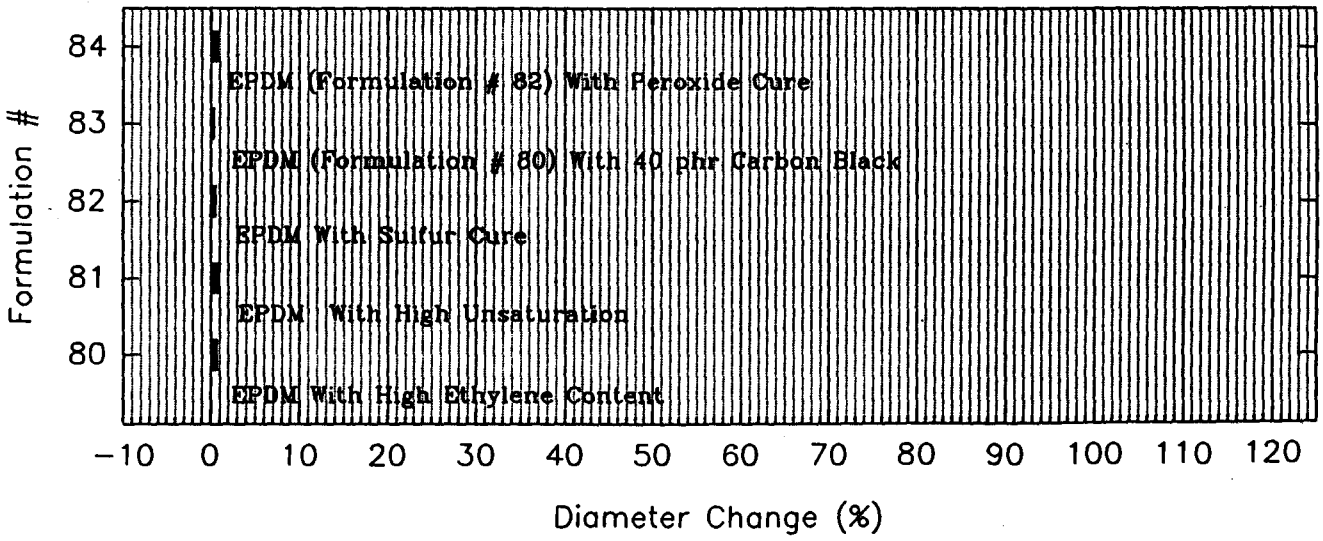
Ethylene Acrlic Elastomers



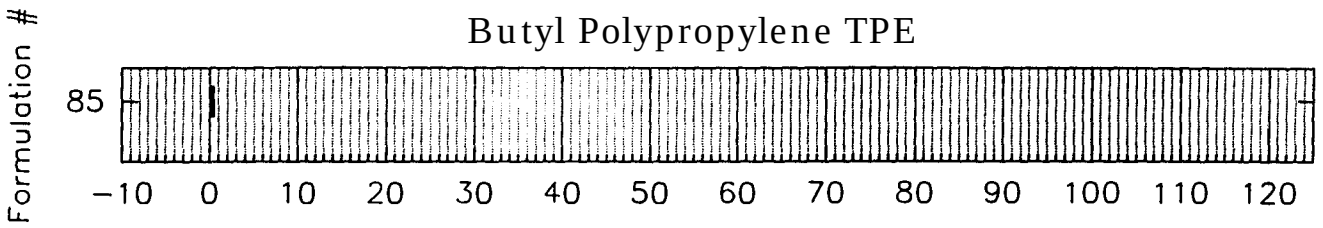
Chlorinated Polyethylenes

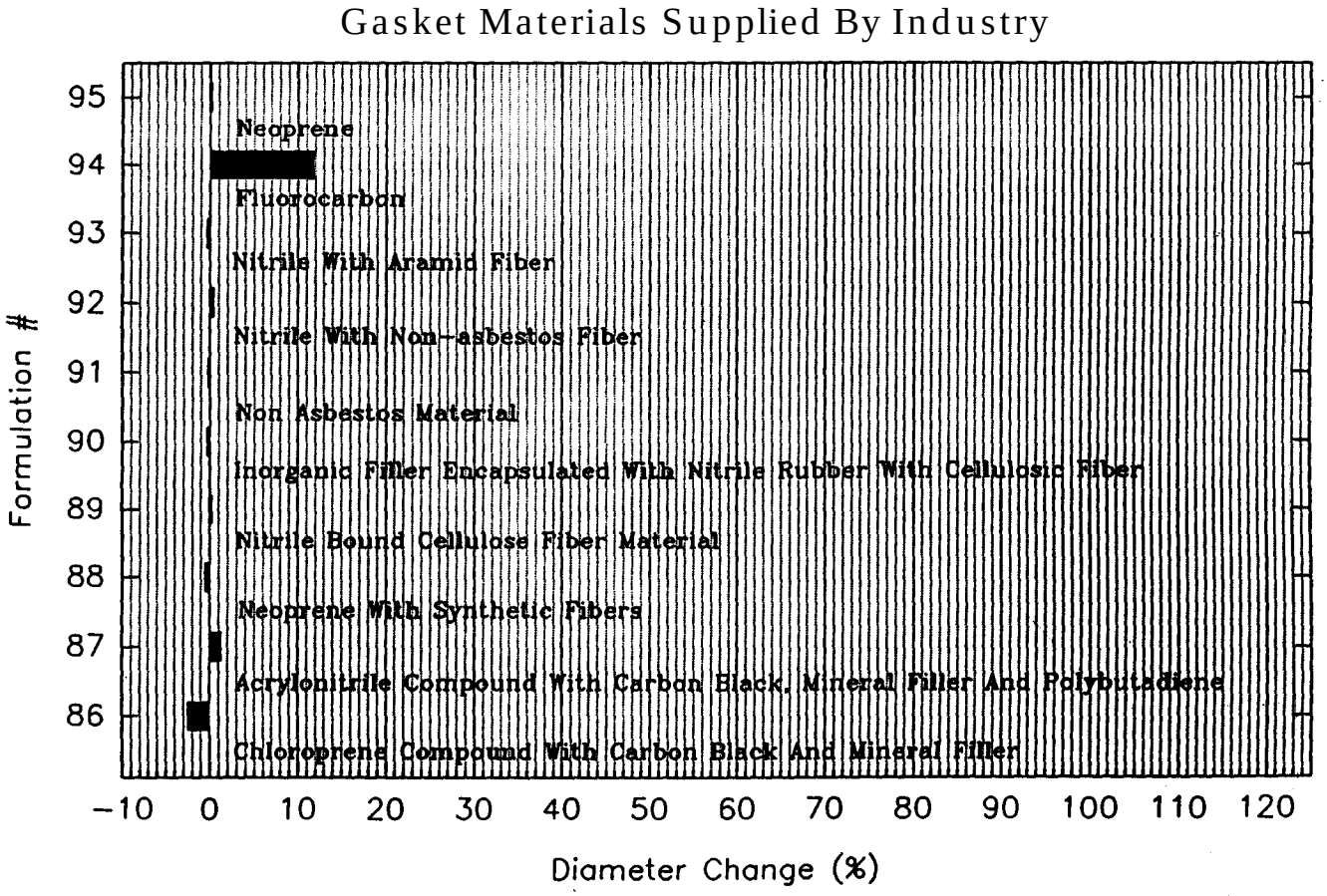


Ethylene Propylene Diene Rubbers



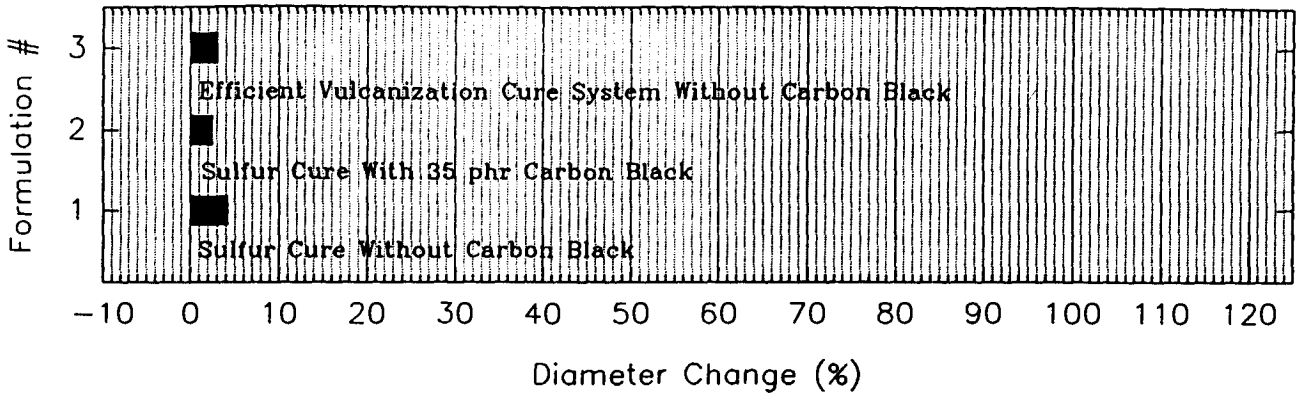
% Insitu Diameter Change In R-143a



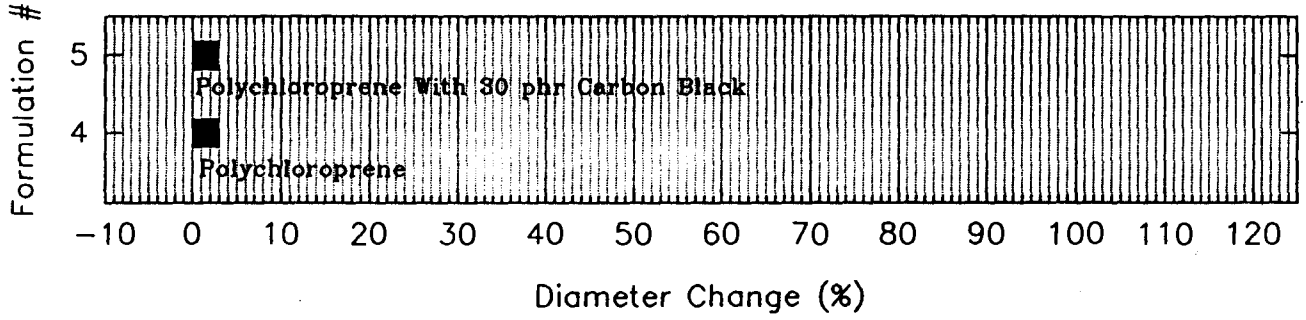


% Insitu Diameter Change In R-152a

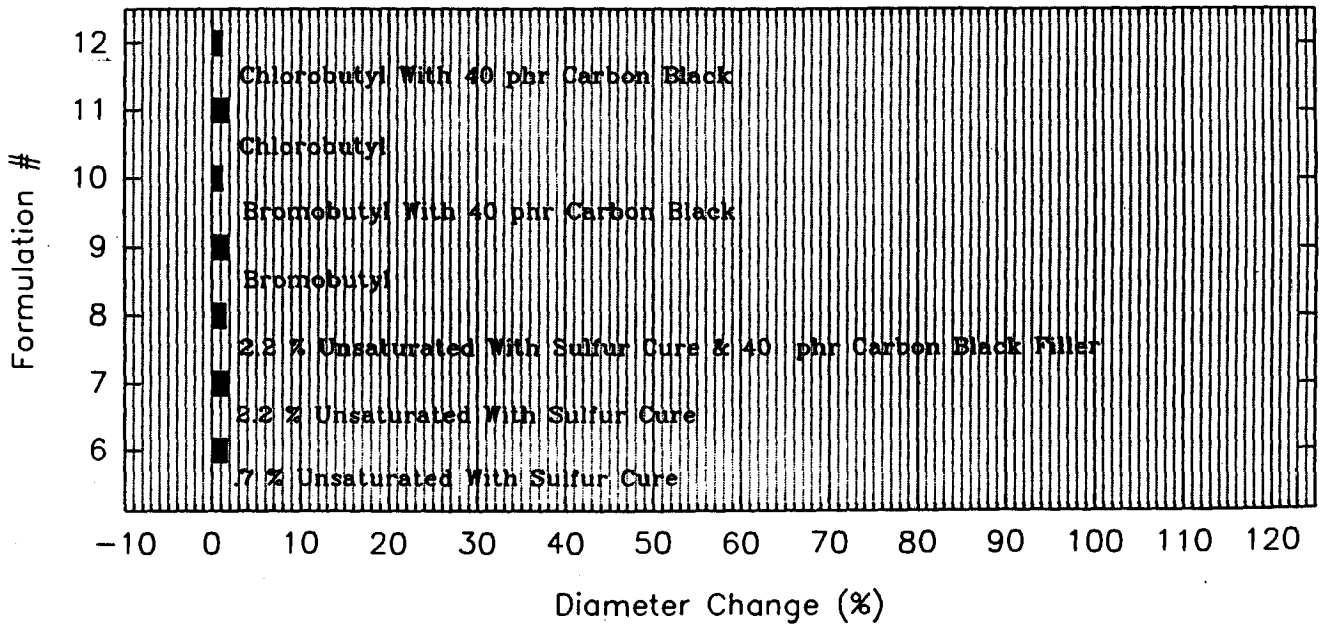
Polyisoprenes



Polychloroprenes

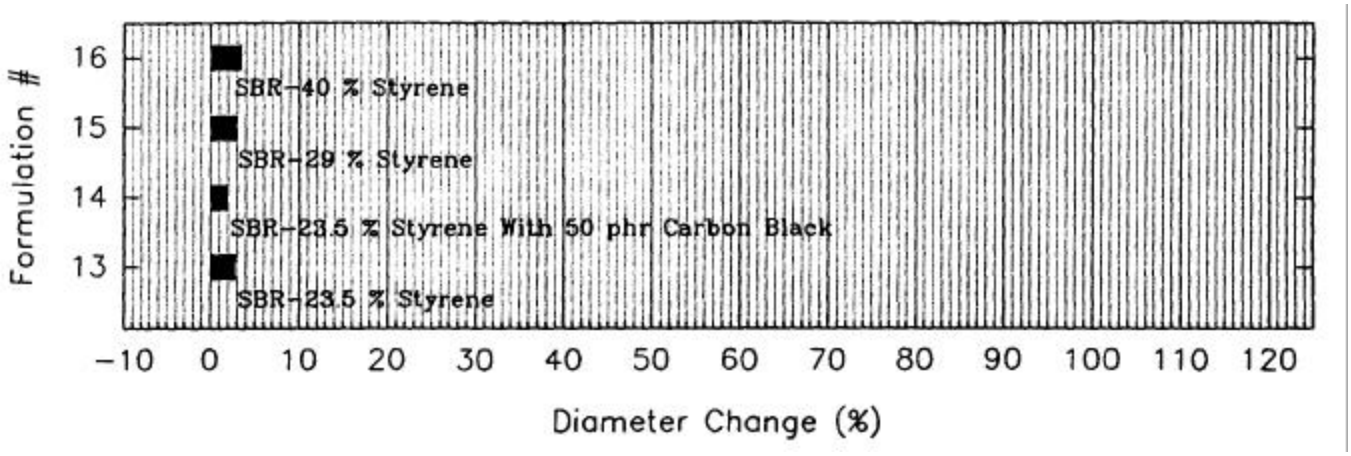


Butyl Rubbers

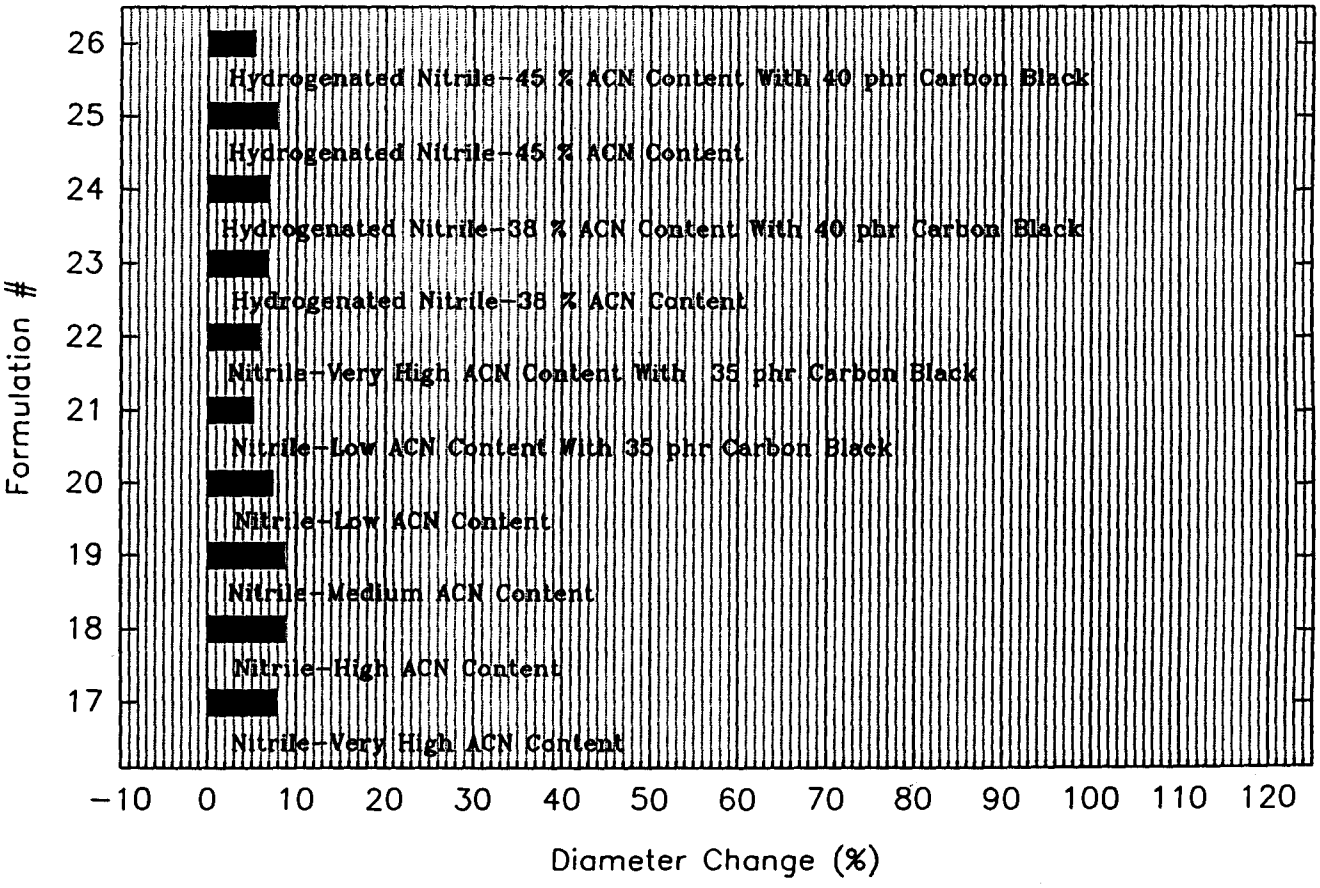


% Insitu Diameter Change In R-152a

Styrene Butadiene Rubbers

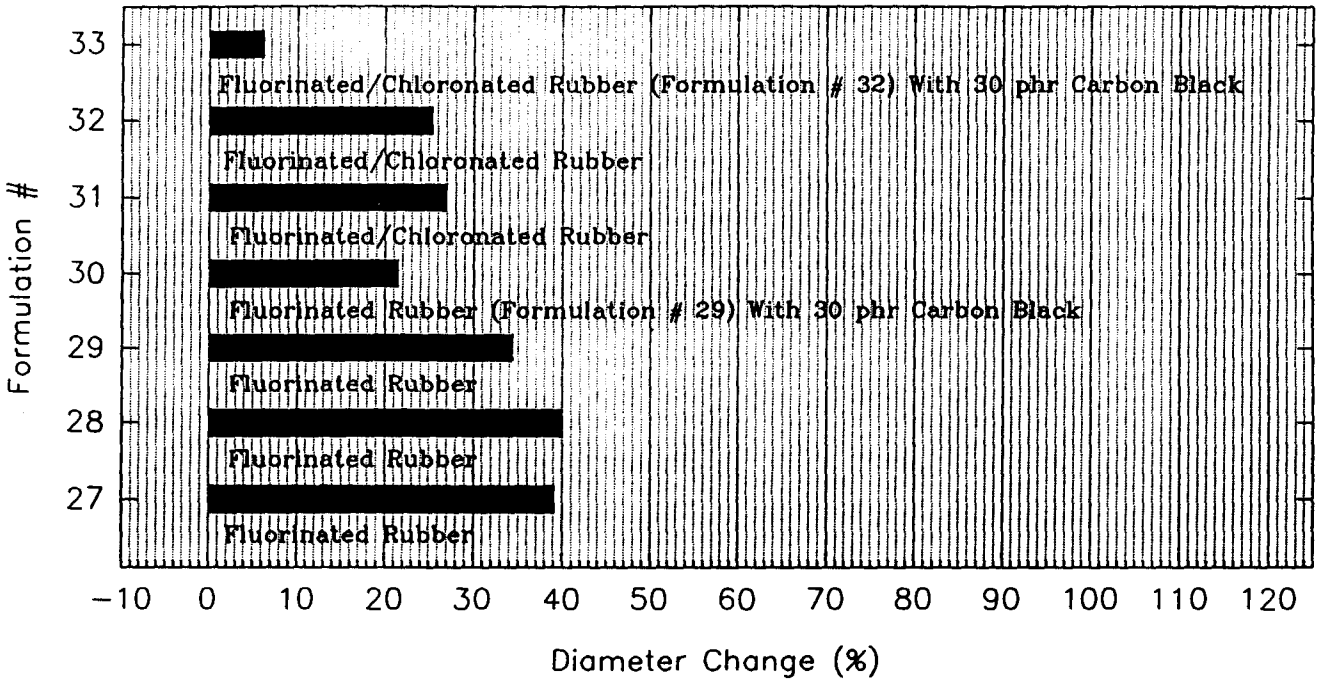


Nitrile Rubbers

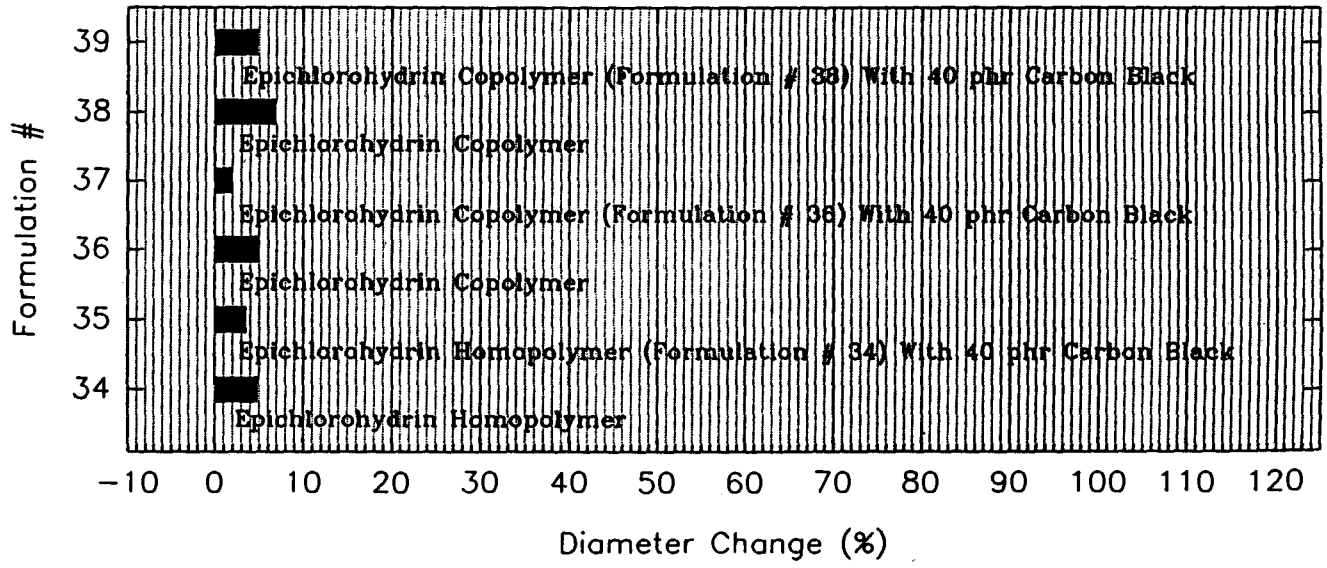


% Insitu Diameter Change In R-152a

Fluorinated Rubbers

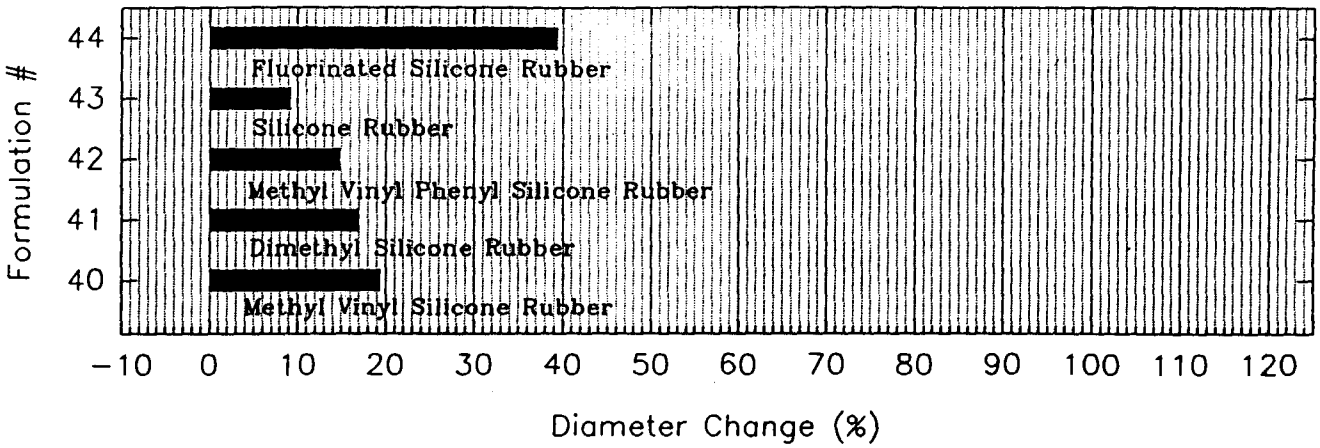


Epichlorohydrin Based Rubbers

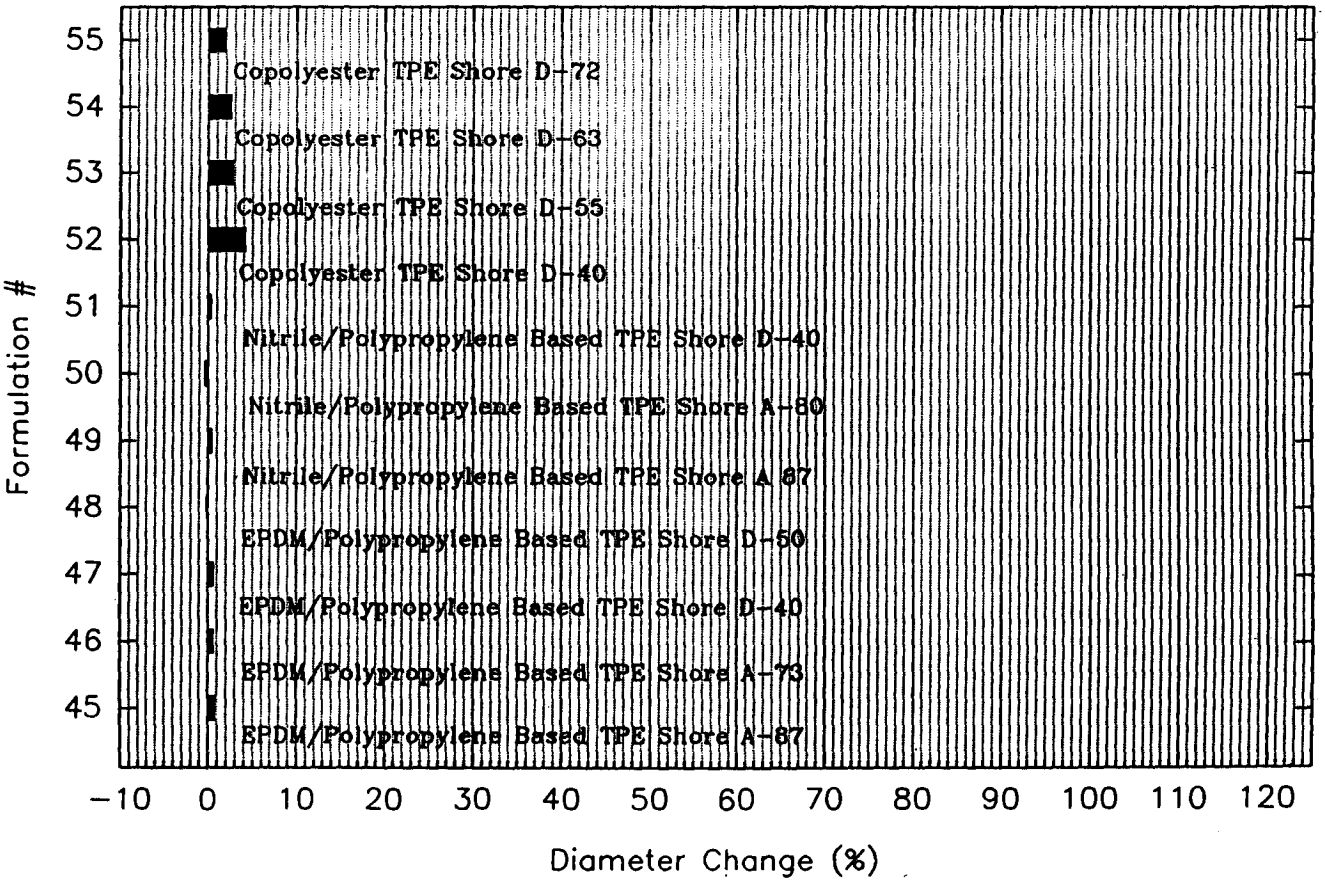


% Insitu Diameter Change In R-152a

Silicones

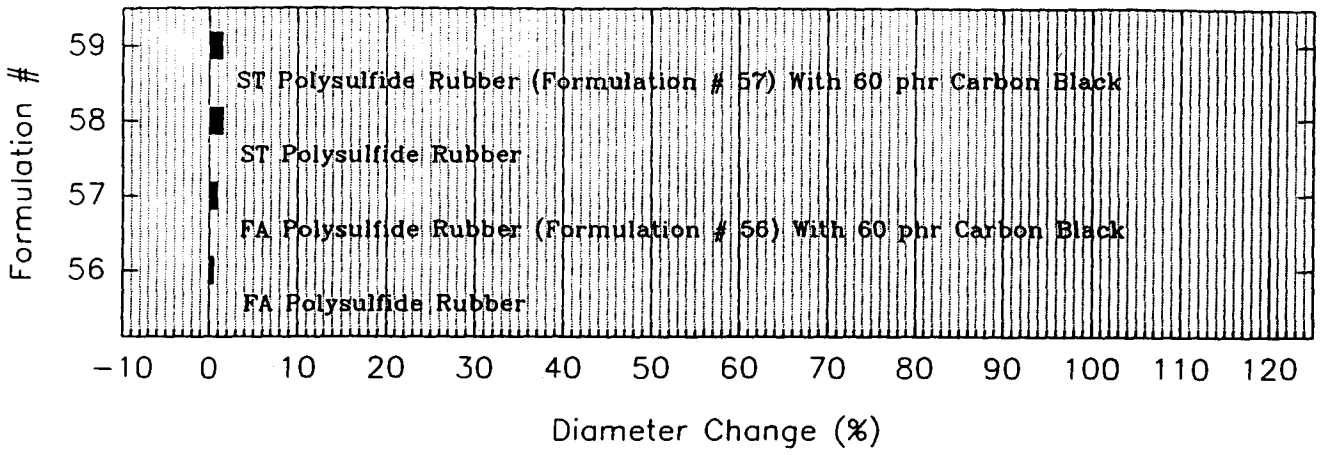


Thermoplastic Elastomers

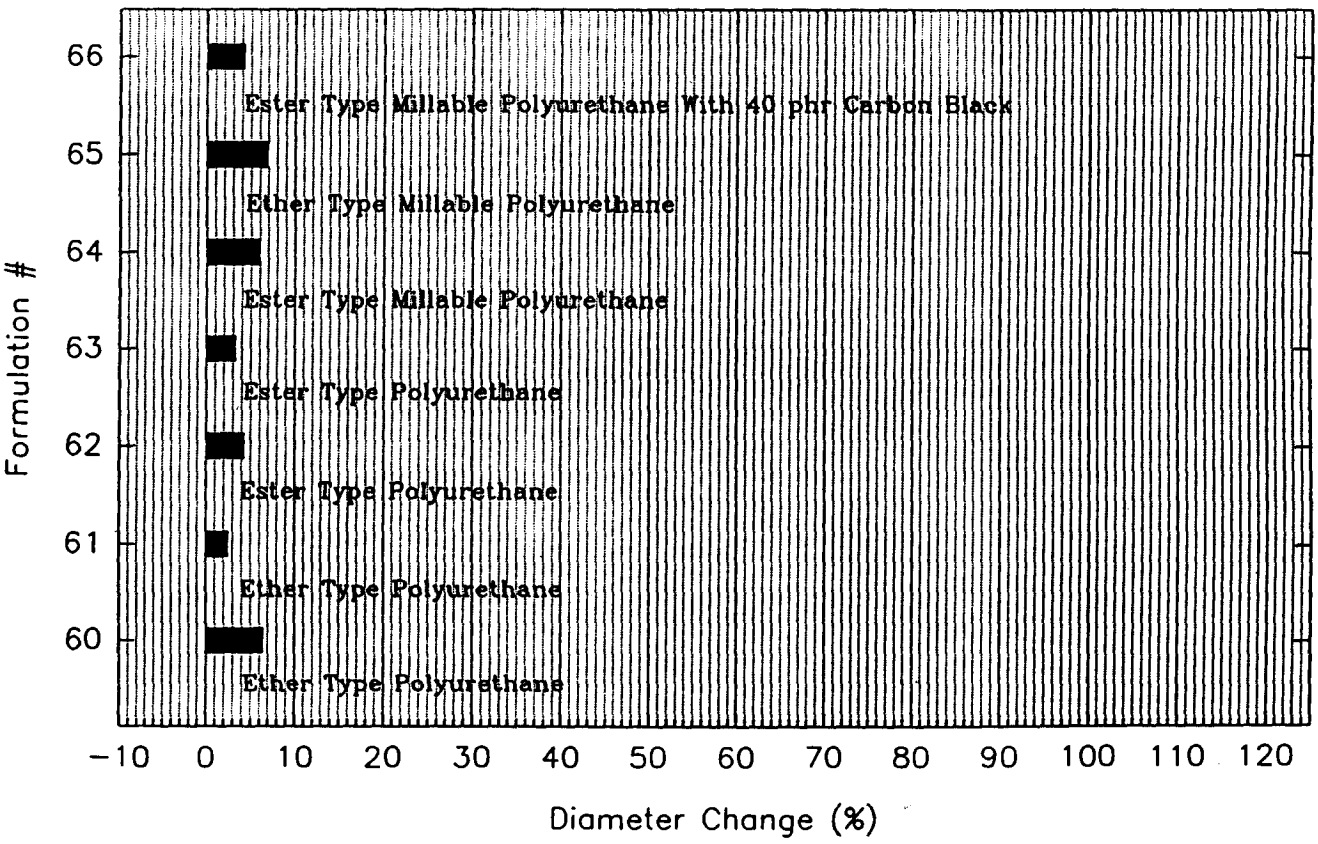


% Insitu Diameter Change In R-152a

Polysulfide Rubbers

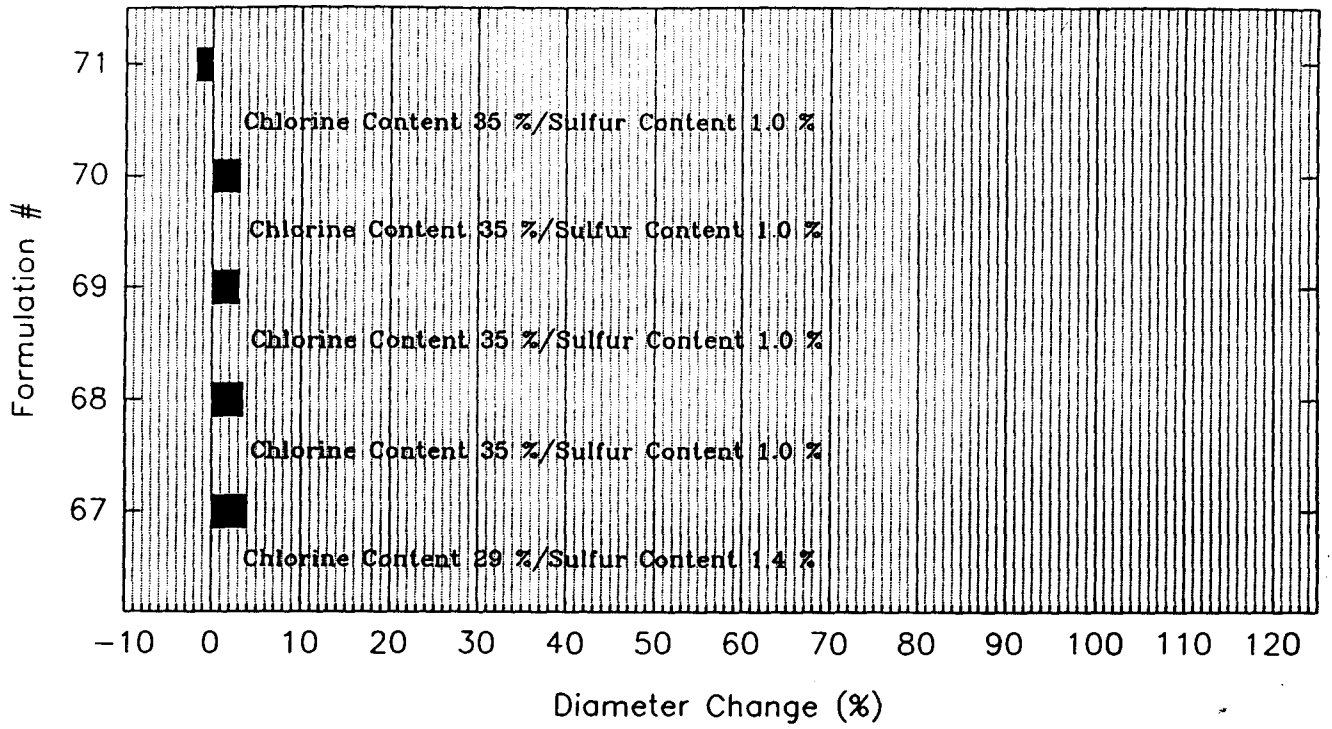


Polyurethanes

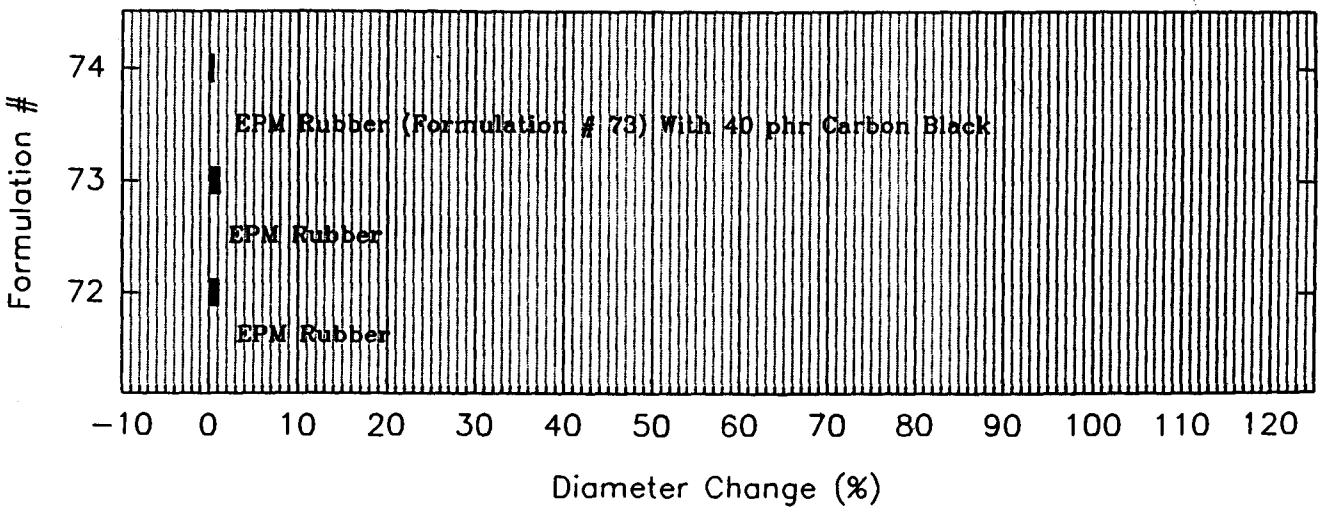


% Insitu Diameter Change In R-152a

Chlorosulfonated Polyethylenes

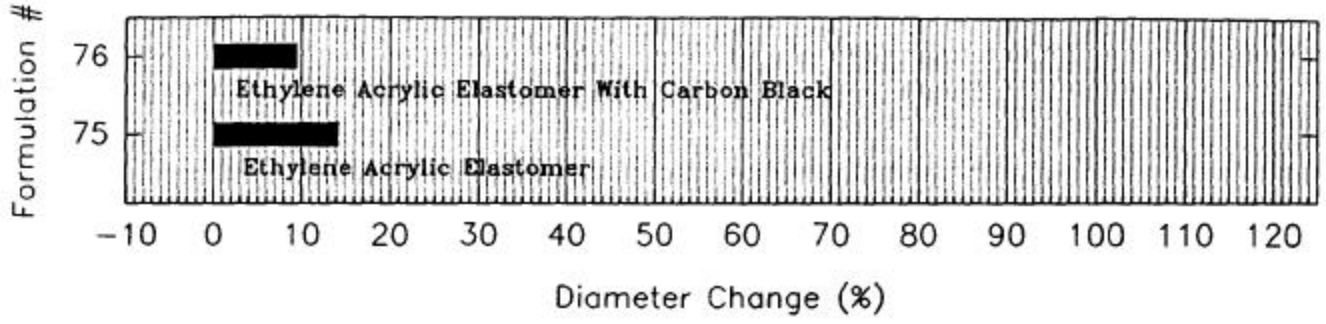


EPM Rubbers

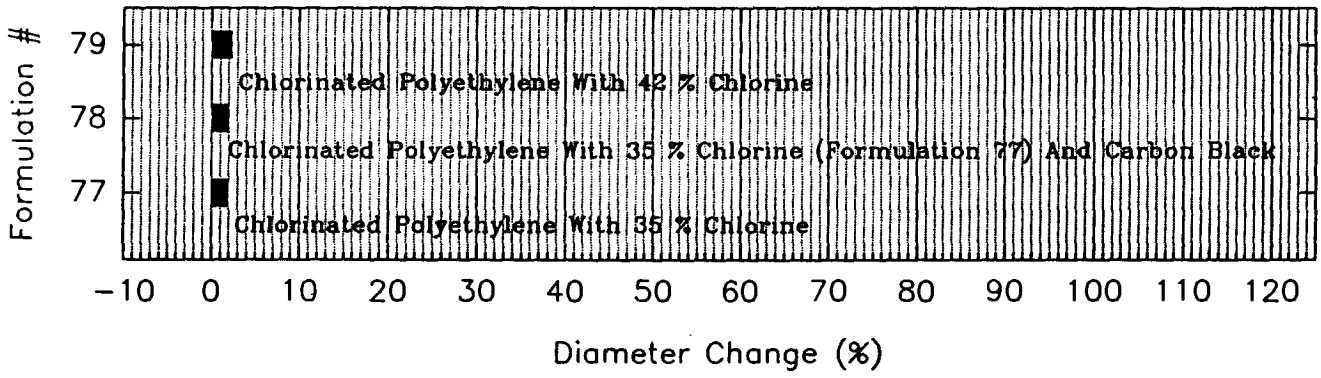


% Insitu Diameter Change In R-152a

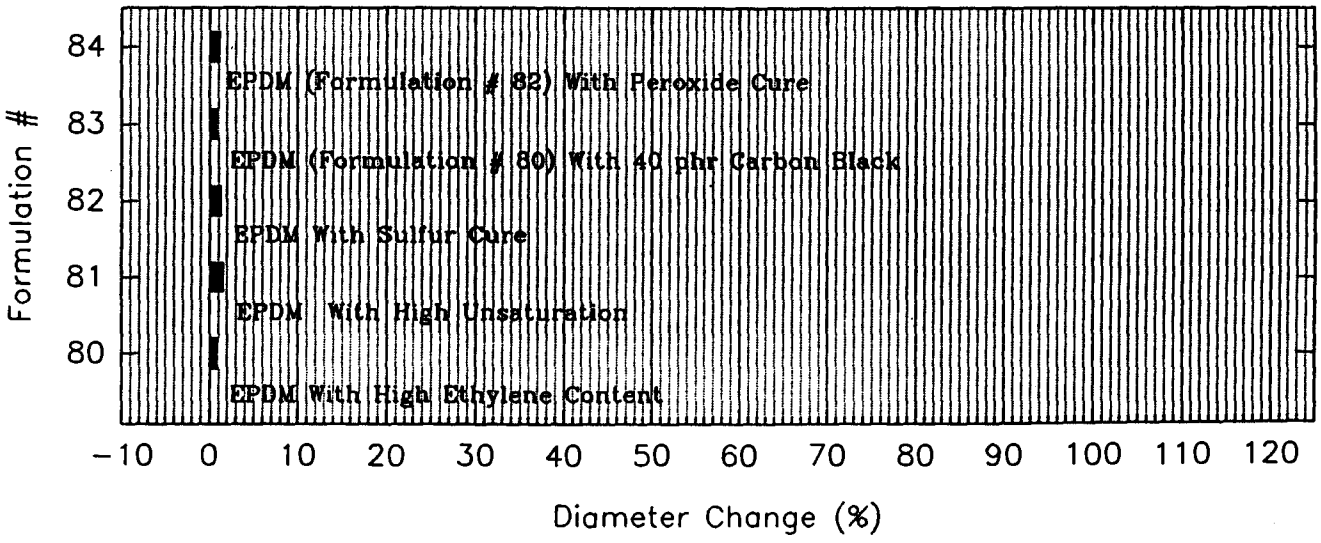
Ethylene Acrlic Elastomers



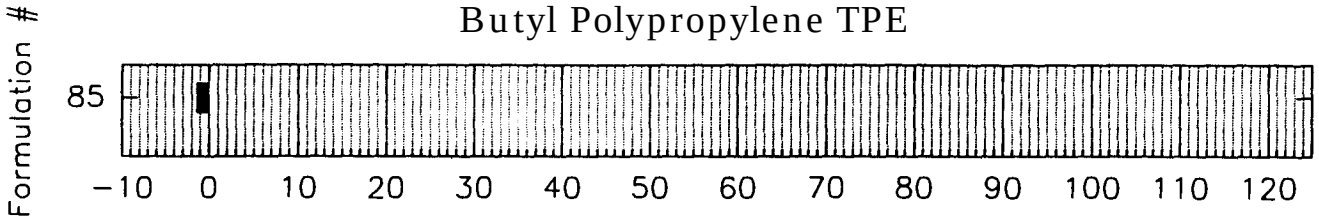
Chlorinated Polyethylenes

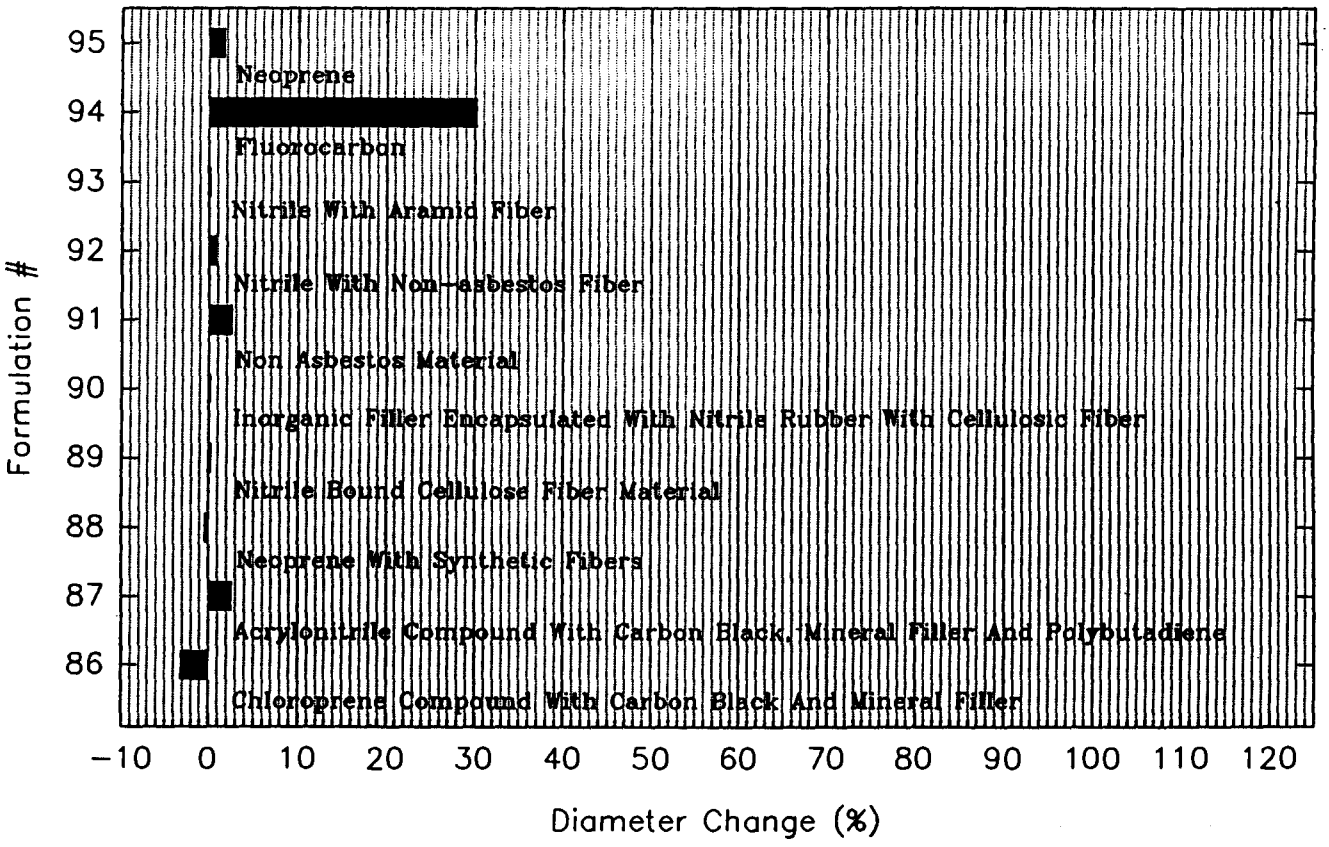


Ethylene Propylene Diene Rubbers



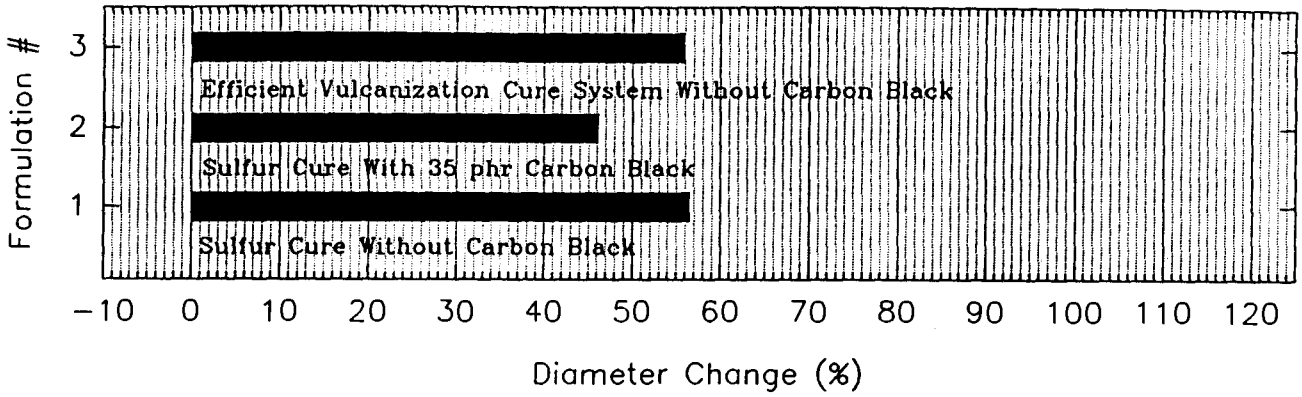
% Insitu Diameter Change In R-152a



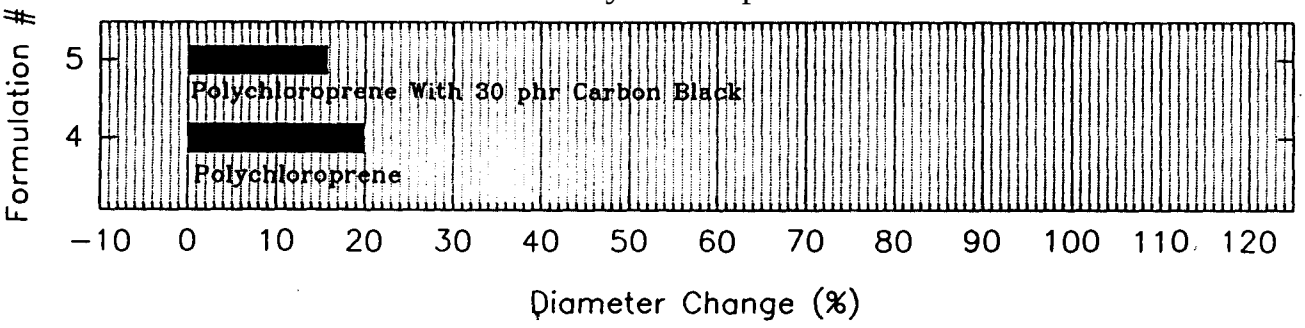


% Diameter Change In Alkyl Benzene

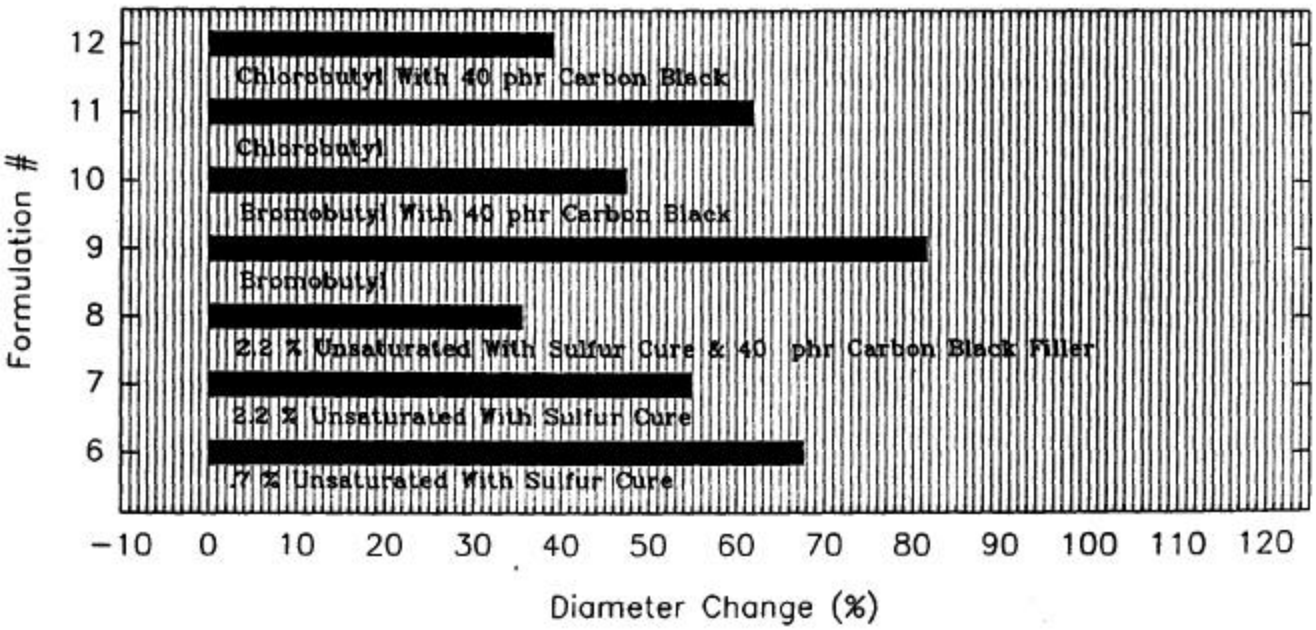
Polyisoprenes



Polychloroprenes

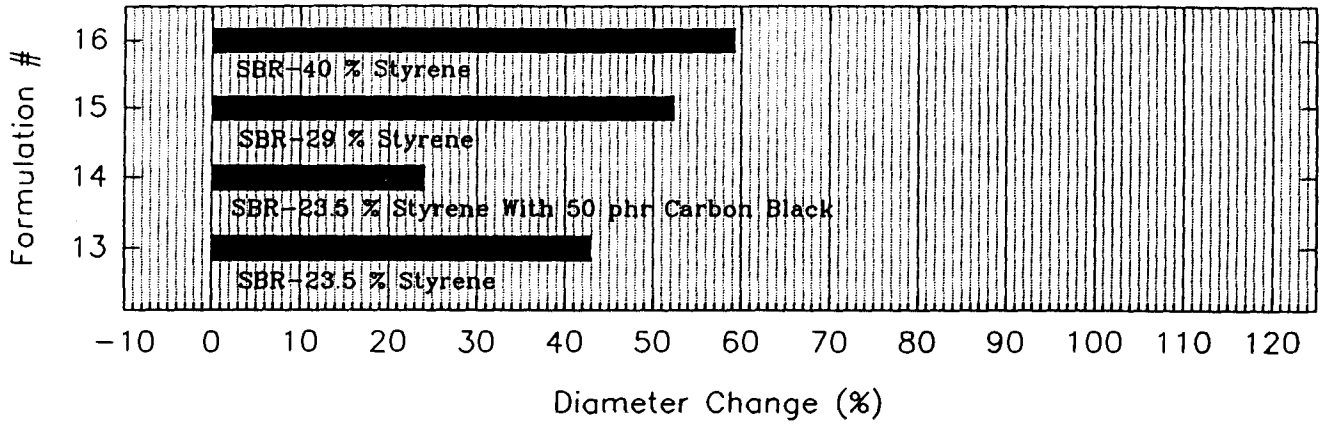


Butyl Rubbers

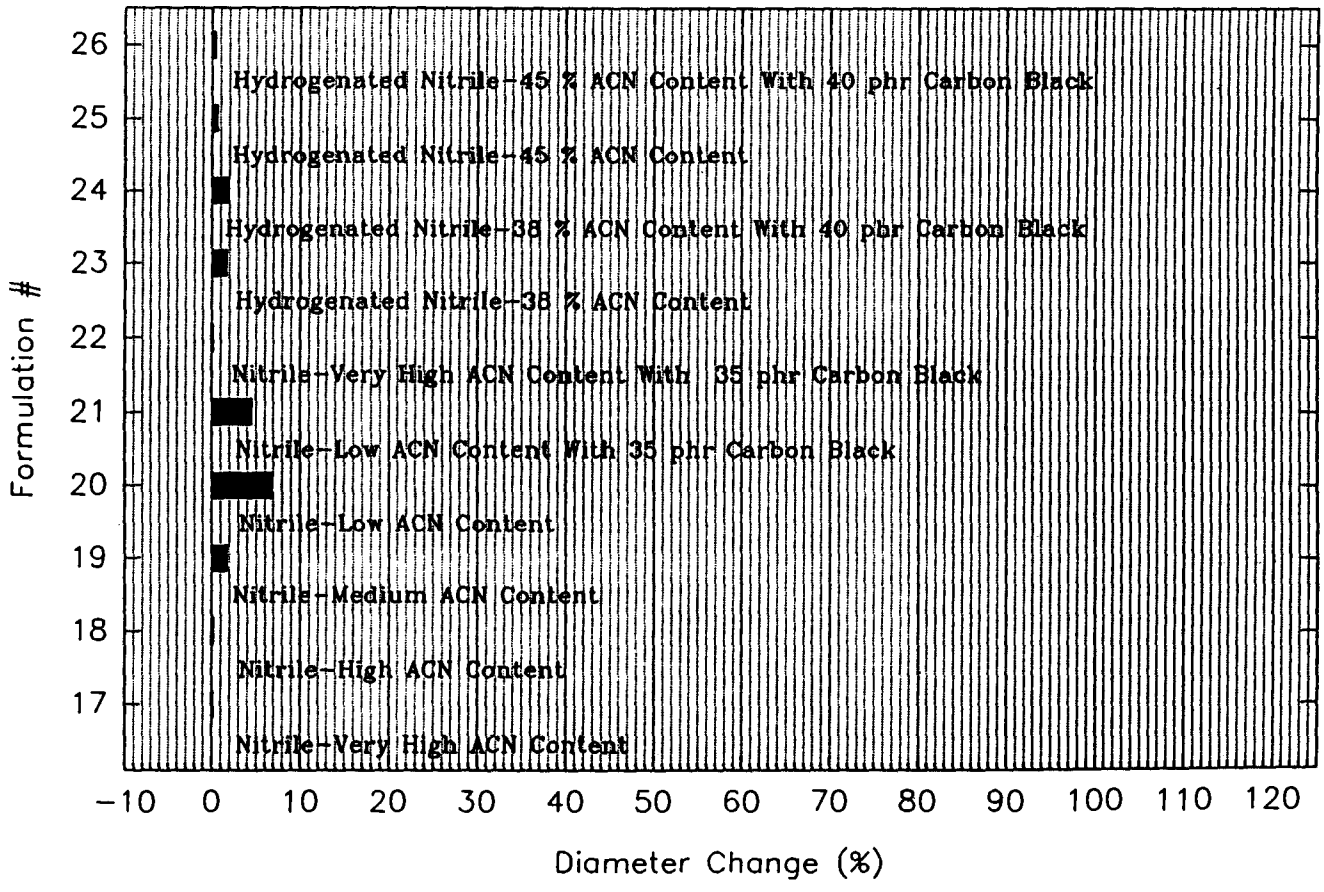


% Diameter Change In Alkyl Benzene

Styrene Butadiene Rubbers

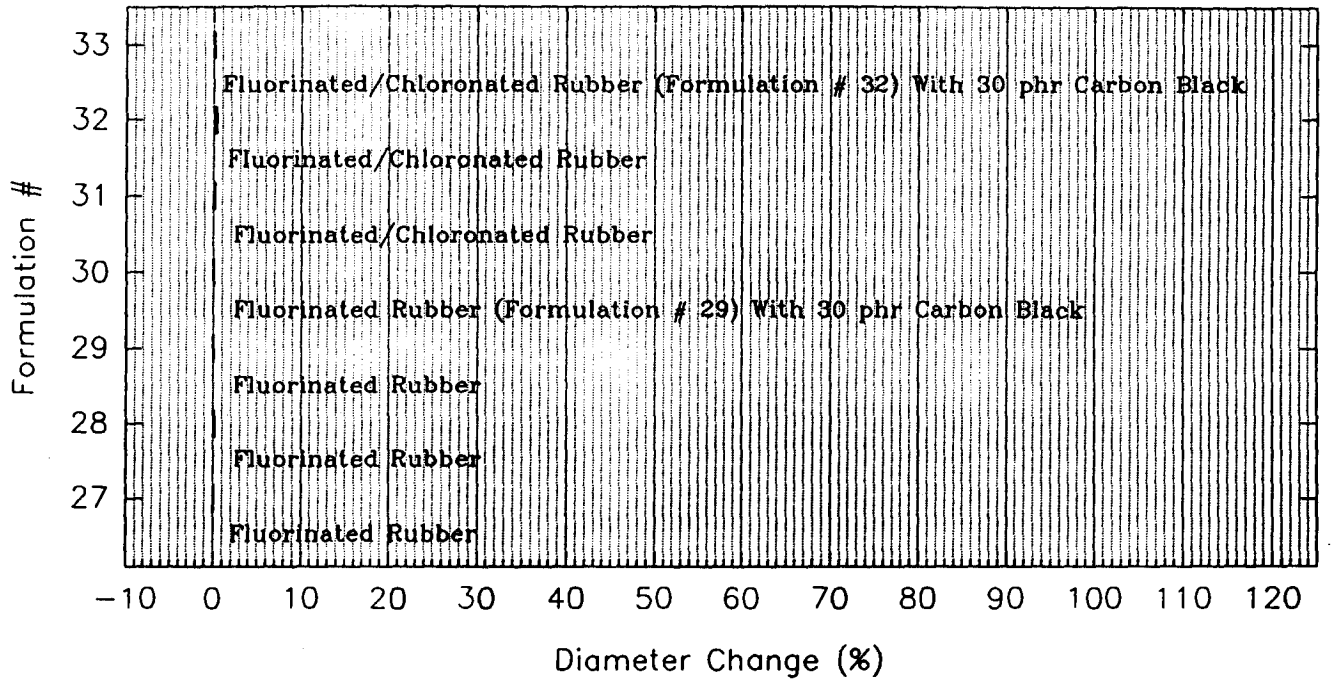


Nitrile Rubbers

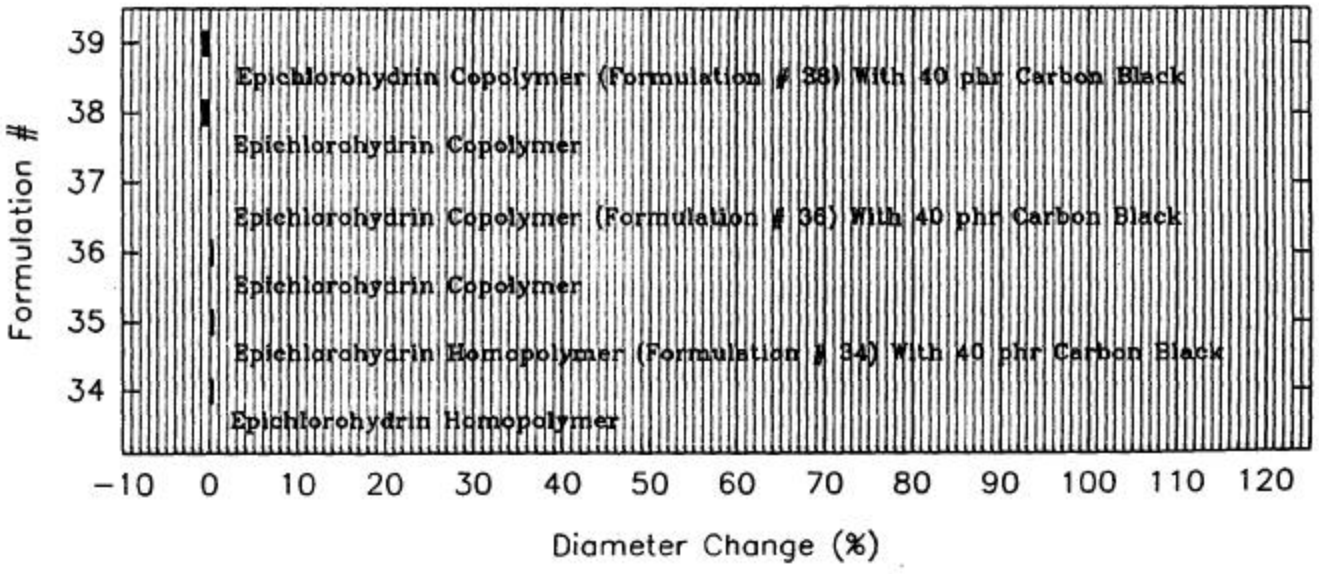


% Diameter Change In Alkyl Benzene

Fluorinated Rubbers

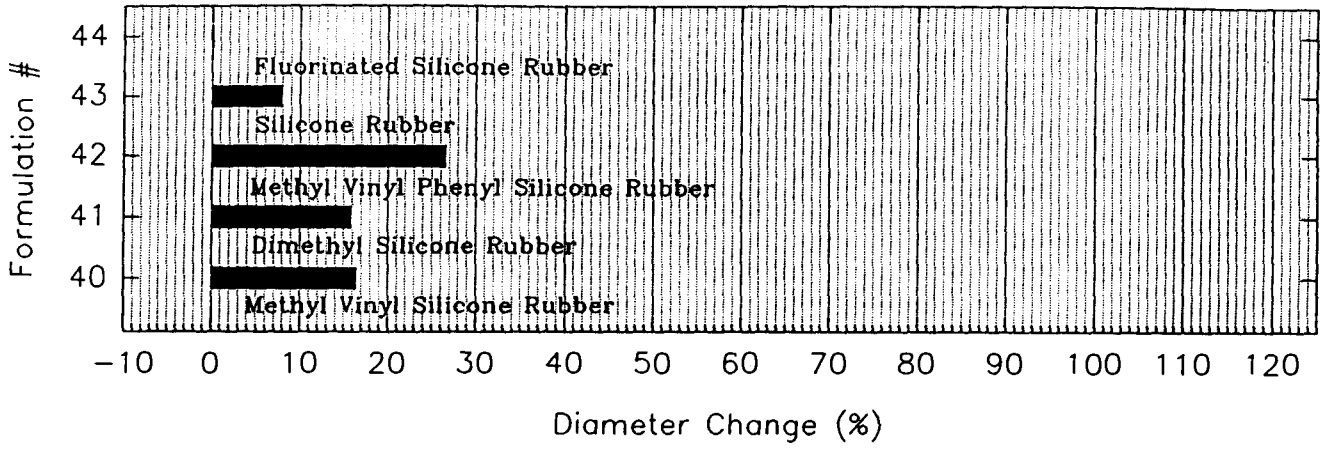


Epichlorohydrin Based Rubbers

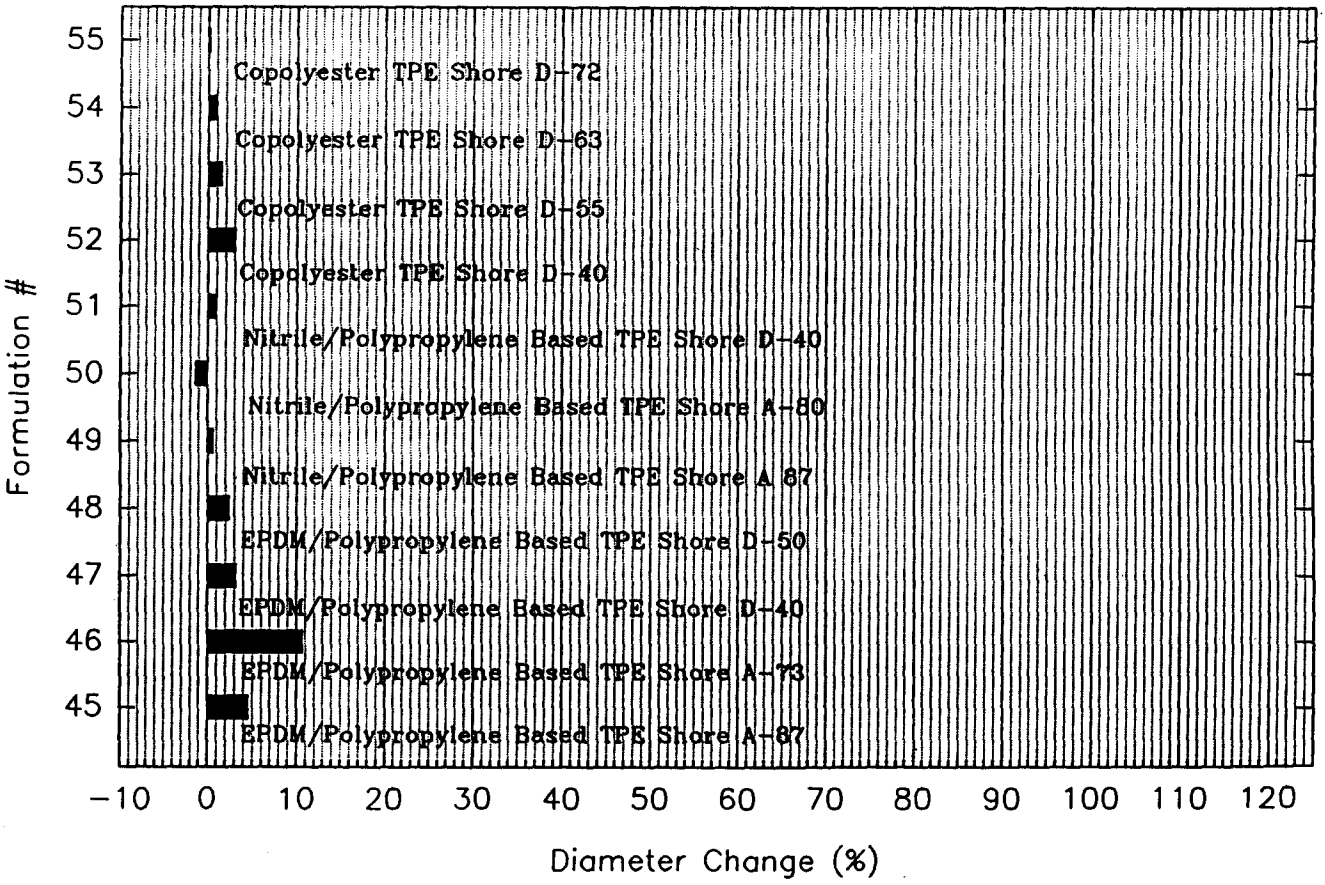


% Diameter Change In Alkyl Benzene

Silicones

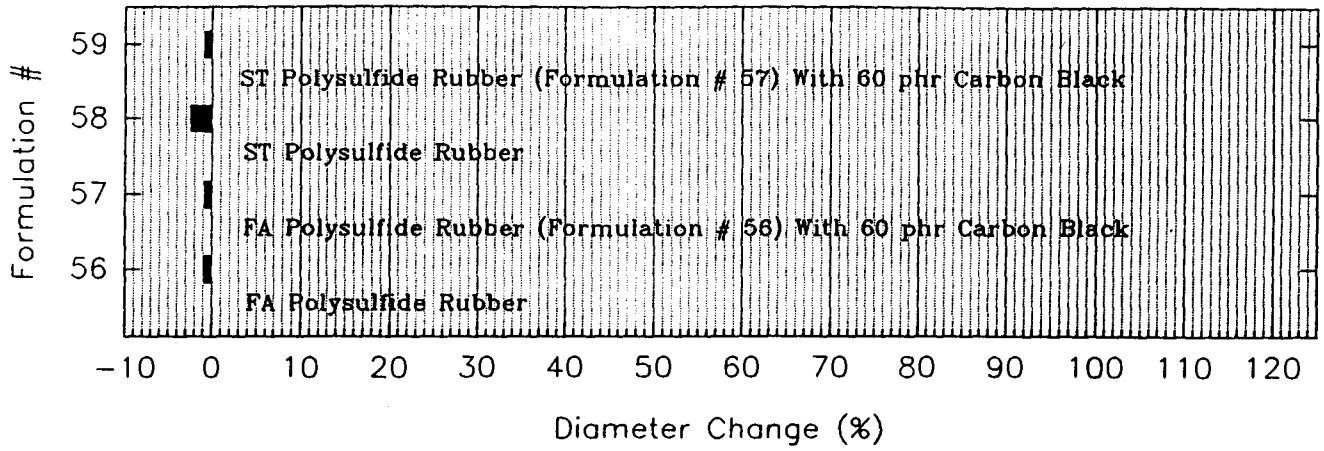


Thermoplastic Elastomers

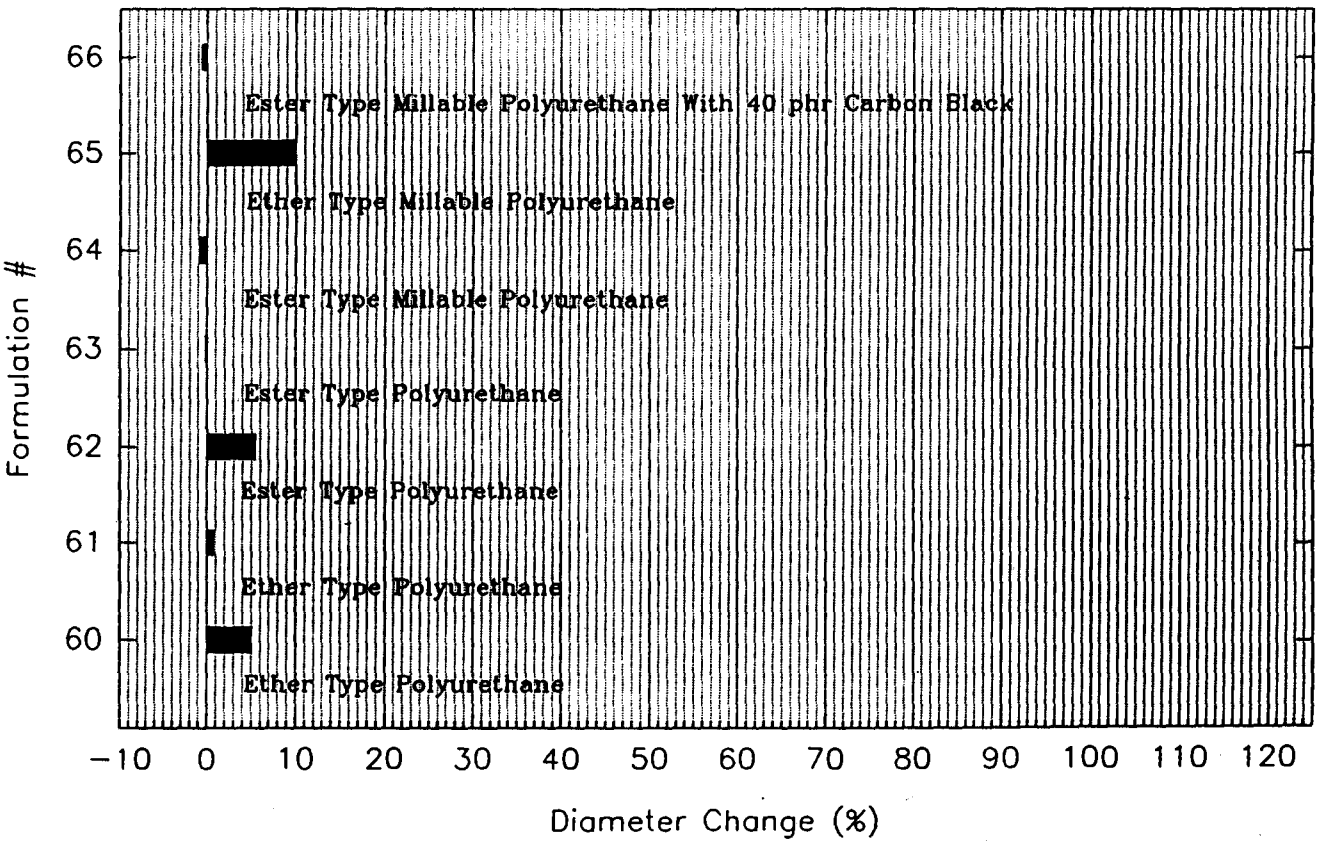


% Diameter Change In Alkyl Benzene

Polysulfide Rubbers

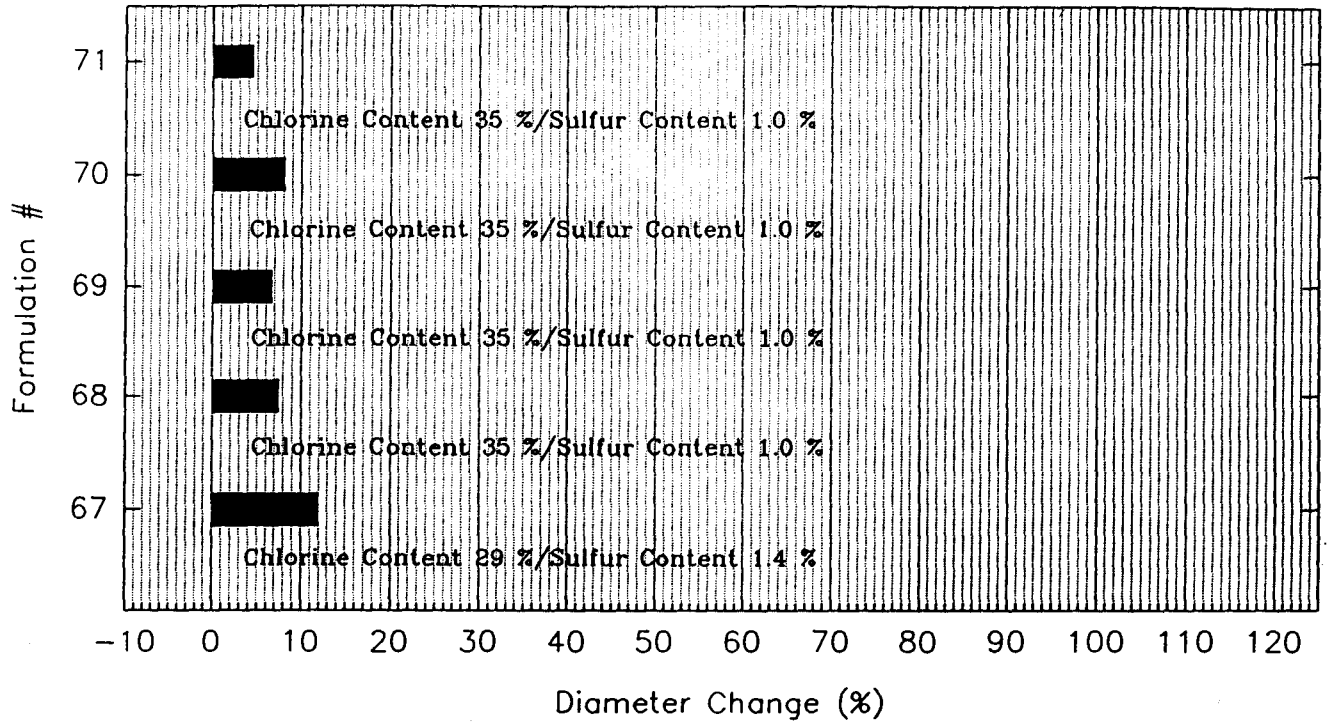


Polyurethanes

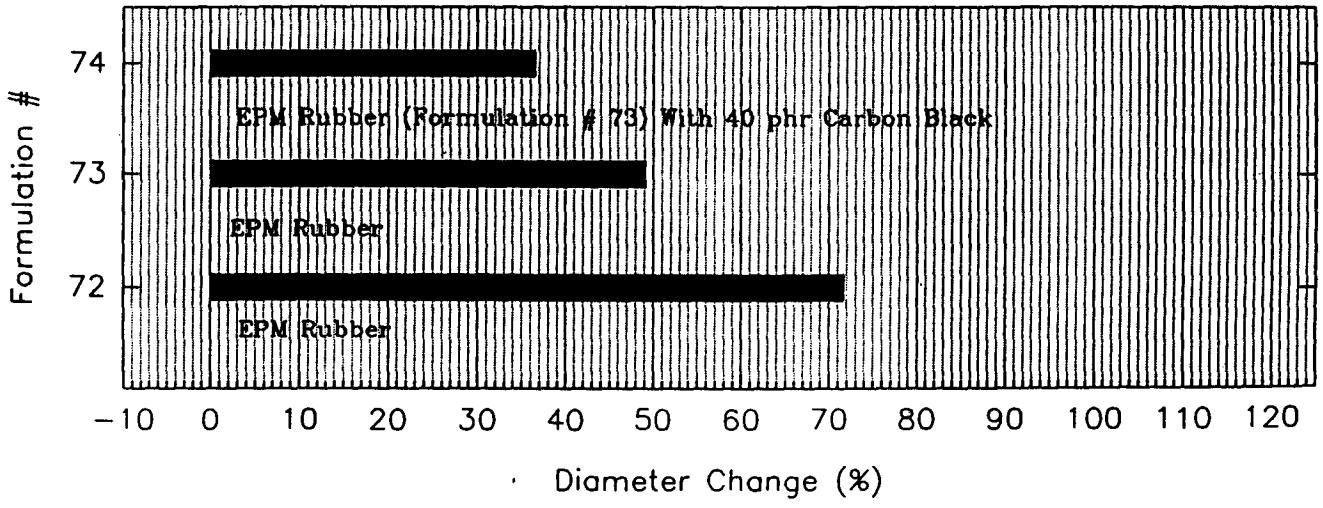


% Diameter Change In Alkyl Benzene

Chlorosulfonated Polyethylenes

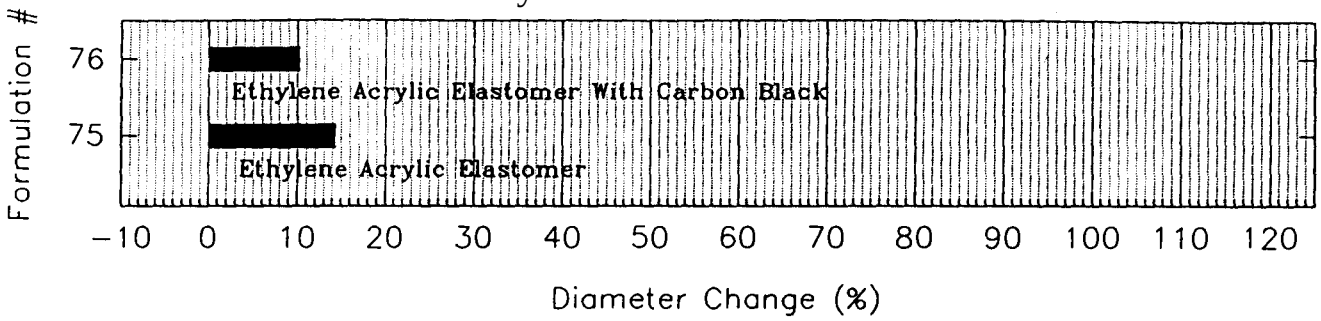


EPM Rubbers

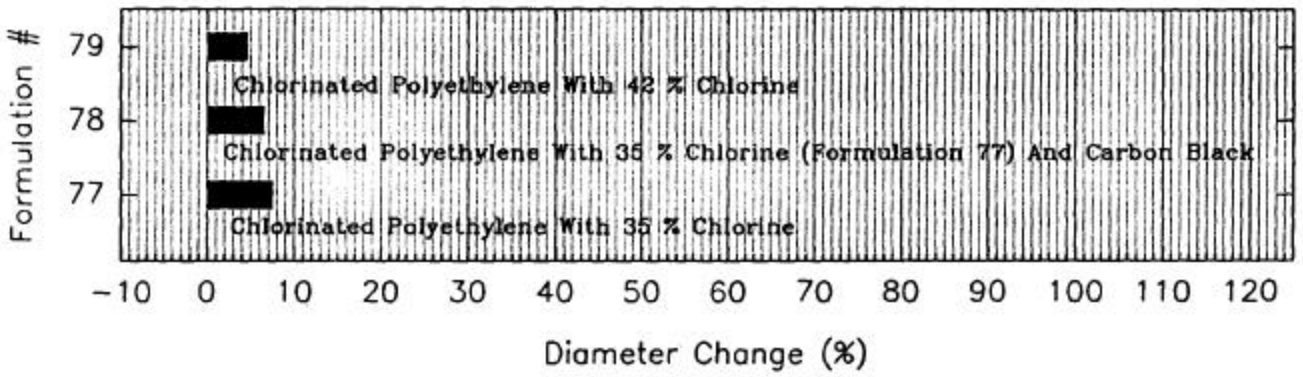


% Diameter Change In Alkyl Benzene

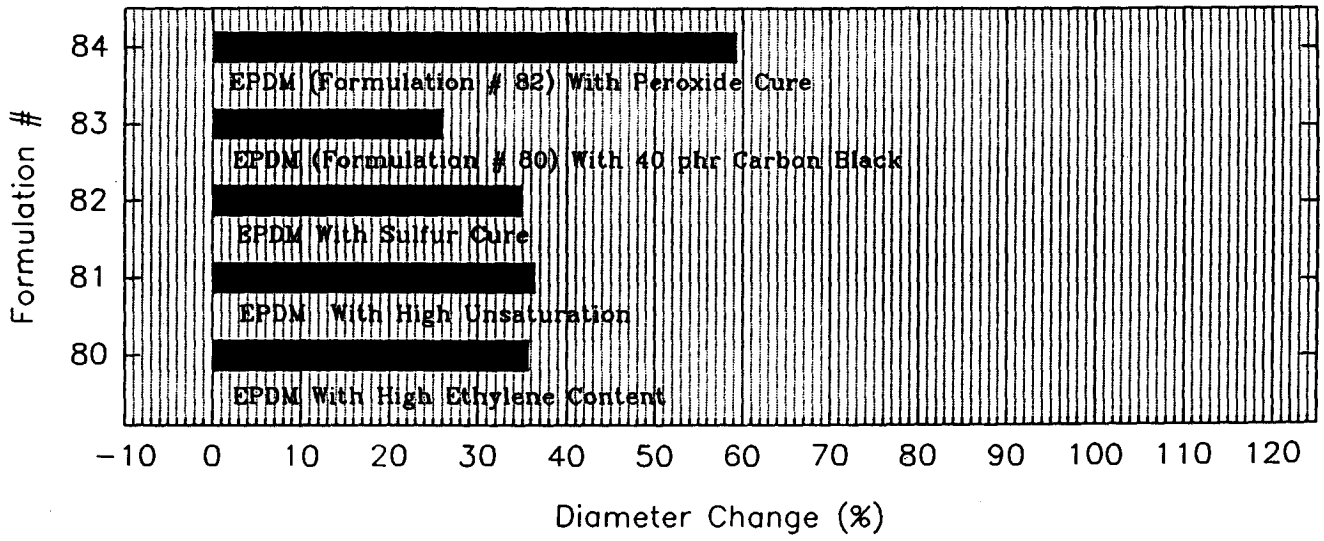
Ethylene Acrlic Elastomers



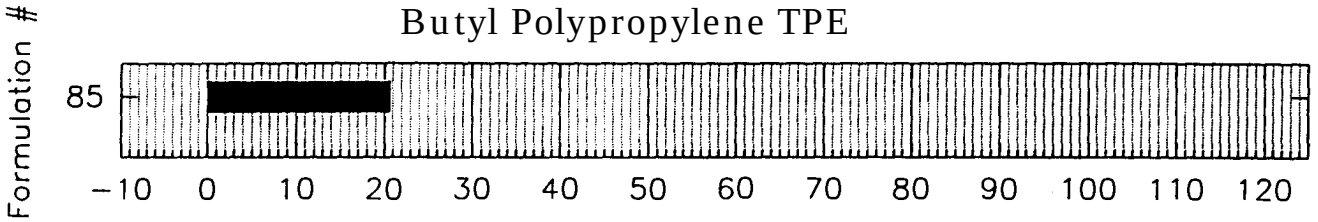
Chlorinated Polyethylenes

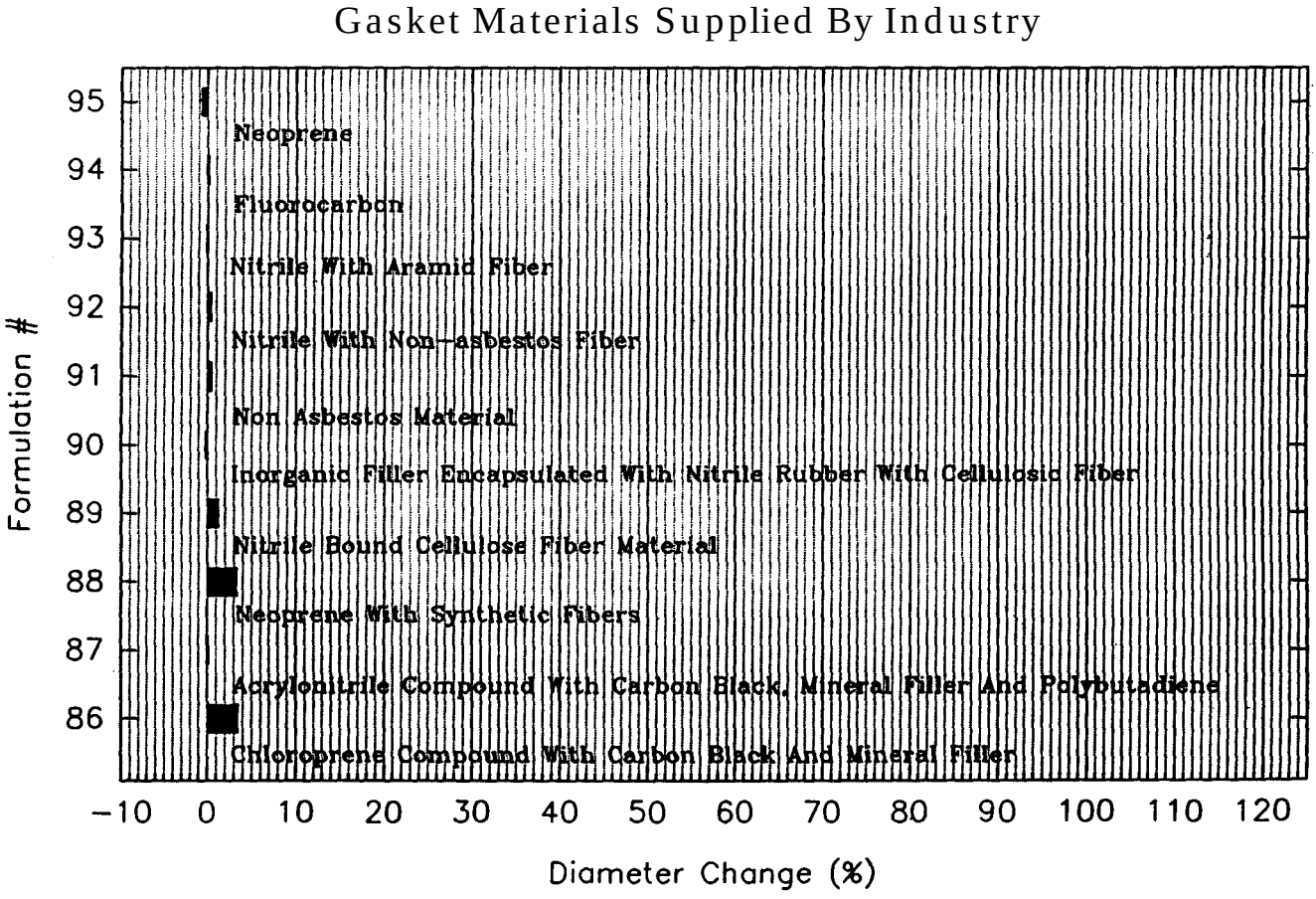


Ethylene Propylene Diene Rubbers



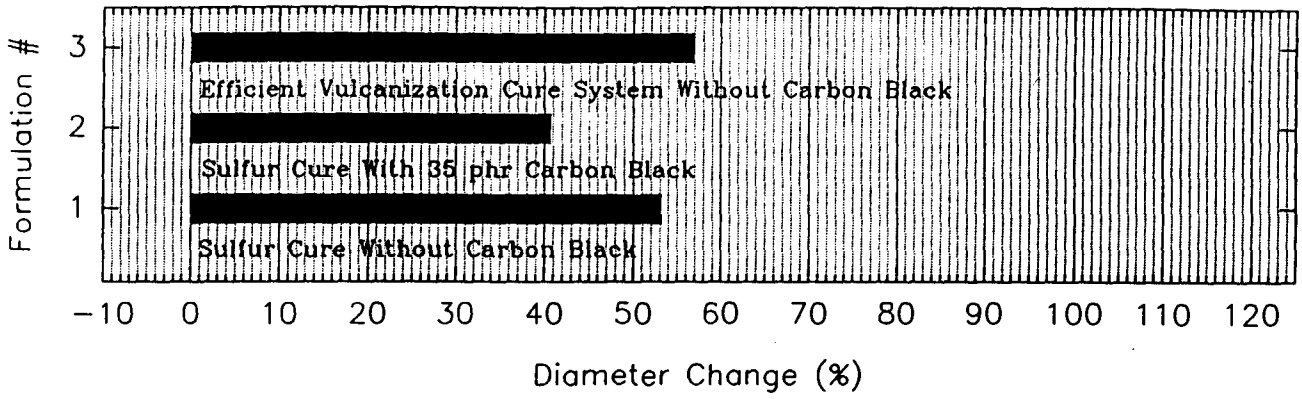
% Diameter Change In Alkyl Benzene



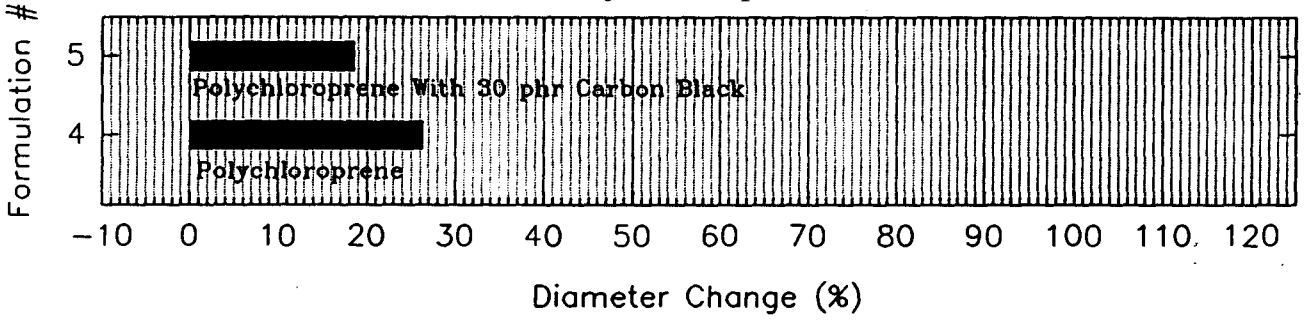


% Diameter Change In Mineral Oil

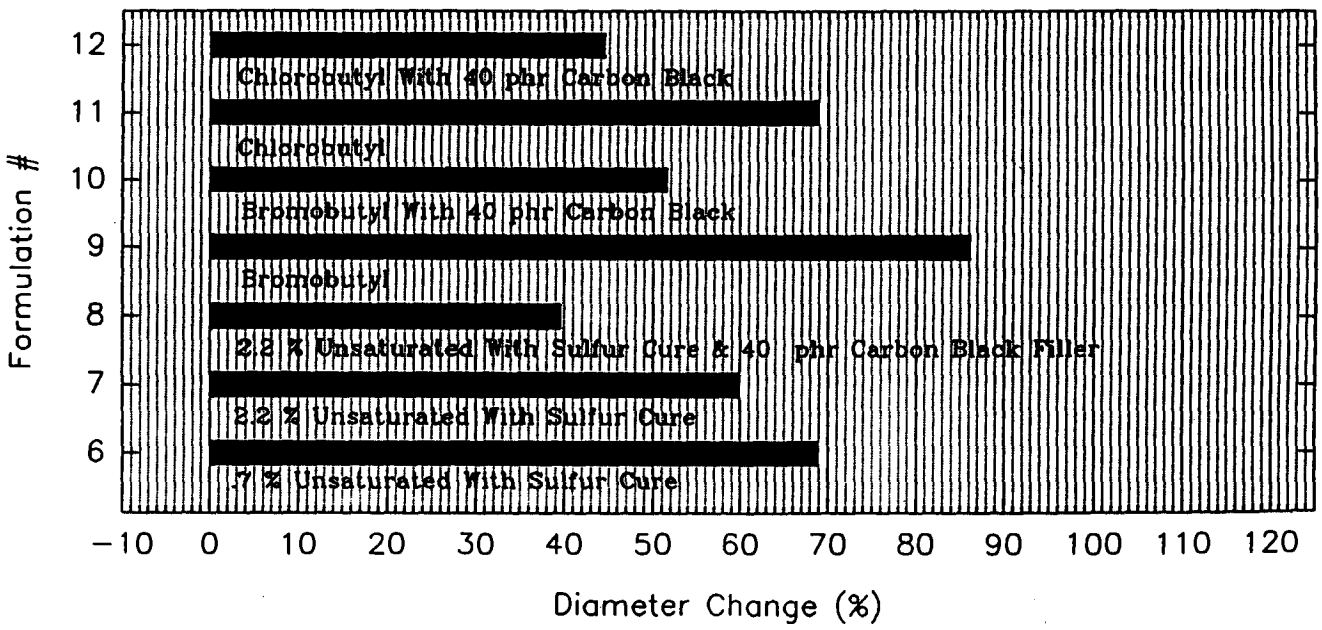
Polyisoprenes



Polychloroprenes

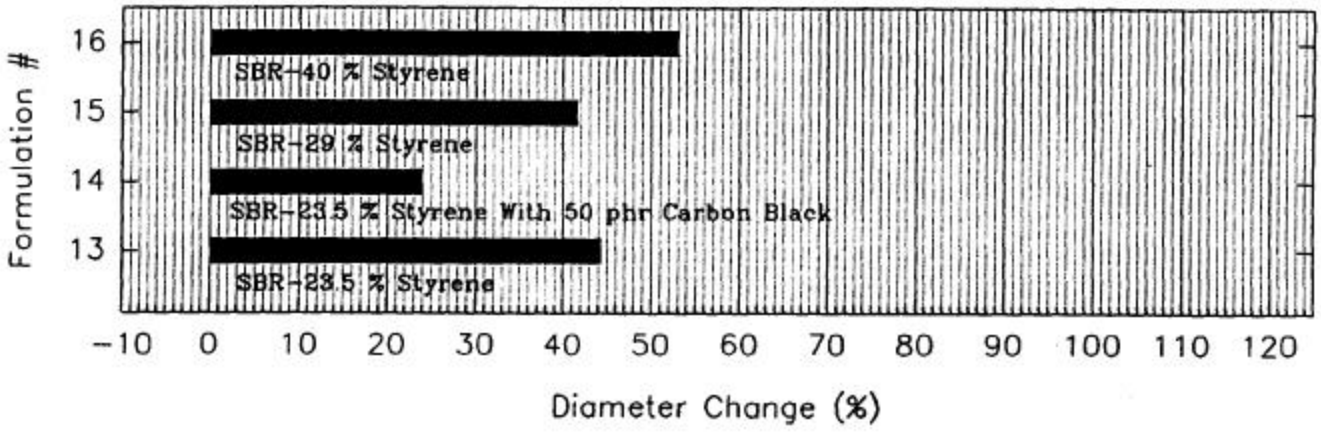


Butyl Rubbers

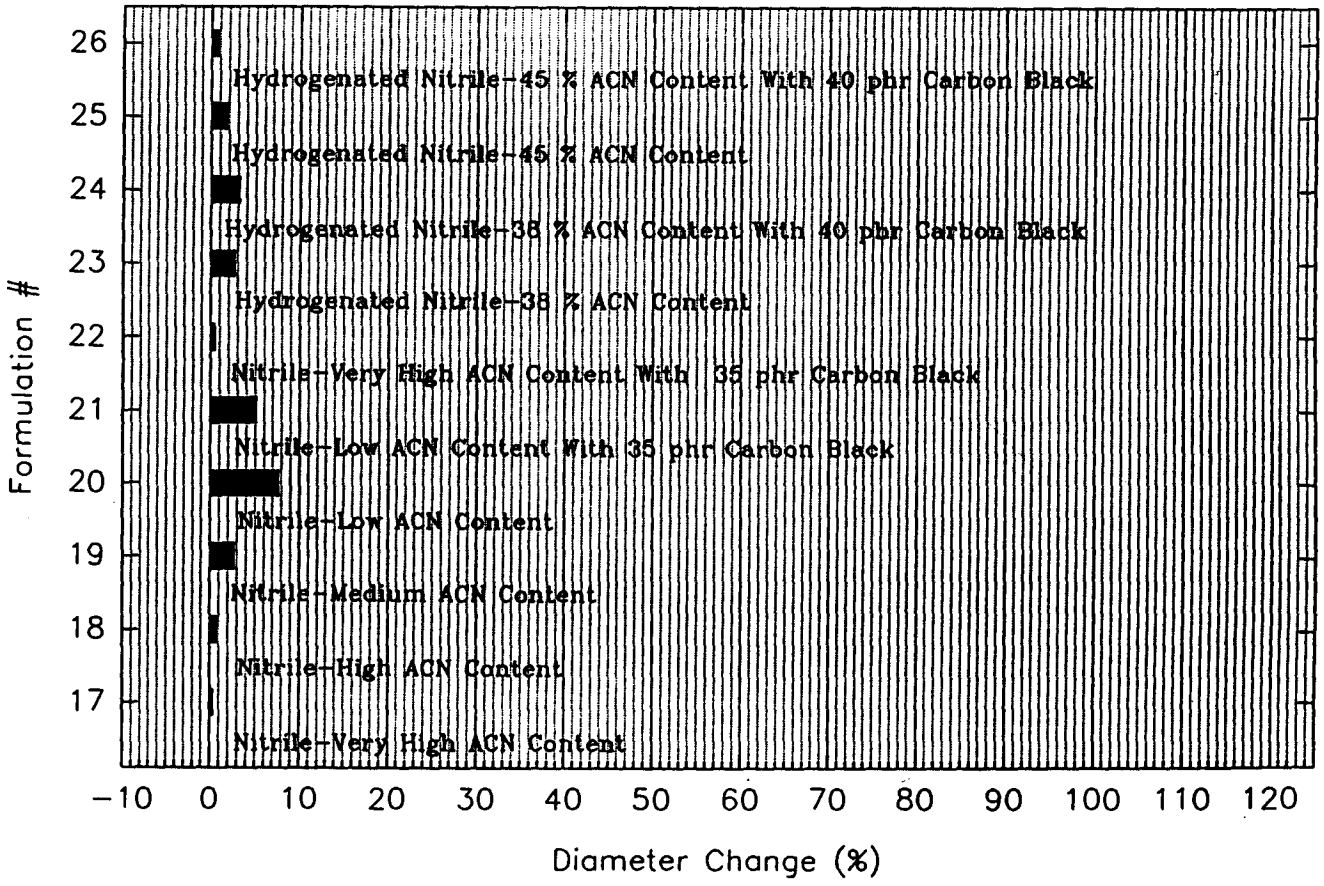


% Diameter Change In Mineral Oil

Styrene Butadiene Rubbers

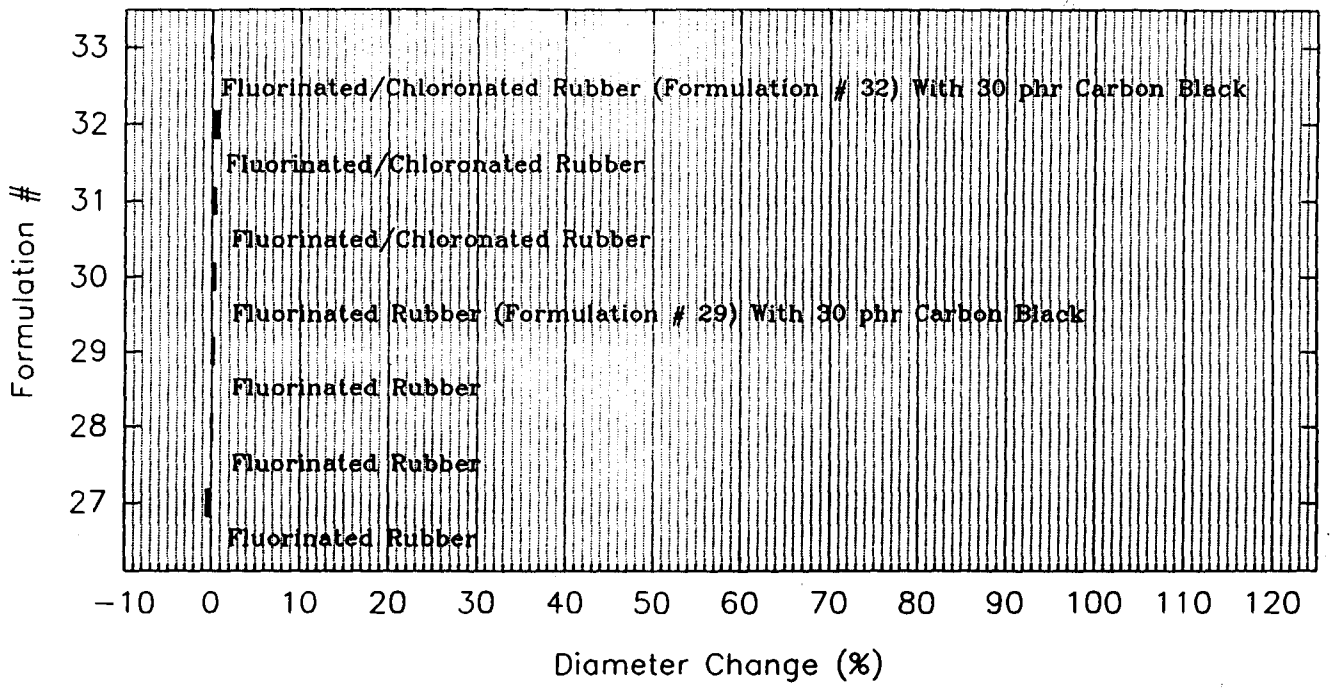


Nitrile Rubbers

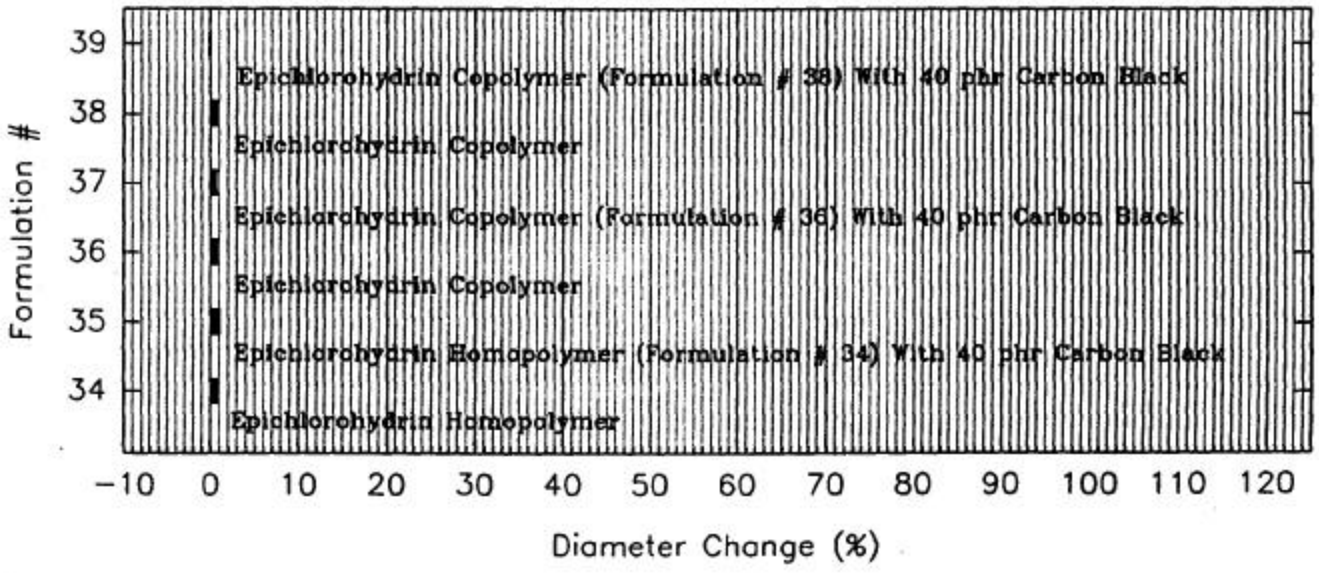


% Diameter Change In Mineral Oil

Fluorinated Rubbers

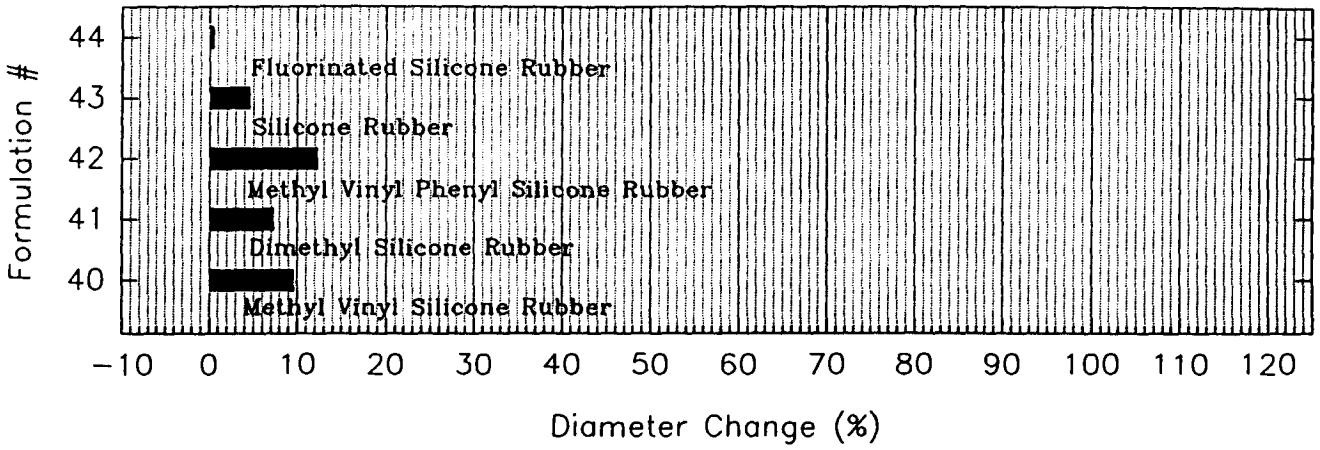


Epichlorohydrin Based Rubbers

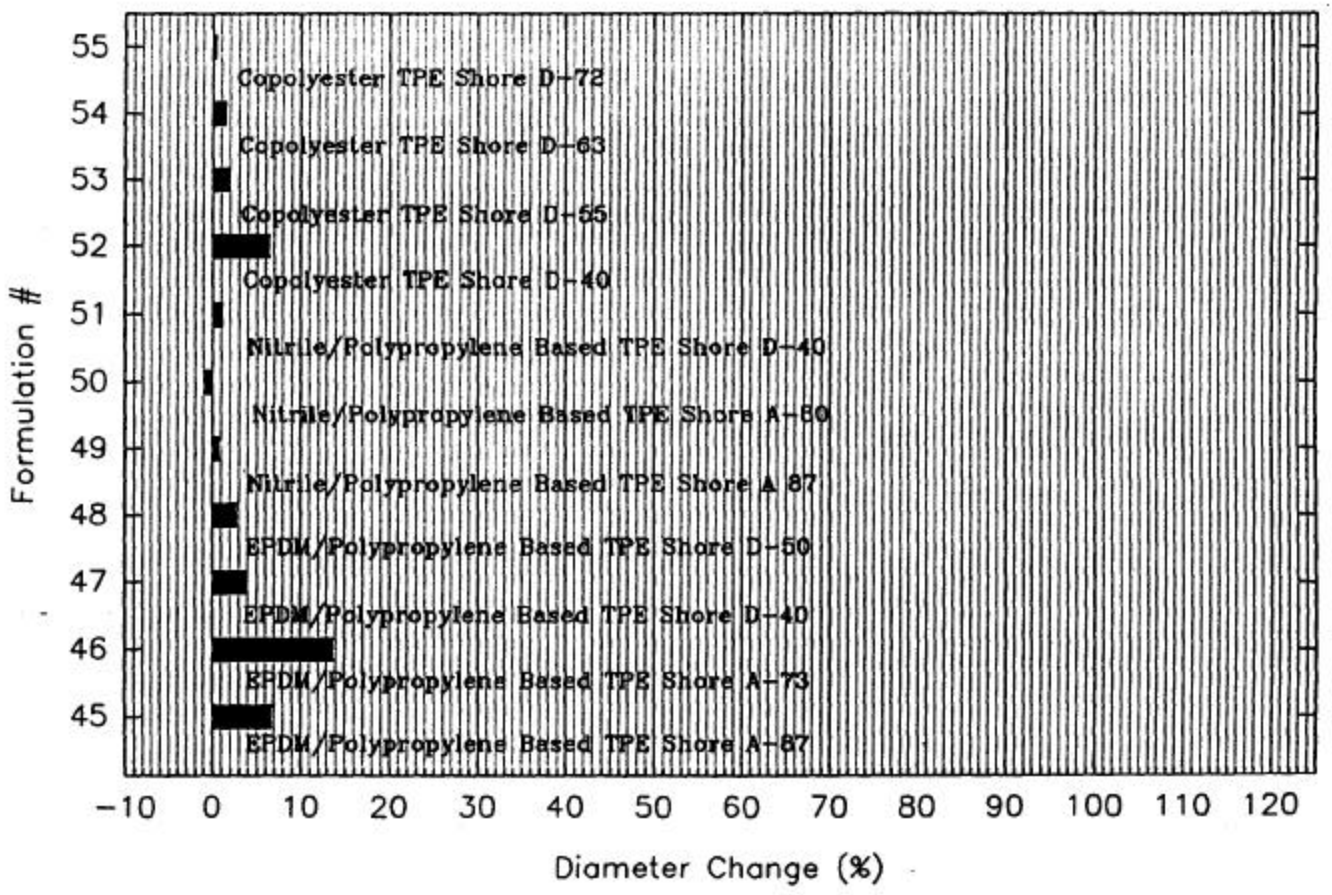


% Diameter Change In Mineral Oil

Silicones

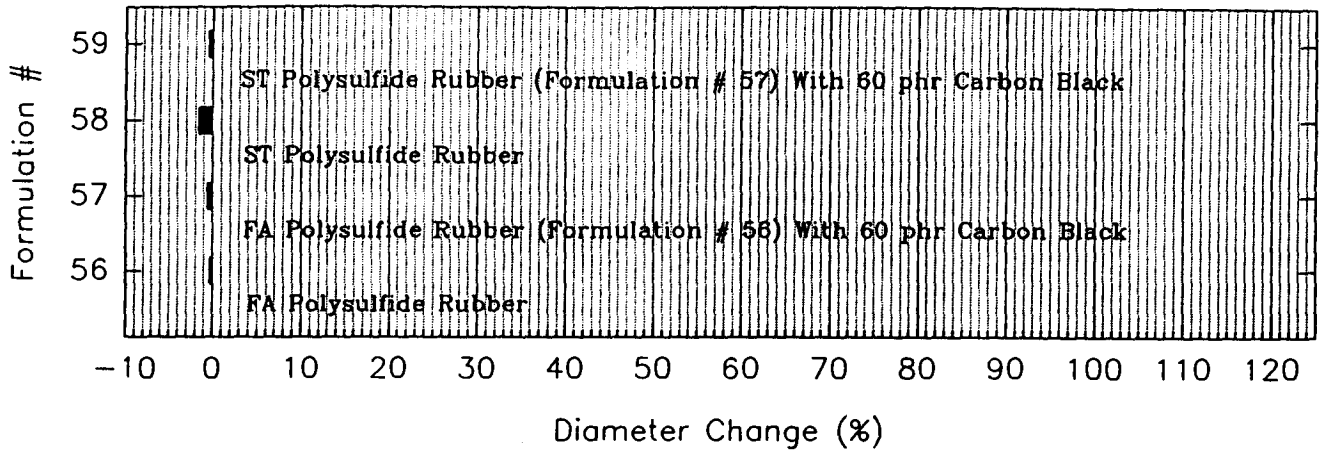


Thermoplastic Elastomers

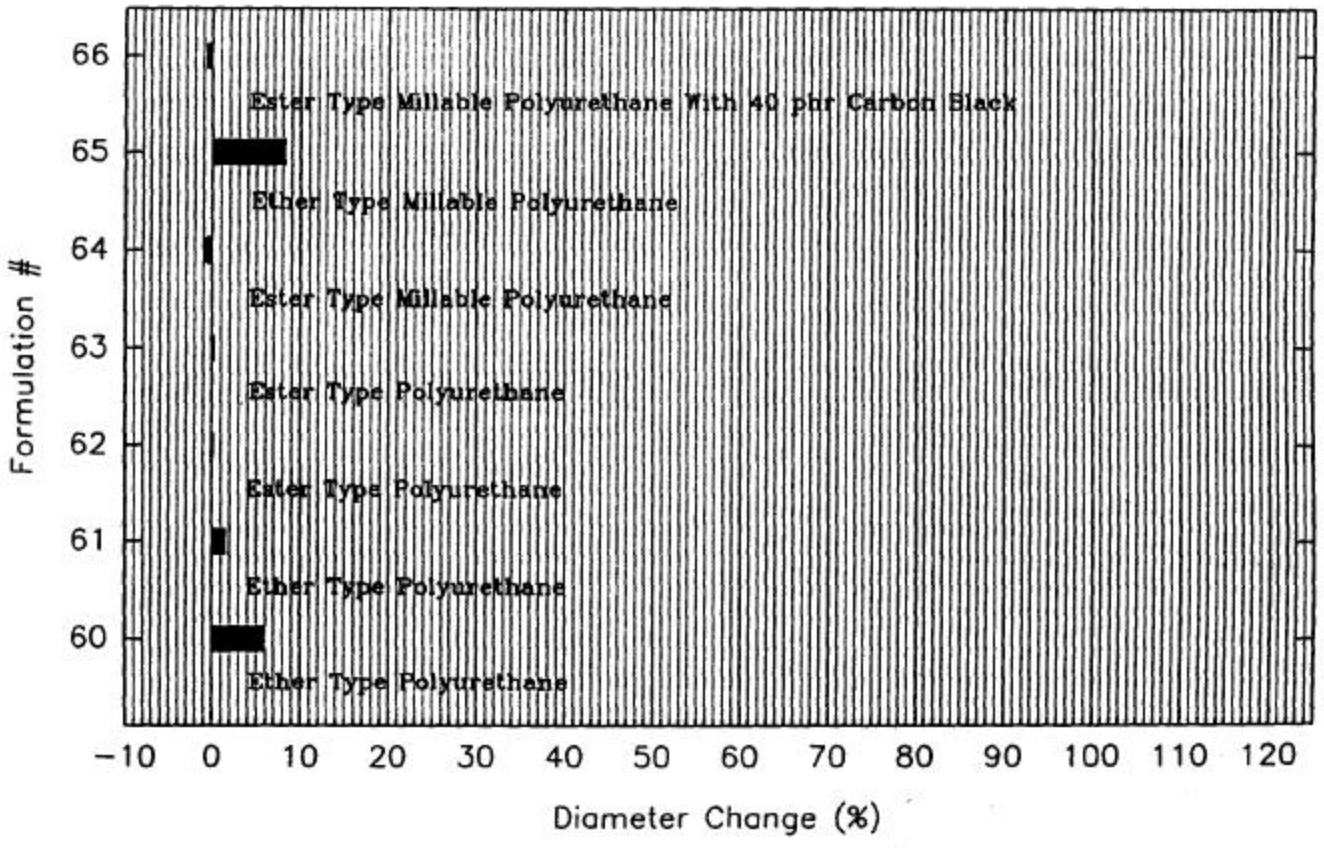


% Diameter Change In Mineral Oil

Polysulfide Rubbers

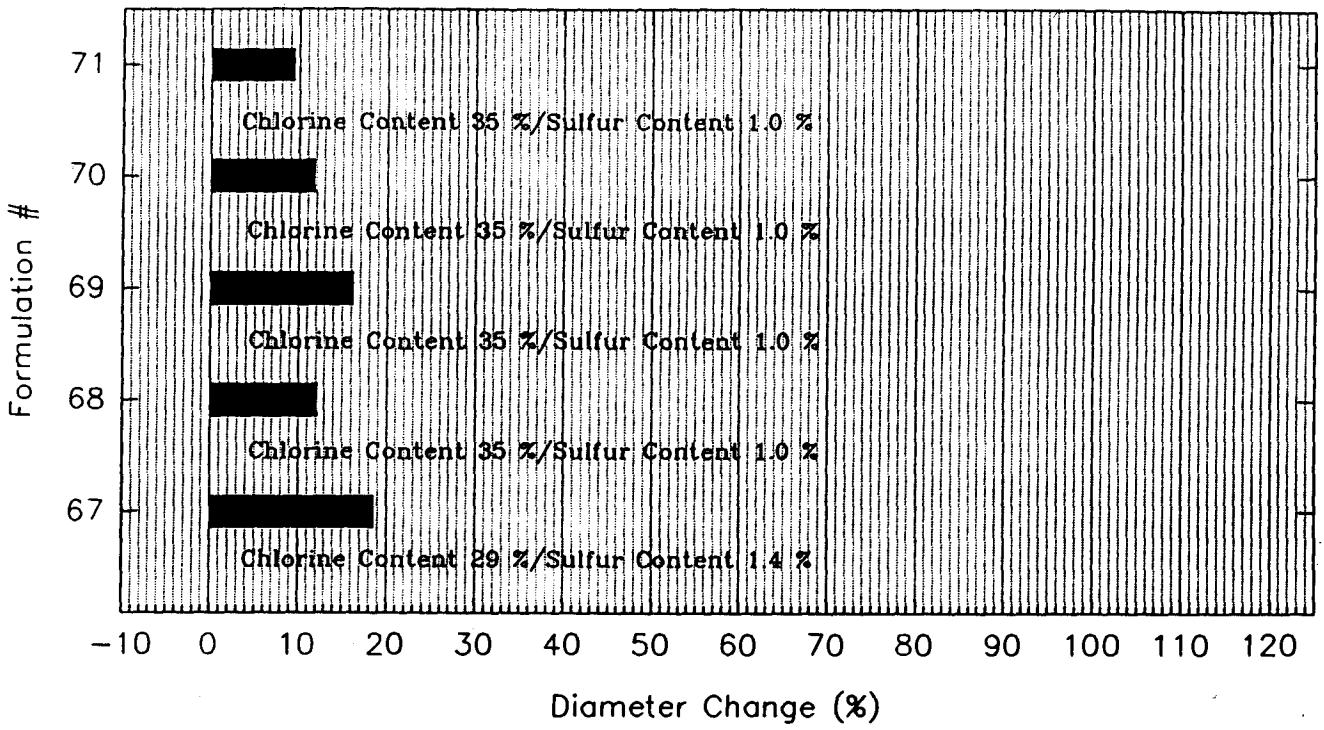


Polyurethanes

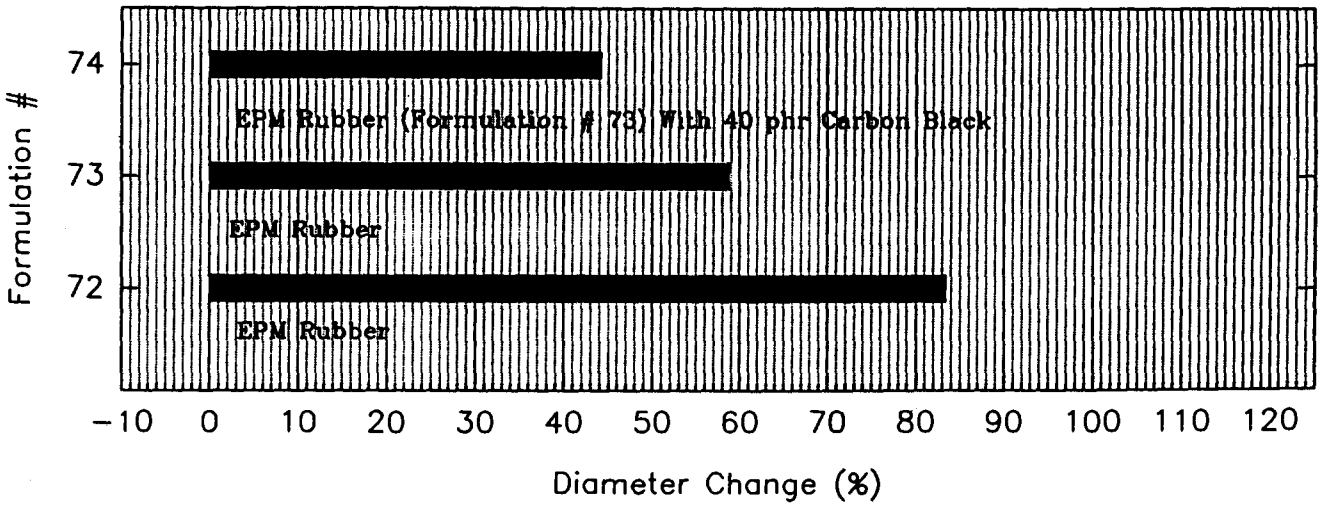


% Diameter Change In Mineral Oil

Chlorosulfonated Polyethylenes

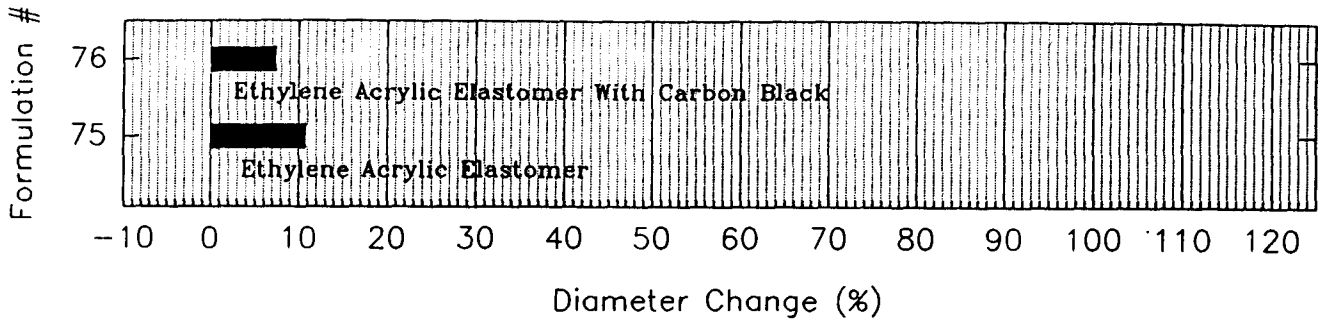


EPM Rubbers

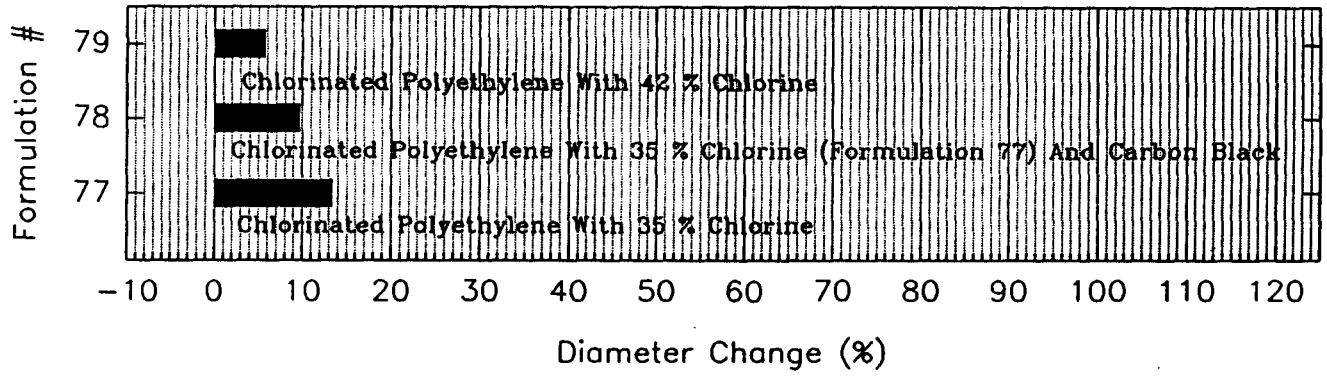


% Diameter Change In Mineral Oil

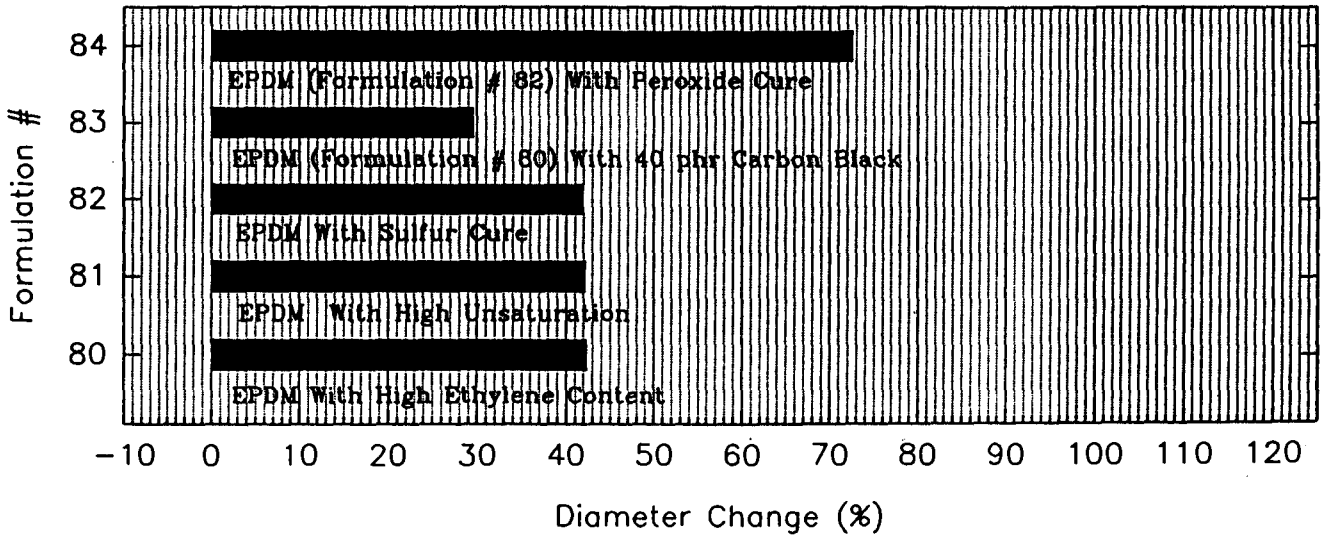
Ethylene Acrlic Elastomers



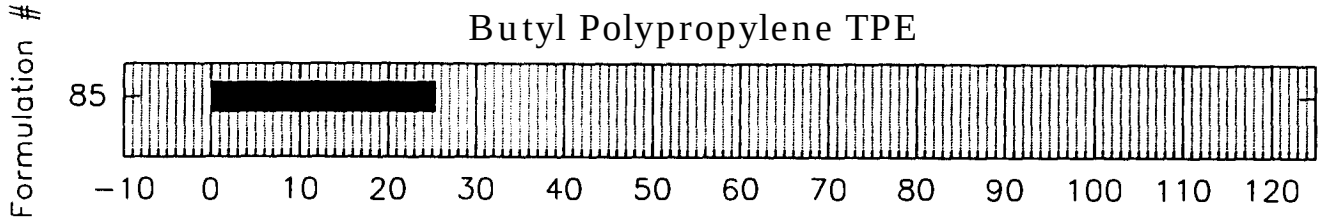
Chlorinated Polyethylenes

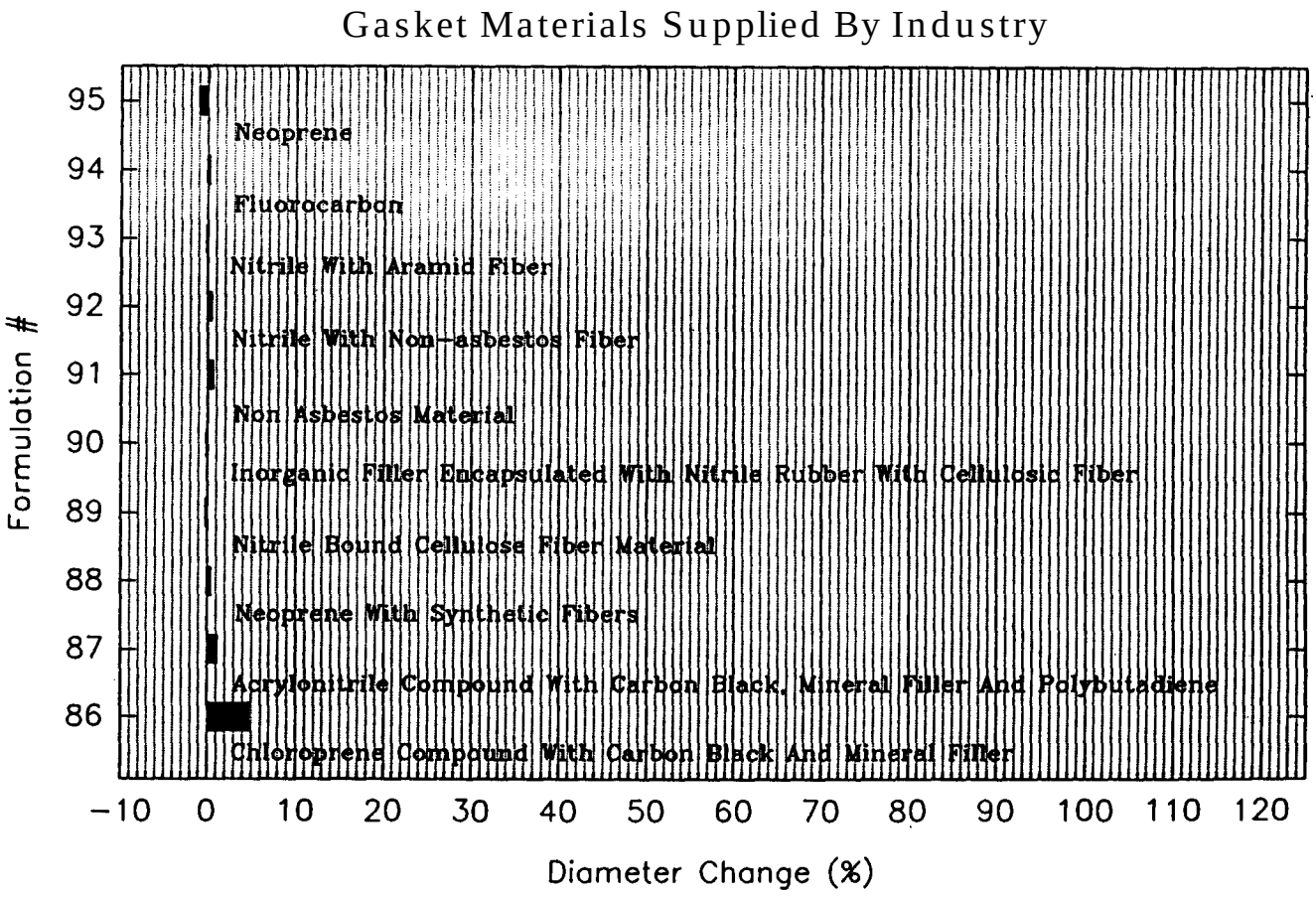


Ethylene Propylene Diene Rubbers



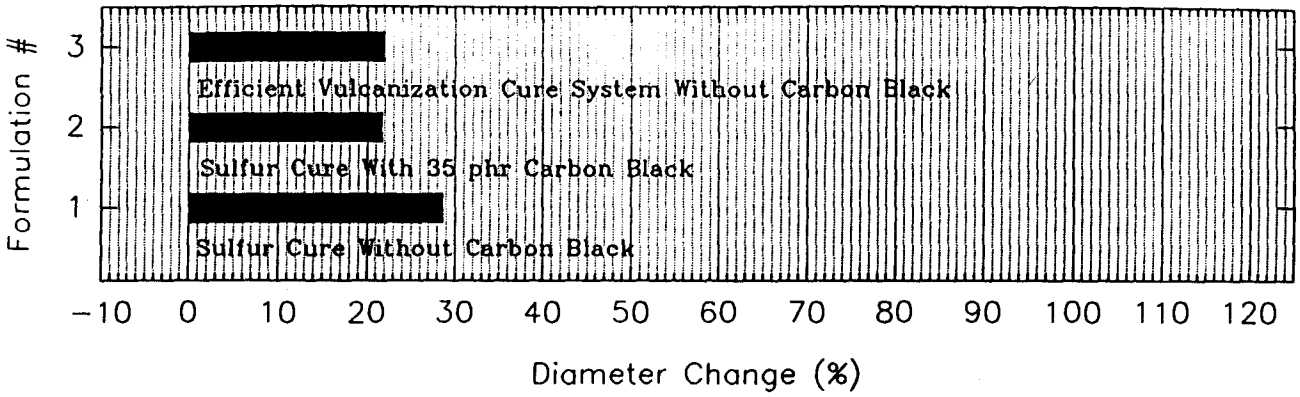
% Diameter Change In Mineral Oil



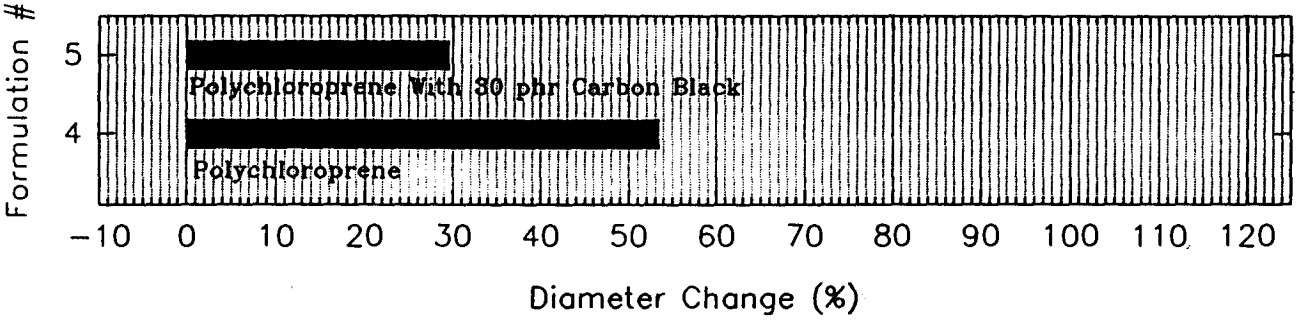


% Diameter Change In Pentaerythritol Ester Mixed Acid

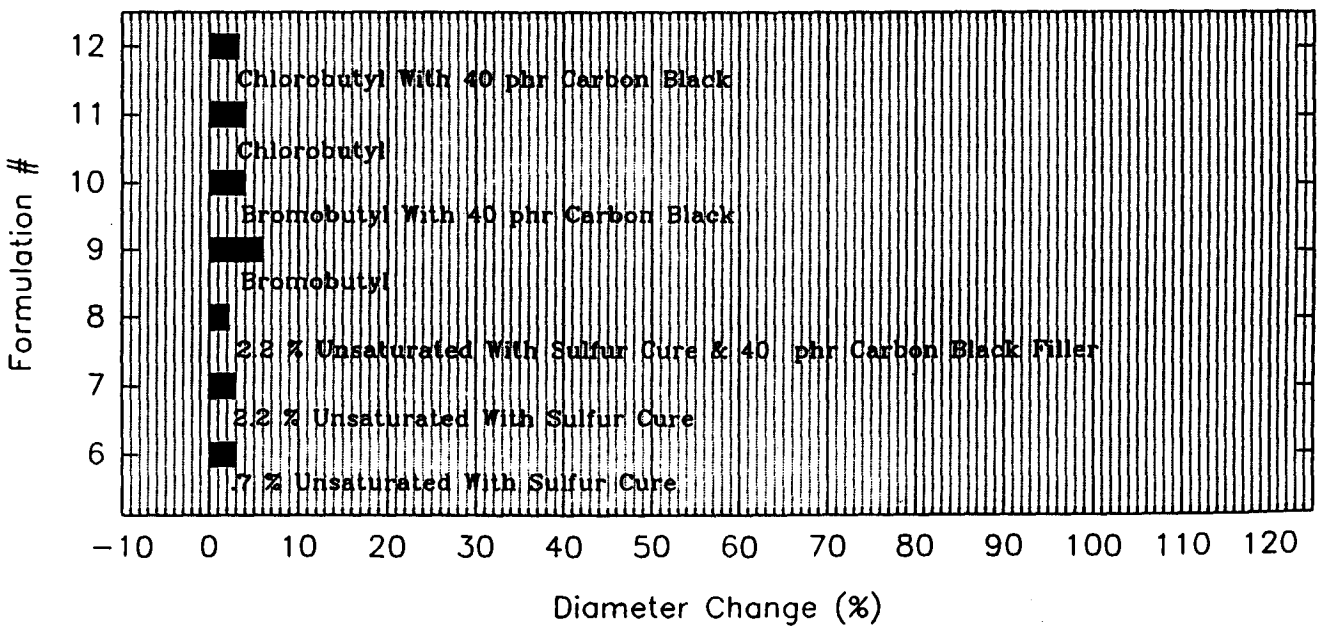
Polyisoprenes



Polychloroprenes

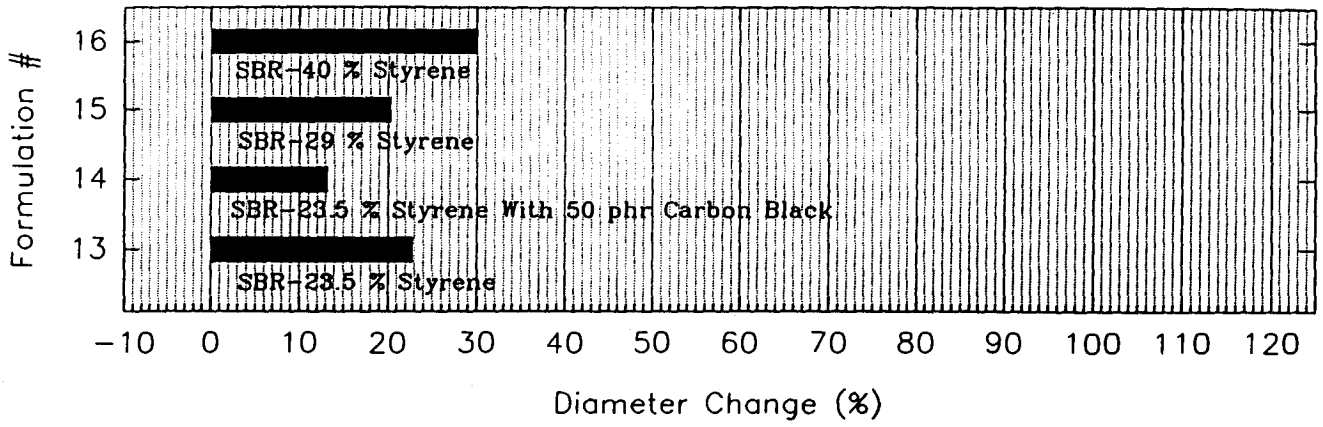


Butyl Rubbers

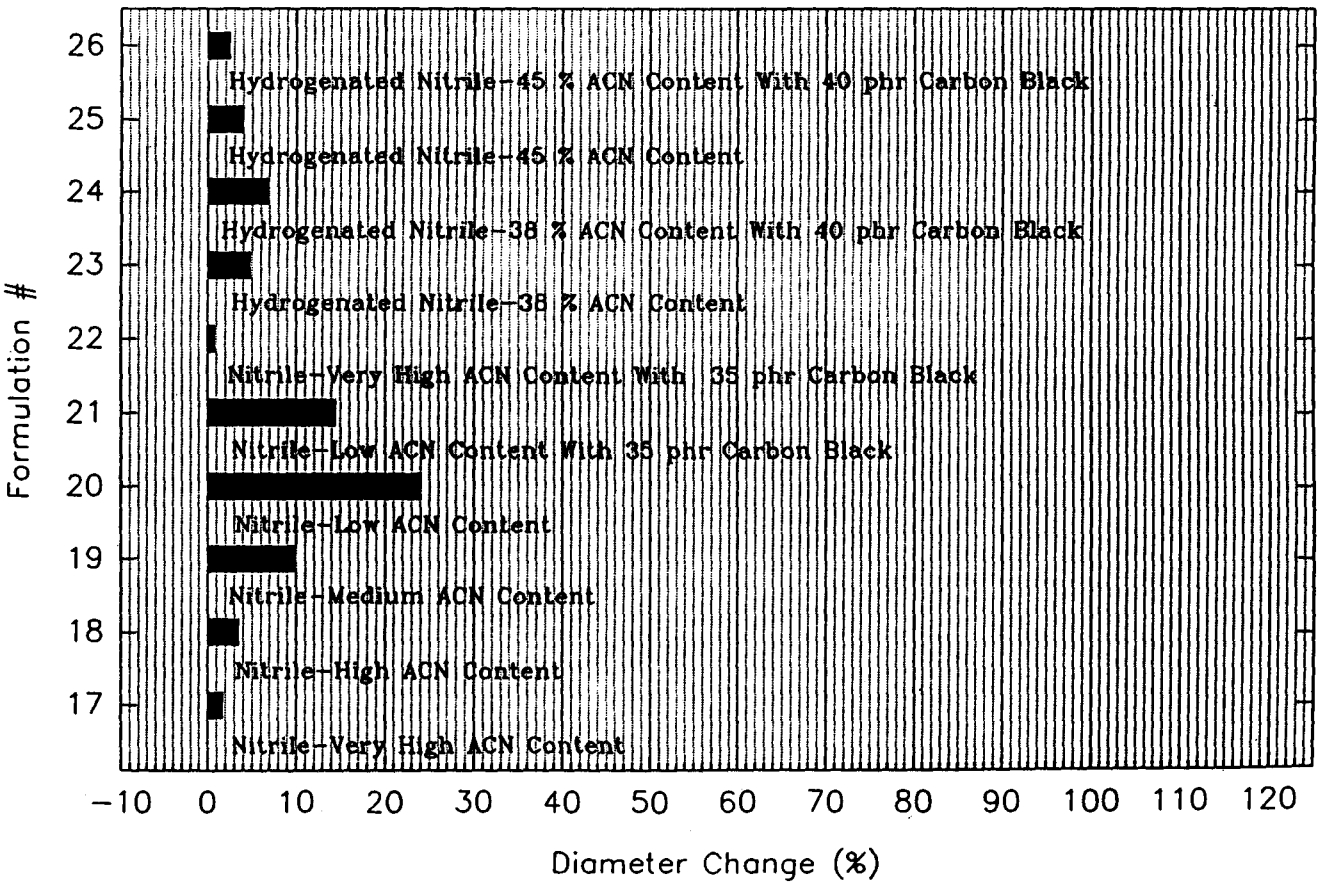


% Diameter Change In Pentaerythritol Ester Mixed Acid

Styrene Butadiene Rubbers

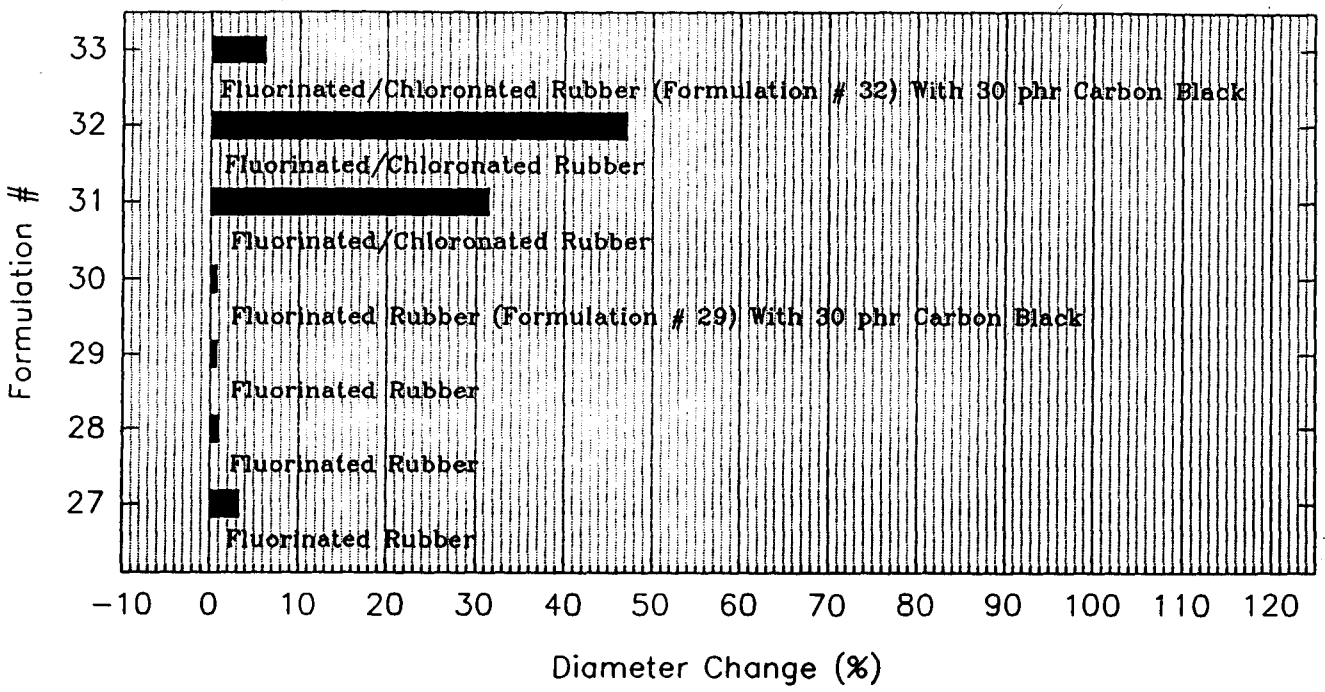


Nitrile Rubbers

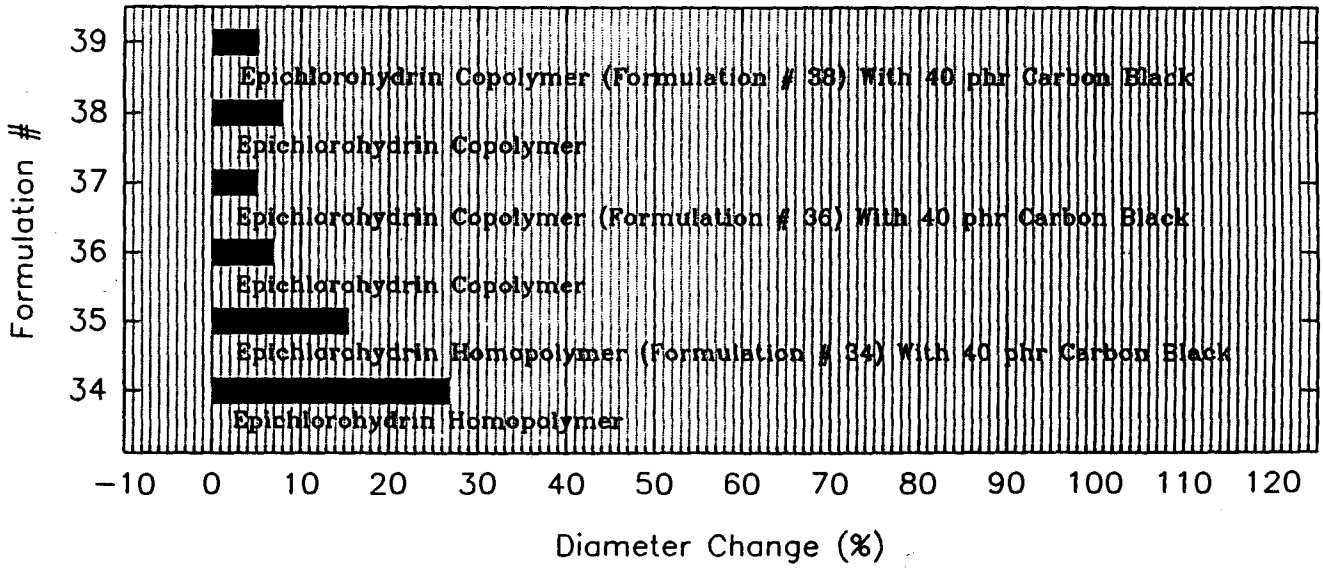


% Diameter Change In Pentaerythritol Ester Mixed Acid

Fluorinated Rubbers

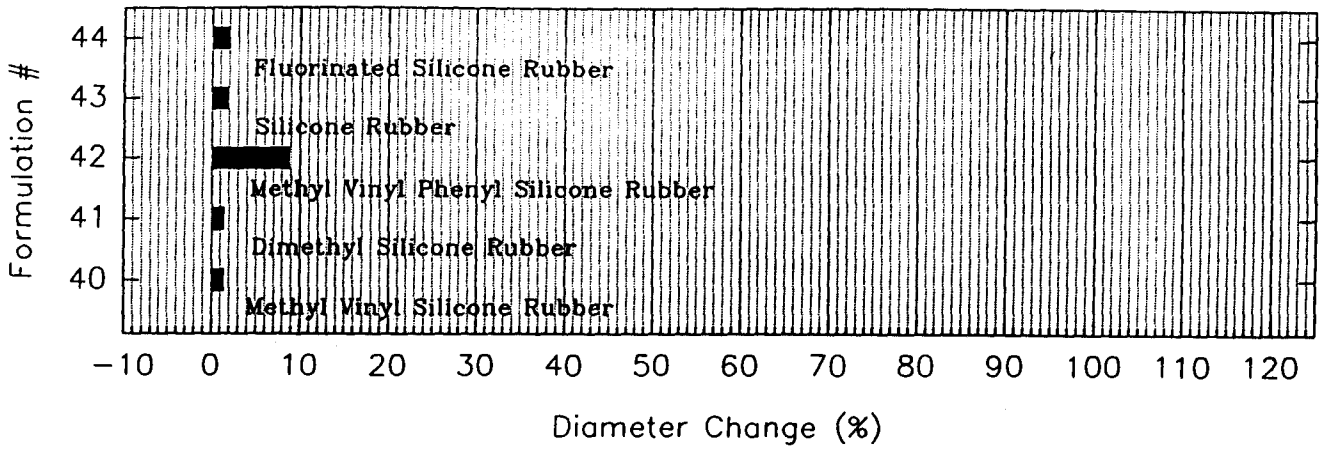


Epichlorohydrin Based Rubbers

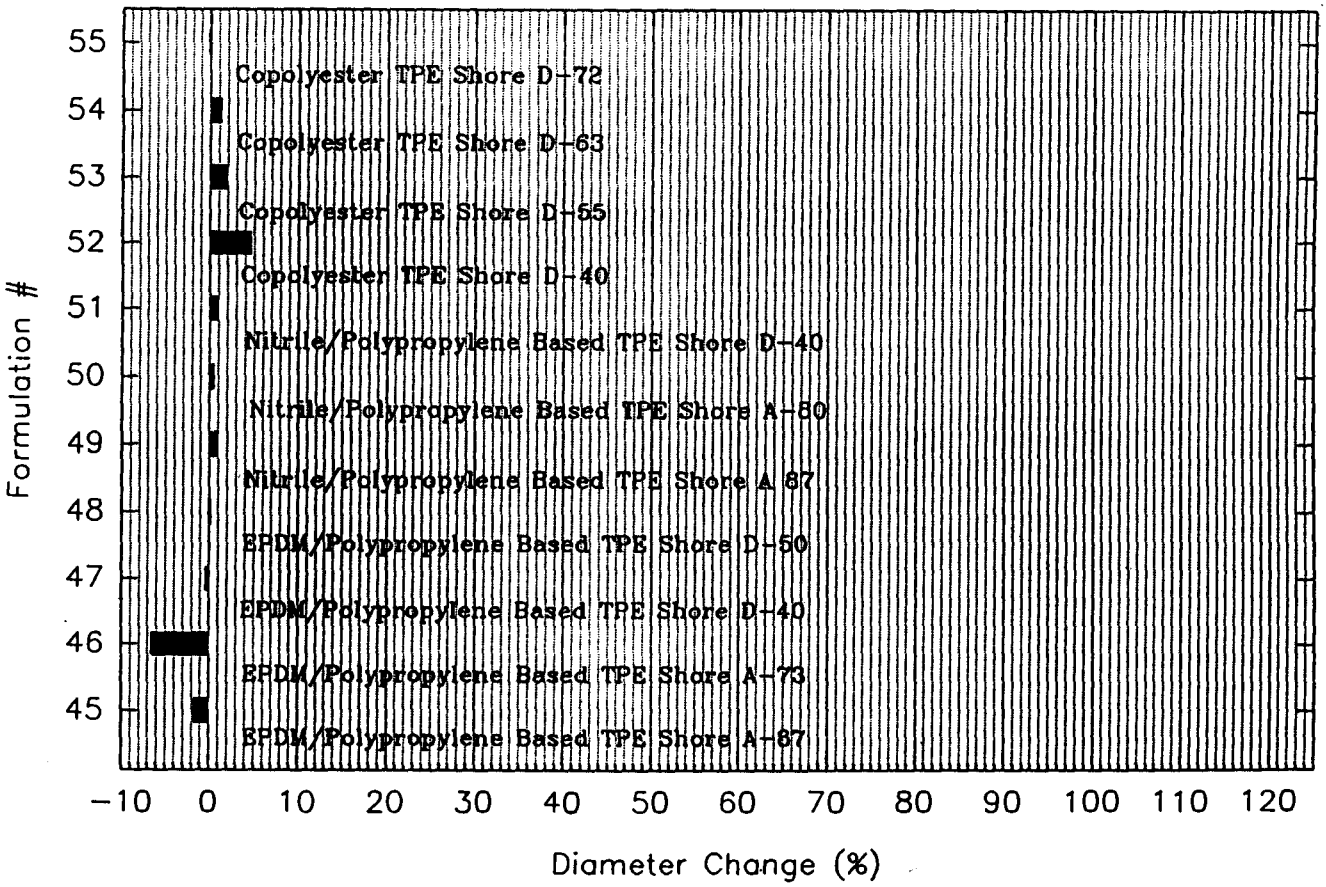


% Diameter Change In Pentaerythritol Ester Mixed Acid

Silicones

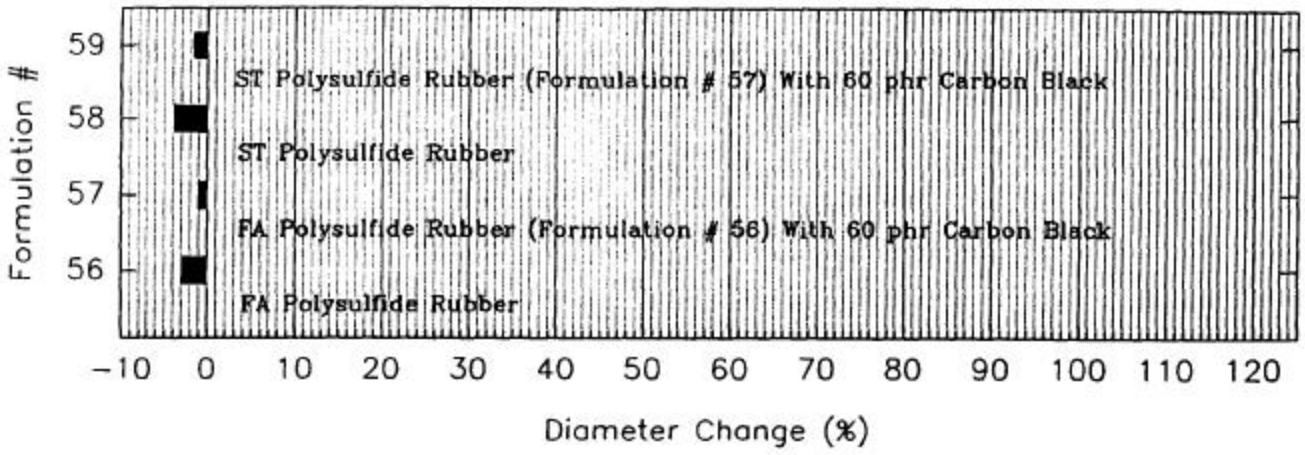


Thermoplastic Elastomers

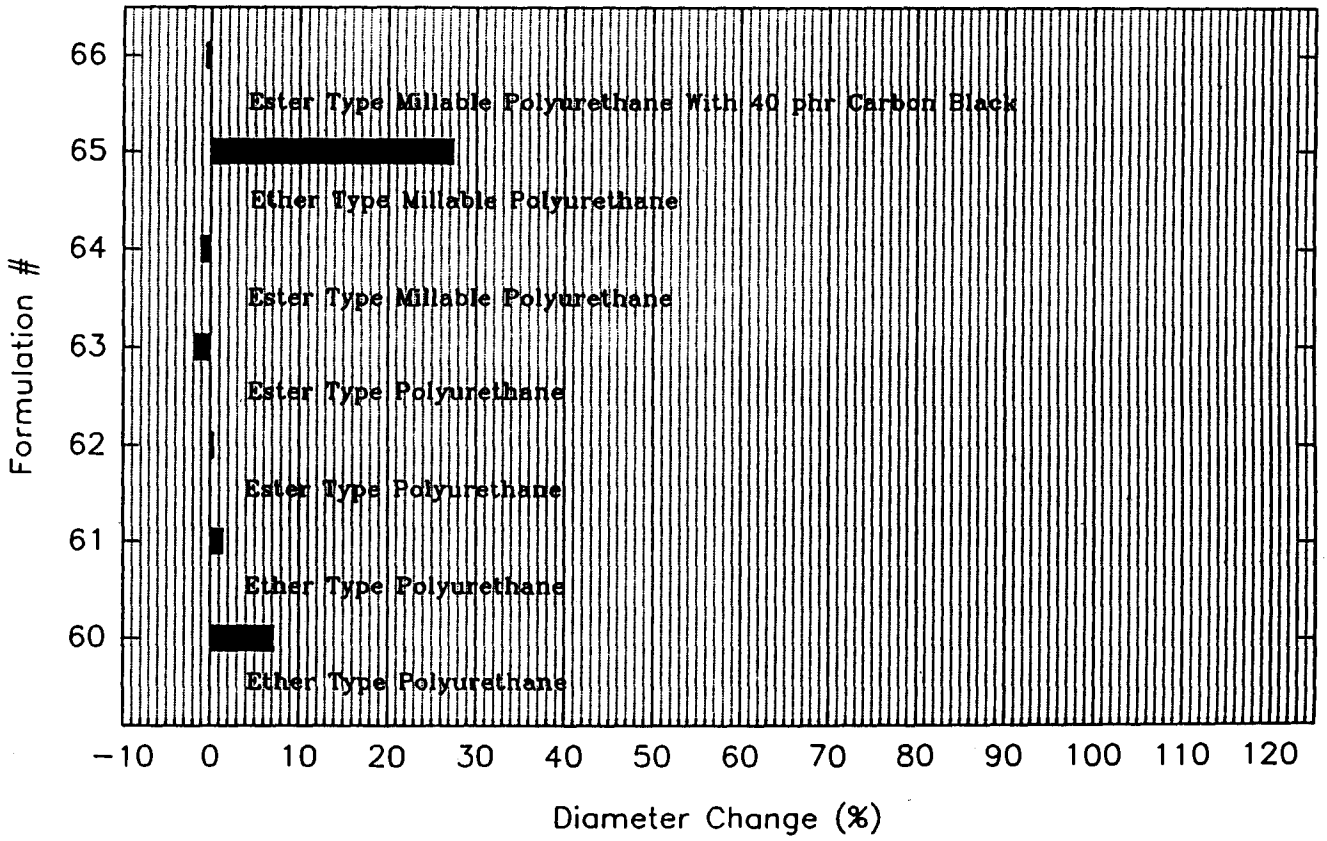


% Diameter Change In Pentaerythritol Ester Mixed Acid

Polysulfide Rubbers

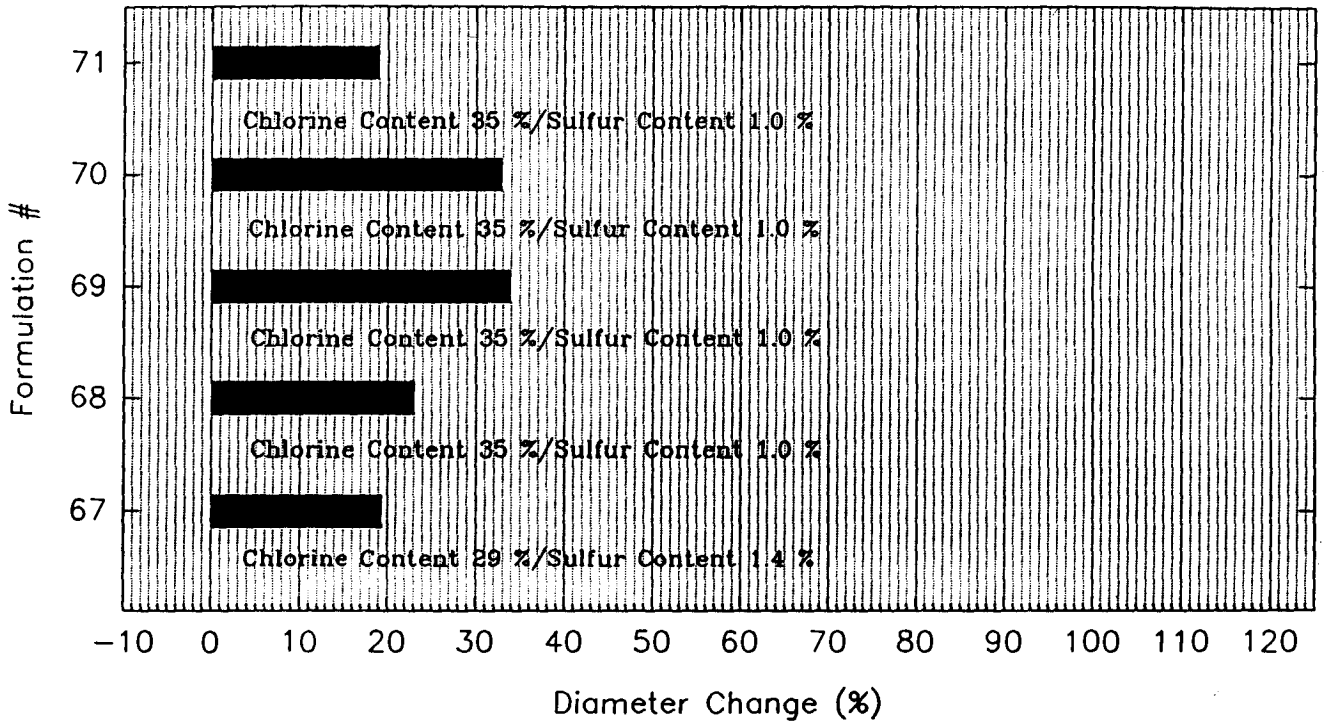


Polyurethanes

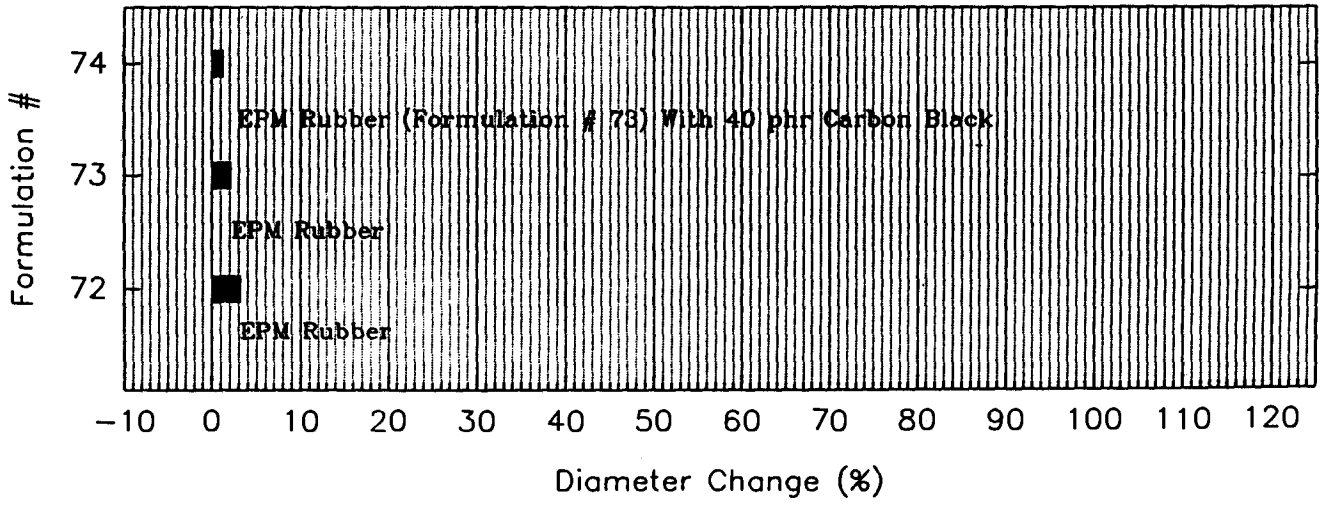


% Diameter Change In Pentaerythritol Ester Mixed Acid

Chlorosulfonated Polyethylenes

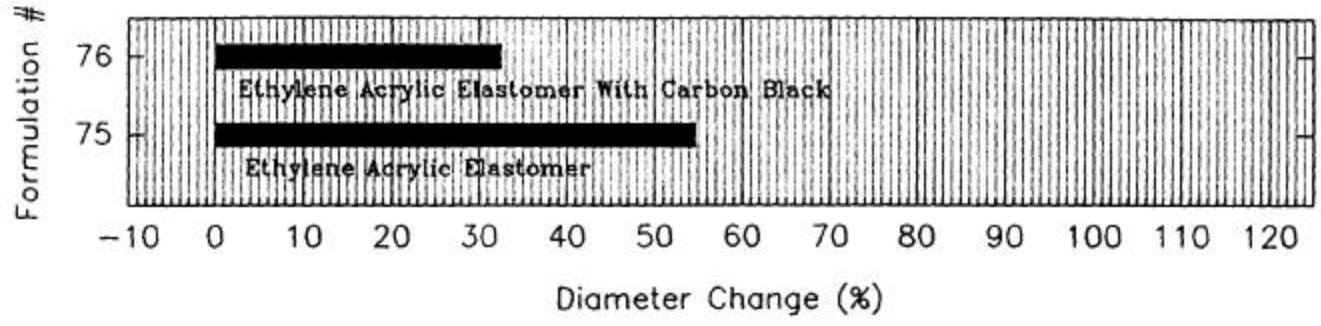


EPM Rubbers

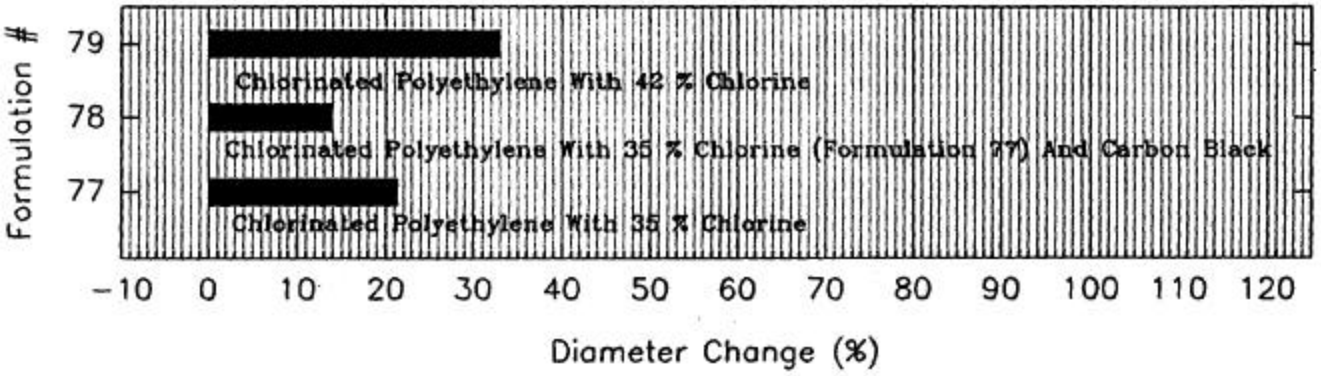


% Diameter Change In Pentaerythritol Ester Mixed Acid

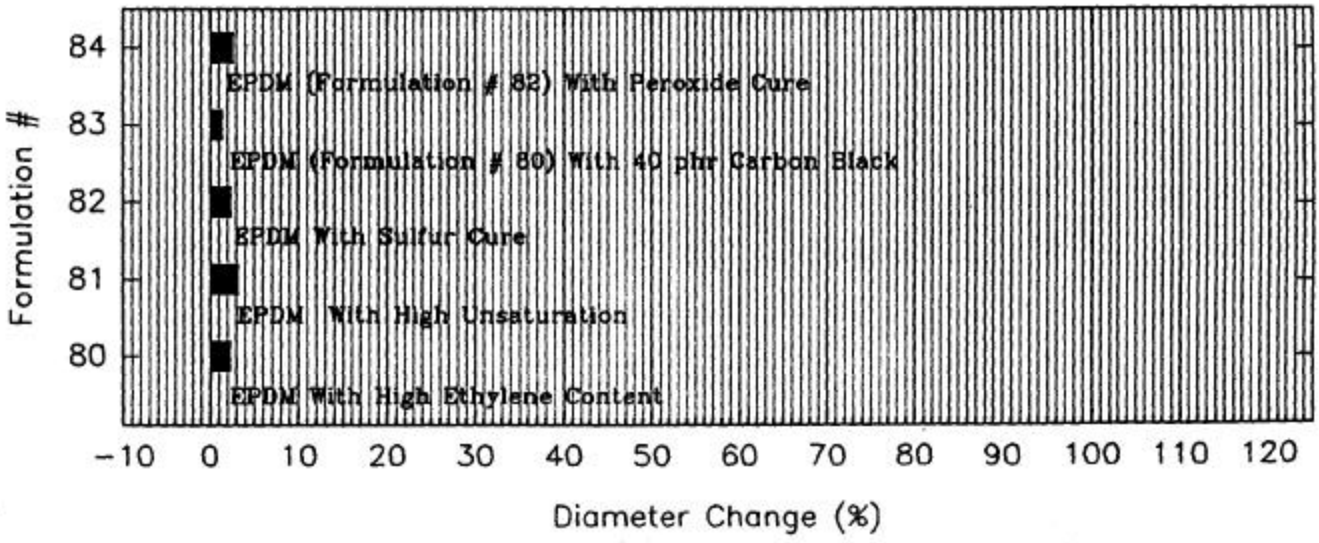
Ethylene Acrlic Elastomers



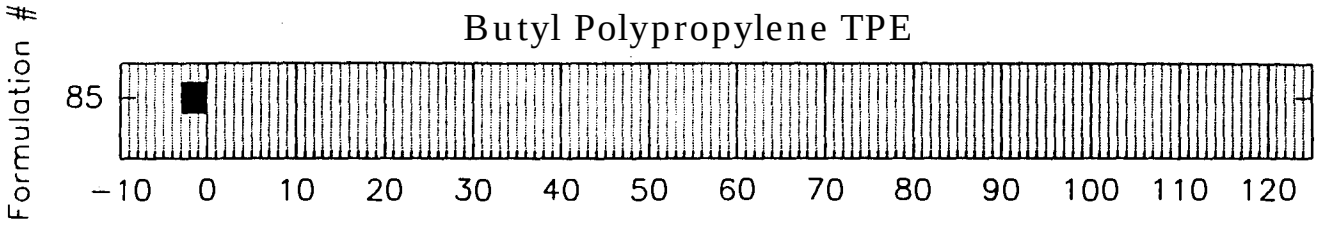
Chlorinated Polyethylenes

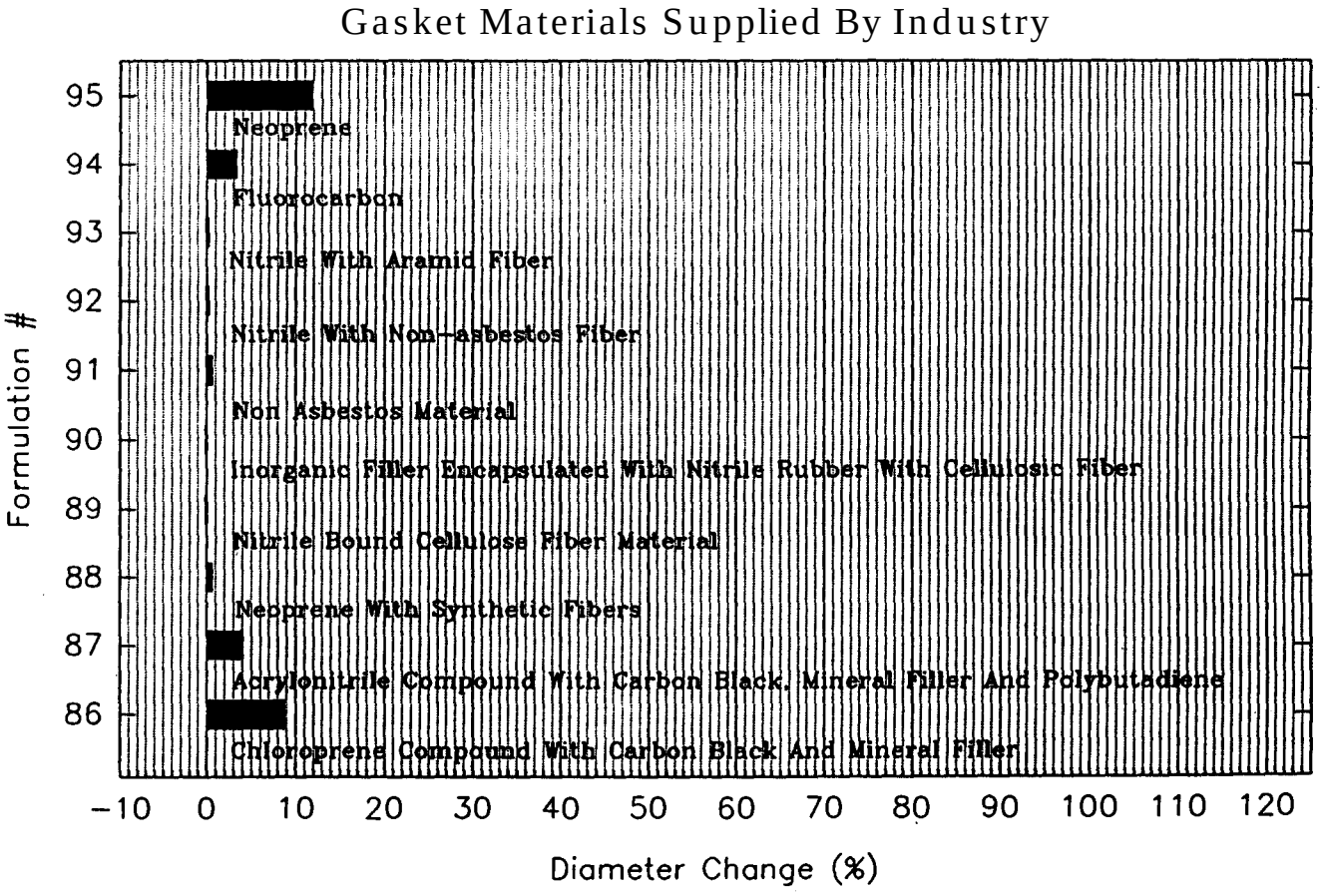


Ethylene Propylene Diene Rubbers



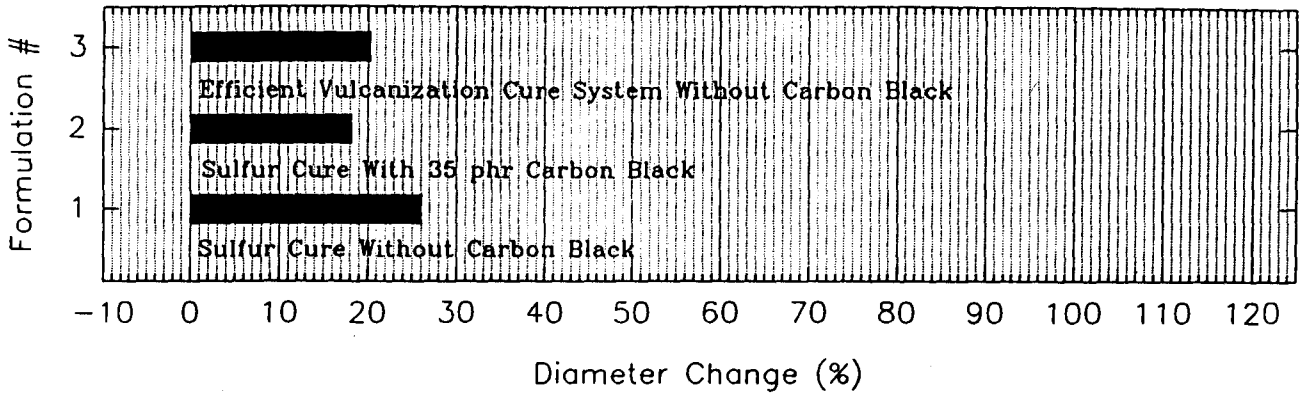
% Diameter Change In Pentaerythritol Ester Mixed Acid



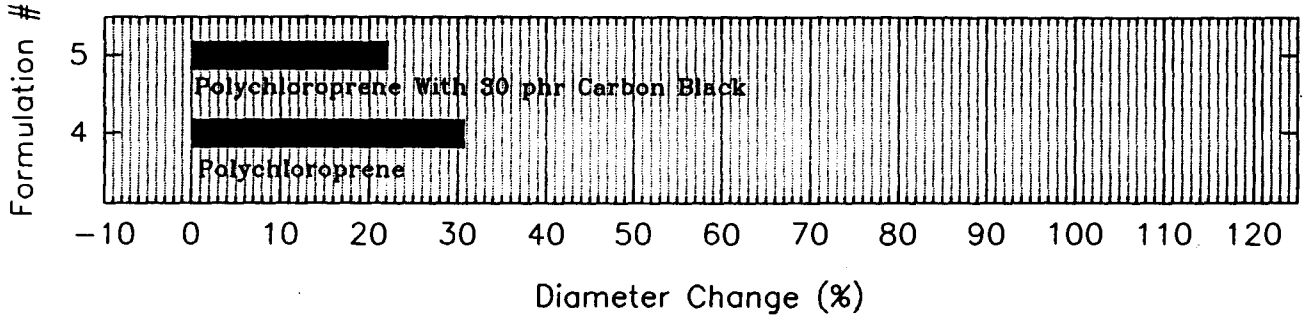


% Diameter Change In Pentaerythritol Ester Branched Acid

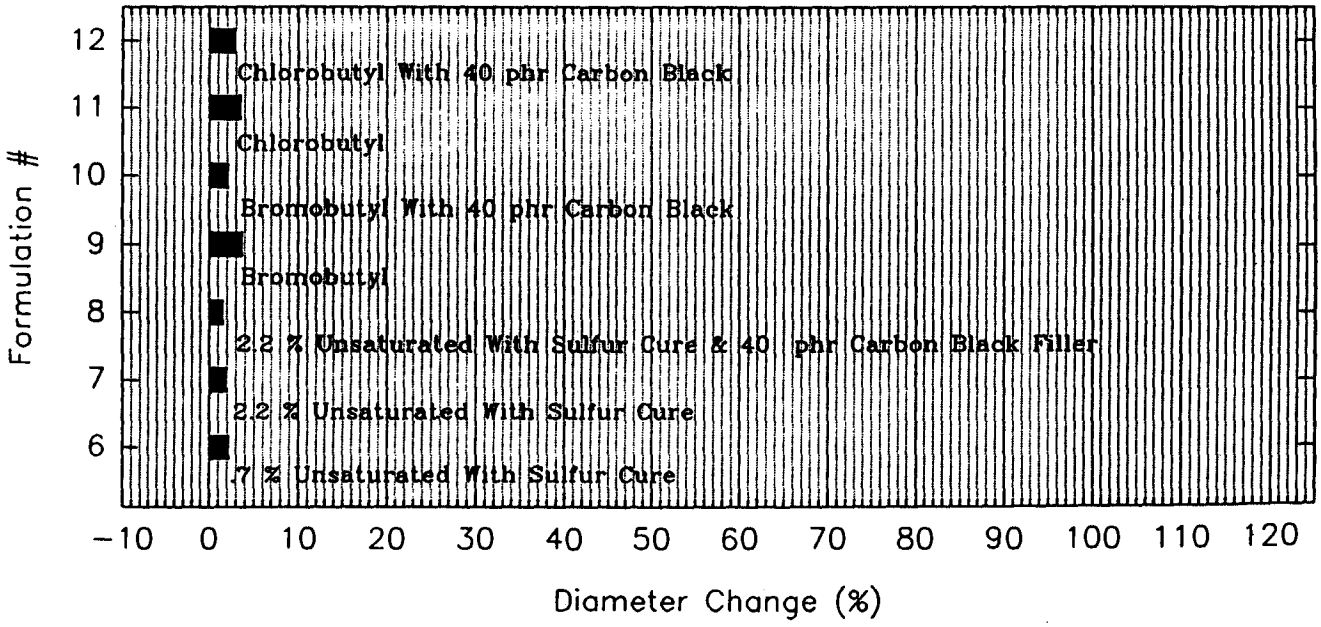
Polyisoprenes



Polychloroprenes

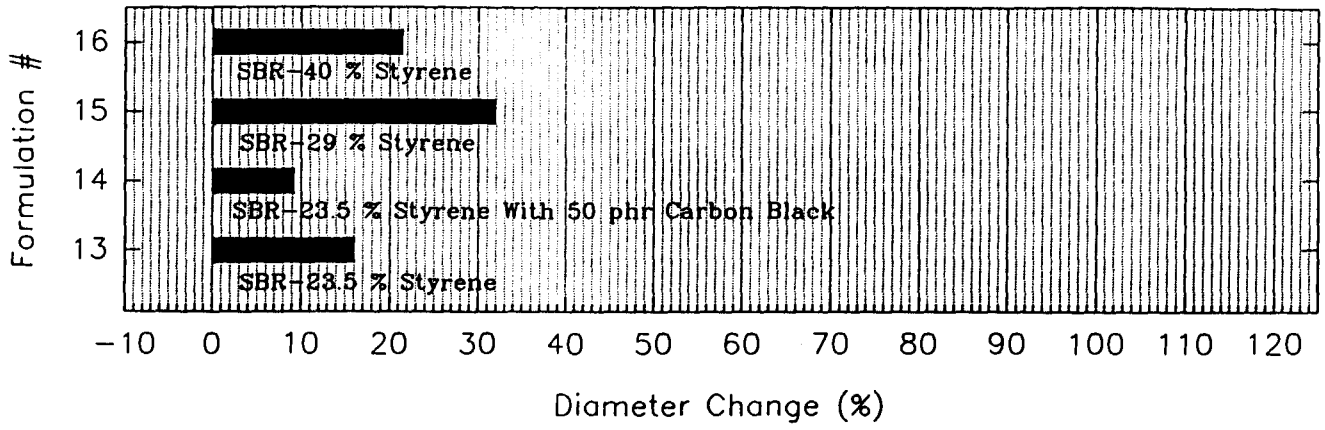


Butyl Rubbers

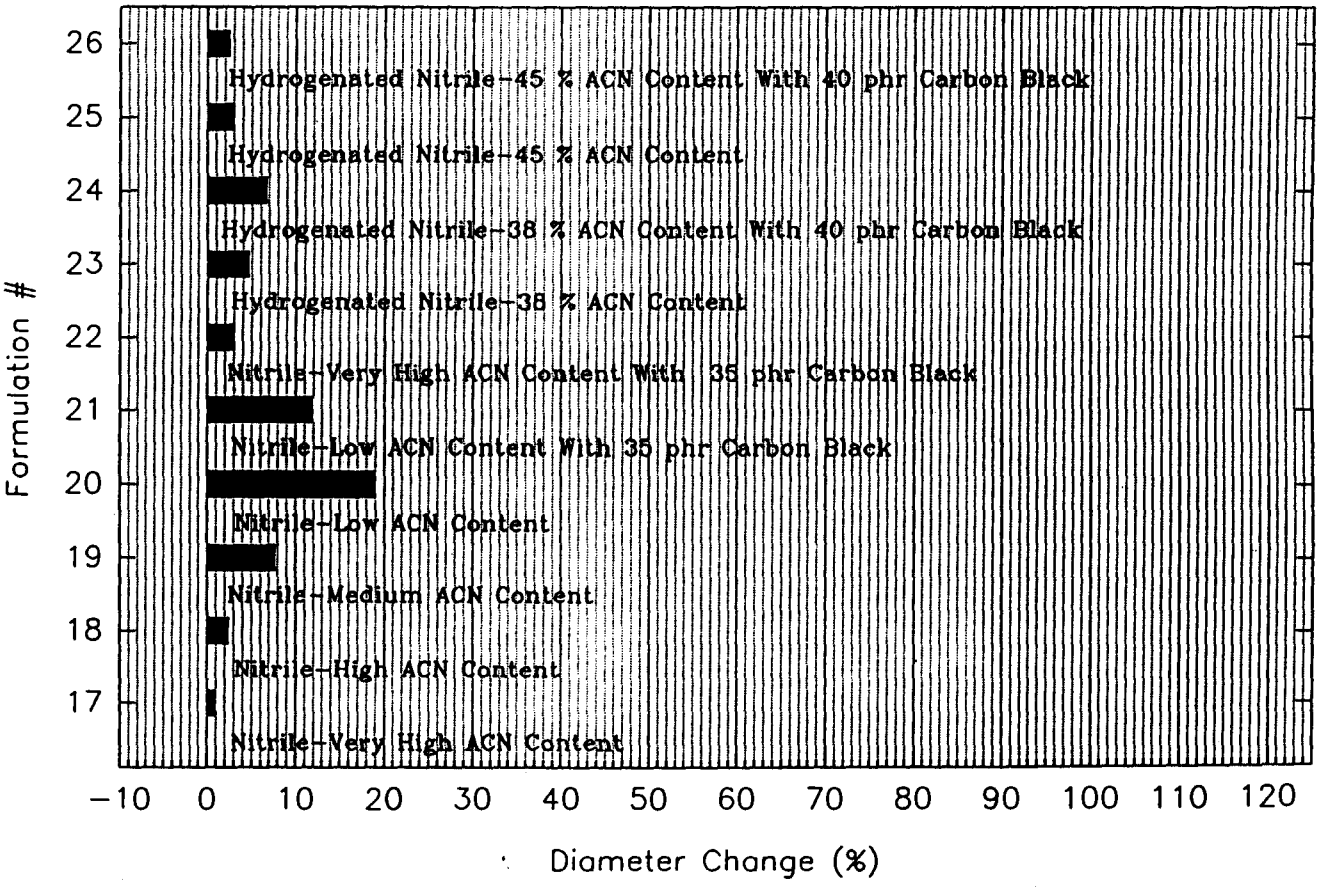


% Diameter Change In Pentaerythritol Ester Branched Acid

Styrene Butadiene Rubbers

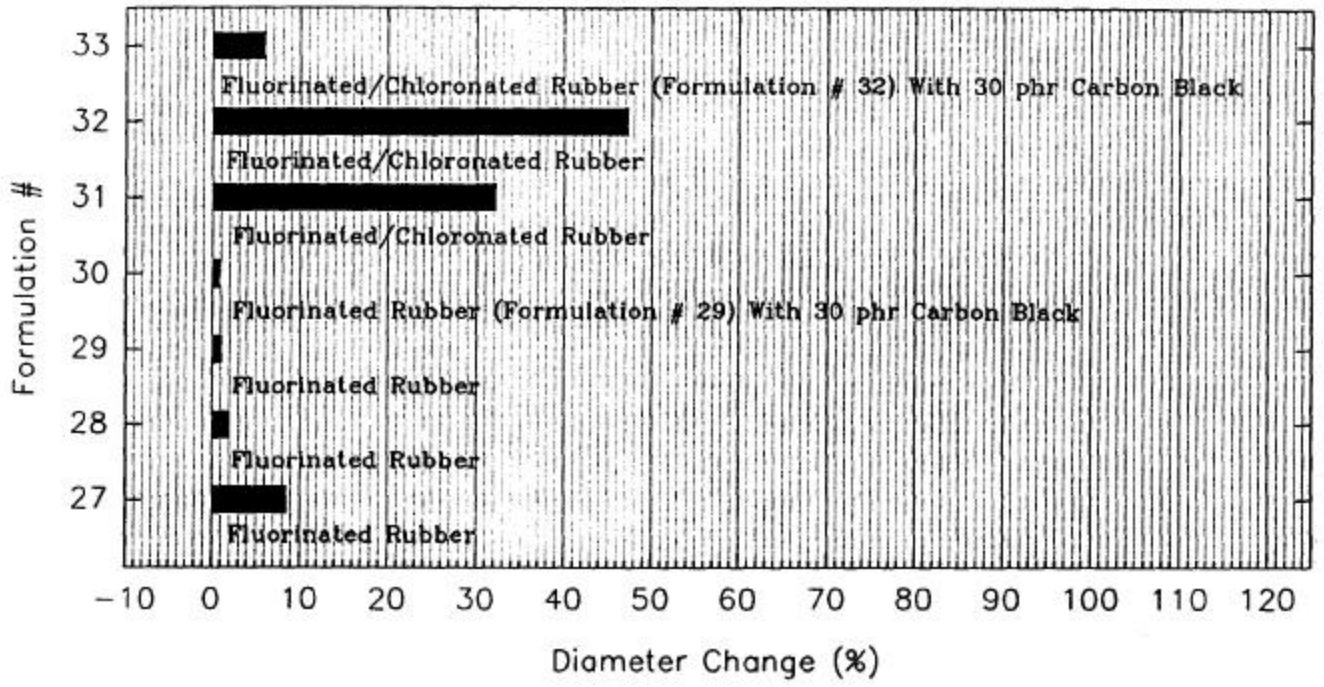


Nitrile Rubbers

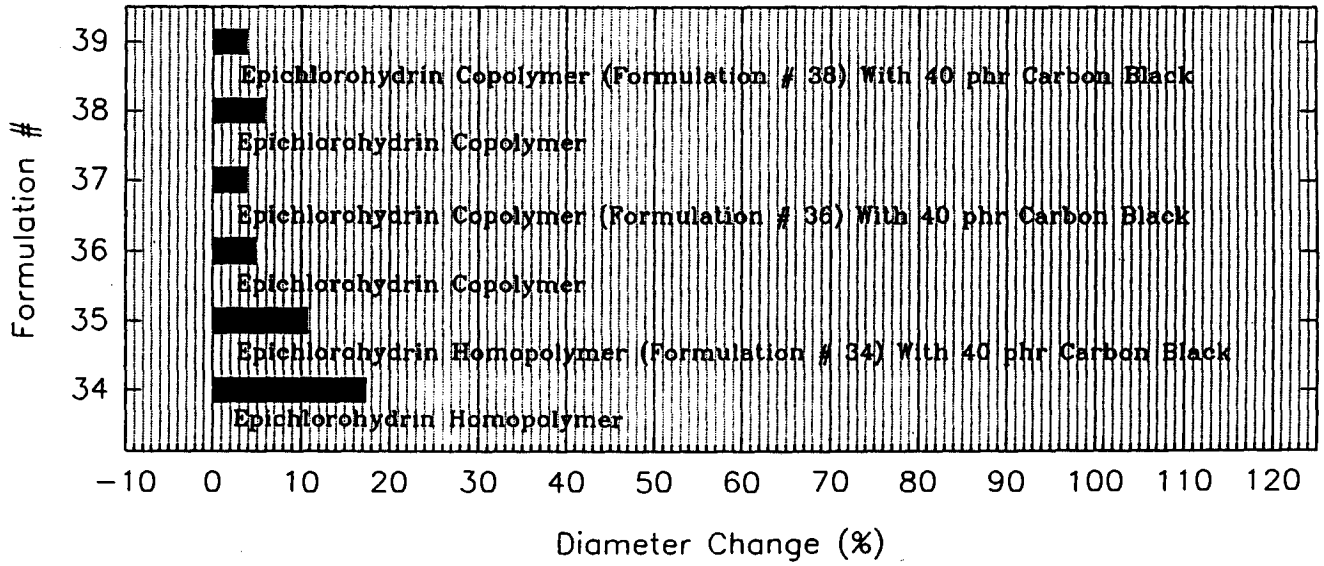


% Diameter Change In Pentaerythritol Ester Branched Acid

Fluorinated Rubbers

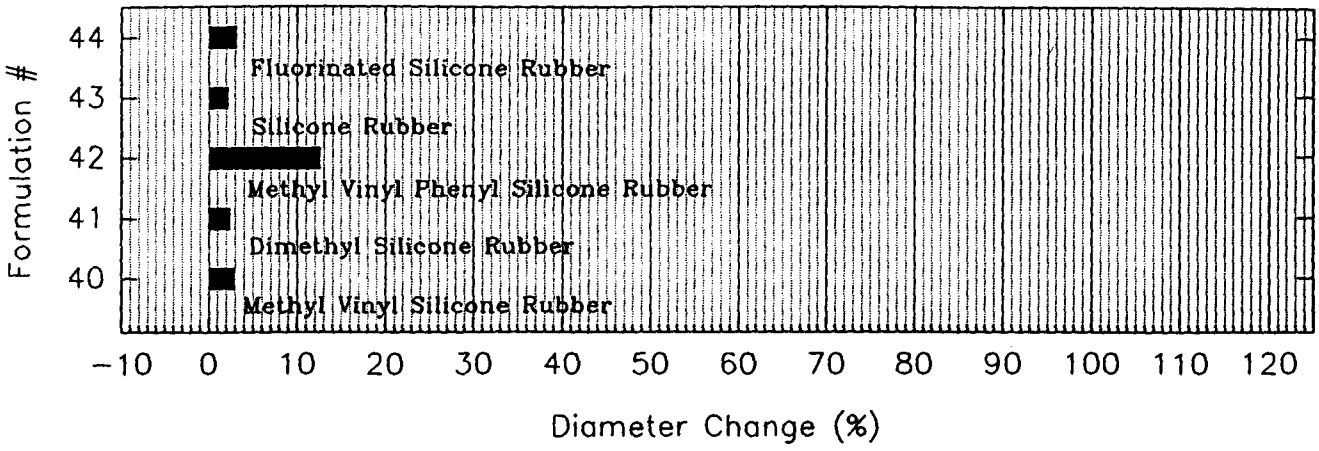


Epichlorohydrin Based Rubbers

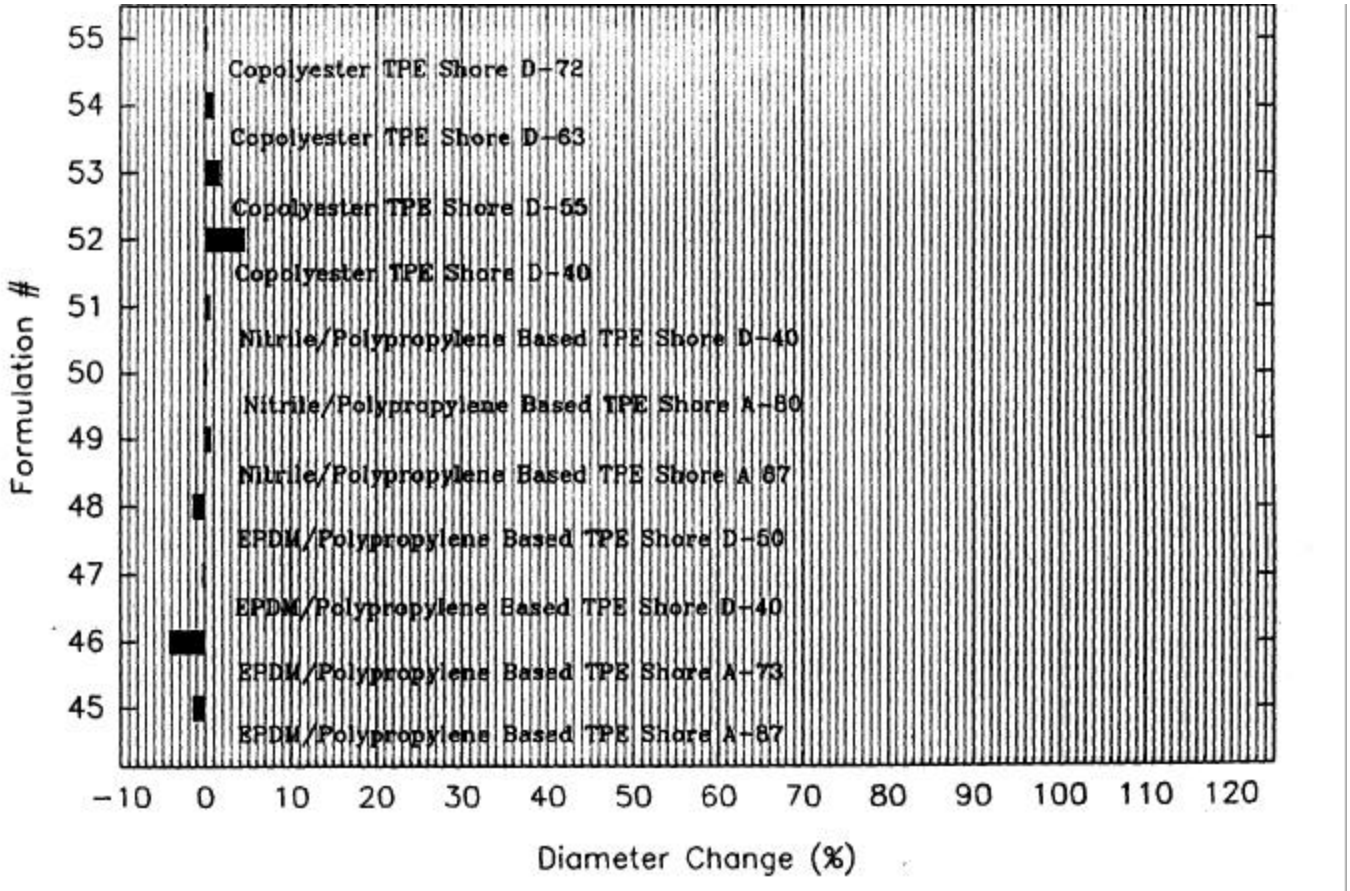


% Diameter Change In Pentaerythritol Ester Branched Acid

Silicones

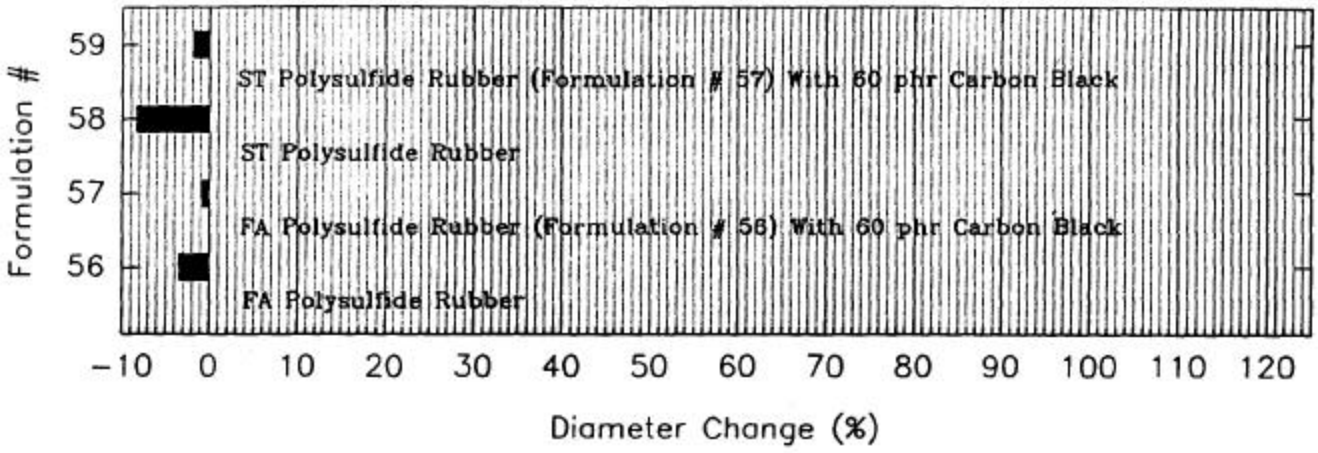


Thermoplastic Elastomers

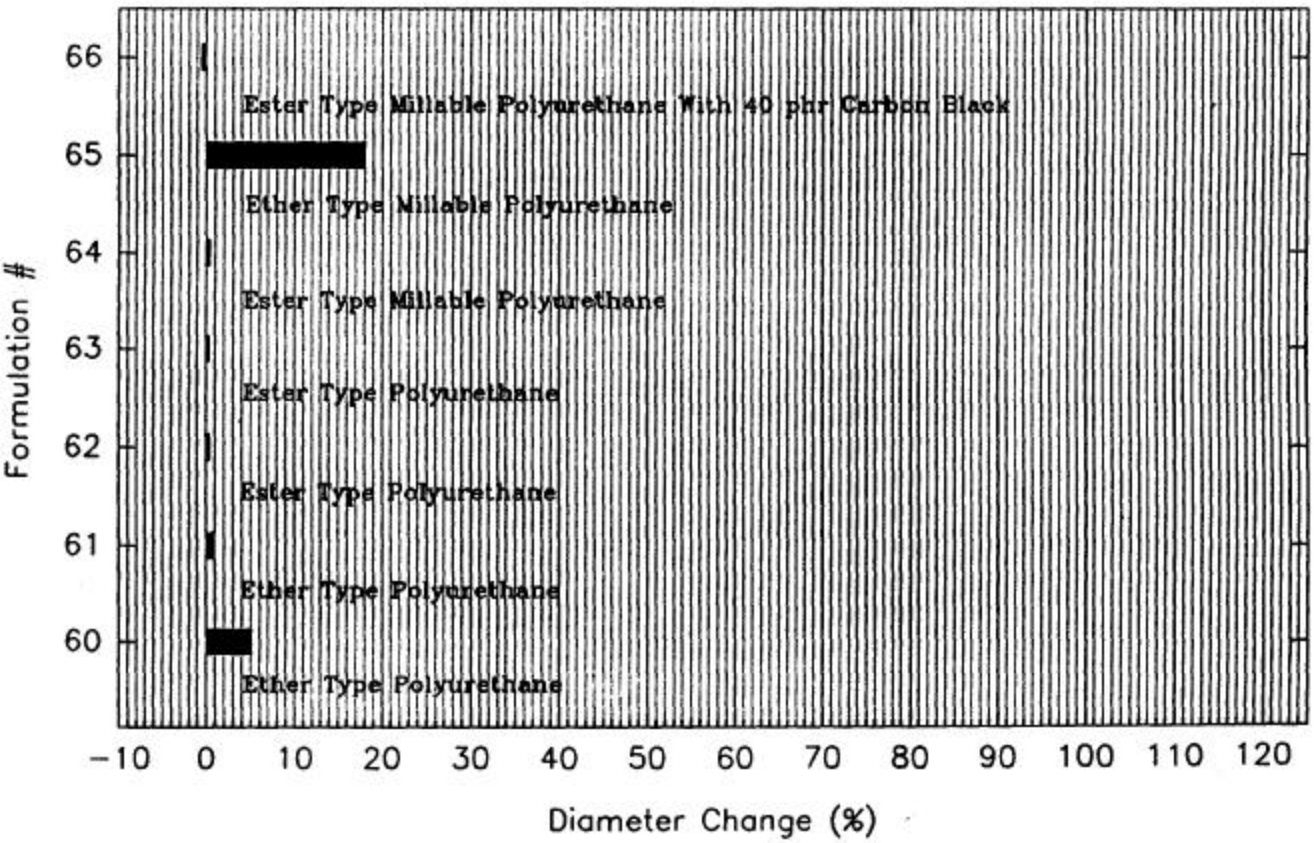


% Diameter Change In Pentaerythritol Ester Branched Acid

Polysulfide Rubbers

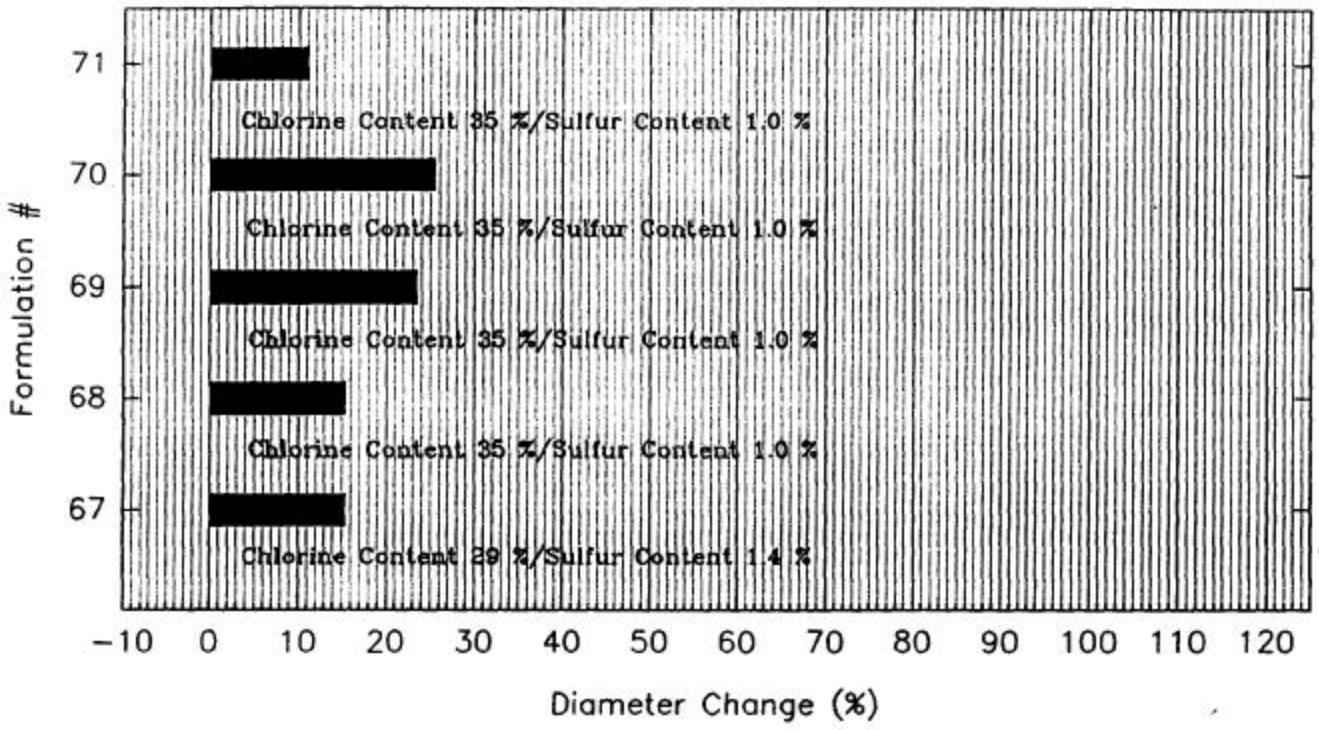


Polyurethanes

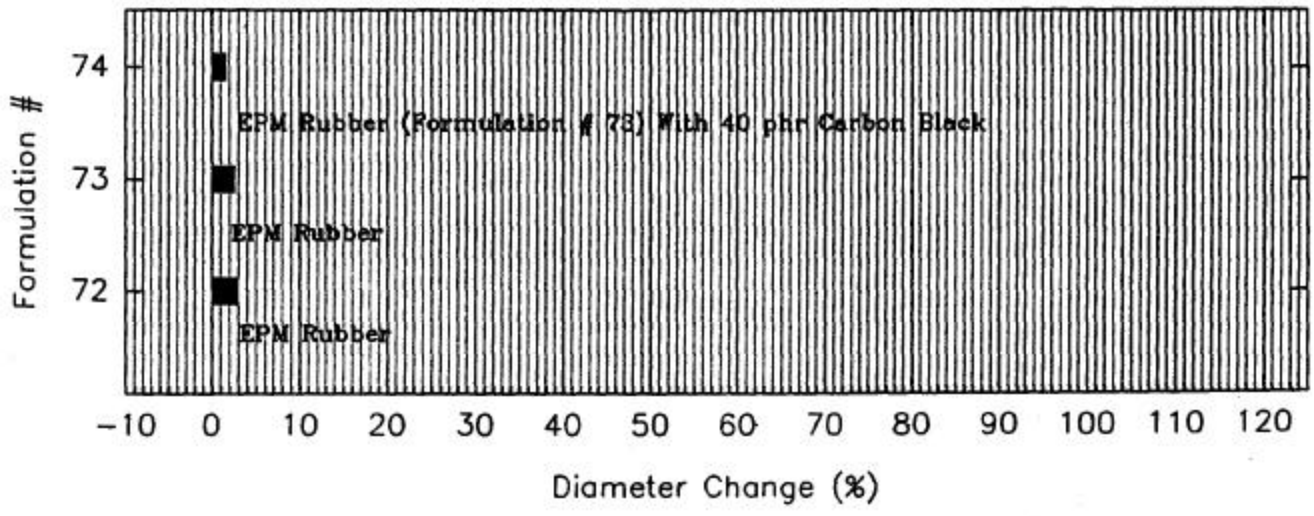


% Diameter Change In Pentaerythritol Ester Branched Acid

Chlorosulfonated Polyethylenes

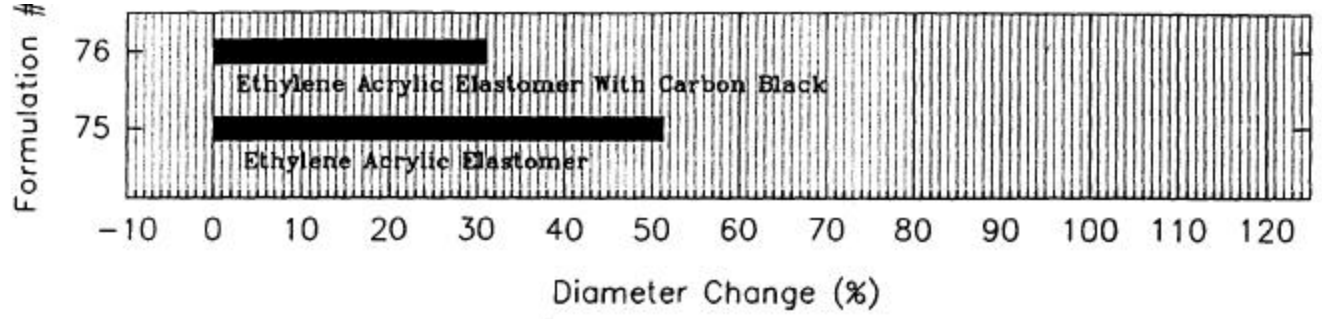


EPM Rubbers

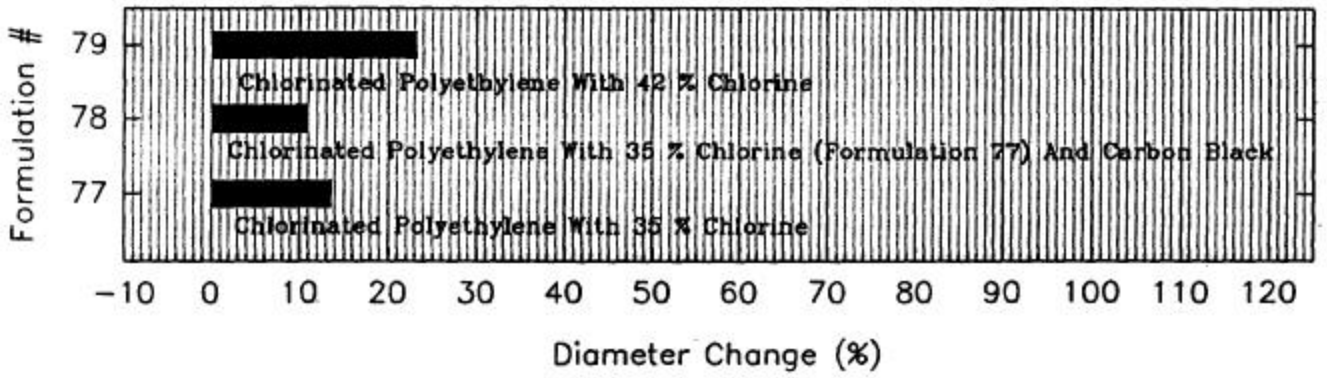


% Diameter Change In Pentaerythritol Ester Branched Acid

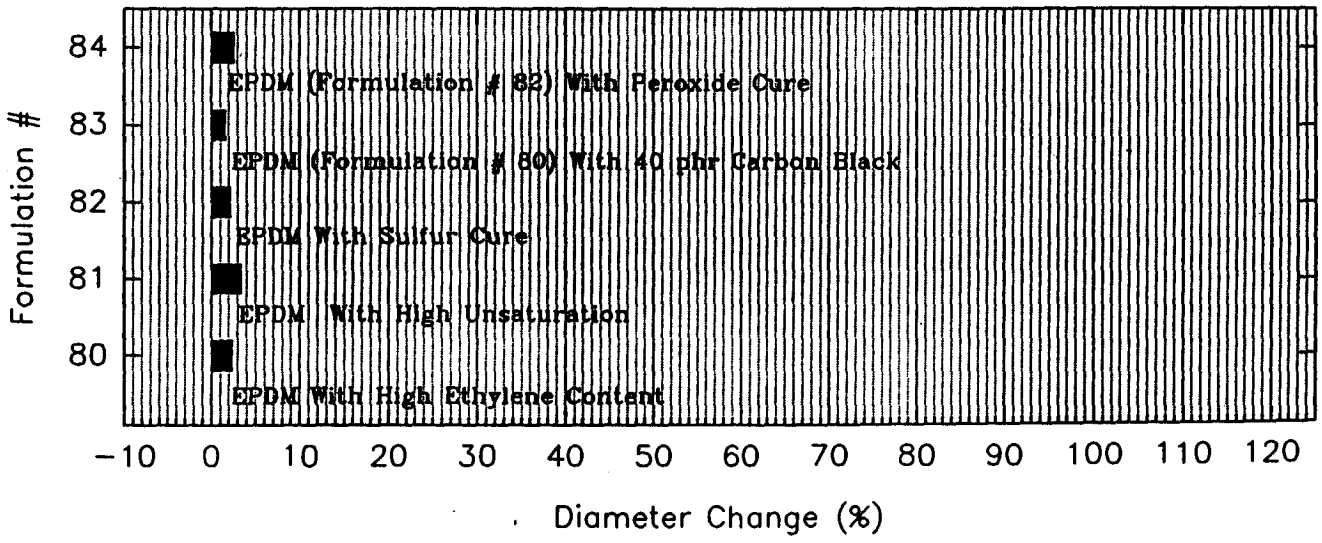
Ethylene Acrlic Elastomers



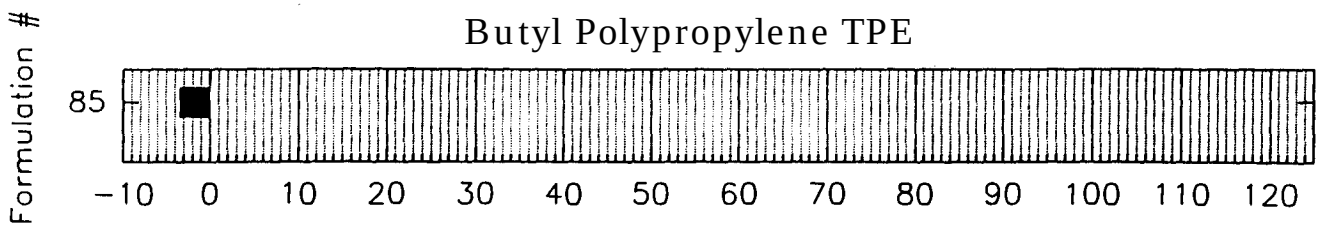
Chlorinated Polyethylenes

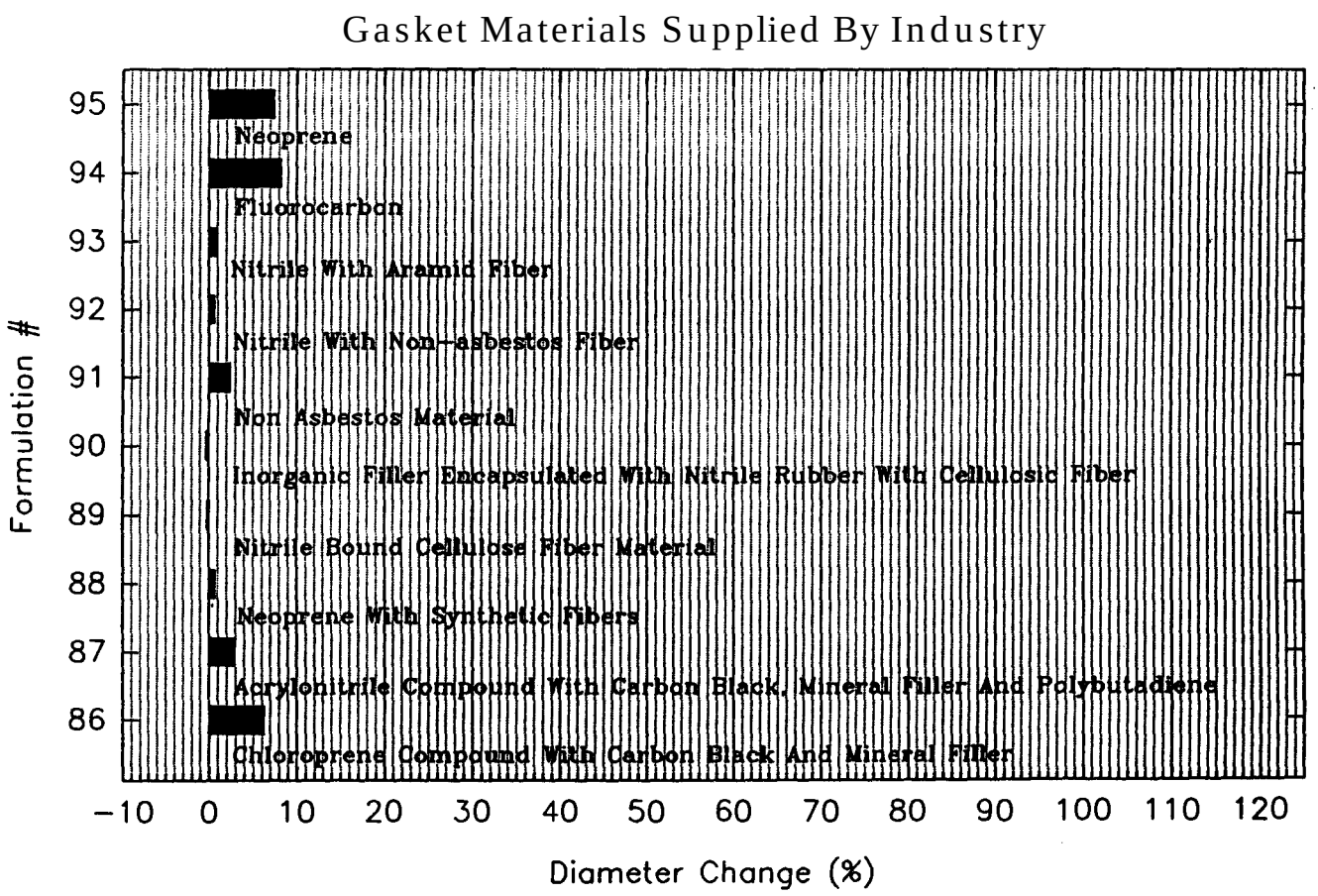


Ethylene Propylene Diene Rubbers



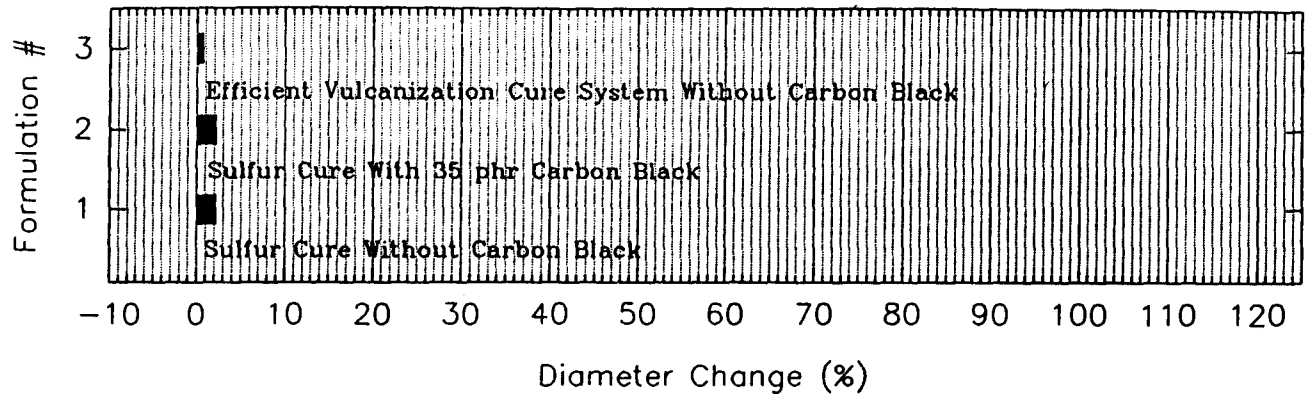
% Diameter Change In Pentaerythritol Ester Branched Acid



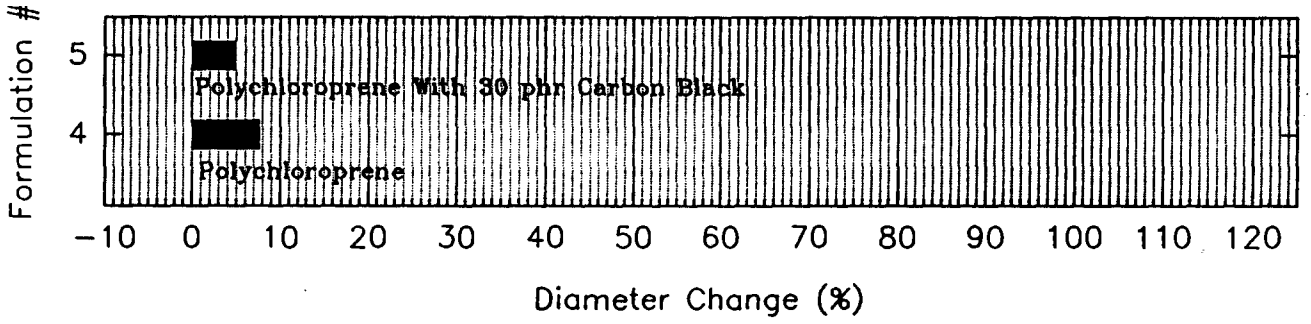


% Diameter Change In Polypropylene Glycol Diol

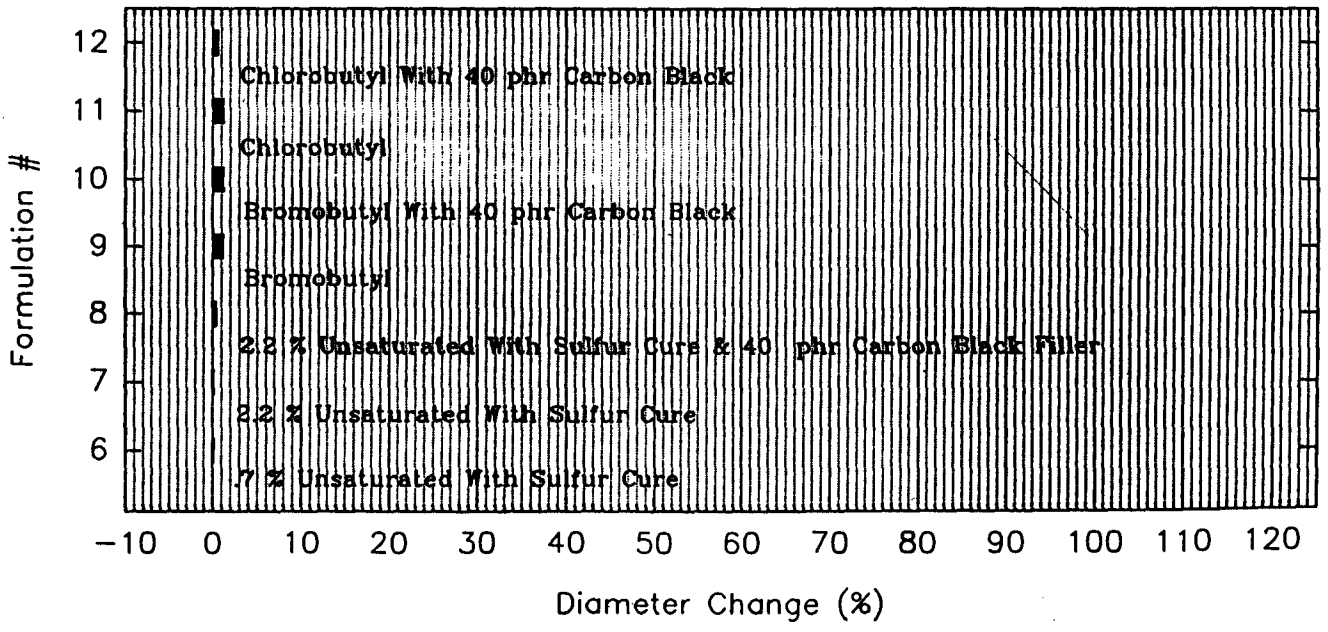
Polyisoprenes



Polychloroprenes

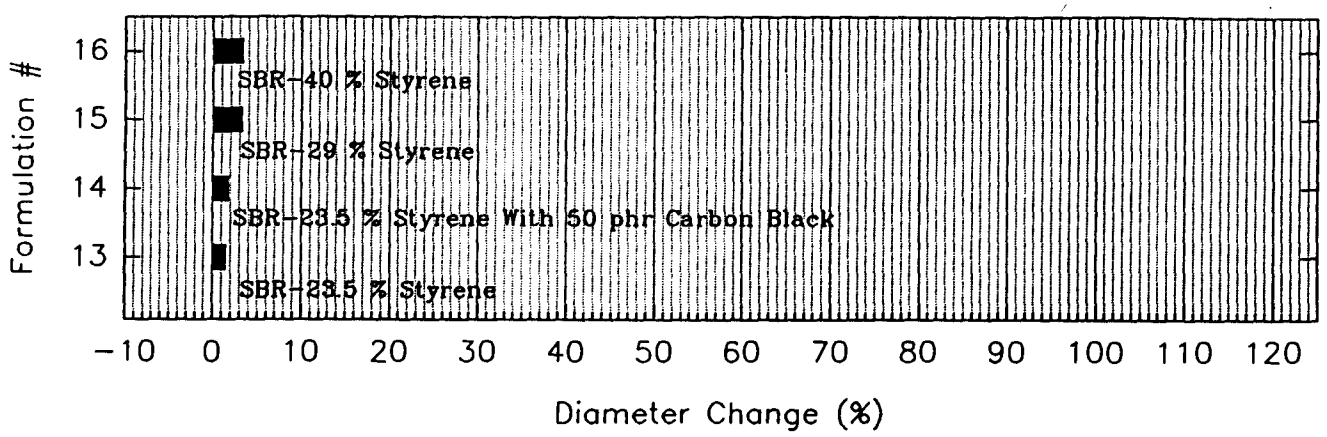


Butyl Rubbers

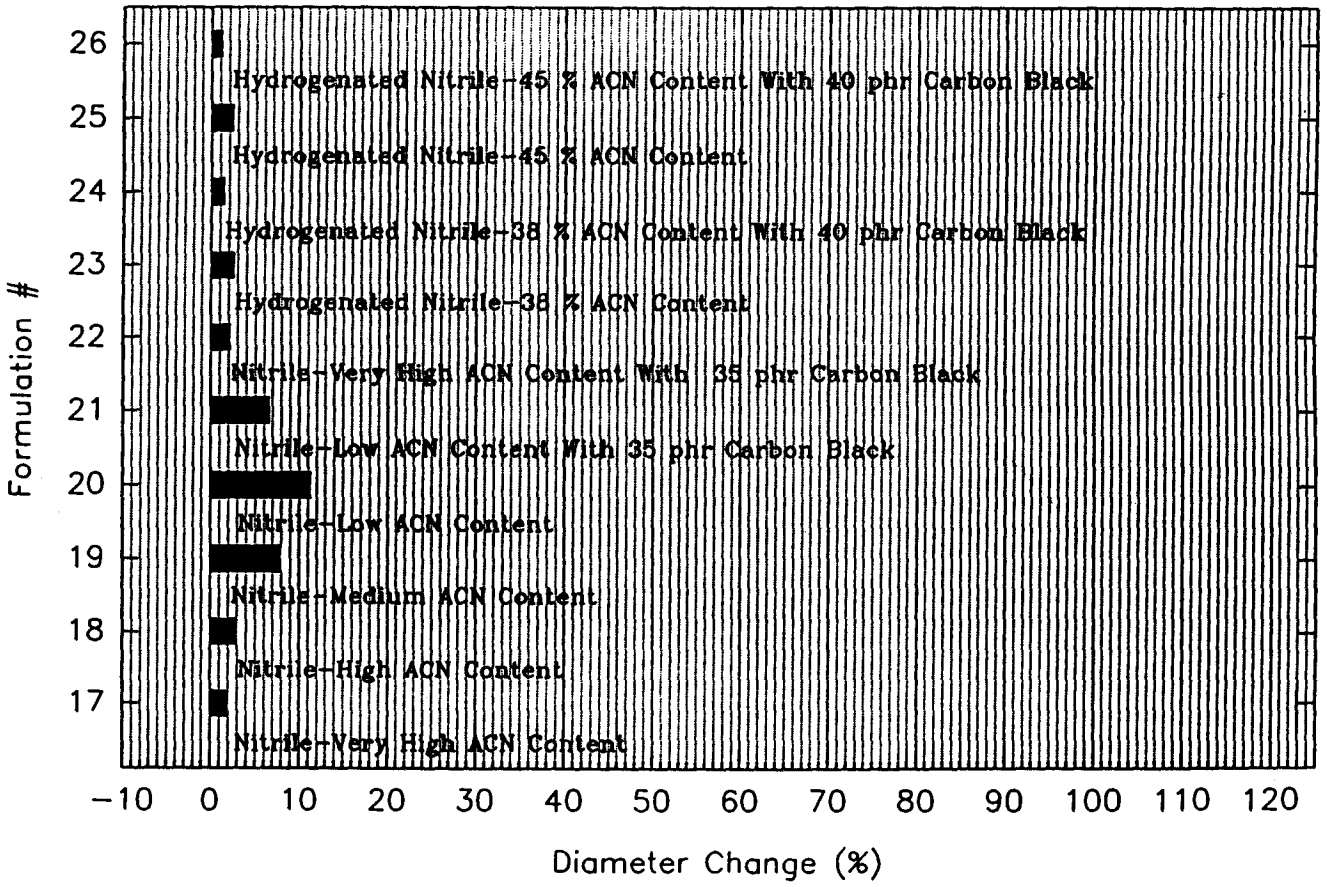


% Diameter Change In Polypropylene Glycol Diol

Styrene Butadiene Rubbers

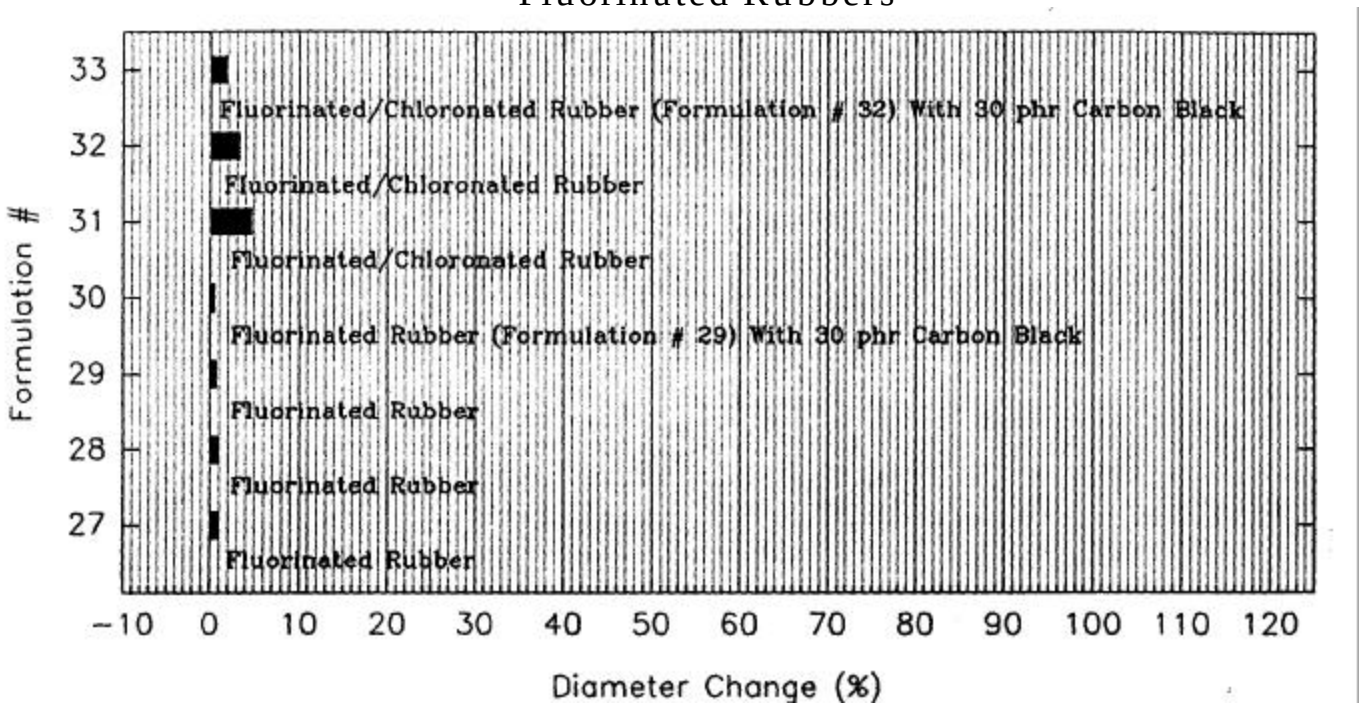


Nitrile Rubbers

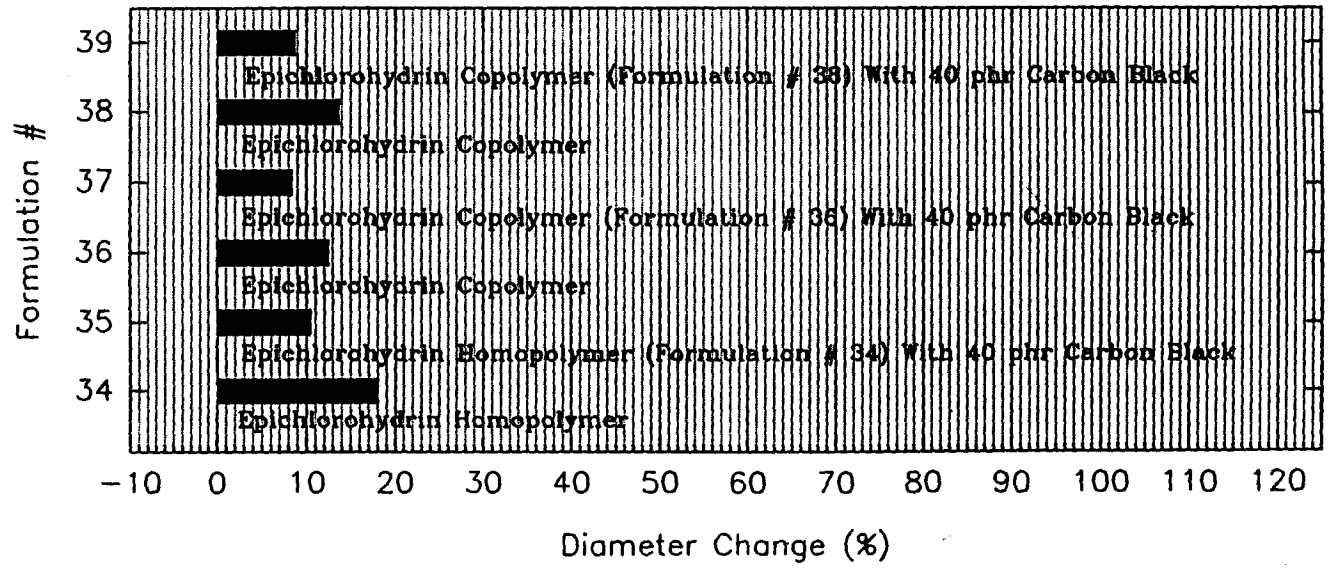


% Diameter Change In Polypropylene Glycol Diol

Fluorinated Rubbers

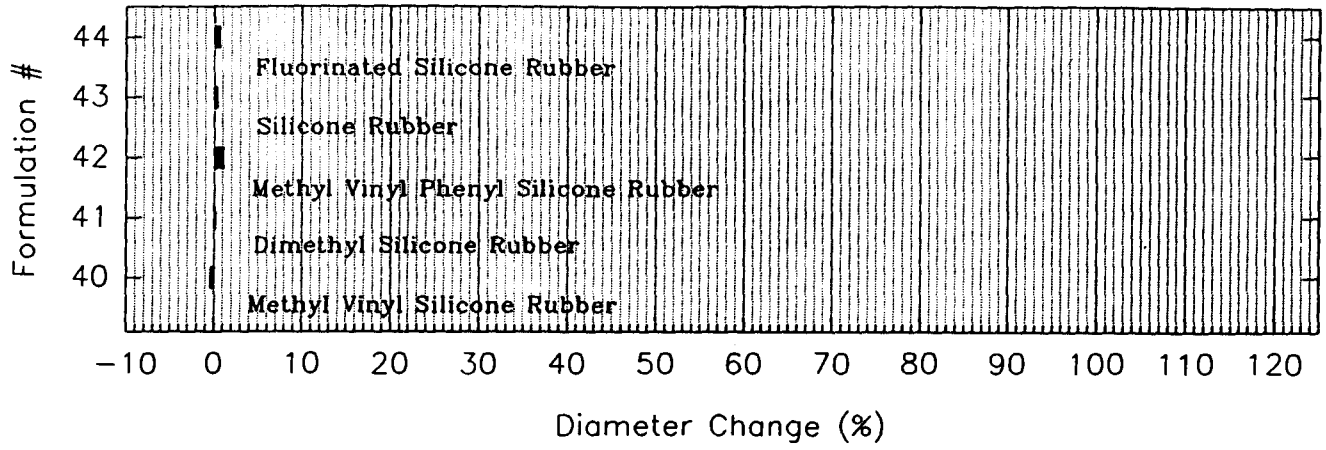


Epichlorohydrin Based Rubbers

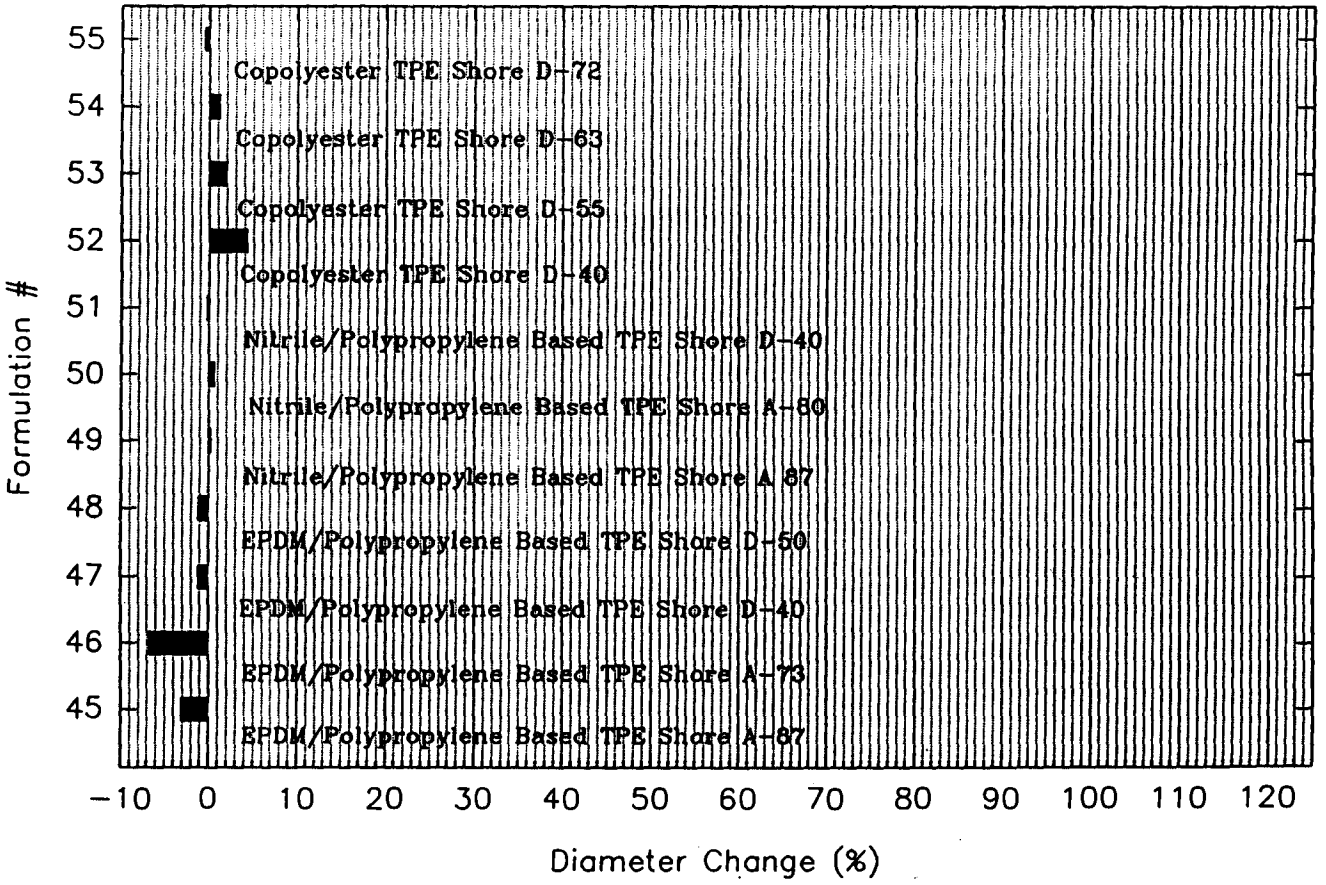


% Diameter Change In Polypropylene Glycol Diol

Silicones

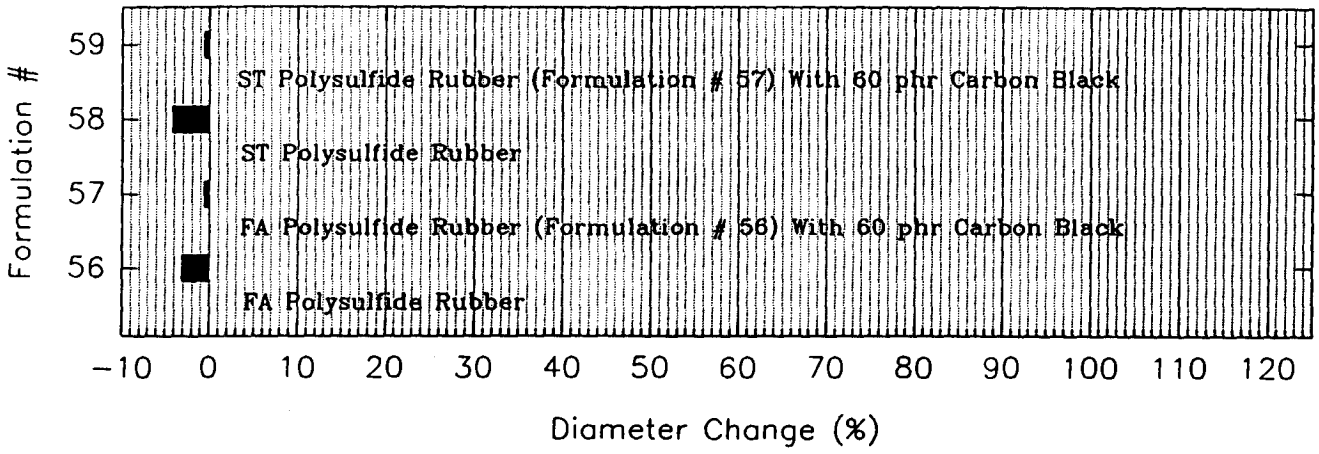


Thermoplastic Elastomers

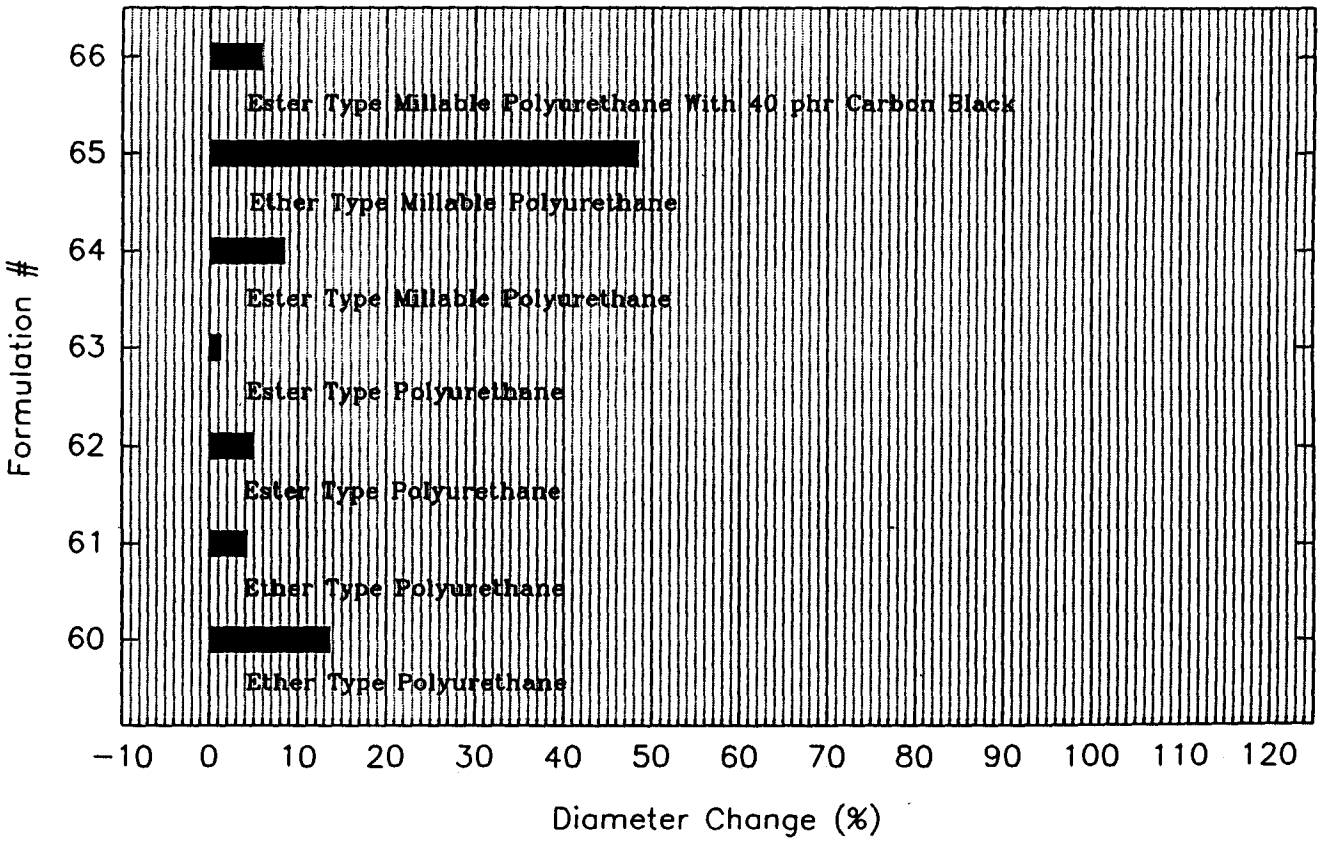


% Diameter Change In Polypropylene Glycol Diol

Polysulfide Rubbers

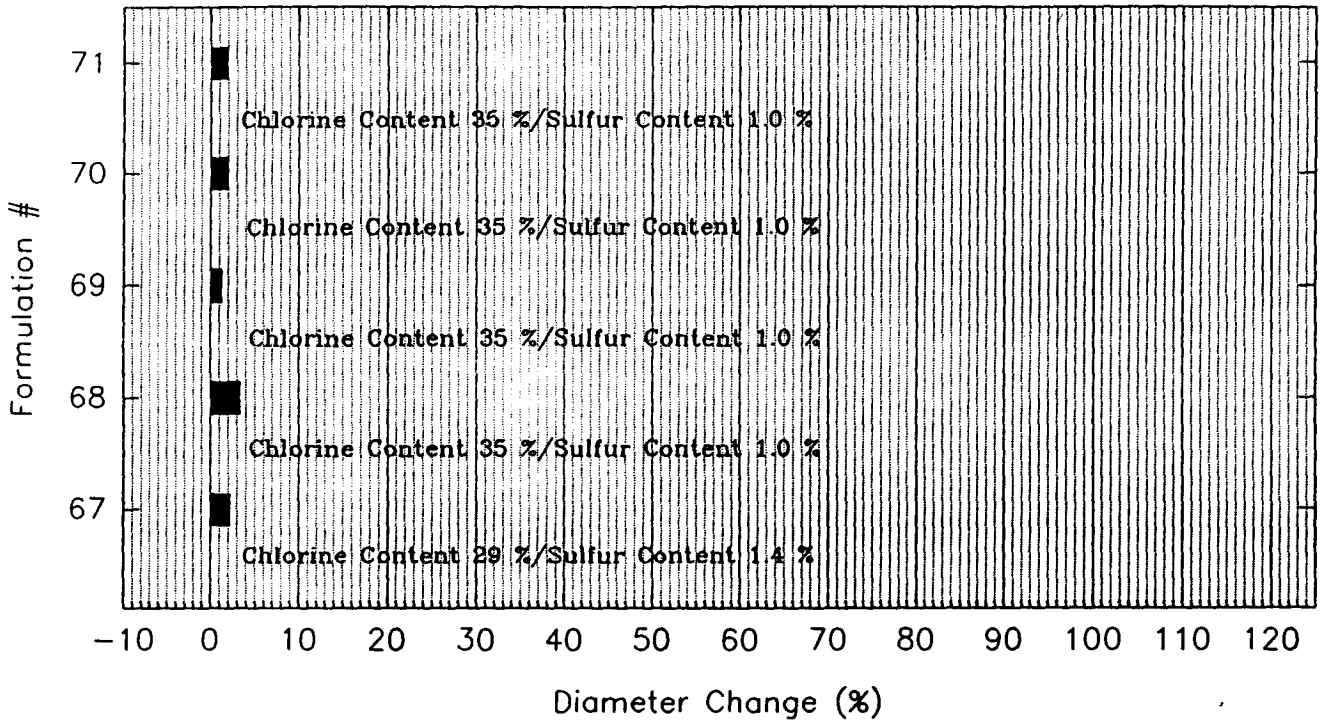


Polyurethanes

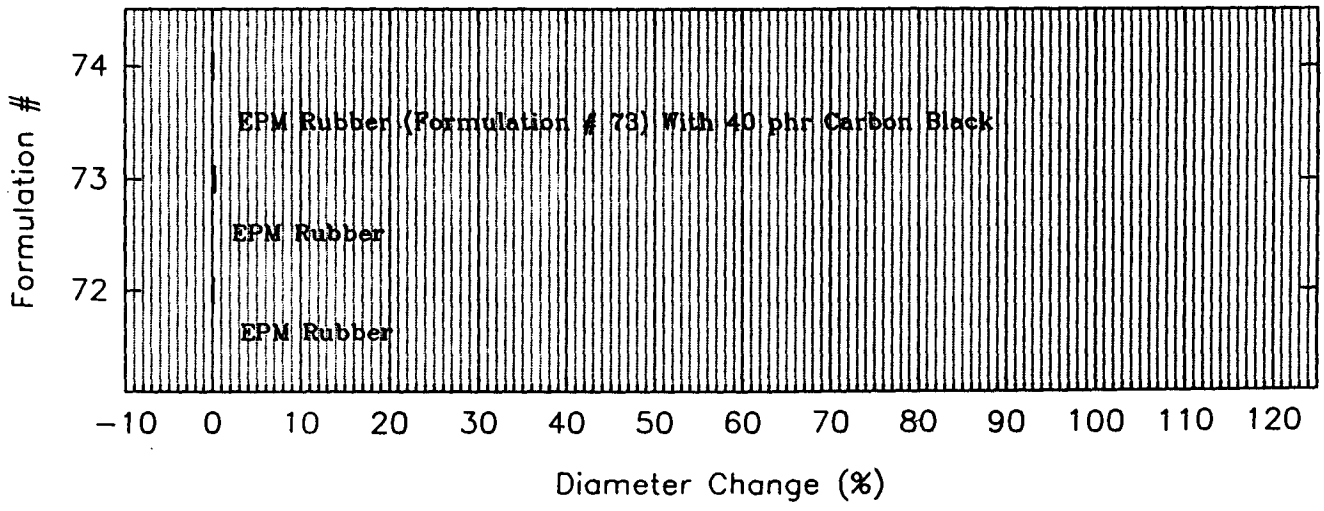


% Diameter Change In Polypropylene Glycol Diol

Chlorosulfonated Polyethylenes

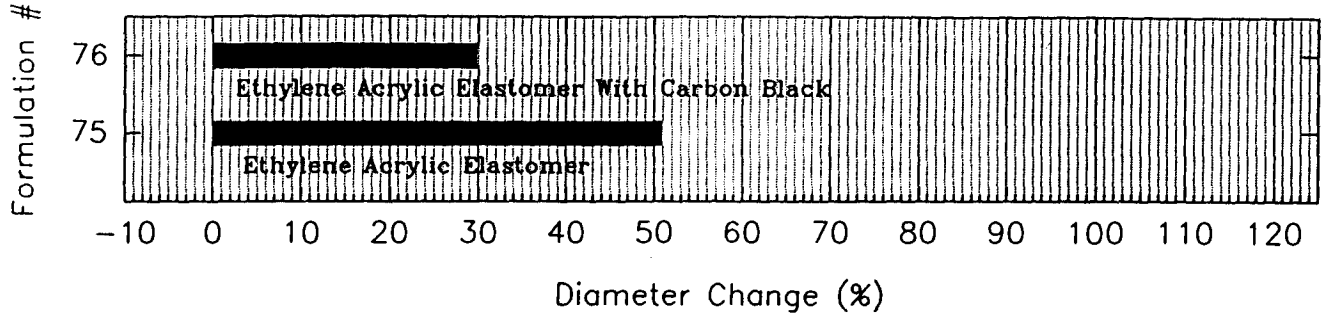


EPM Rubbers

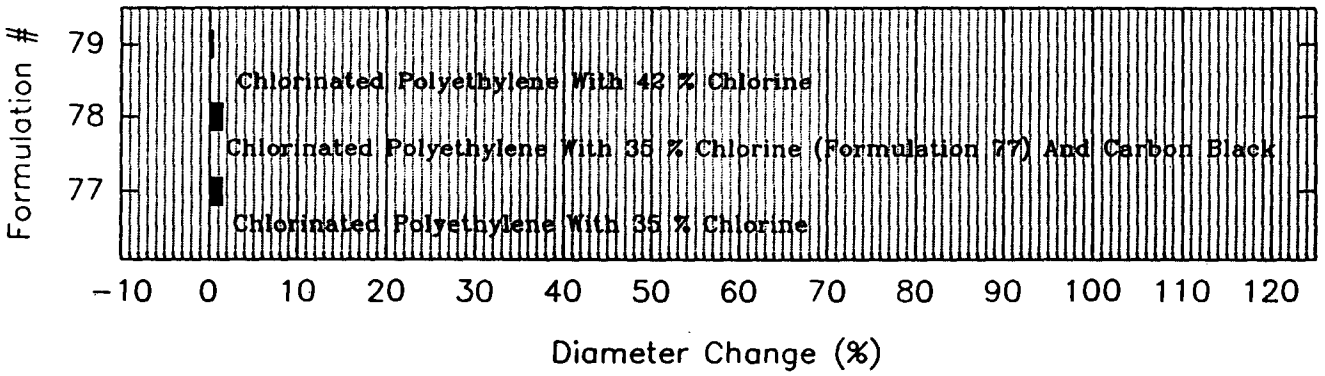


% Diameter Change In Polypropylene Glycol Diol

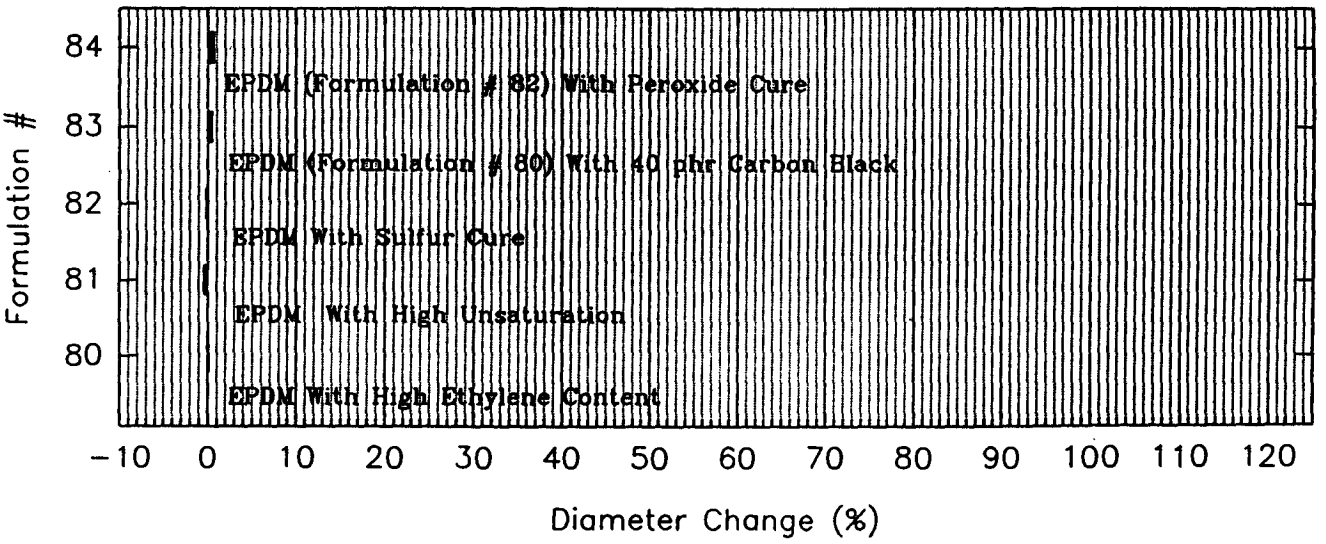
Ethylene Acrlic Elastomers



Chlorinated Polyethylenes

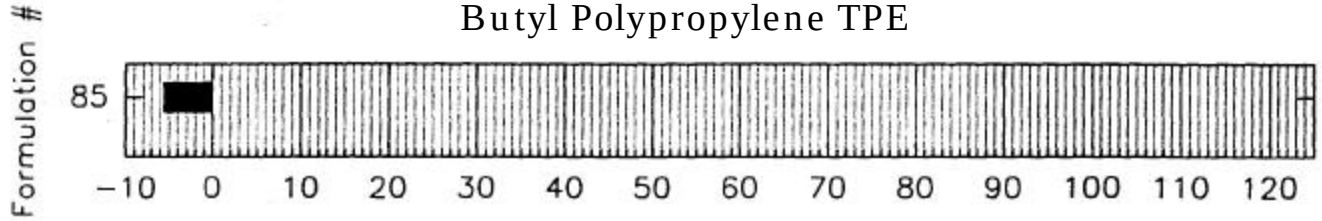


Ethylene Propylene Diene Rubbers

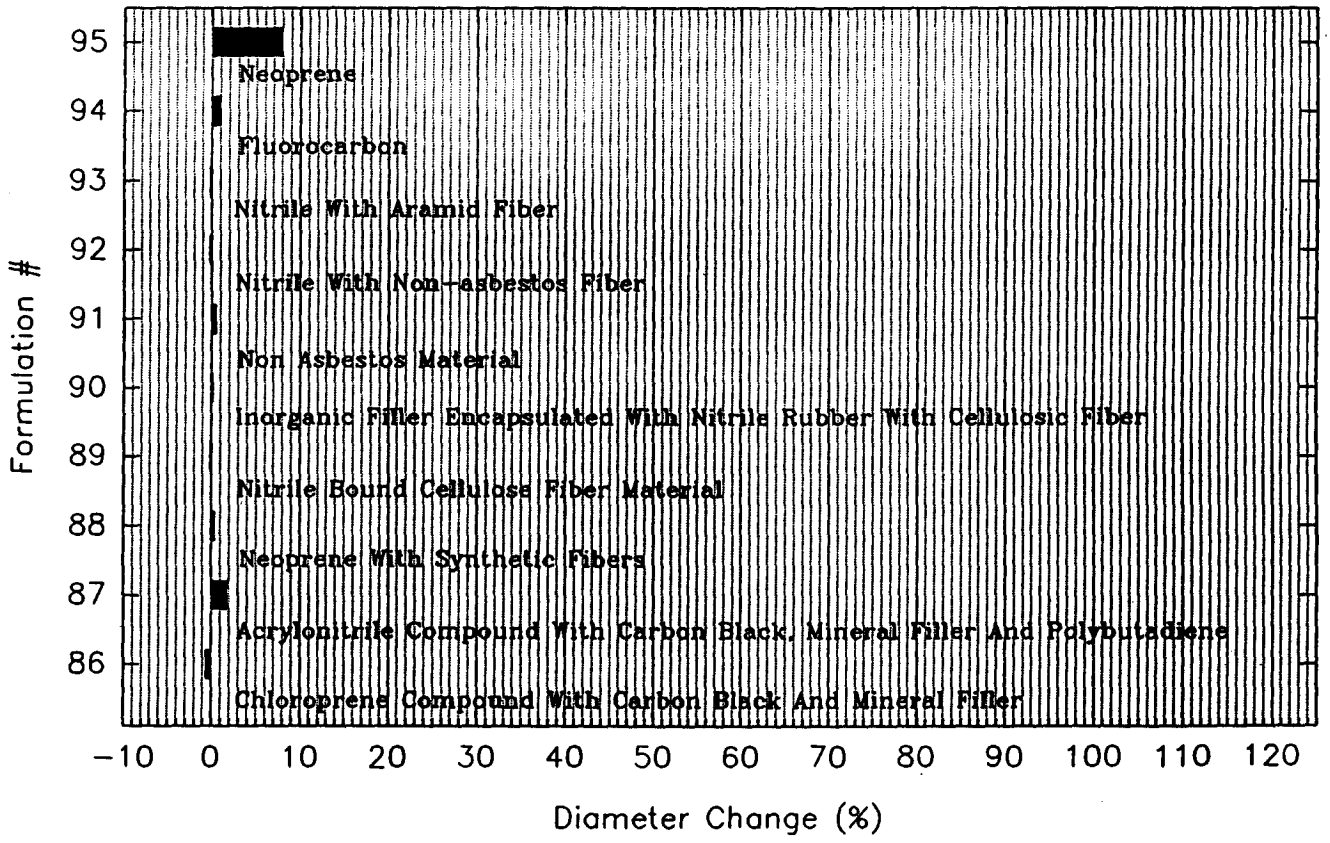


% Diameter Change In
Polypropylene Glycol Diol

Butyl Polypropylene TPE

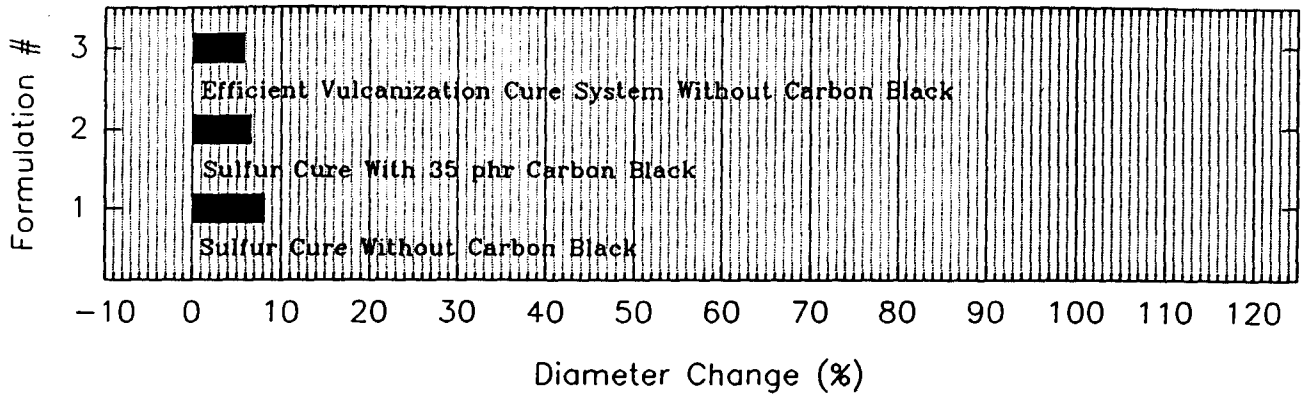


Gasket Materials Supplied By Industry

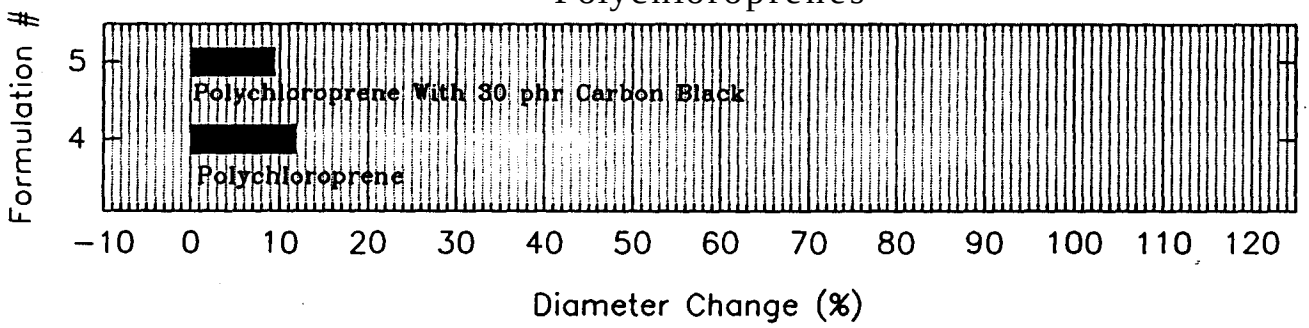


% Diameter Change In Polypropylene Glycol Butyl Monoether

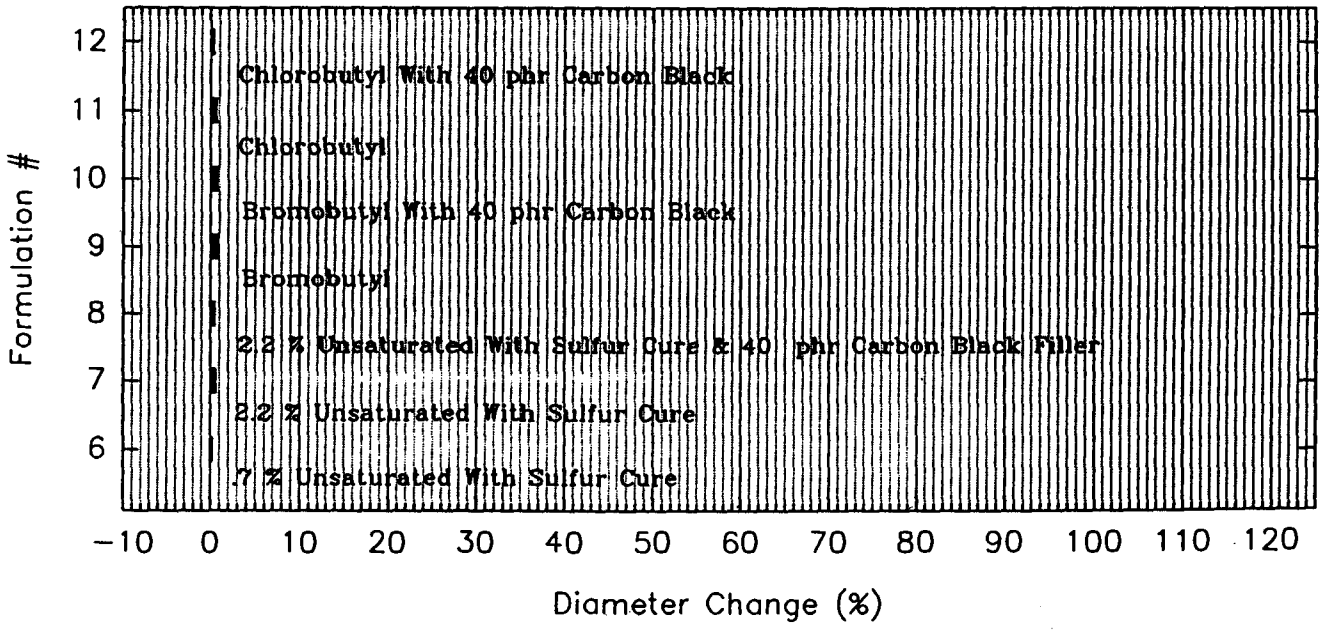
Polyisoprenes



Polychloroprenes

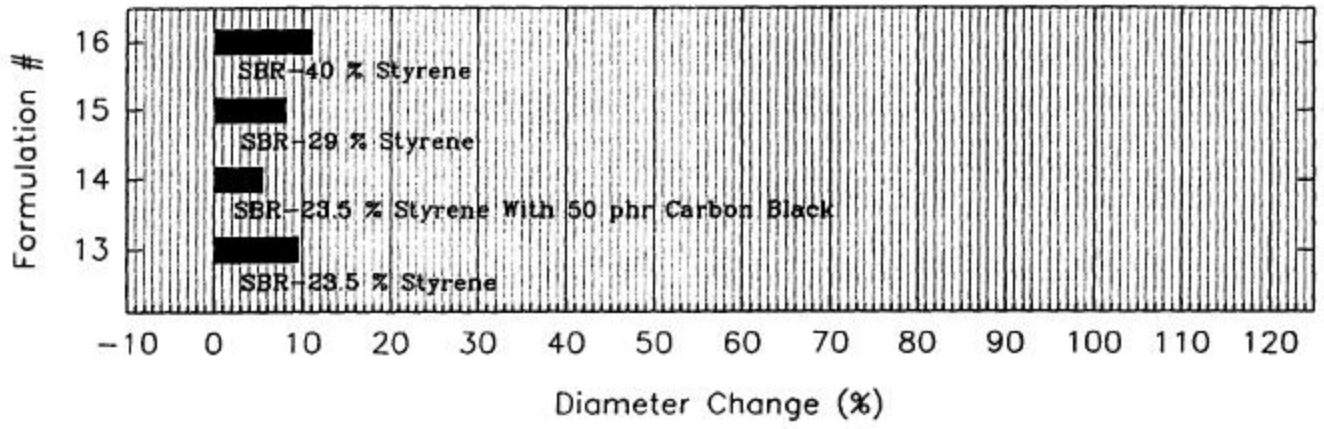


Butyl Rubbers

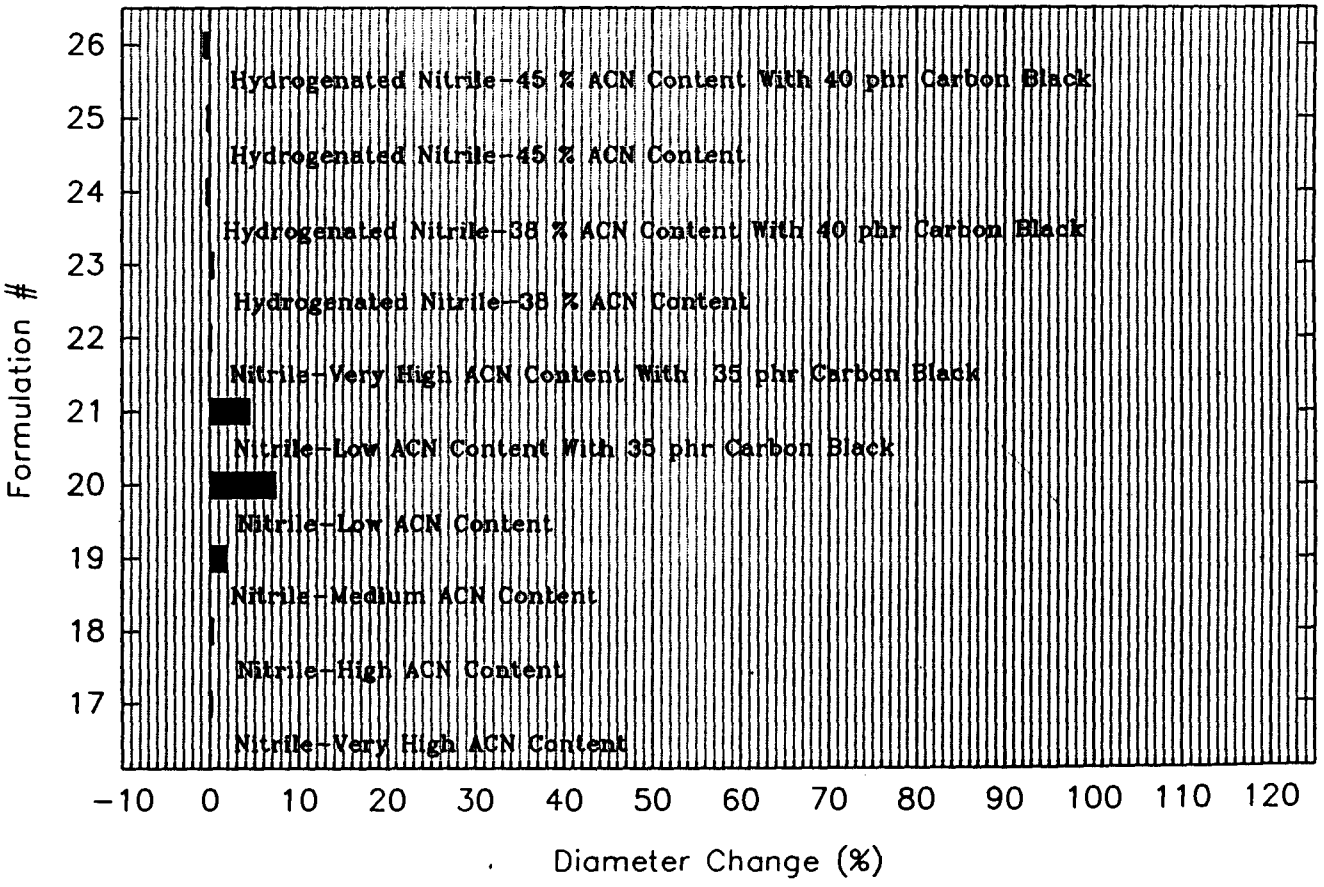


% Diameter Change In Polypropylene Glycol Butyl Monoether

Styrene Butadiene Rubbers

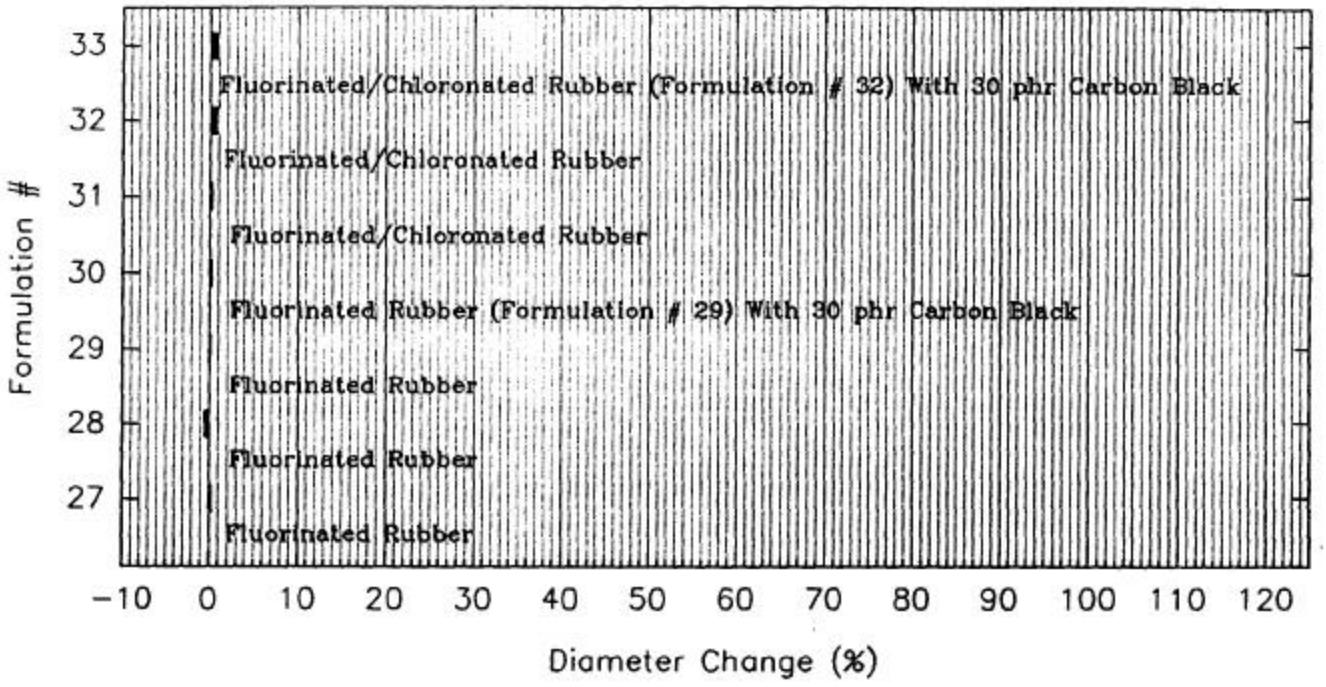


Nitrile Rubbers

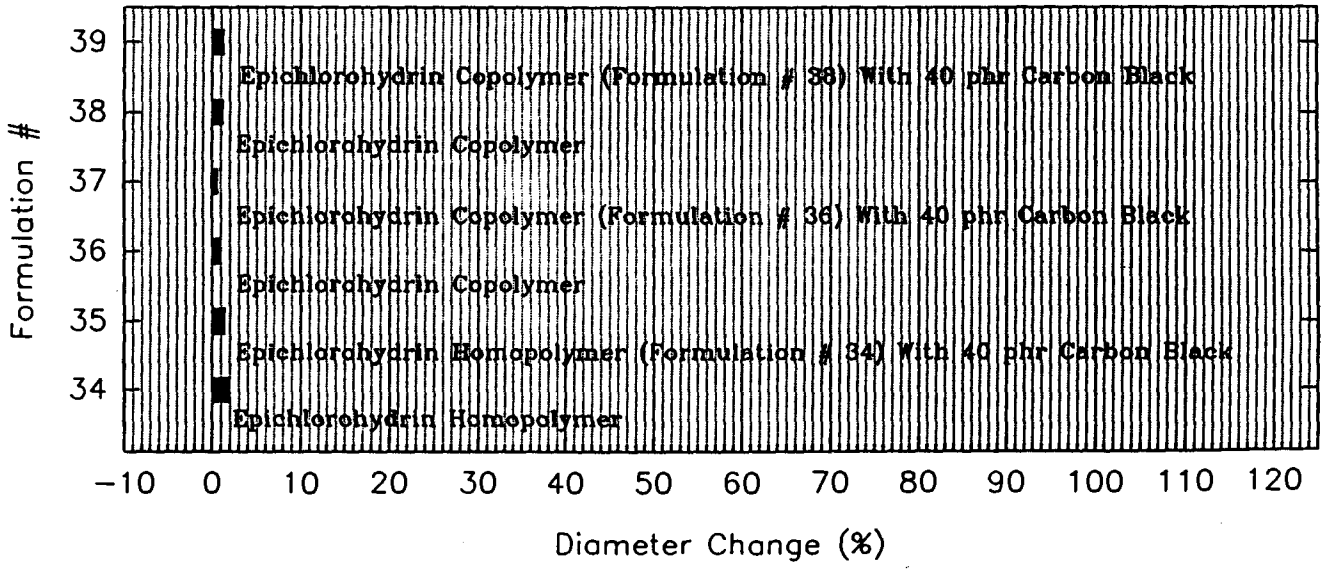


% Diameter Change In Polypropylene Glycol Butyl Monoether

Fluorinated Rubbers

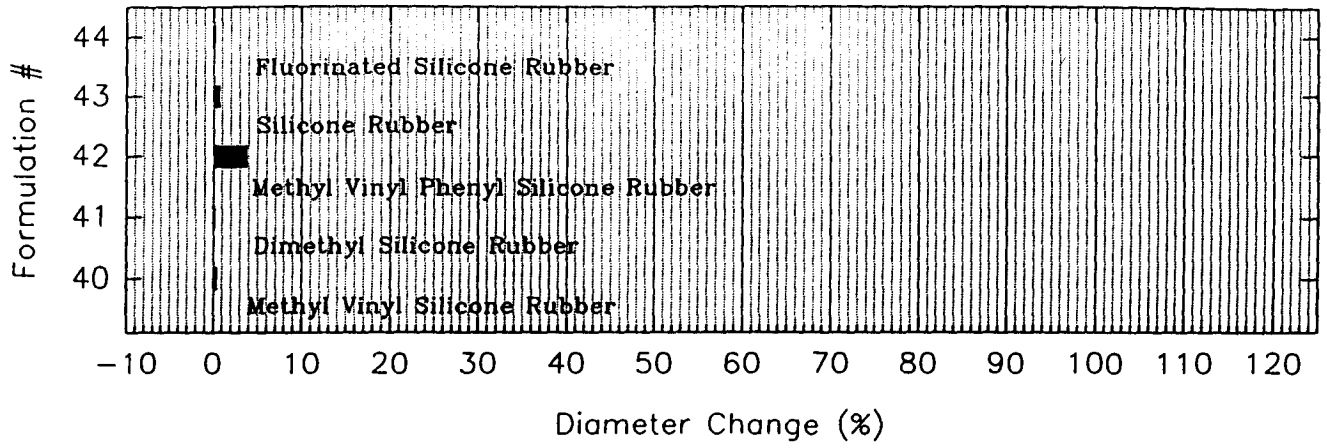


Epichlorohydrin Based Rubbers

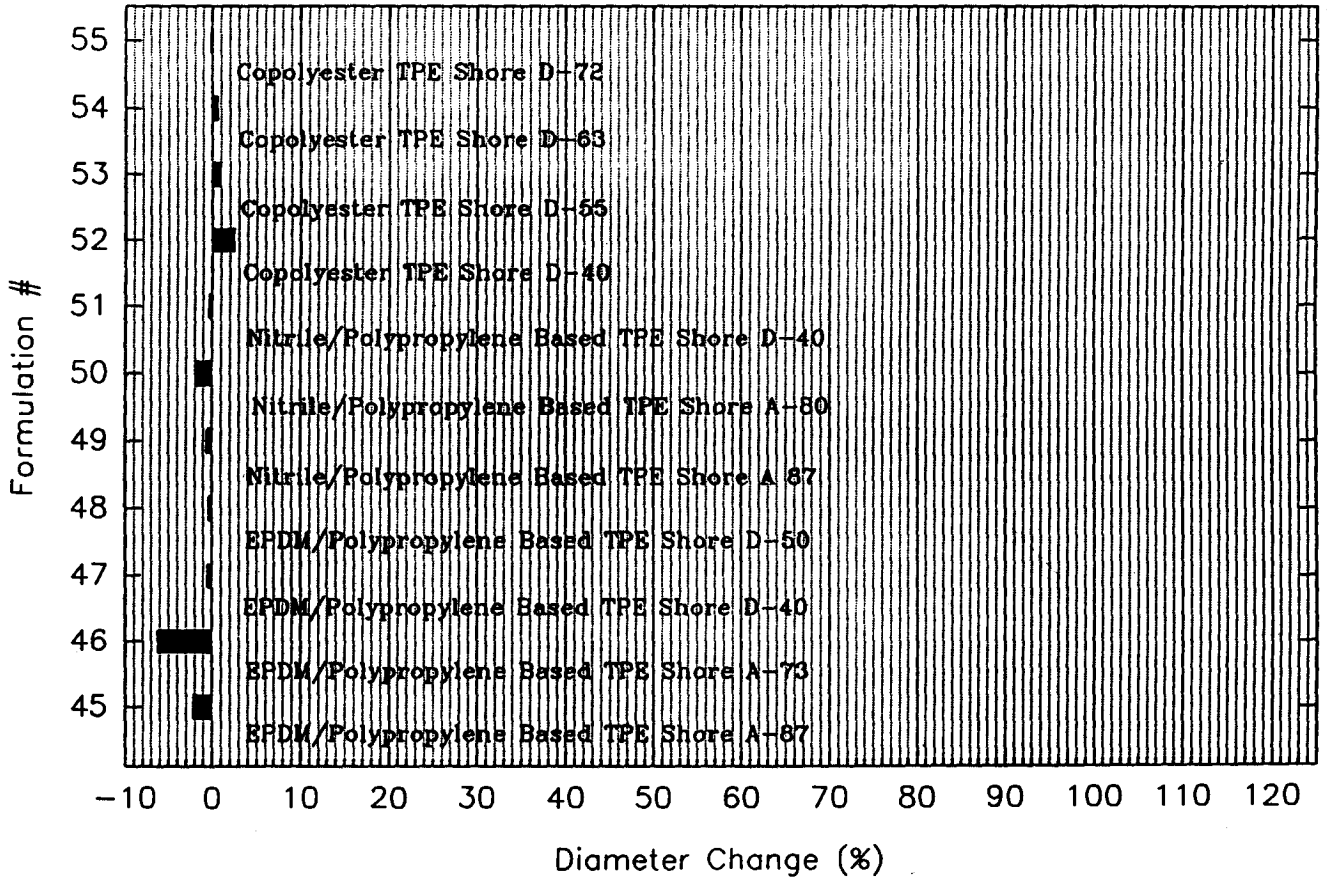


% Diameter Change In Polypropylene Glycol Butyl Monoether

Silicones

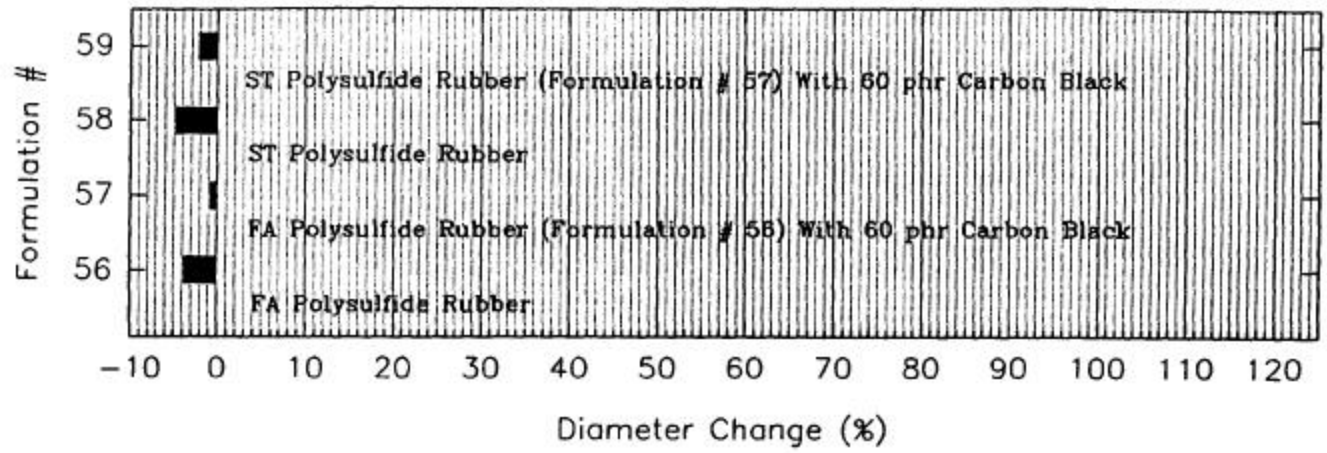


Thermoplastic Elastomers

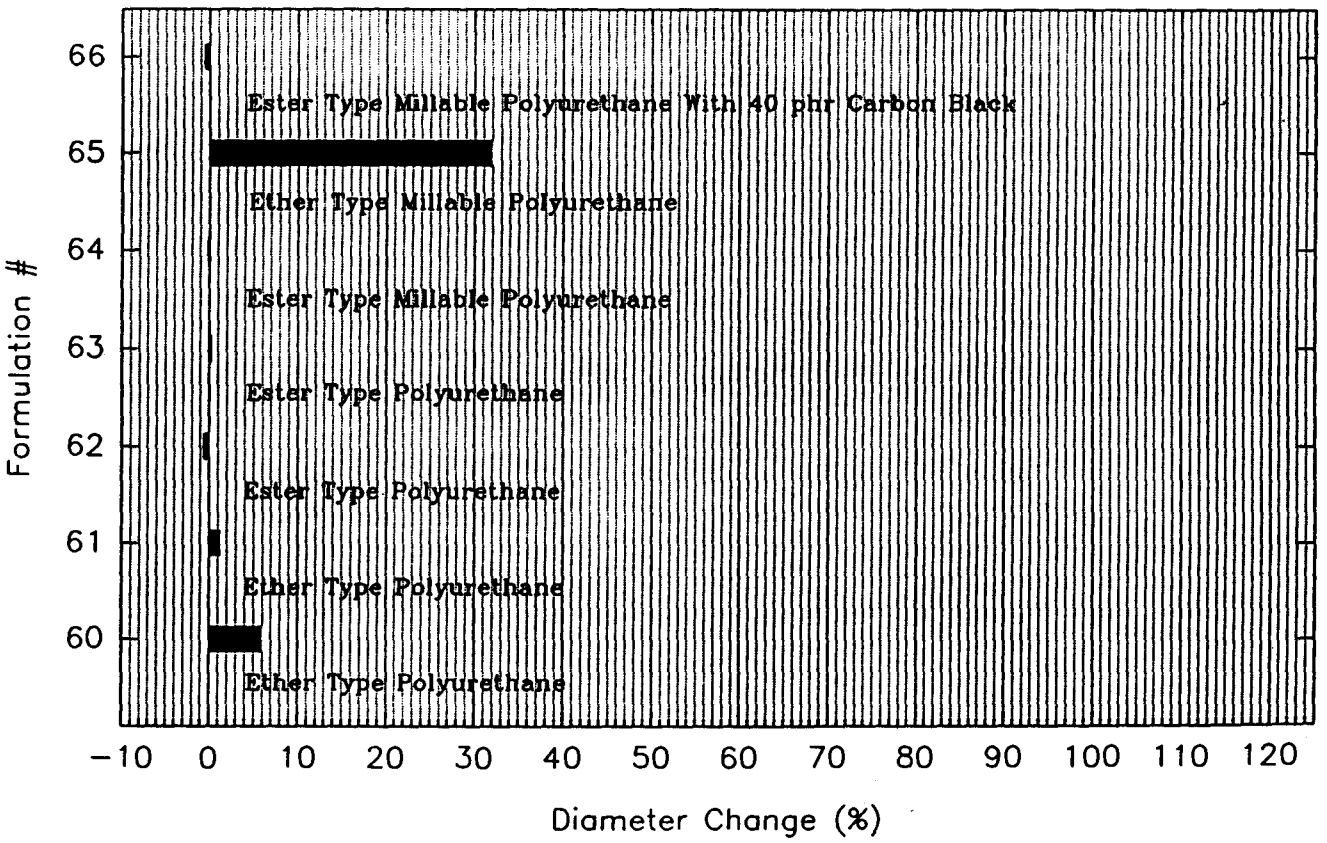


% Diameter Change In Polypropylene Glycol Butyl Monoether

Polysulfide Rubbers

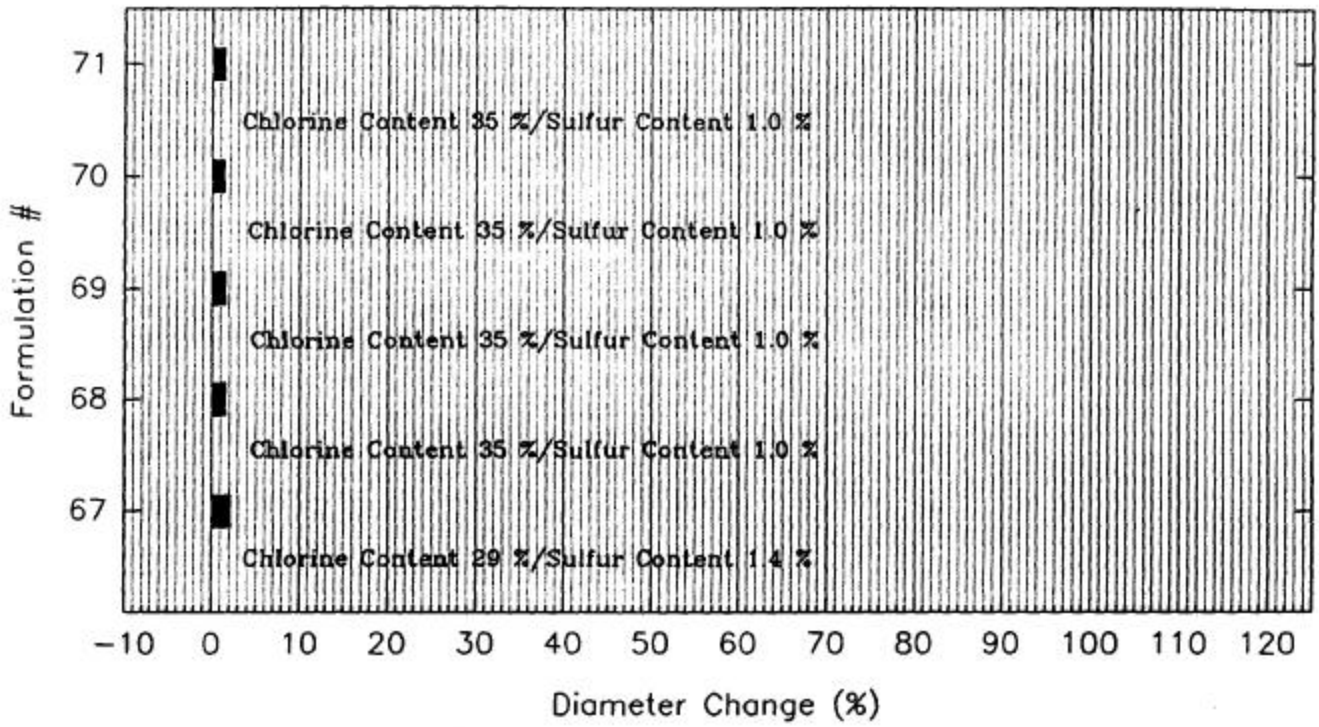


Polyurethanes

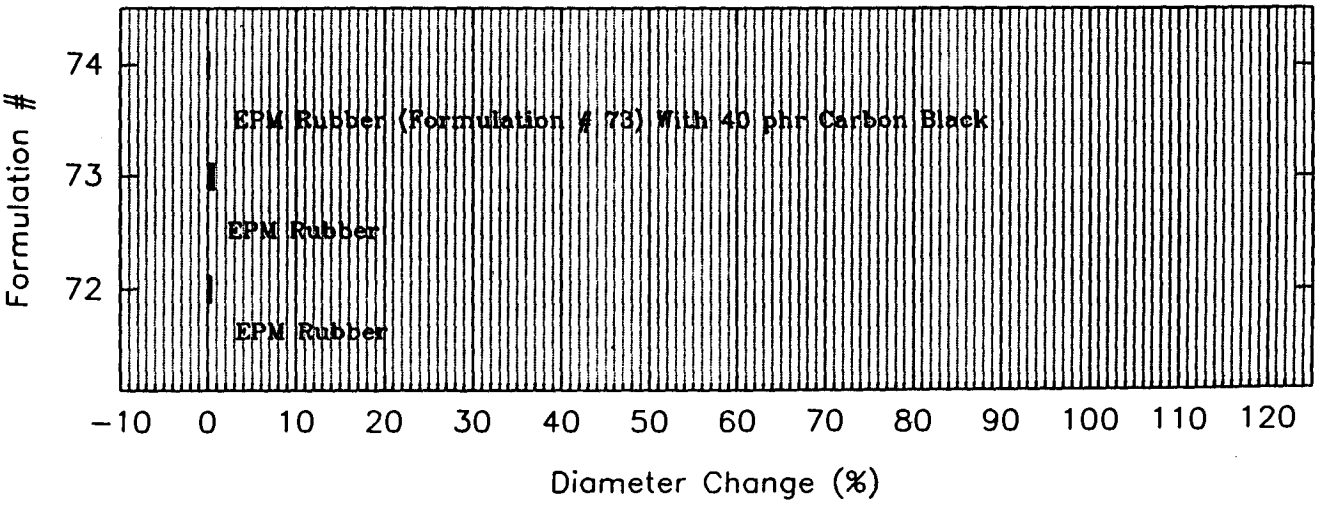


% Diameter Change In
Polypropylene Glycol Butyl

Chlorosulfonated Polyethylenes

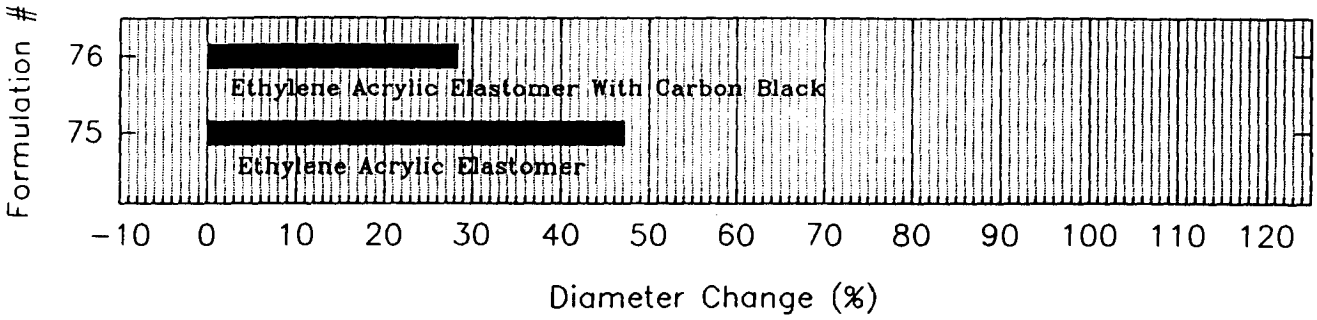


EPM Rubbers

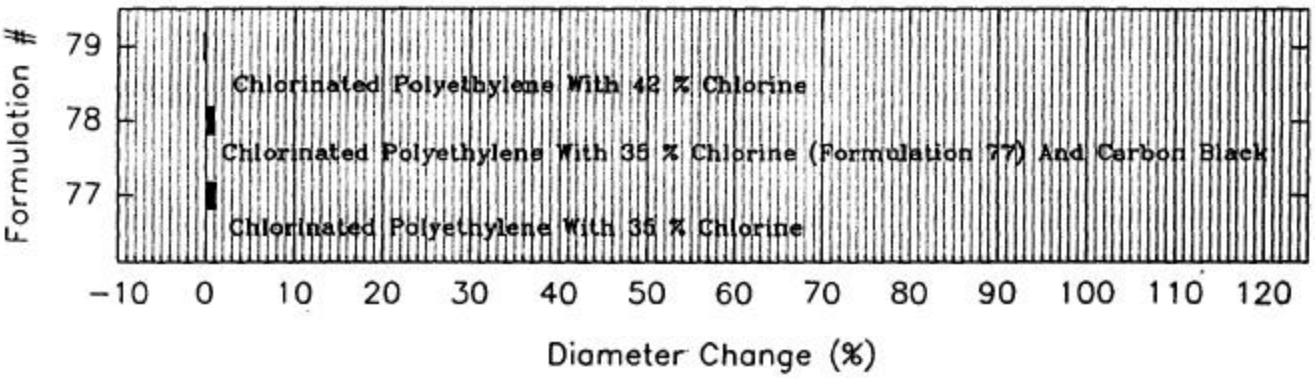


% Diameter Change In Polypropylene Glycol Butyl Monoether

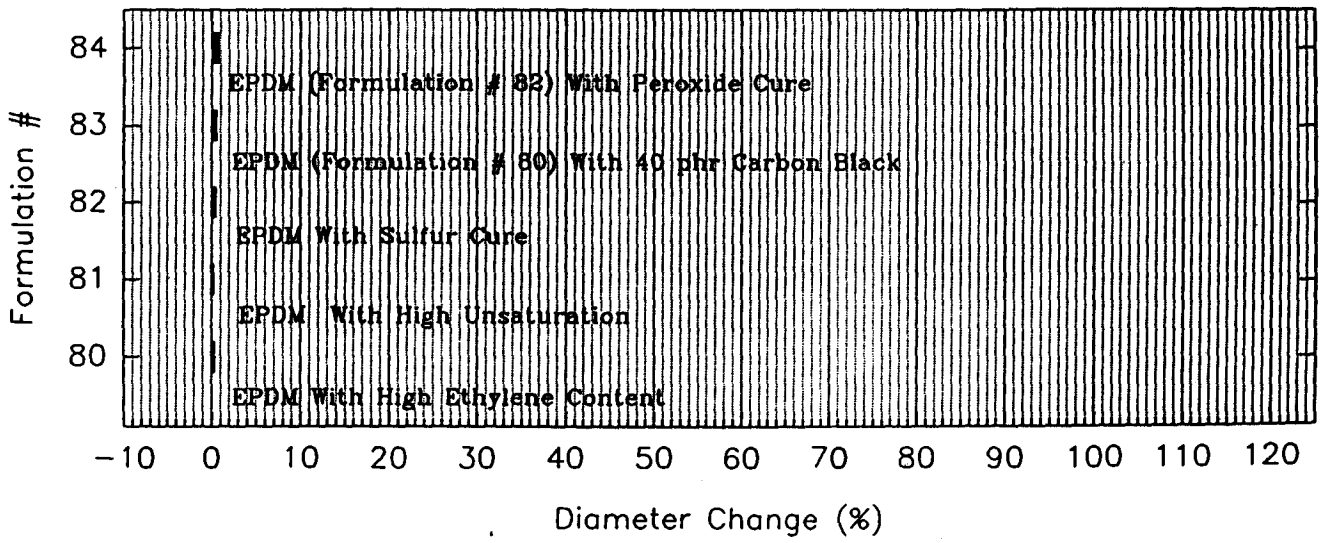
Ethylene Acrlic Elastomers



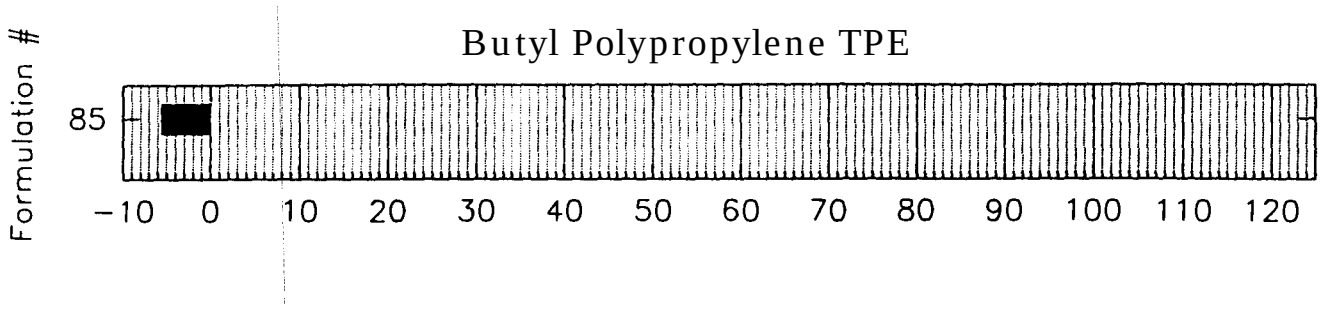
Chlorinated Polyethylenes

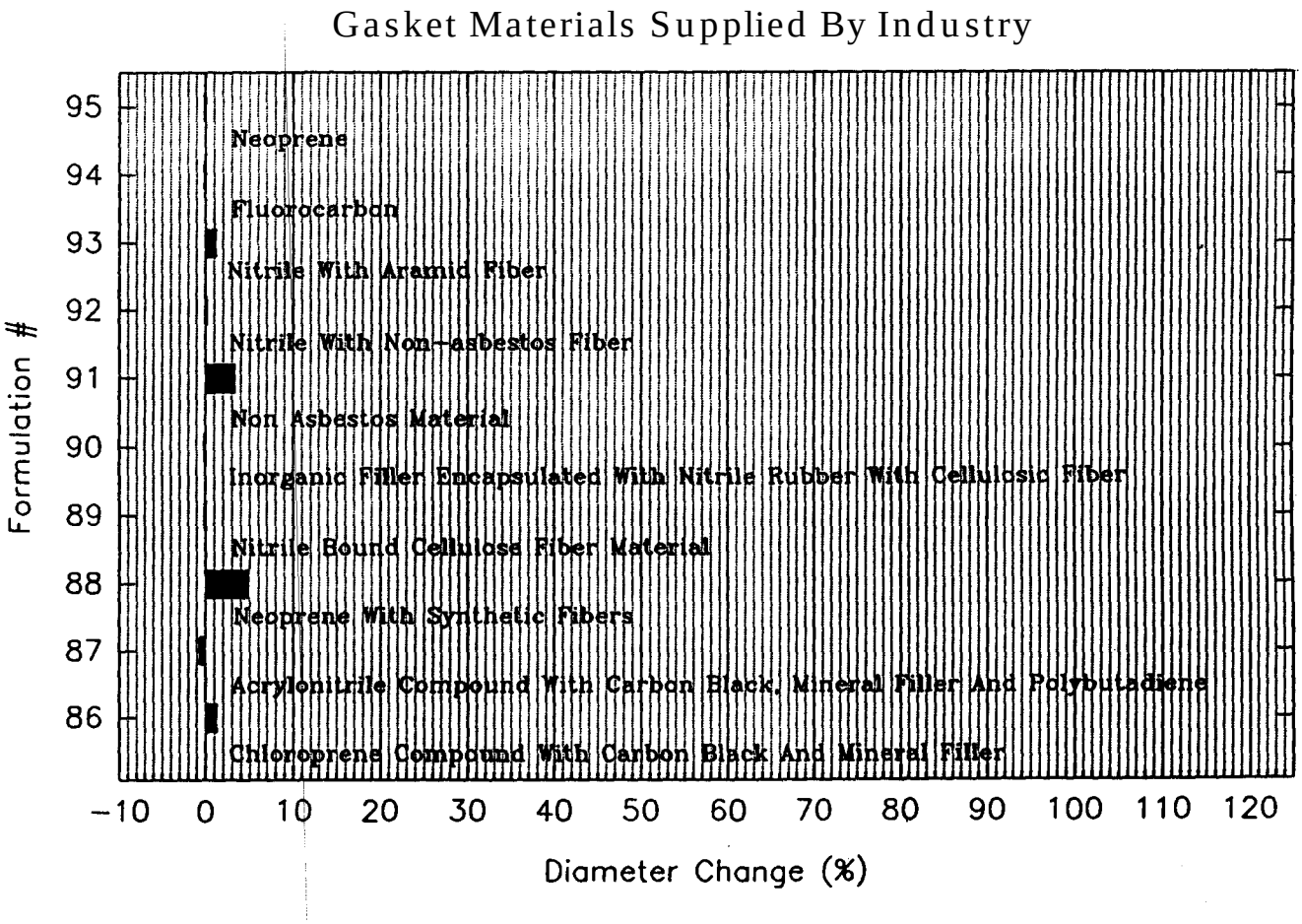


Ethylene Propylene Diene Rubbers



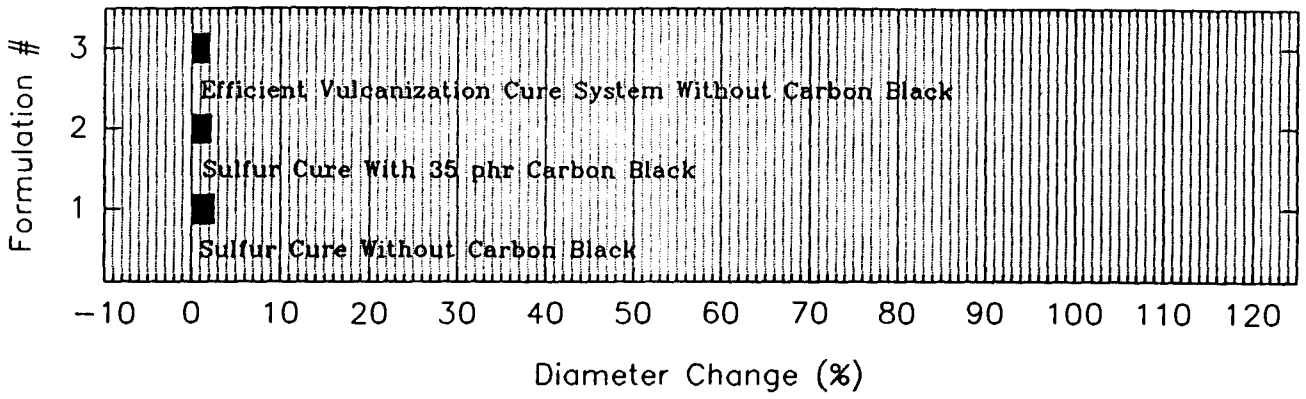
% Diameter Change In Polypropylene Glycol Butyl Monoether



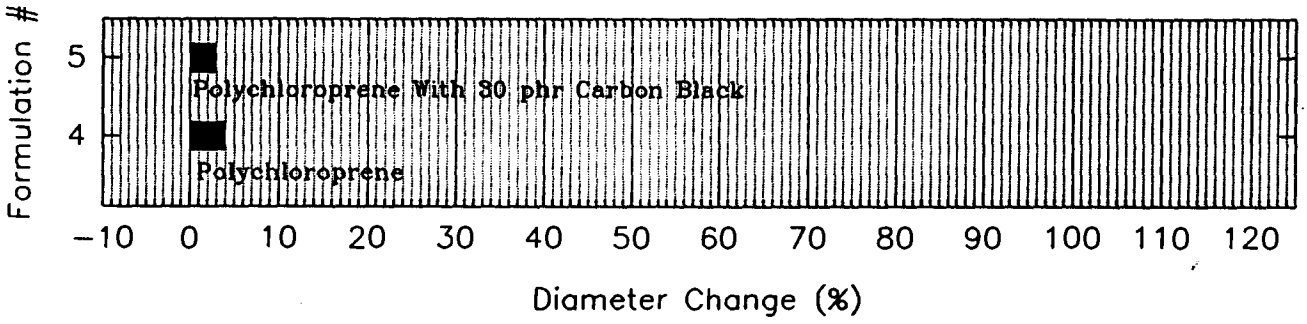


% Diameter Change In Modified Polyglycol

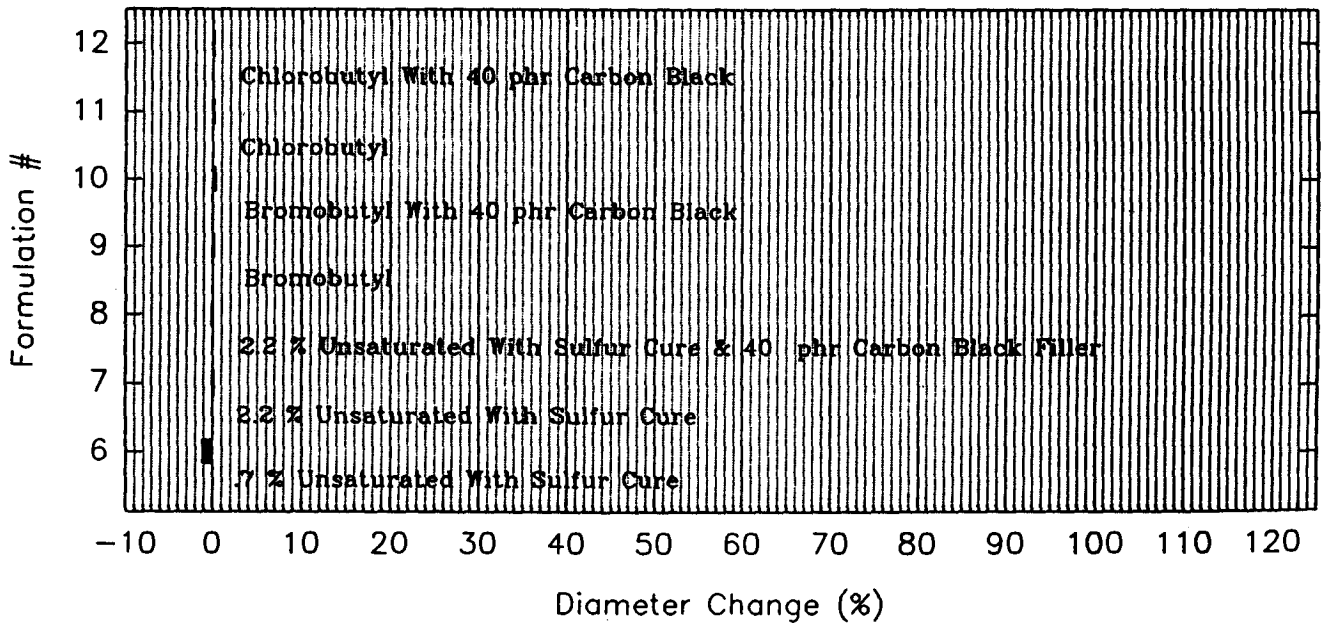
Polyisoprenes



Polychloroprenes

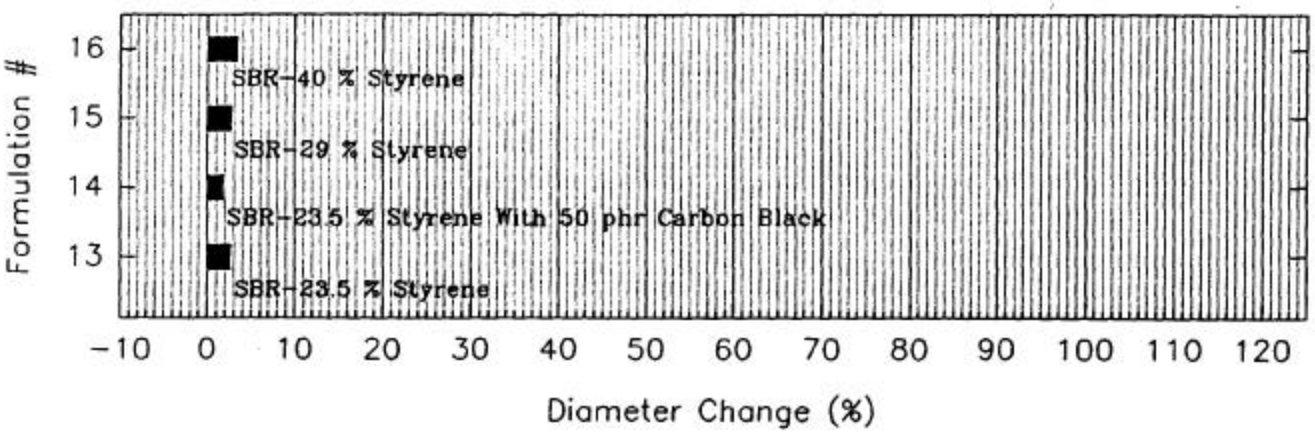


Butyl Rubbers

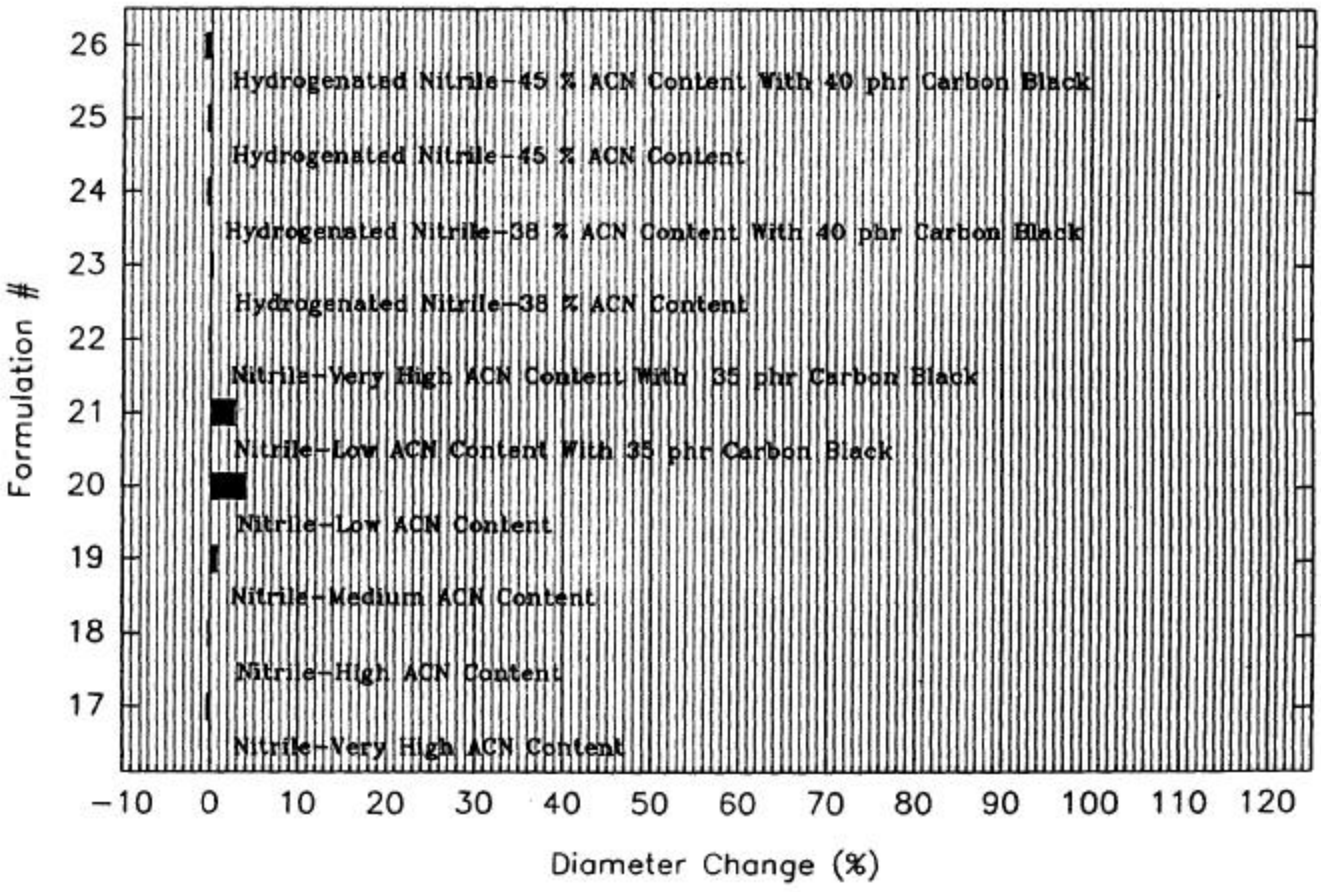


% Diameter Change In Modified Polyglycol

Styrene Butadiene Rubbers

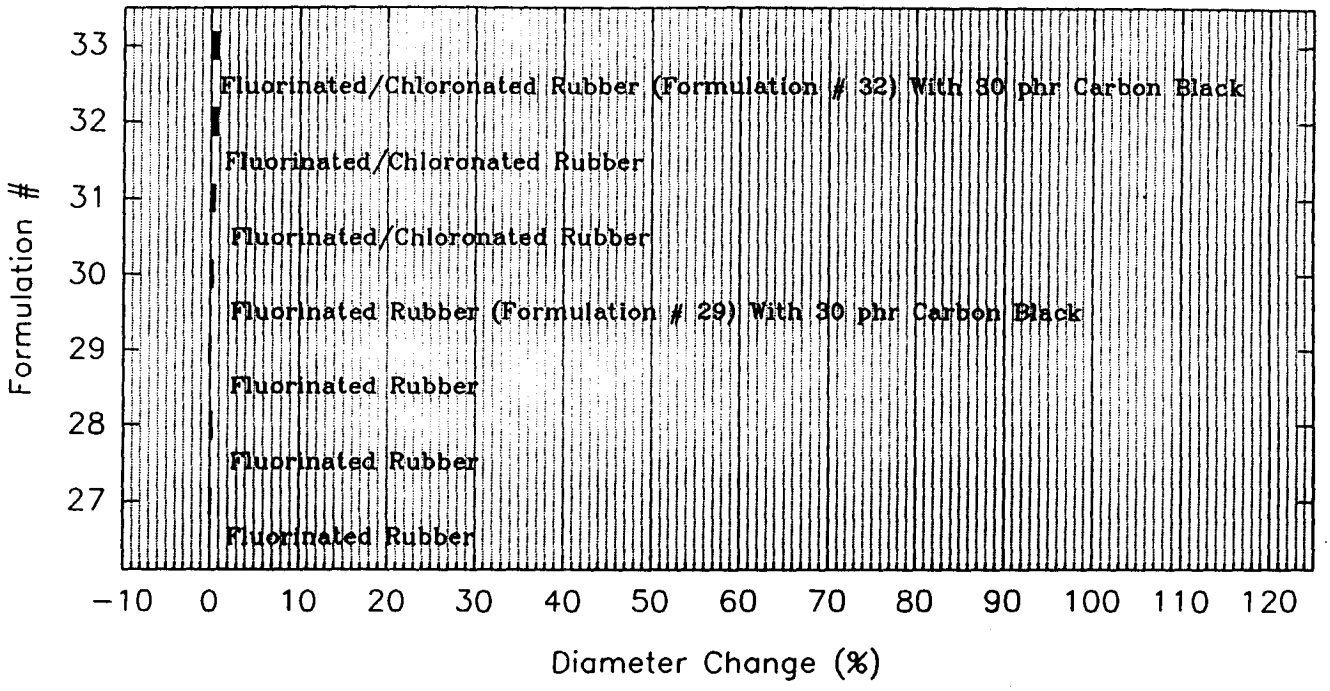


Nitrile Rubbers

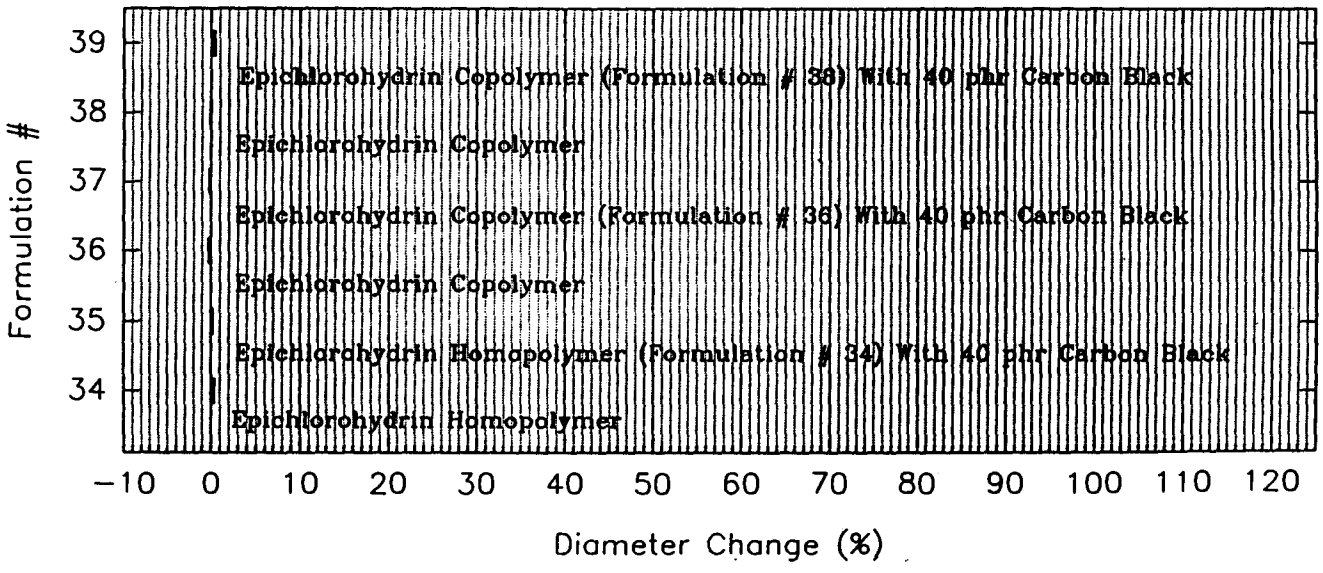


% Diameter Change In Modified Polyglycol

Fluorinated Rubbers

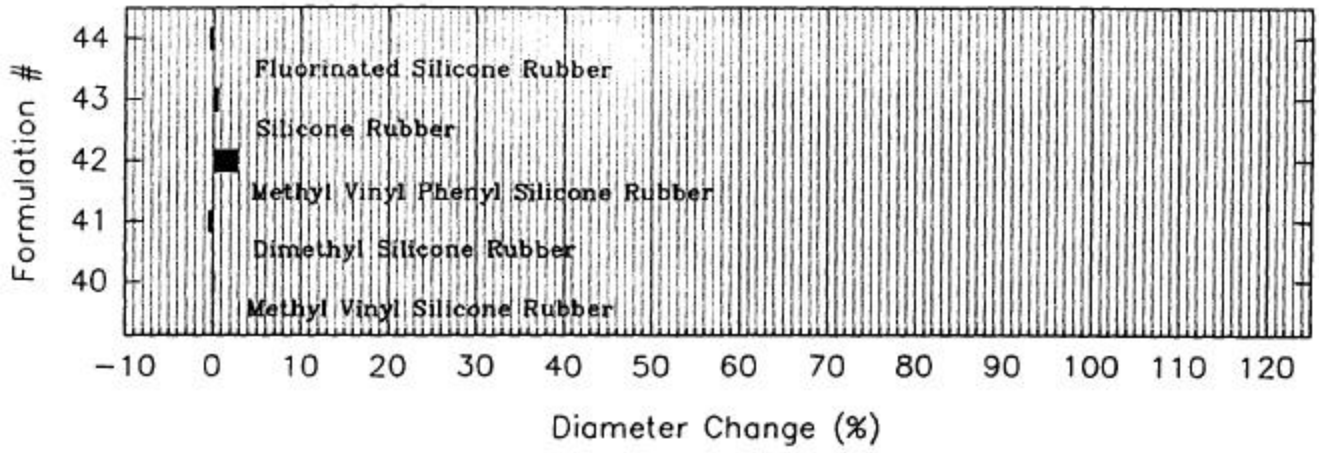


Epichlorohydrin Based Rubbers

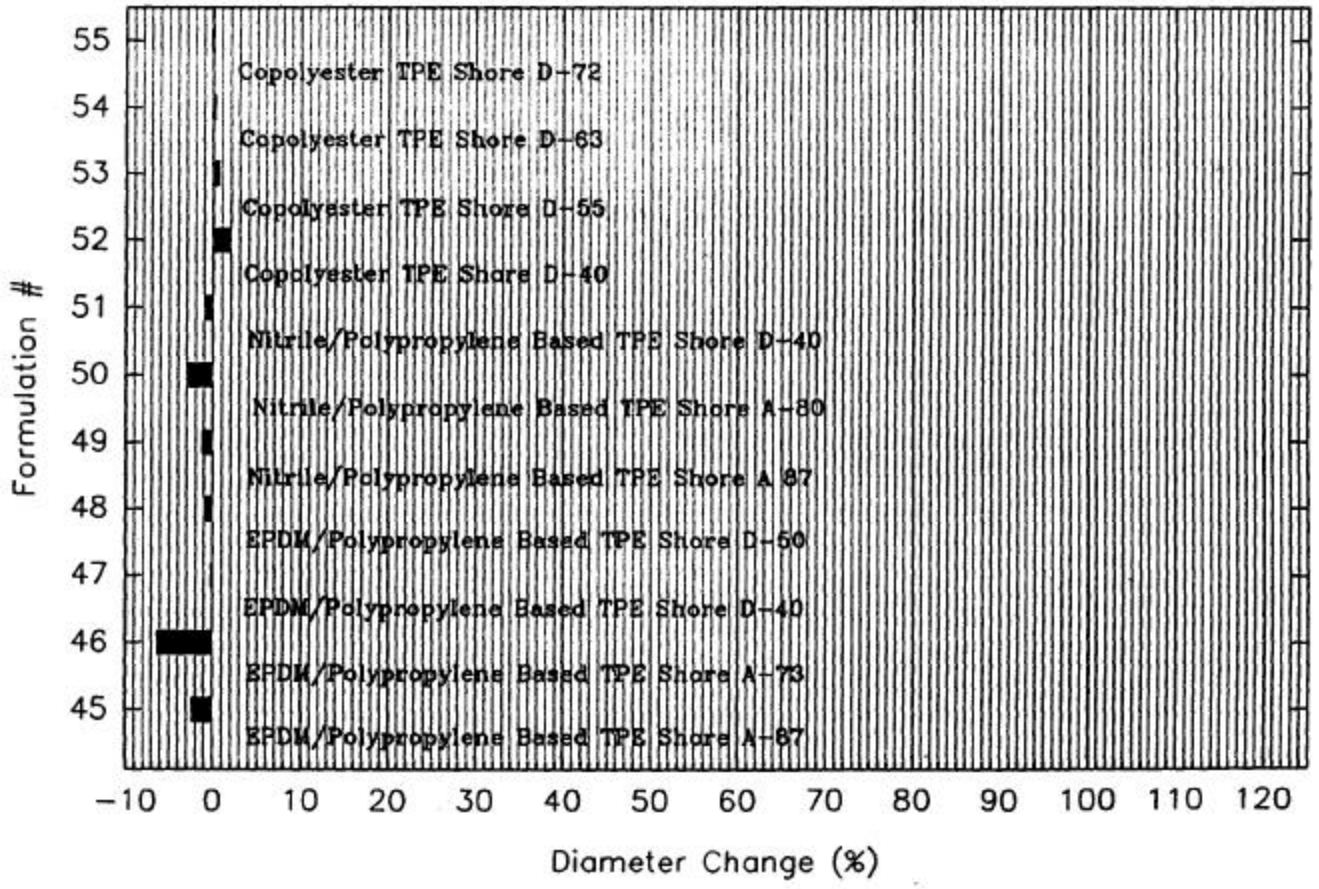


% Diameter Change In Modified Polyglycol

Silicones

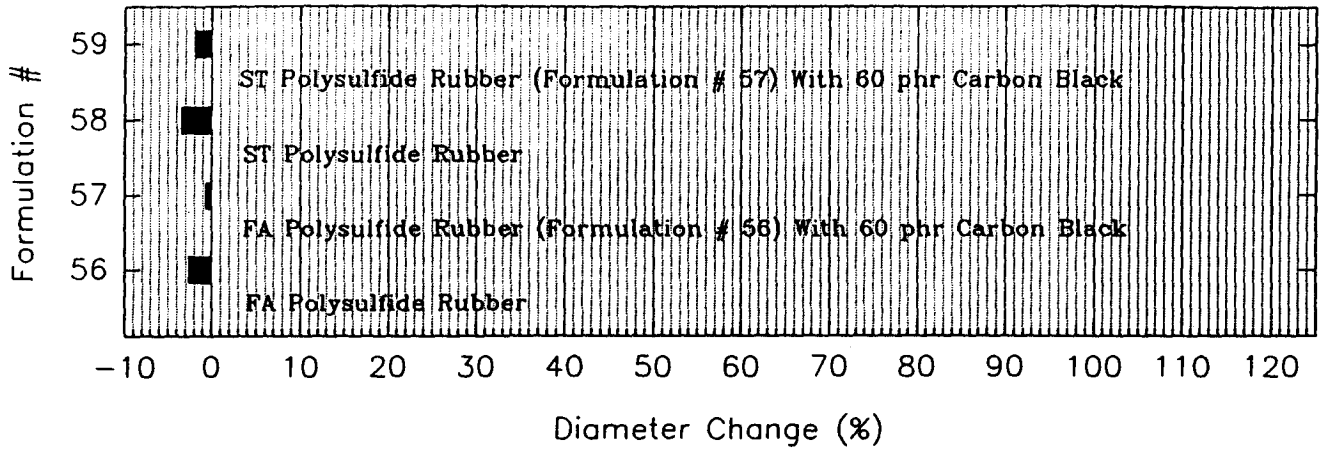


Thermoplastic Elastomers

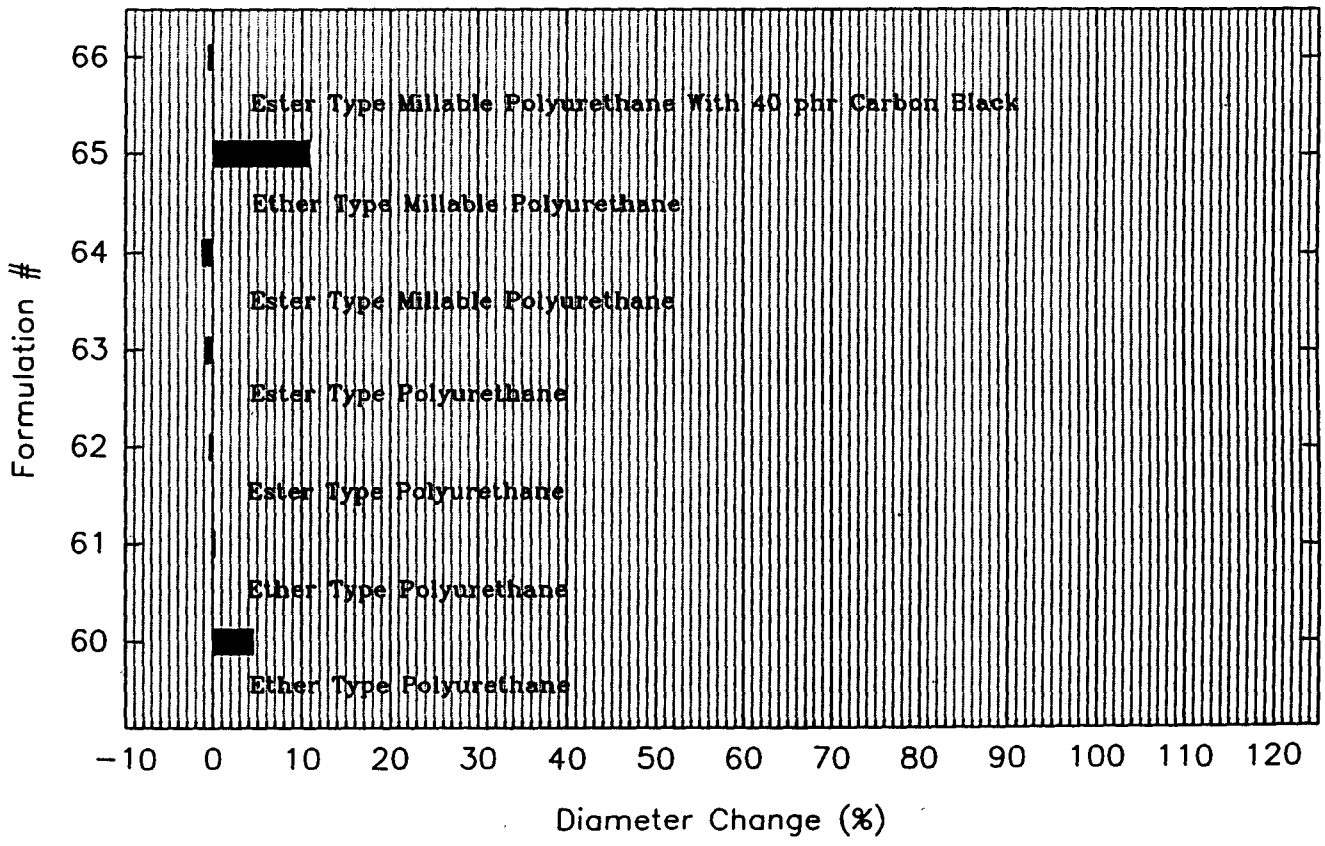


% Diameter Change In Modified Polyglycol

Polysulfide Rubbers

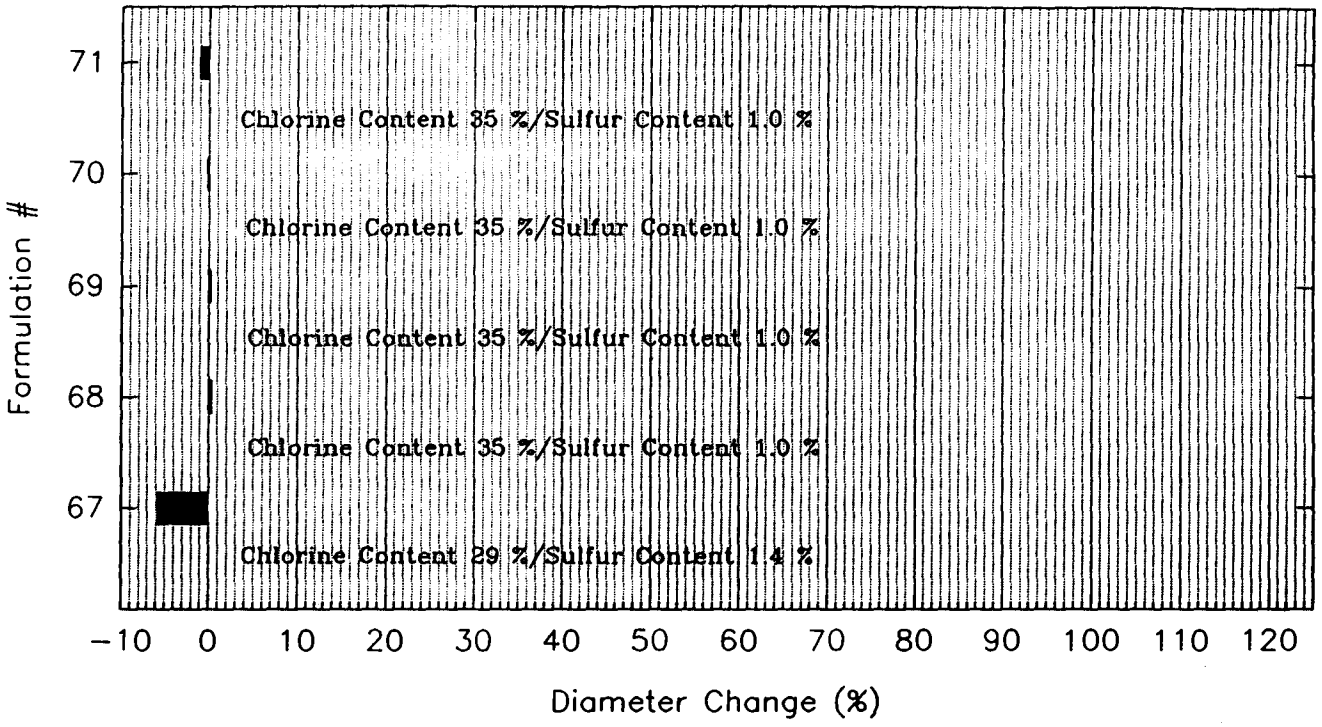


Polyurethanes

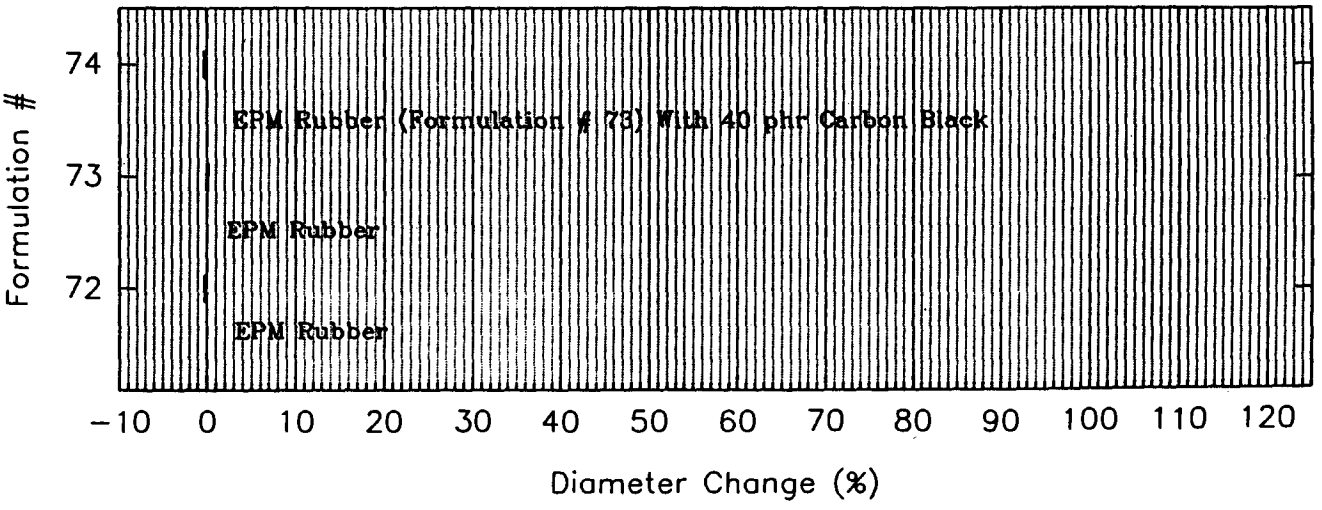


% Diameter Change In Modified Polyglycol

Chlorosulfonated Polyethylenes

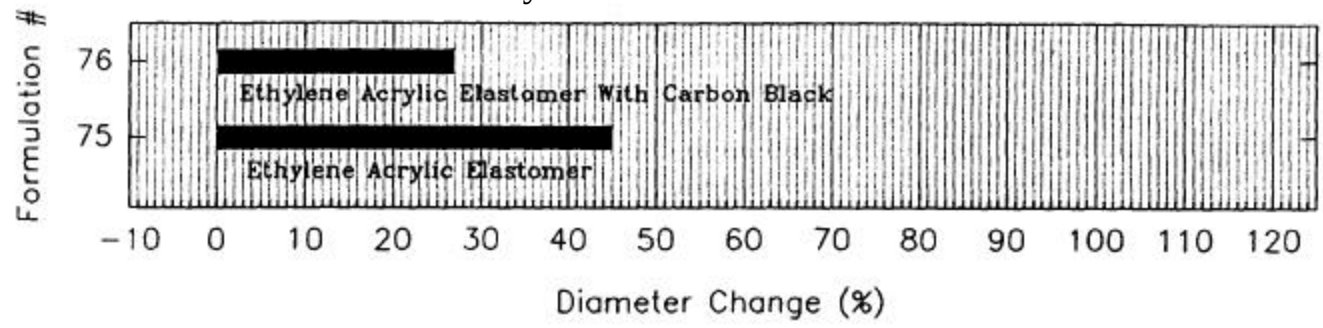


EPM Rubbers

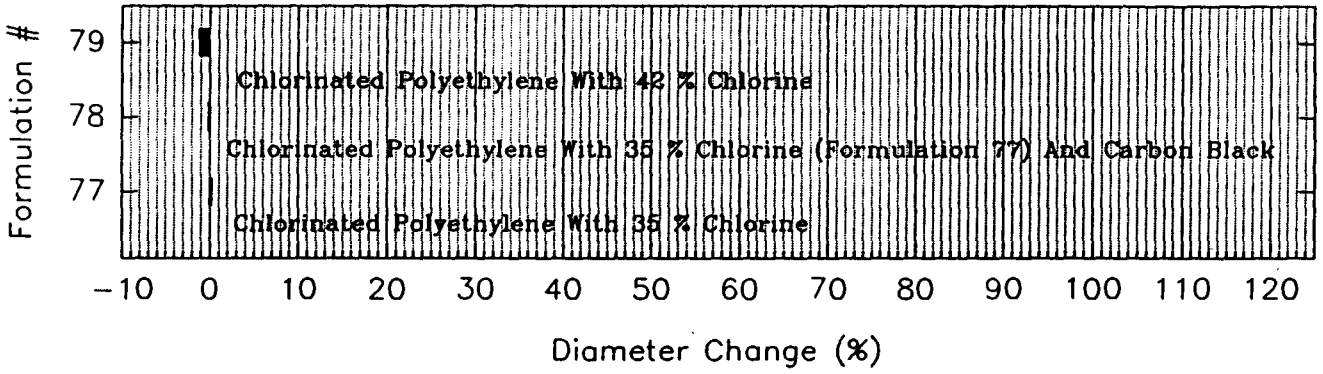


% Diameter Change In Modified Polyglycol

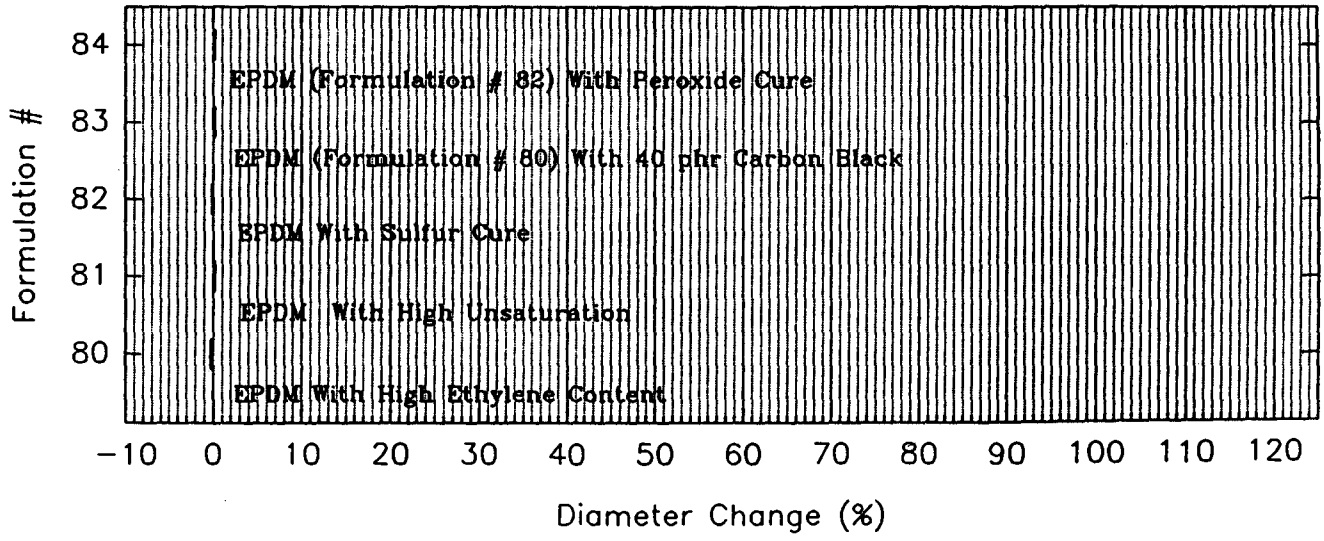
Ethylene Acrlic Elastomers



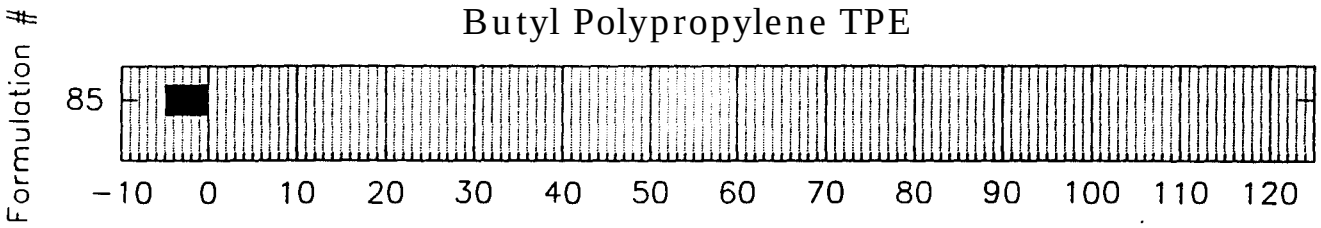
Chlorinated Polyethylenes

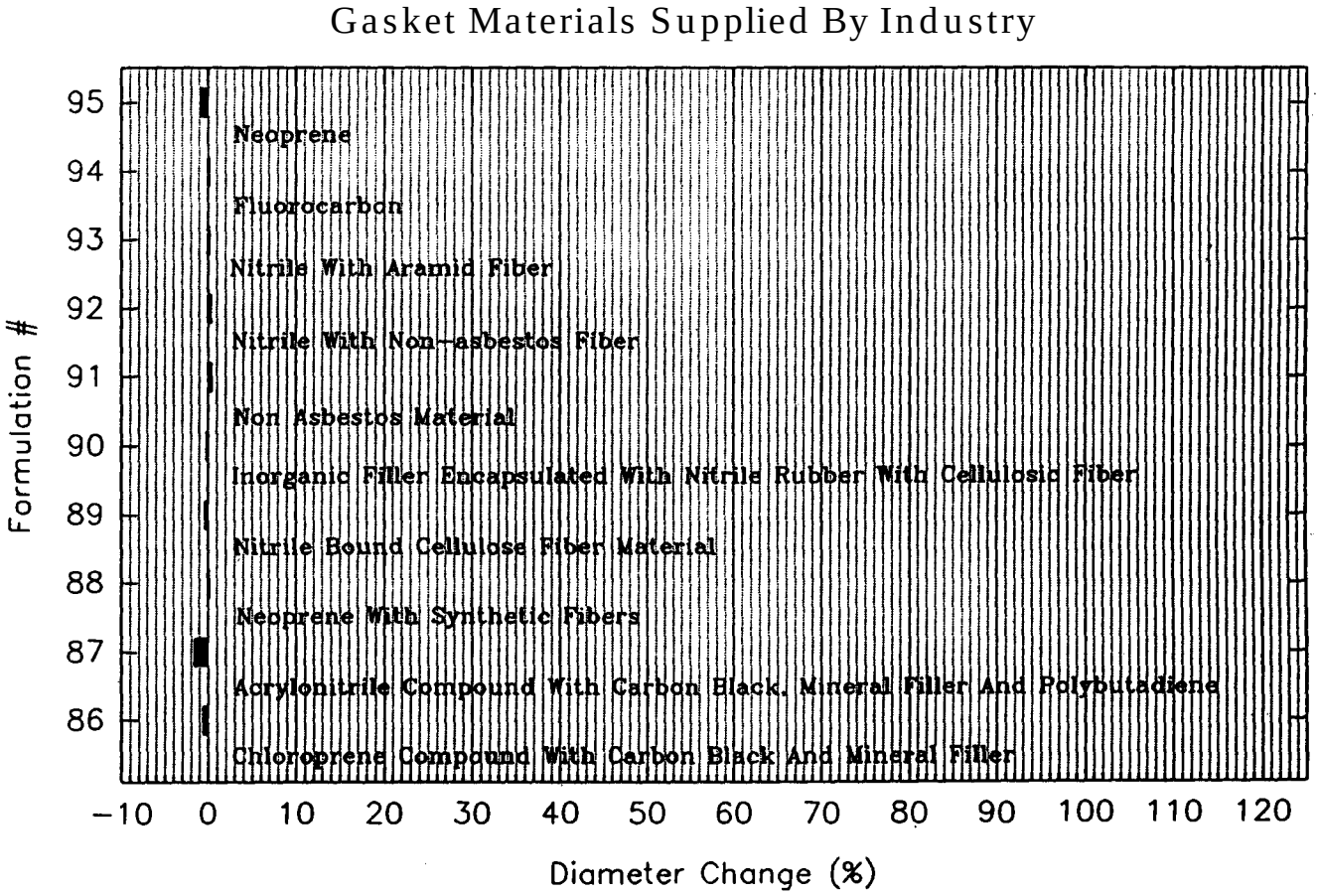


Ethylene Propylene Diene Rubbers



% Diameter Change
In Modified Polyglycol





APPENDIX G

OSCILLATING DISK RHEOMETER CURVES FOR CURABLE ELASTOMER MATERIALS

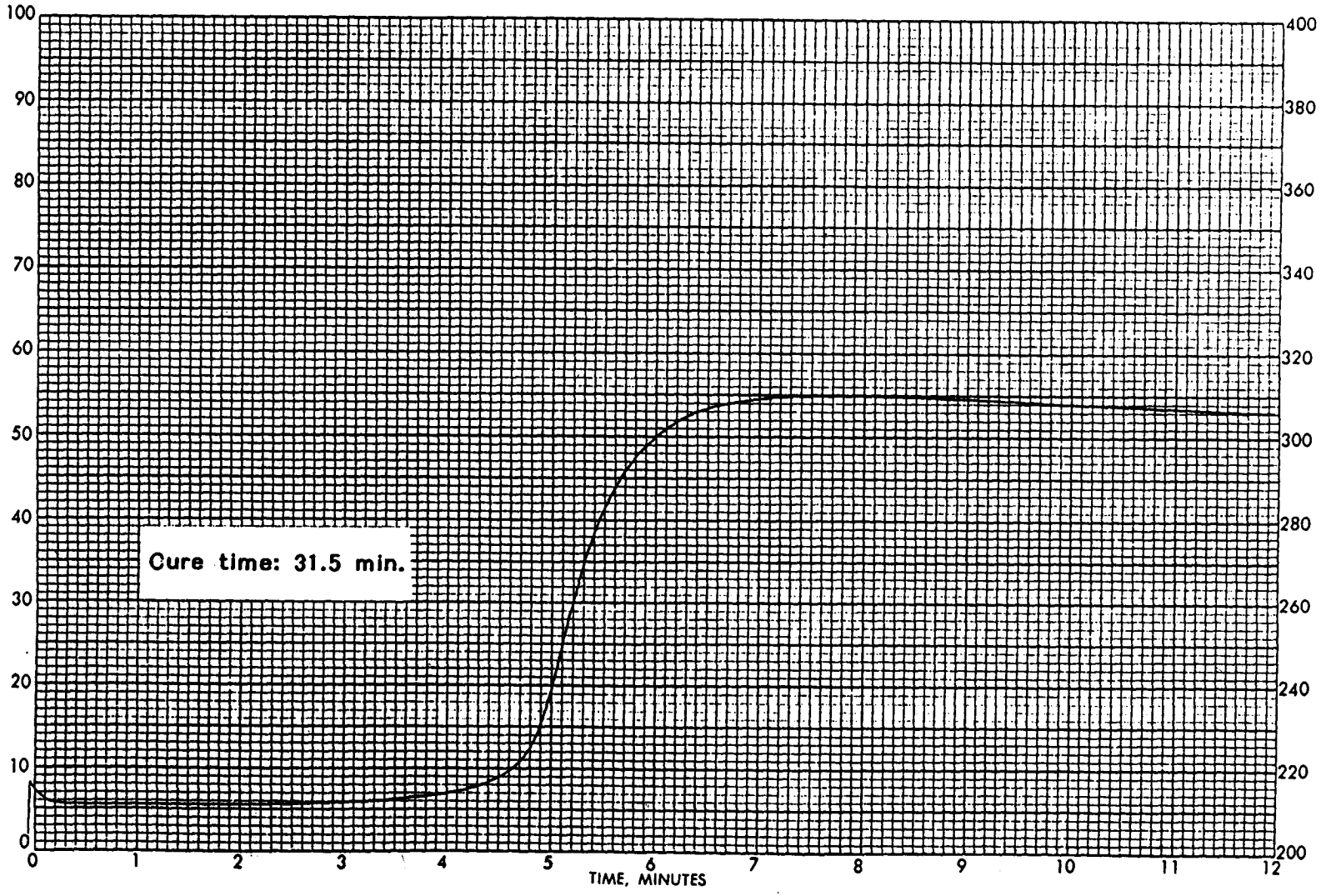
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Polyisoprene
3 Degree Arc

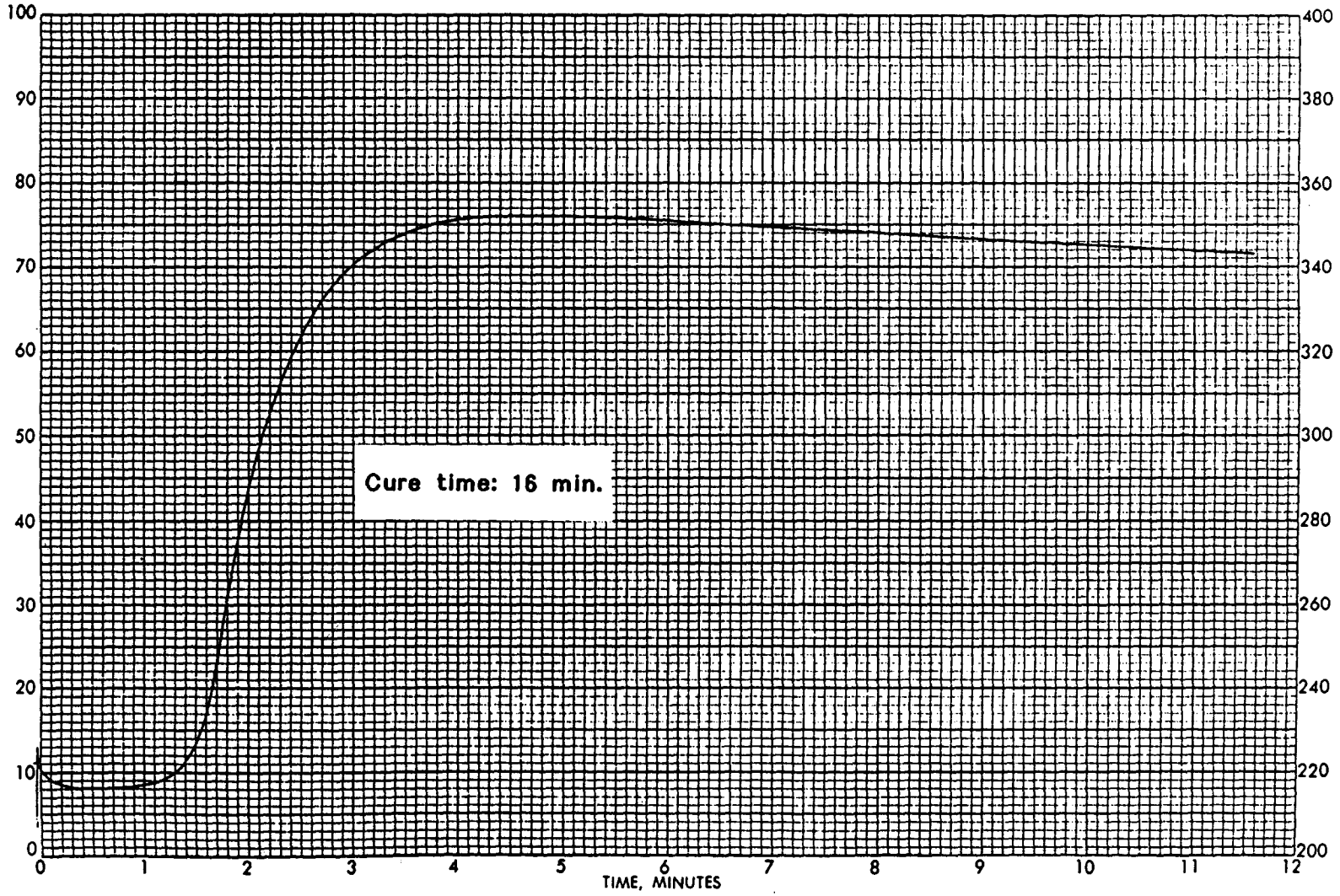
Formulation # 1
Operator: P. Greene

Temperature: 300F



Monsanto ODR

60 Minute Chart Motor | **Stock: Polyisoprene** | **Formulation # 2**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 300F**



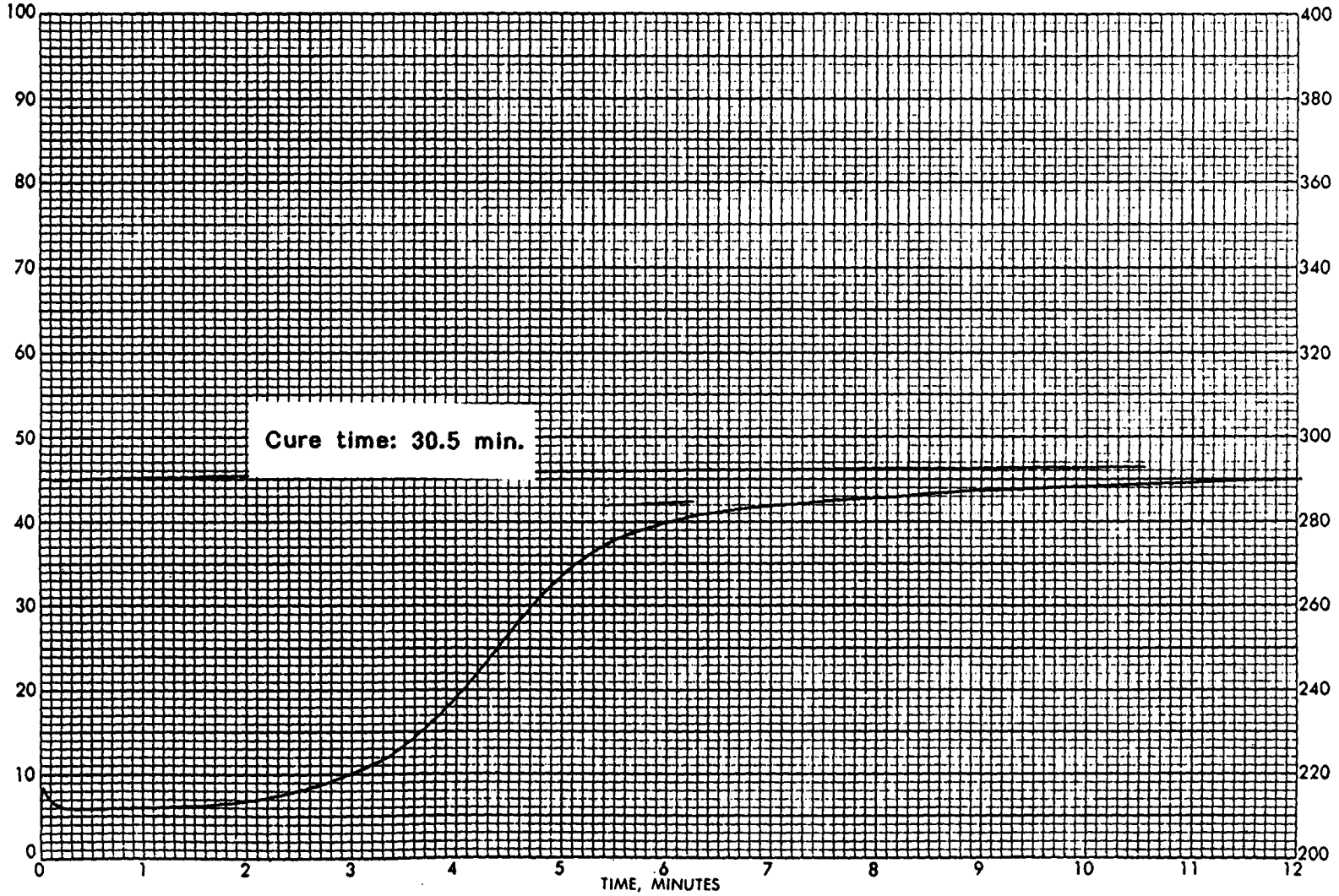
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Polyisoprene
3 Degree Arc

Formulation # 3
Operator: P. Greene

Temperature: 300F



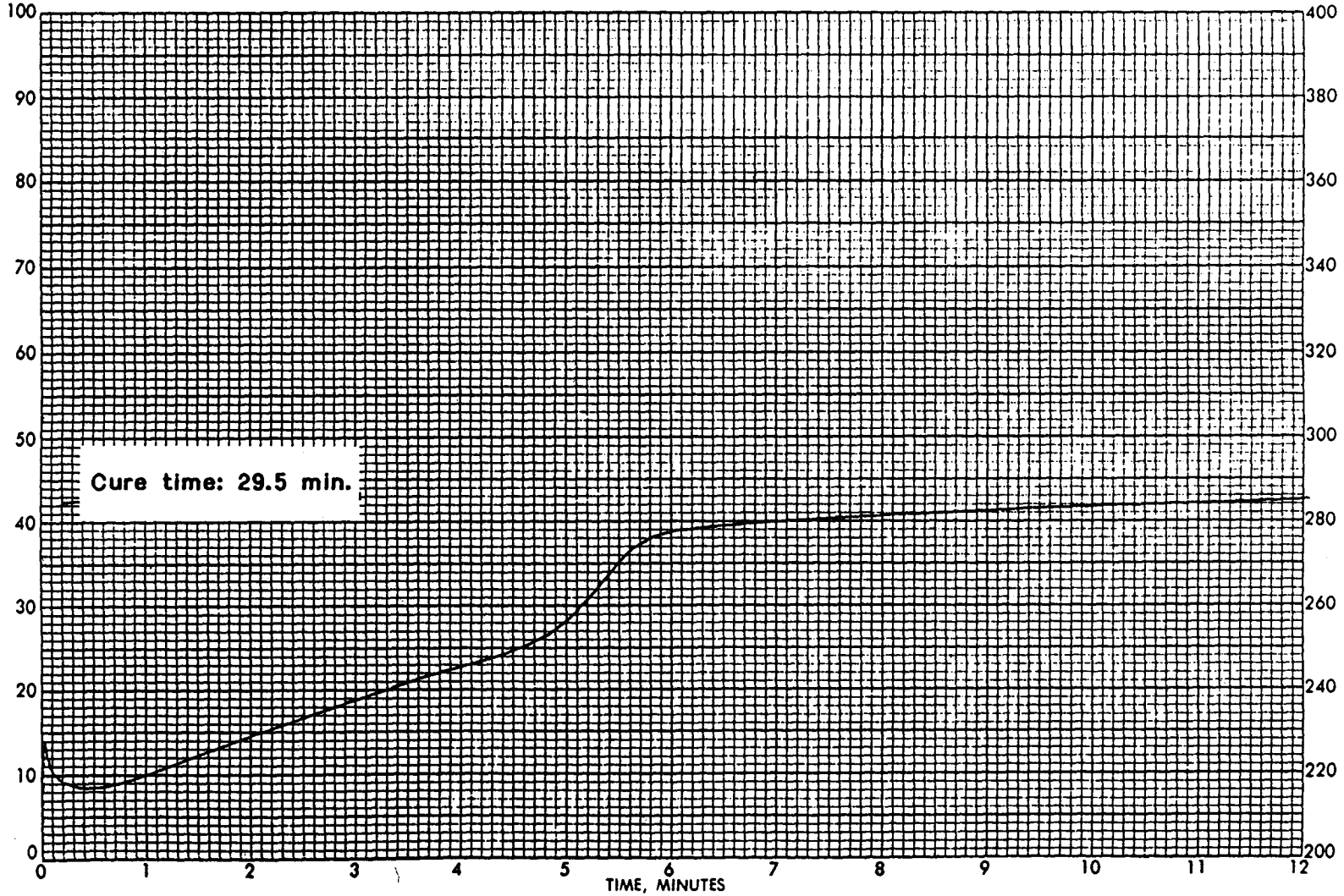
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Poly(chlorobutadiene)
3 Degree Arc

Formulation # 4
Operator: P. Greene

Temperature: 307F



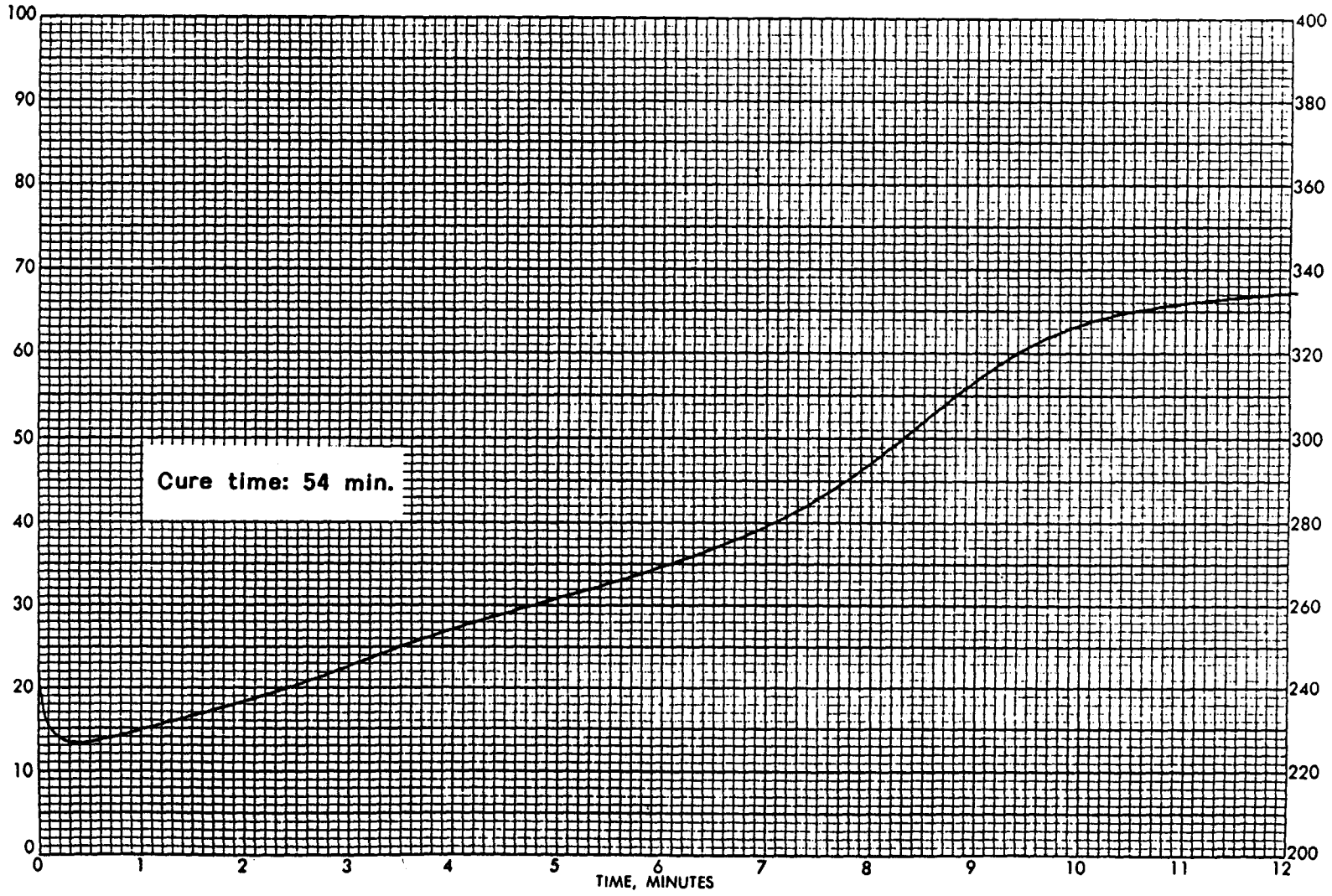
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Poly(chlorobutadiene)
3 Degree Arc

Formulation # 5
Operator: P. Greene

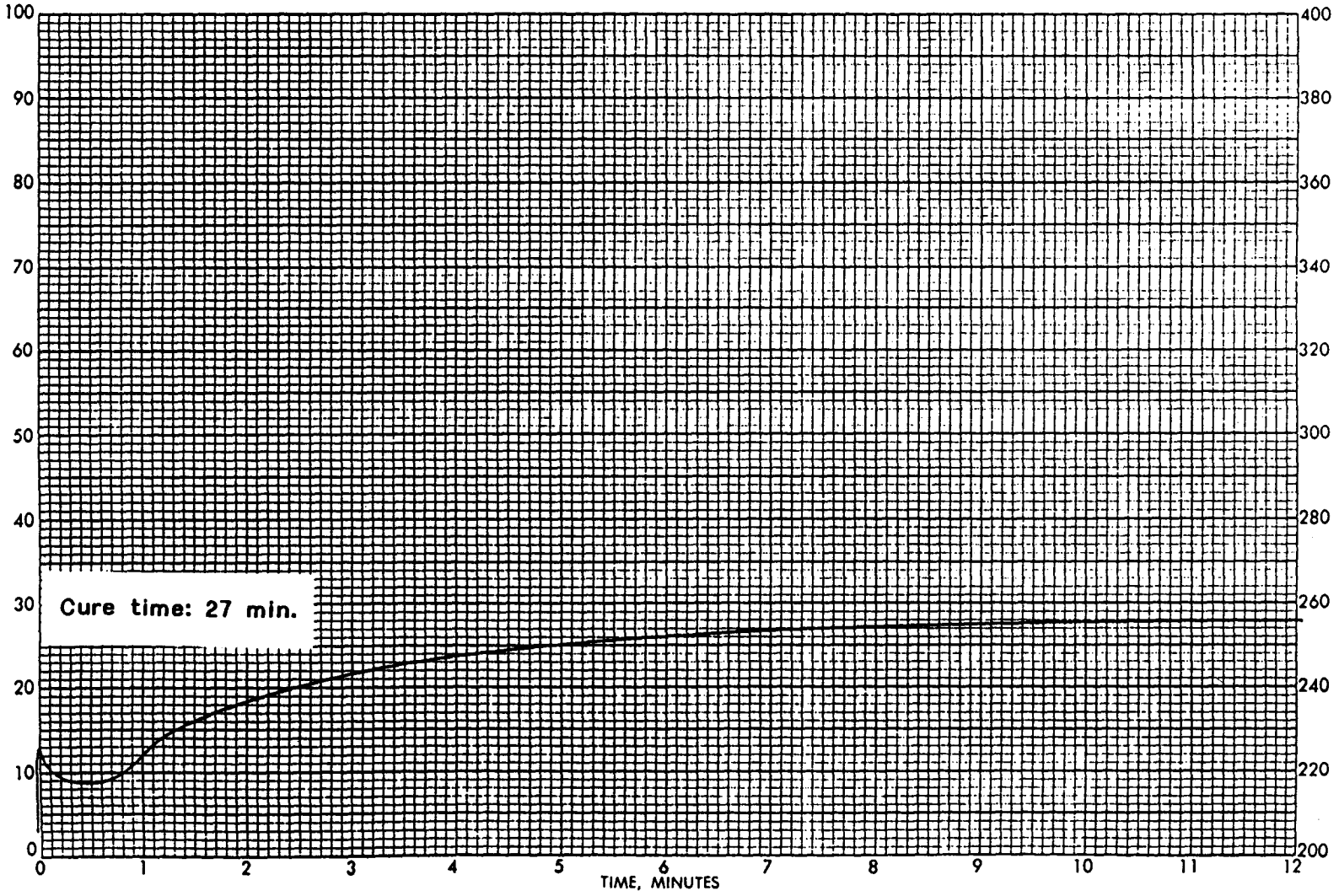
Temperature: 307F



Monsanto ODR

60 Minute Chart Motor | **Stock:Isobutyl isoprene** | **Formulation # 6**

100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



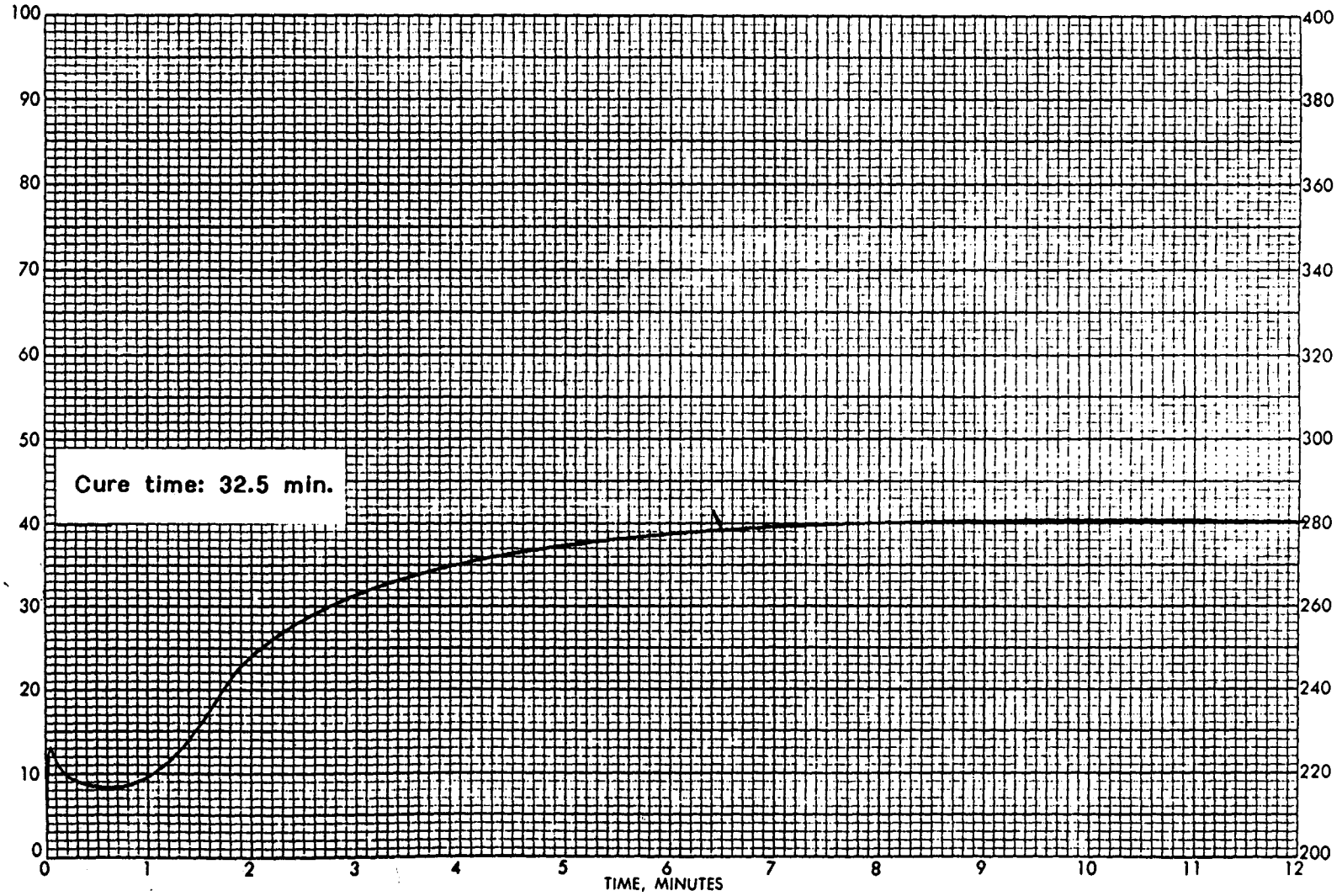
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock:Isobutyl isoprene
3 Degree Arc

Formulation # 7
Operator: P. Greene

Temperature: 320F



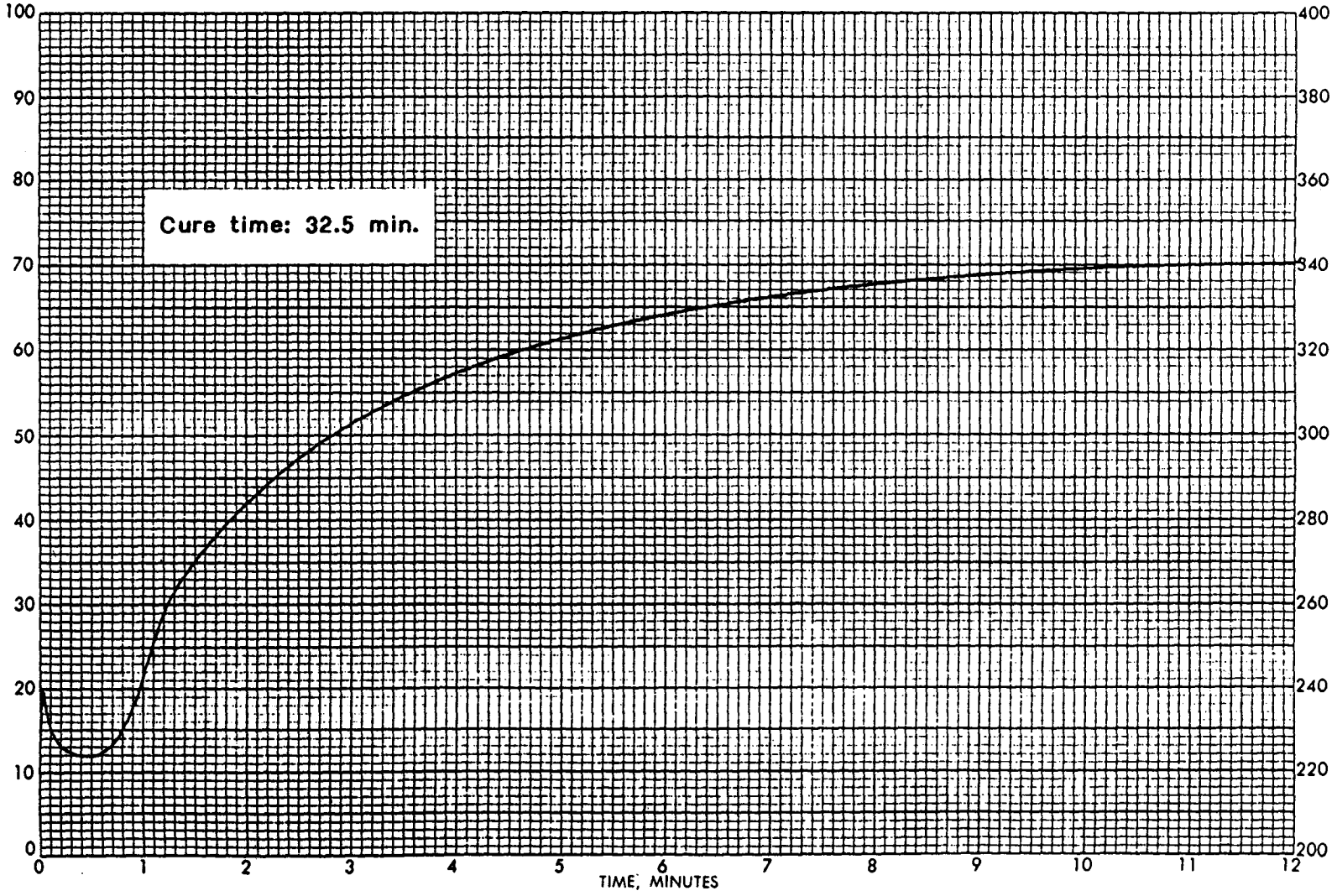
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock:Isobutyl isoprene
3 Degree Arc

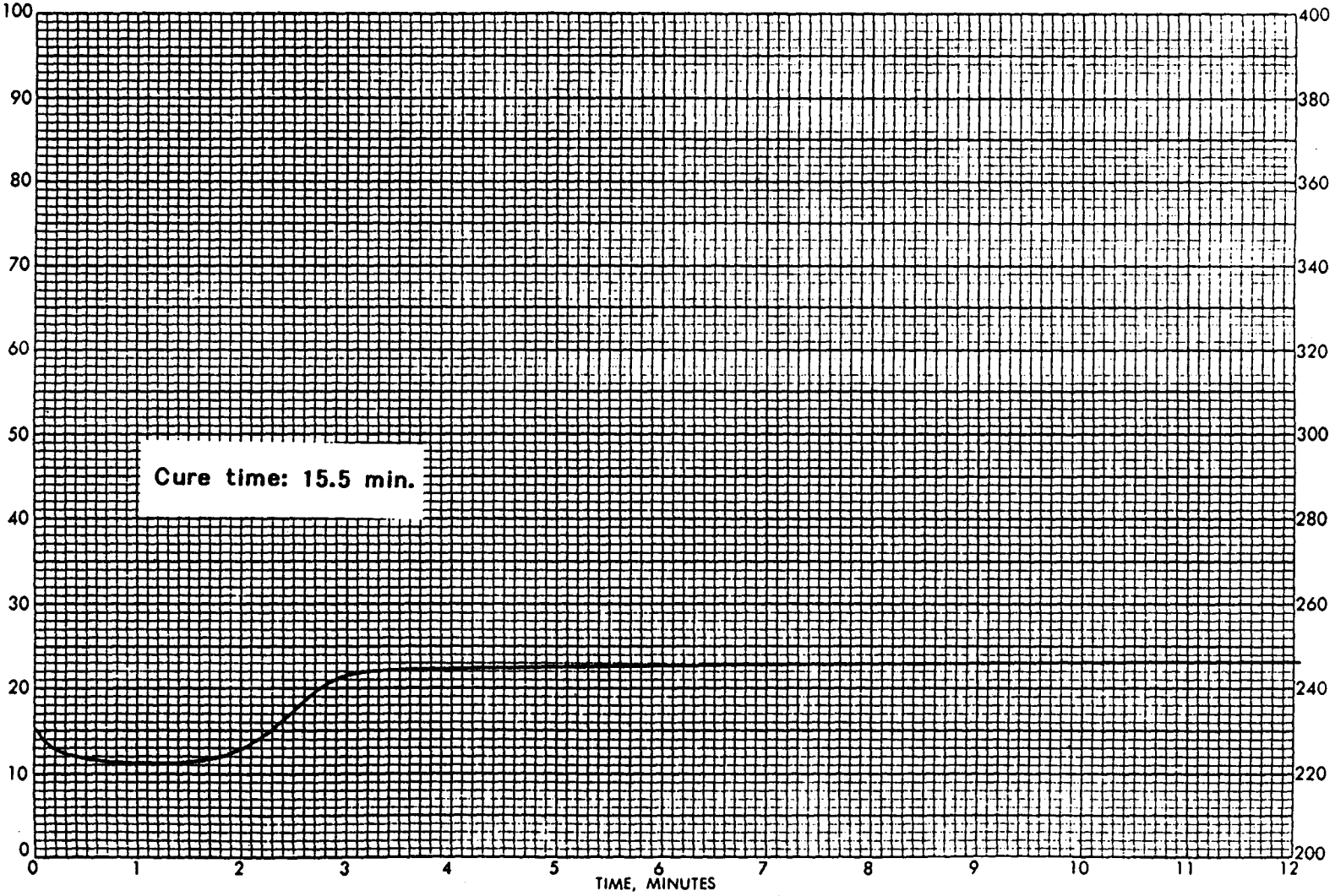
Formulation # 8
Operator: P. Greene

Temperature: 320F



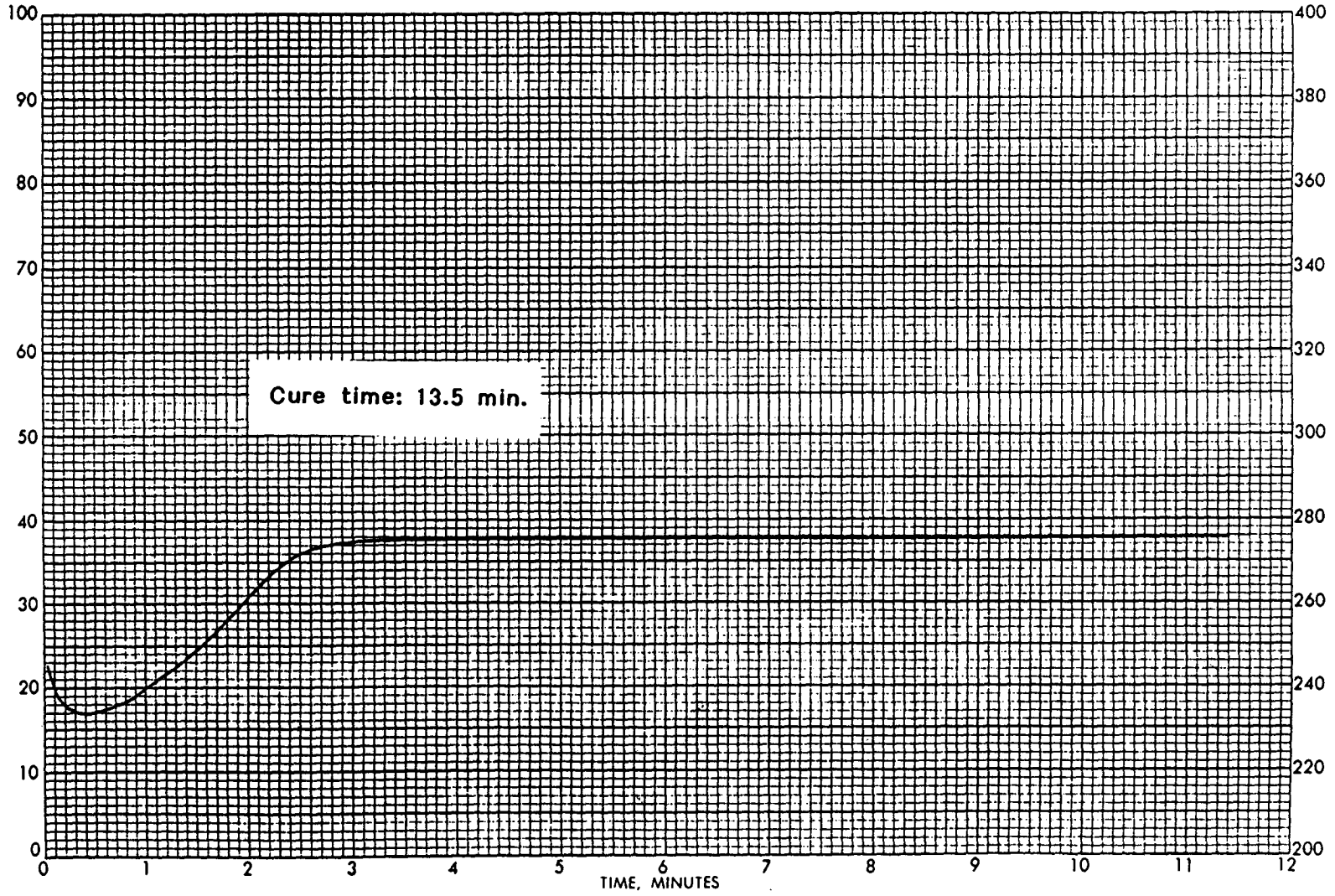
Monsanto ODR

60 Minute Chart Motor **Stock:Bromobutyl** **Formulation # 9**
100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 320F**



Monsanto ODR

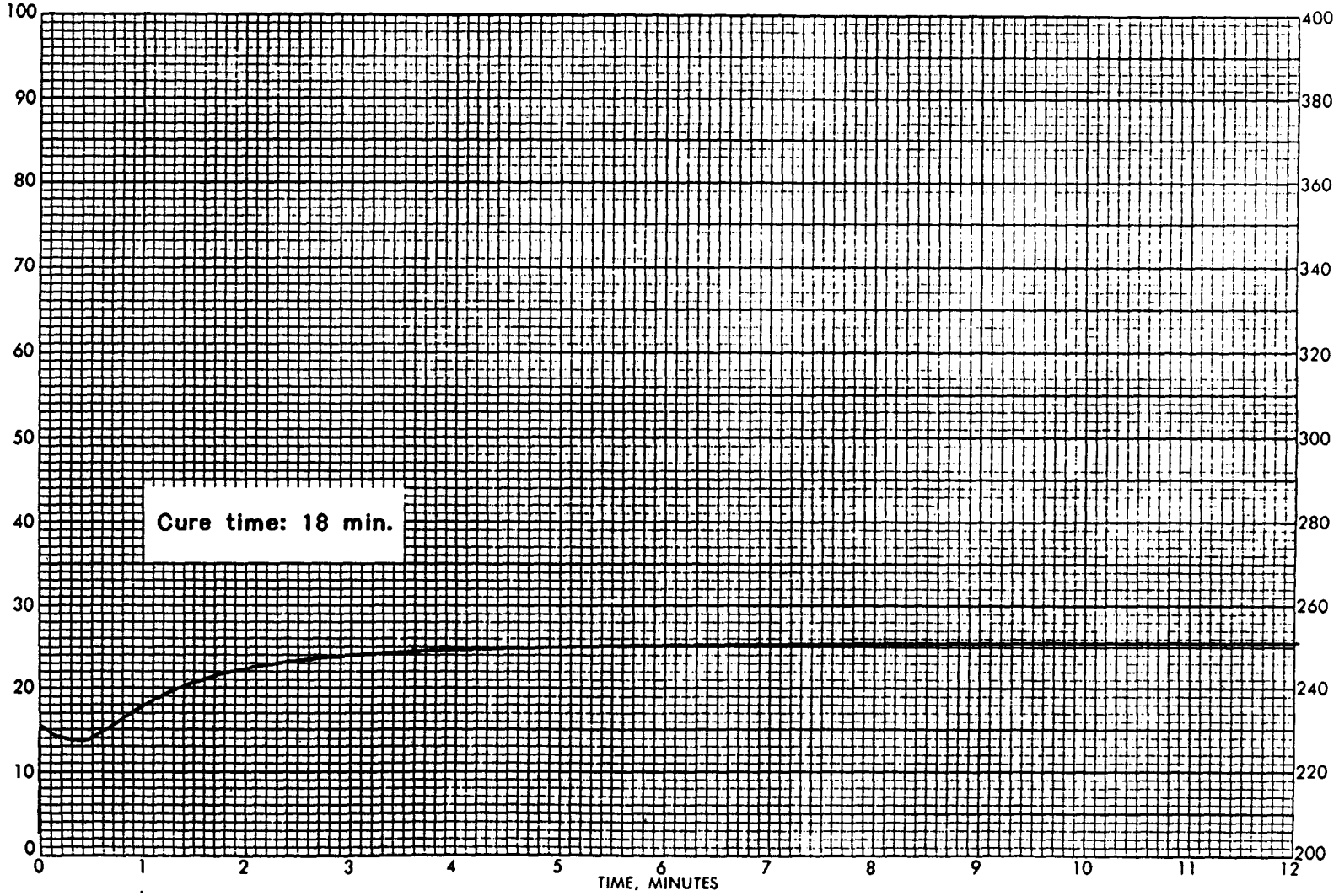
60 Minute Chart Motor | **Stock:Bromobutyl** | **Formulation # 10**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



Monsanto ODR

60 Minute Chart Motor | **Stock:Chlorobutyl** | **Formulation # 11**

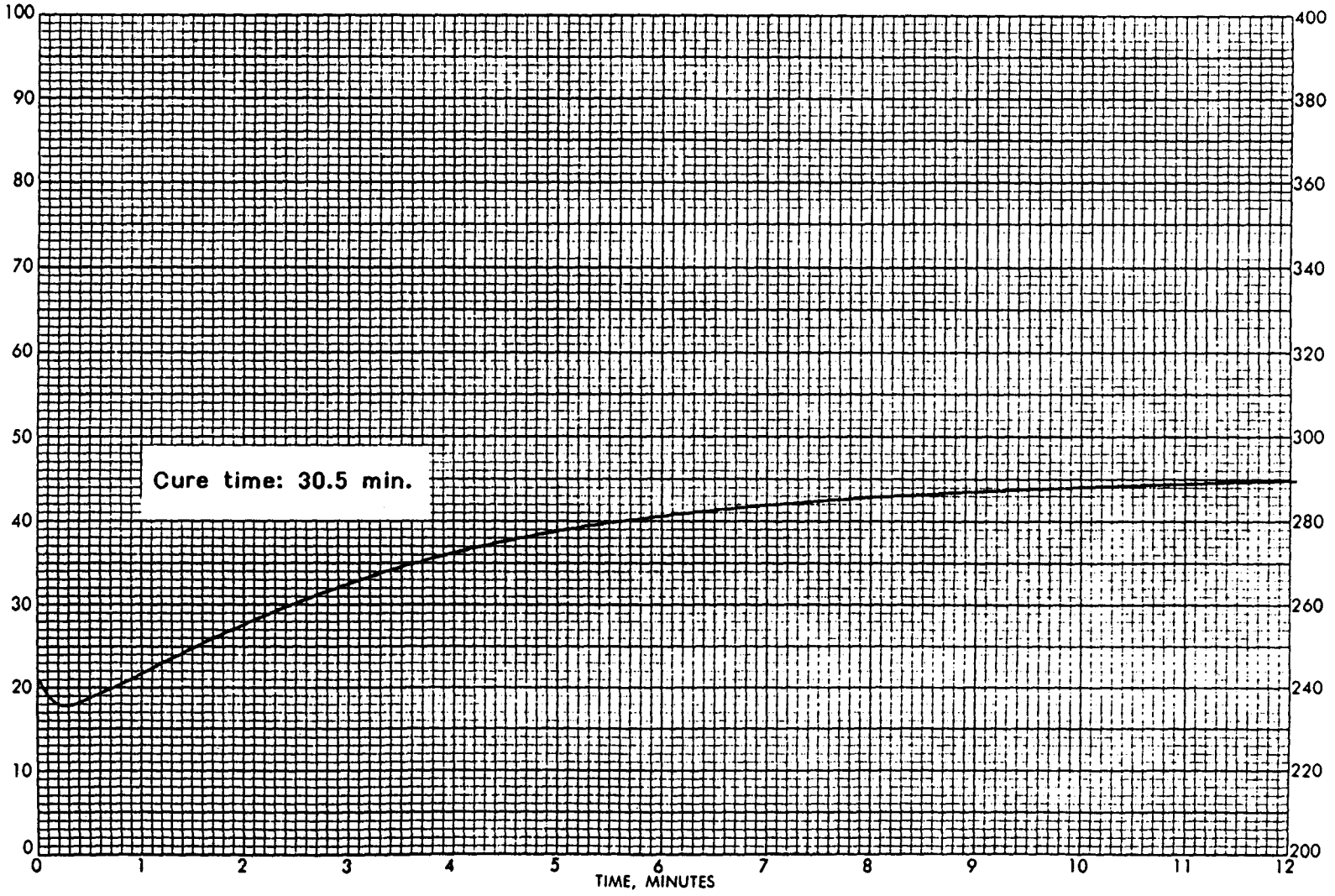
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 302F**



Monsanto ODR

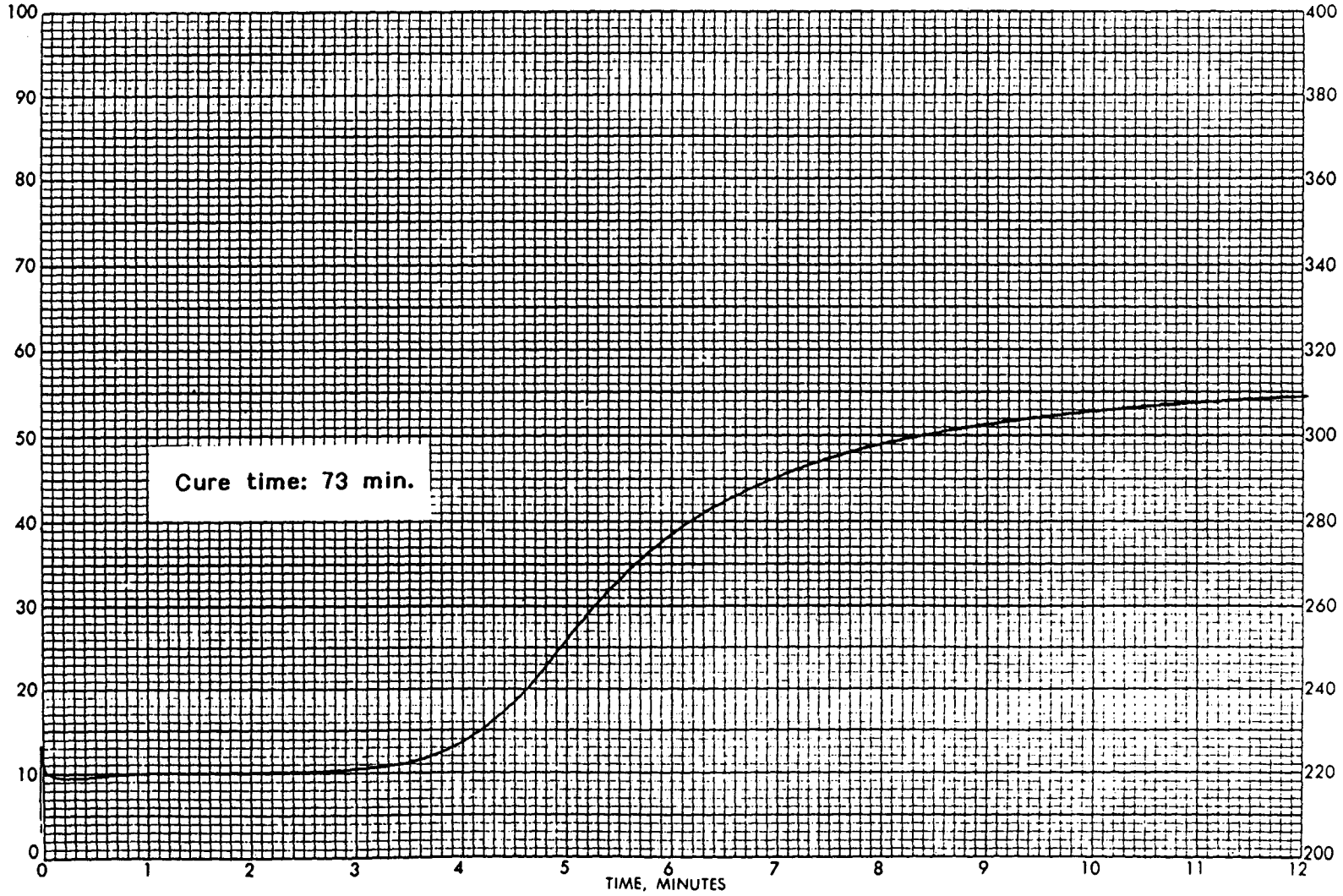
60 Minute Chart Motor | **Stock:Chlorobutyl** | **Formulation # 12**

100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 302F**



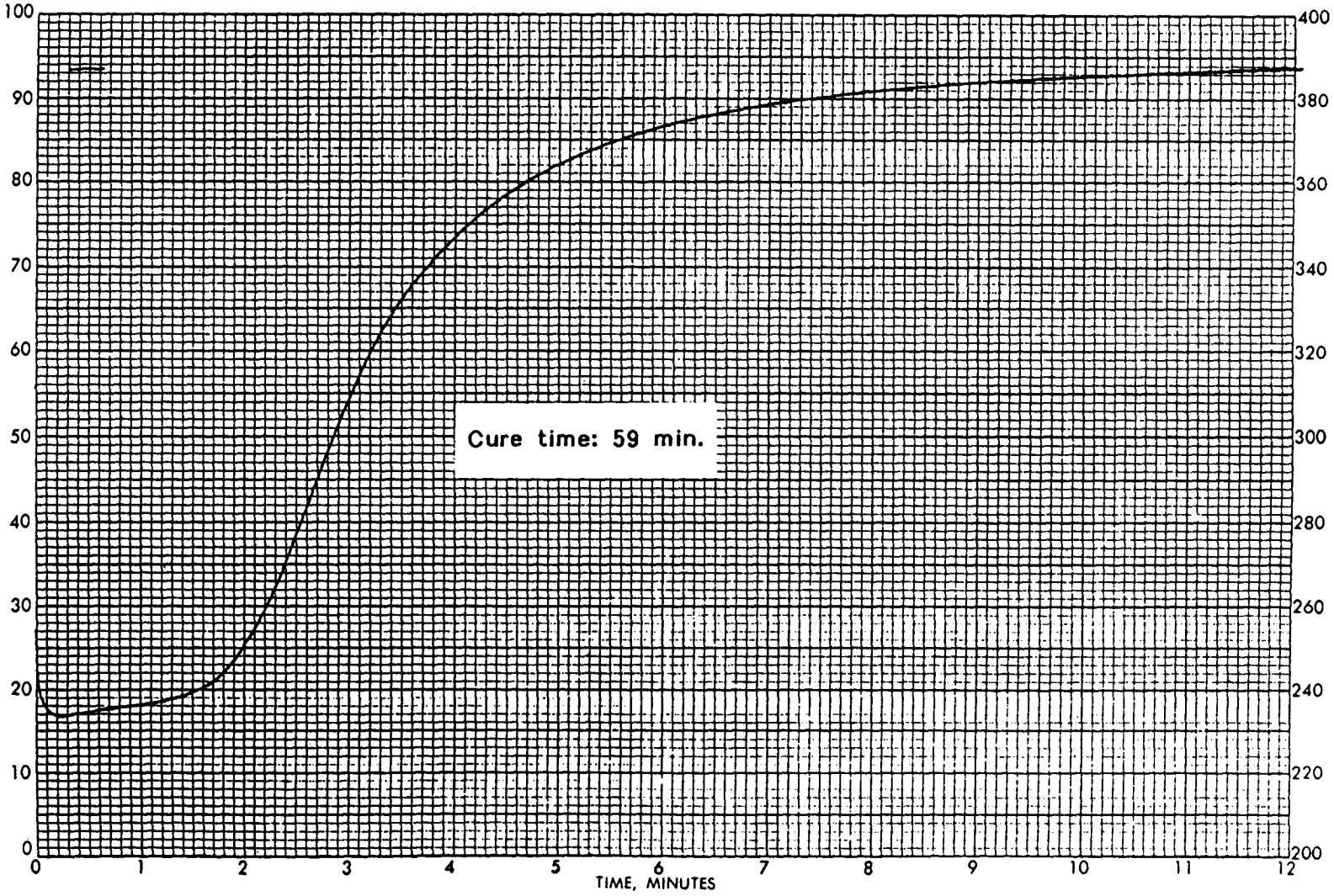
Monsanto ODR

120 minute Chart Motor	Stock: SBR 1502	Formulation # 13	Date: 3/31/92
100 Range Selector	3 Degree Arc	Operator: P. Greene	Temperature: 293 F



Monsanto ODR

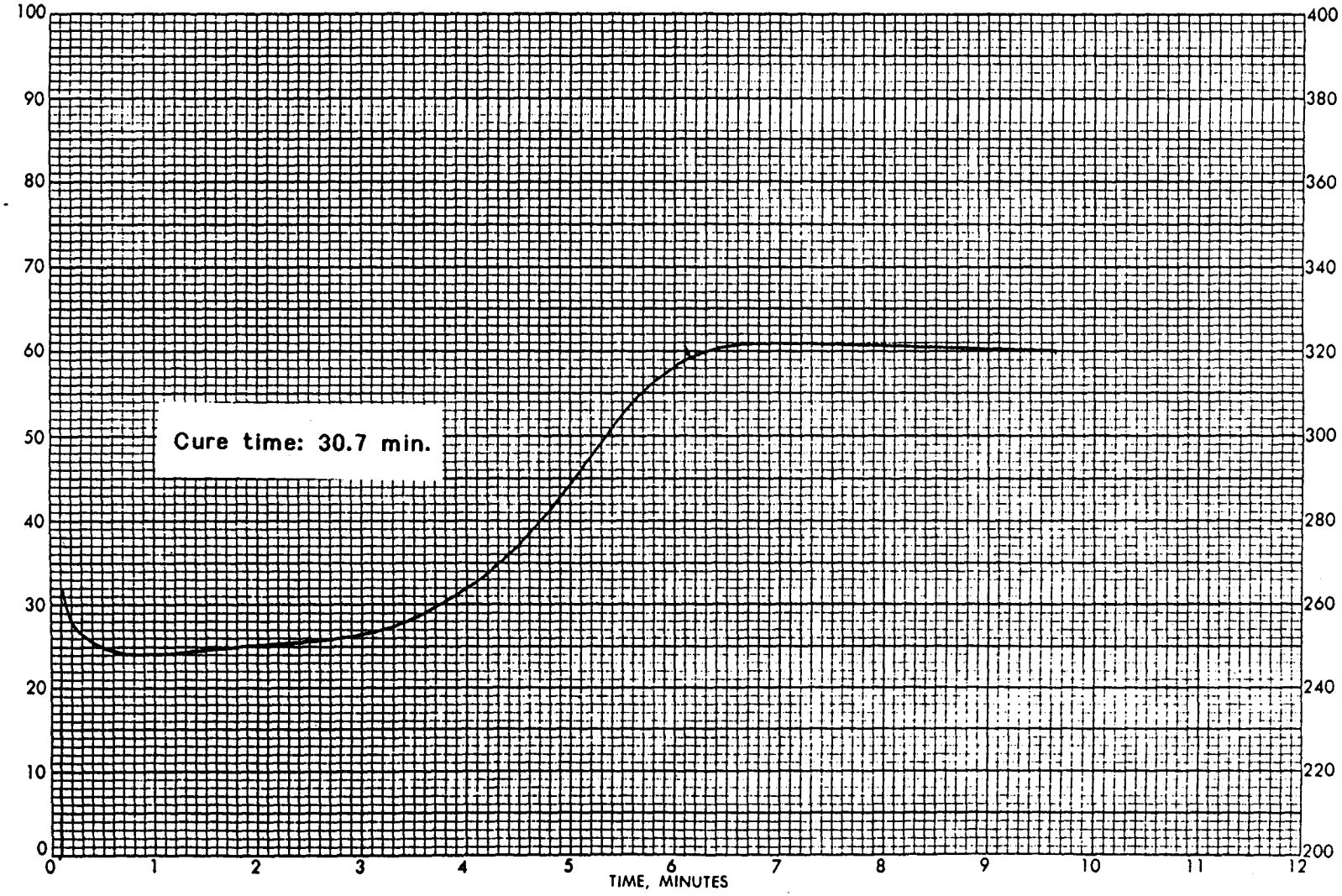
120 minute Chart Motor	Stock: SBR 1502	Formulation # 14	Date: 3/31/92
100 Range Selector	3 Degree Arc	Operator: P. Greene	Temperature: 293 F



Monsanto ODR

60 Minute Chart Motor | **Stock:SBR (med styrene cont)** | **Formulation # 15**

100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



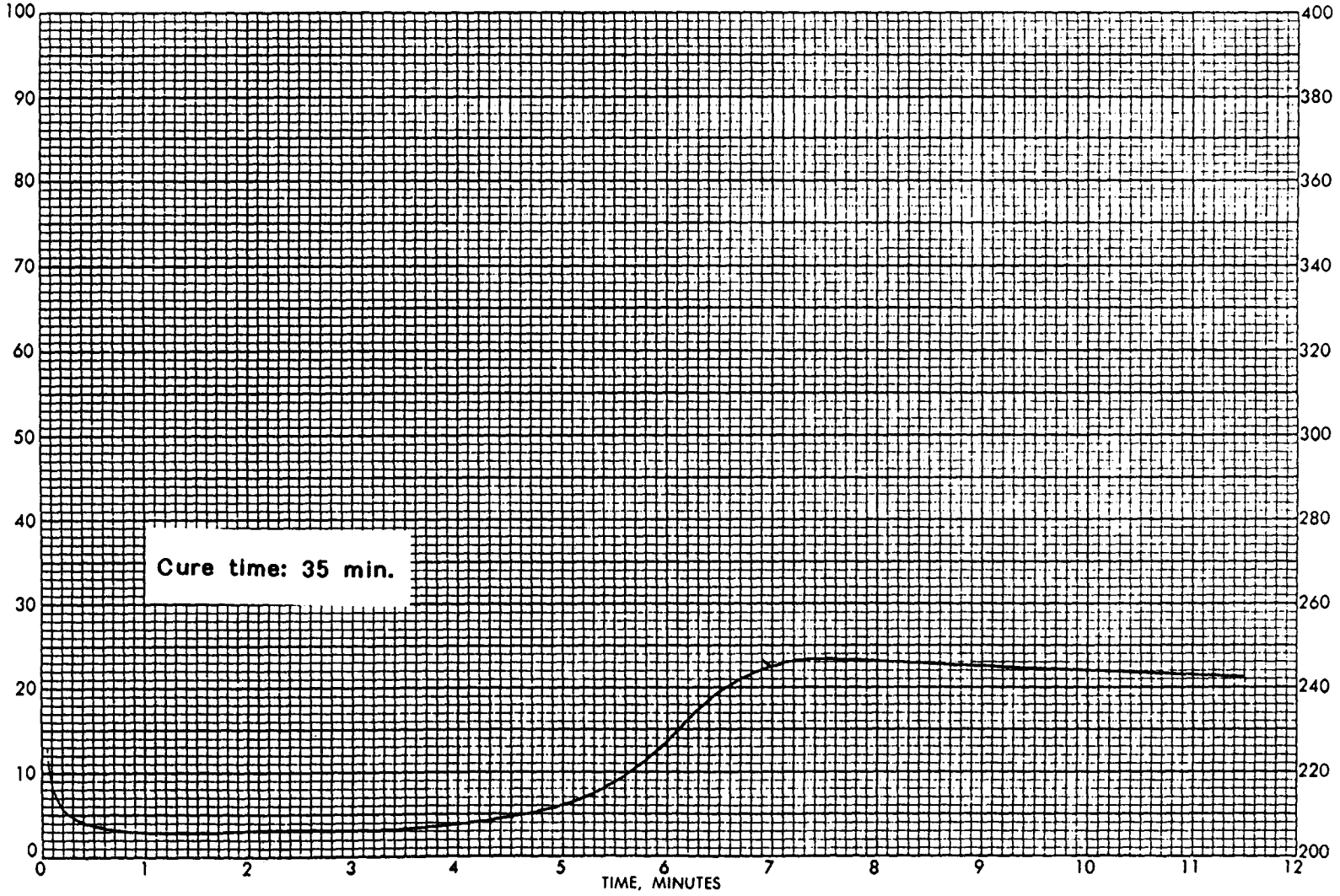
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock:SBR (high styrene cont)
3 Degree Arc

Formulation # 16
Operator: P. Greene

Temperature: 320F



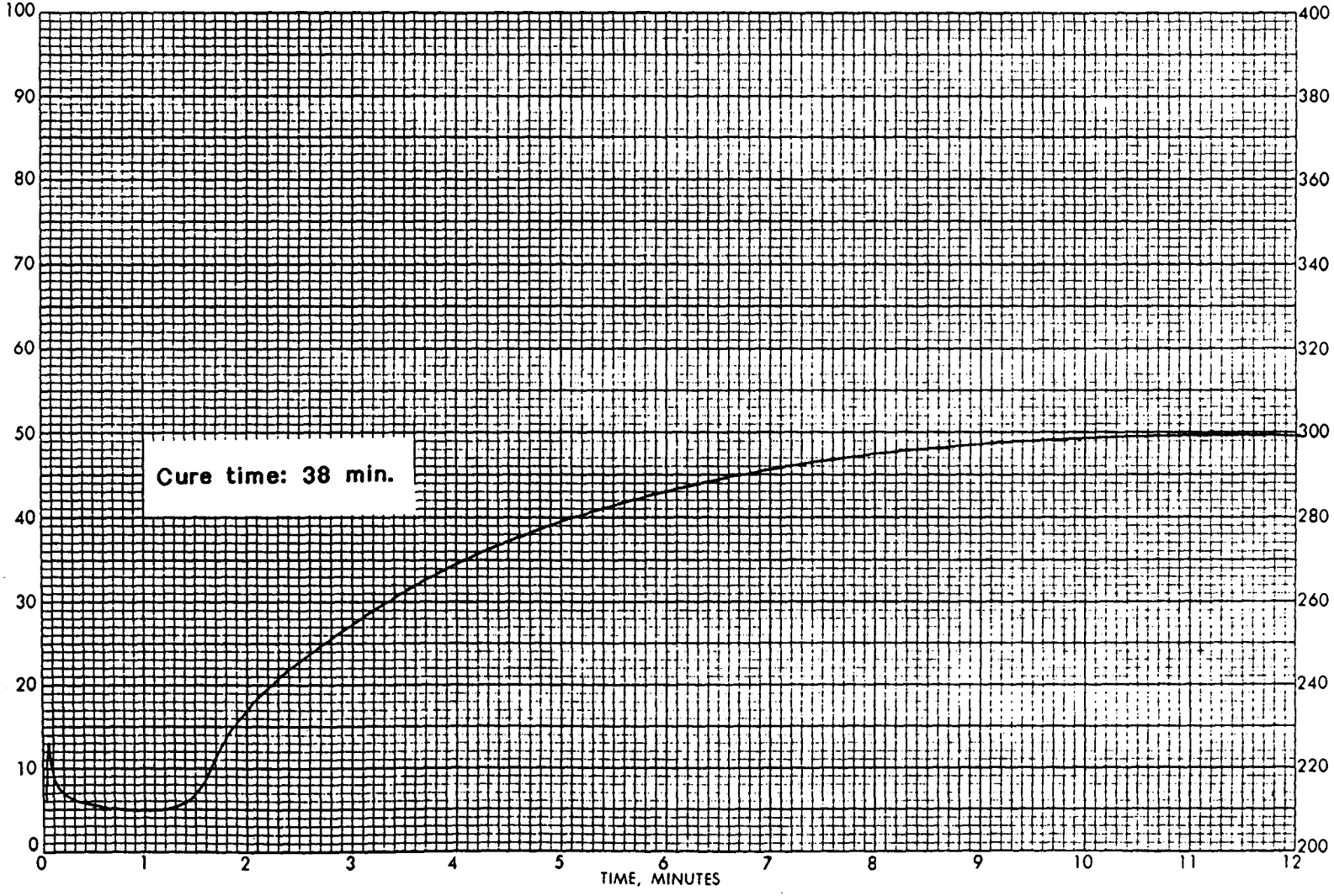
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock:Nitrile (very high ACN)
3 Degree Arc

Formulation # 17
Operator: P. Greene

Temperature: 330F



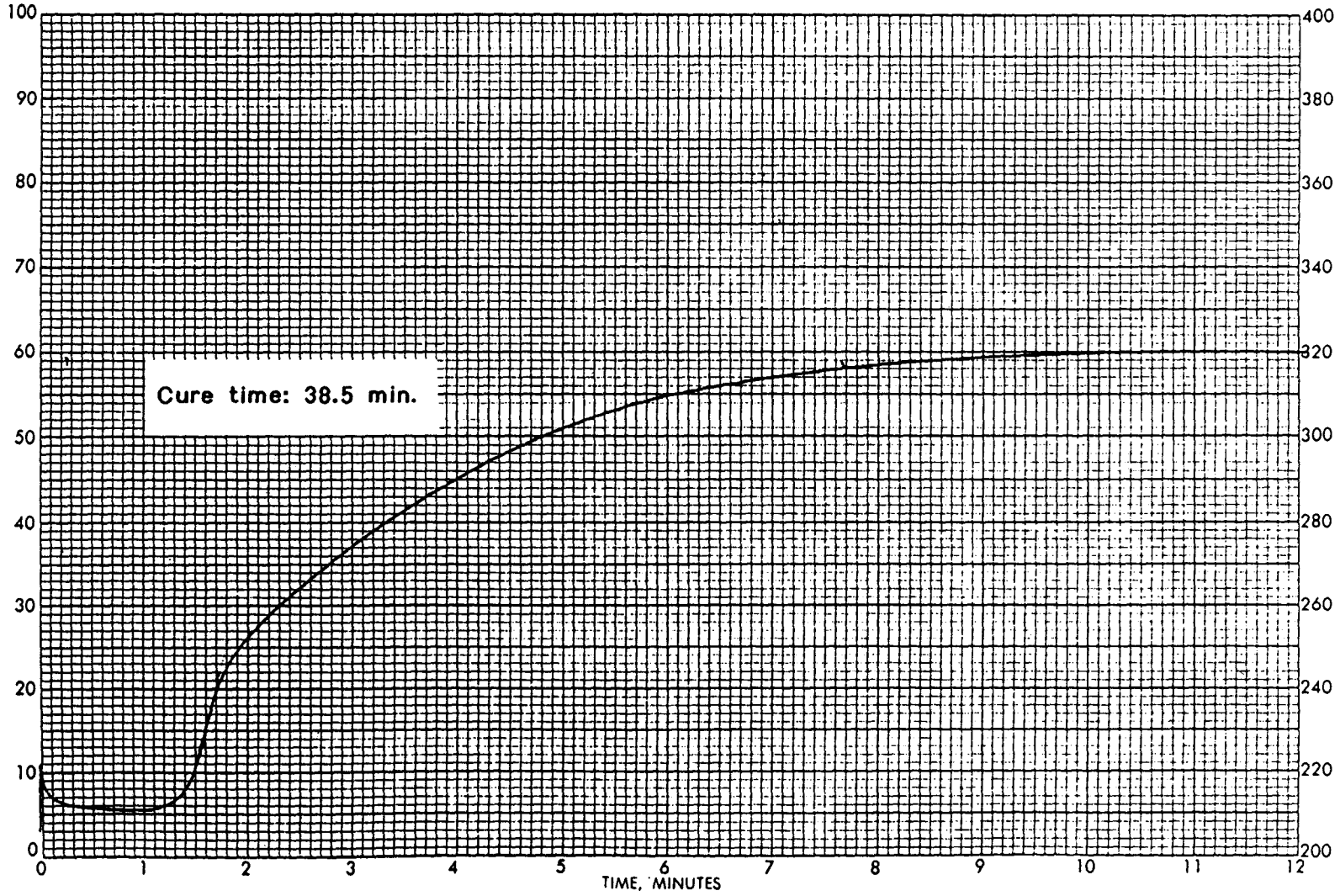
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock:Nitrile (high ACN)
3 Degree Arc

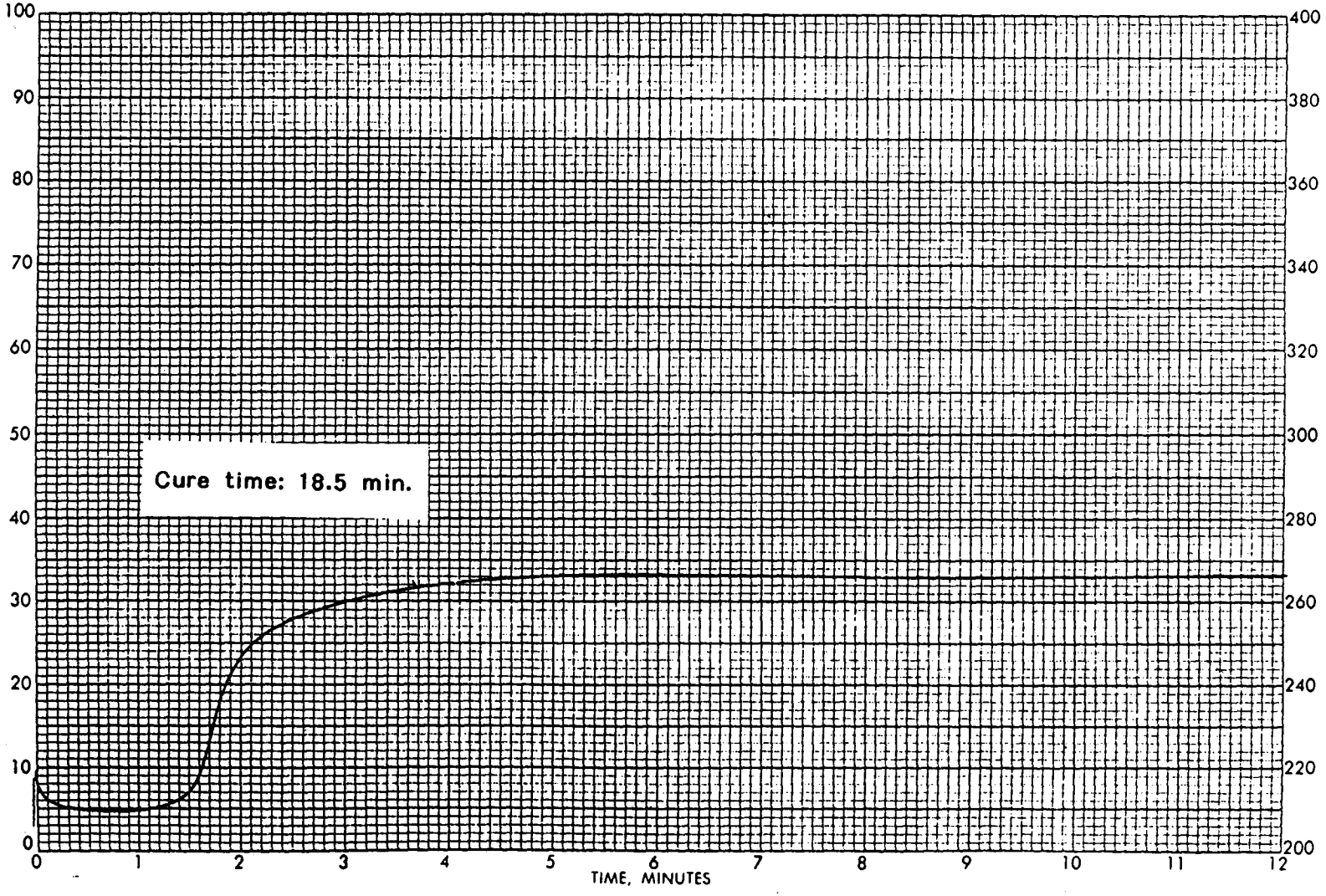
Formulation # 18
Operator: P. Greene

Temperature: 330F



Monsanto ODR

60 Minute Chart Motor | **Stock: Nitrile (medium ACN)** | **Formulation # 19**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 330F**



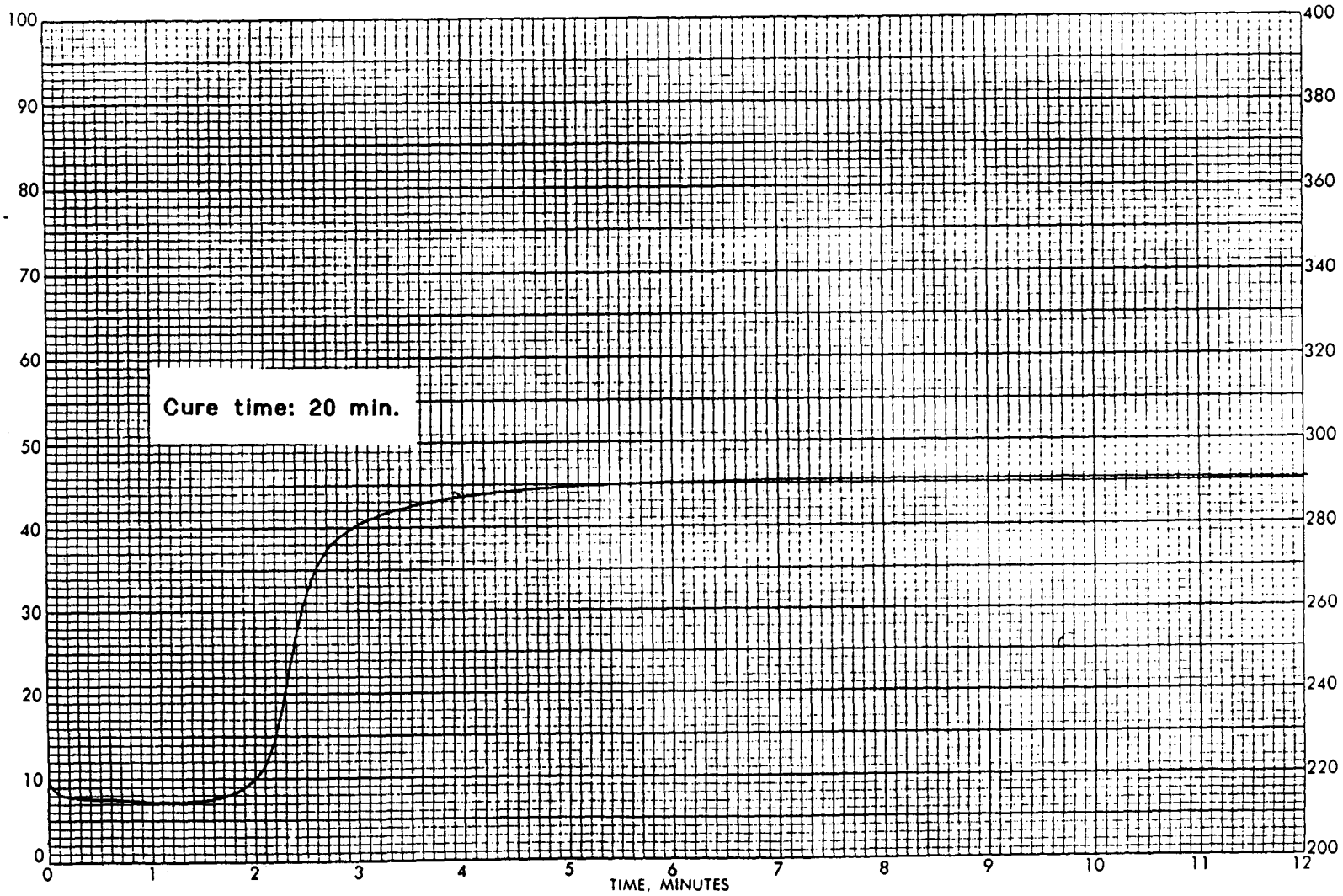
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock:Nitrile (low ACN)
3 Degree Arc

Formulation # 20
Operator: P. Greene

Temperature: 330F



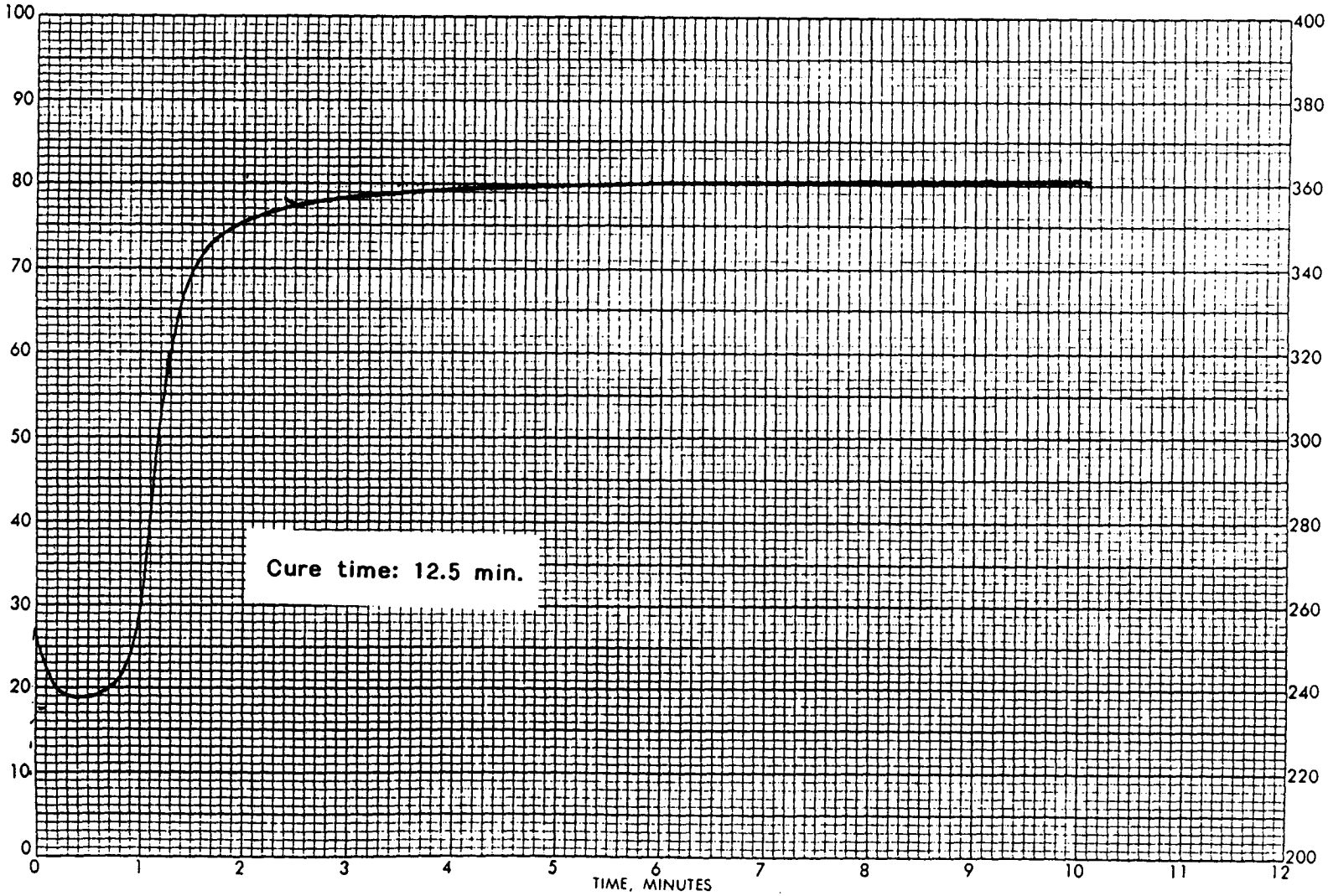
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Nitrile (low ACN)
3 Degree Arc

Formulation # 21
Operator: P. Greene

Temperature: 330F



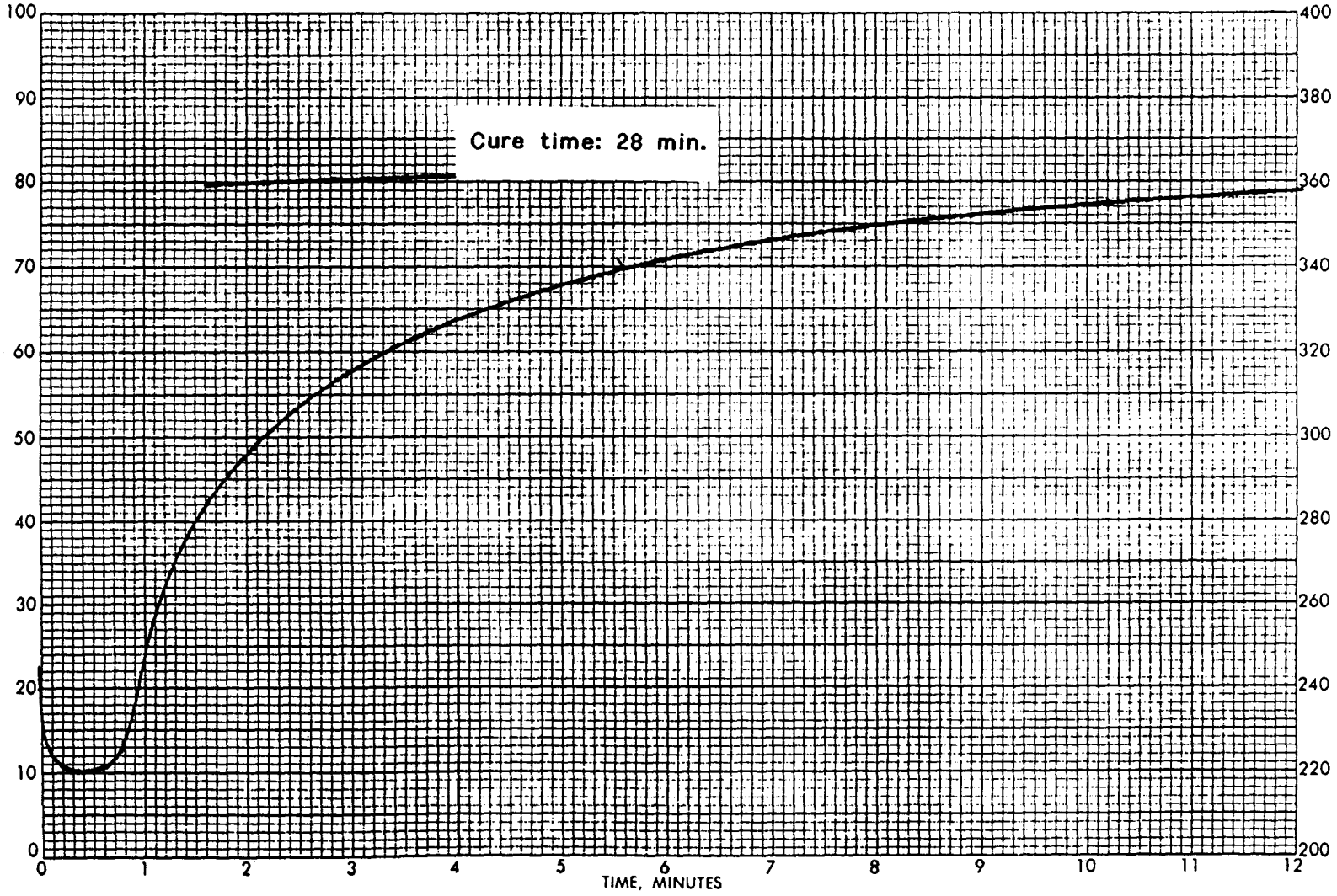
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Nitrile (very high ACN)
3 Degree Arc

Formulation # 22
Operator: P. Greene

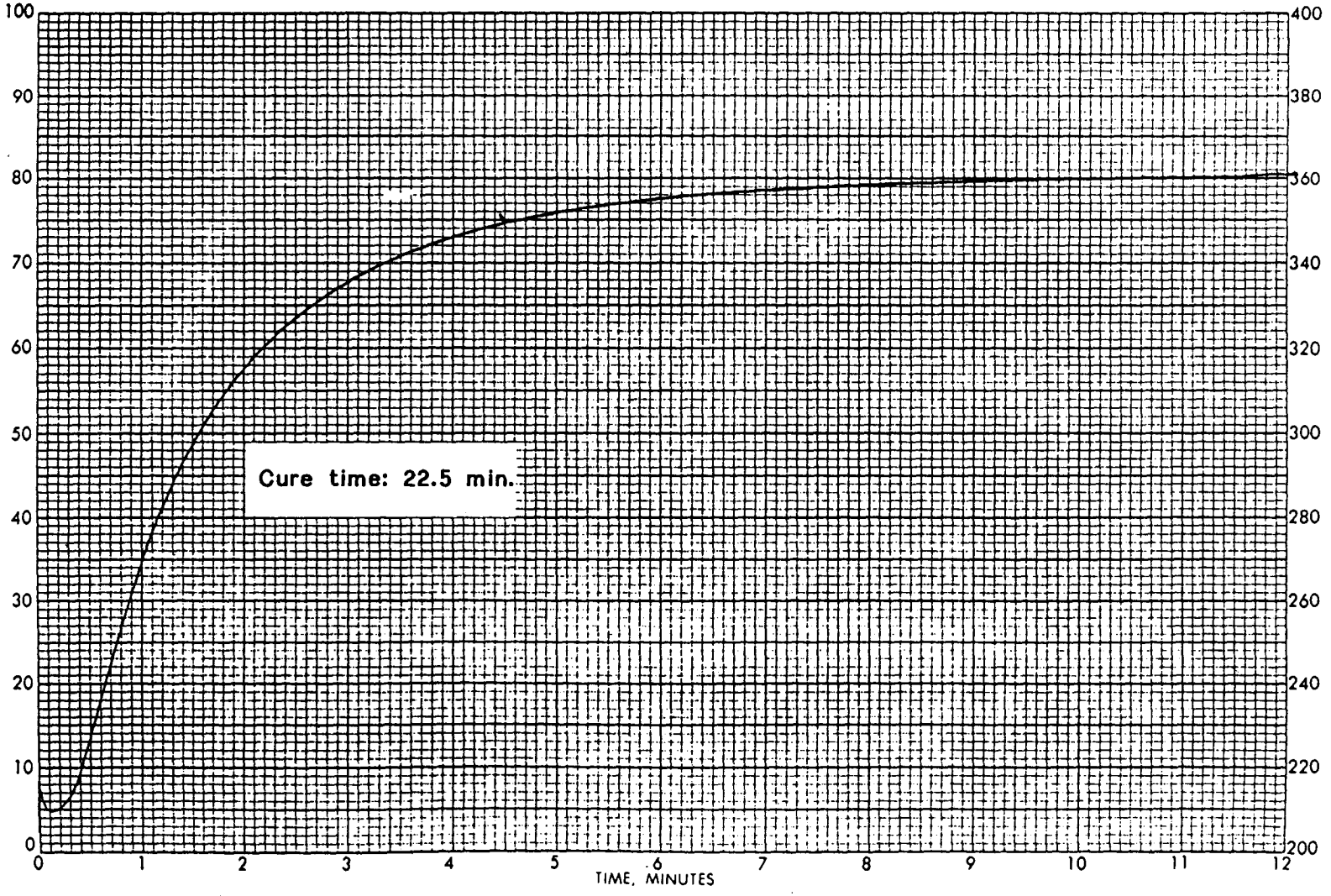
Temperature: 330F



Monsanto ODR

60 minute Chart Motor **Stock: Hyd. Nitrile** **Formulation # 23** **Date: 7/10/92**

200 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 330 F**



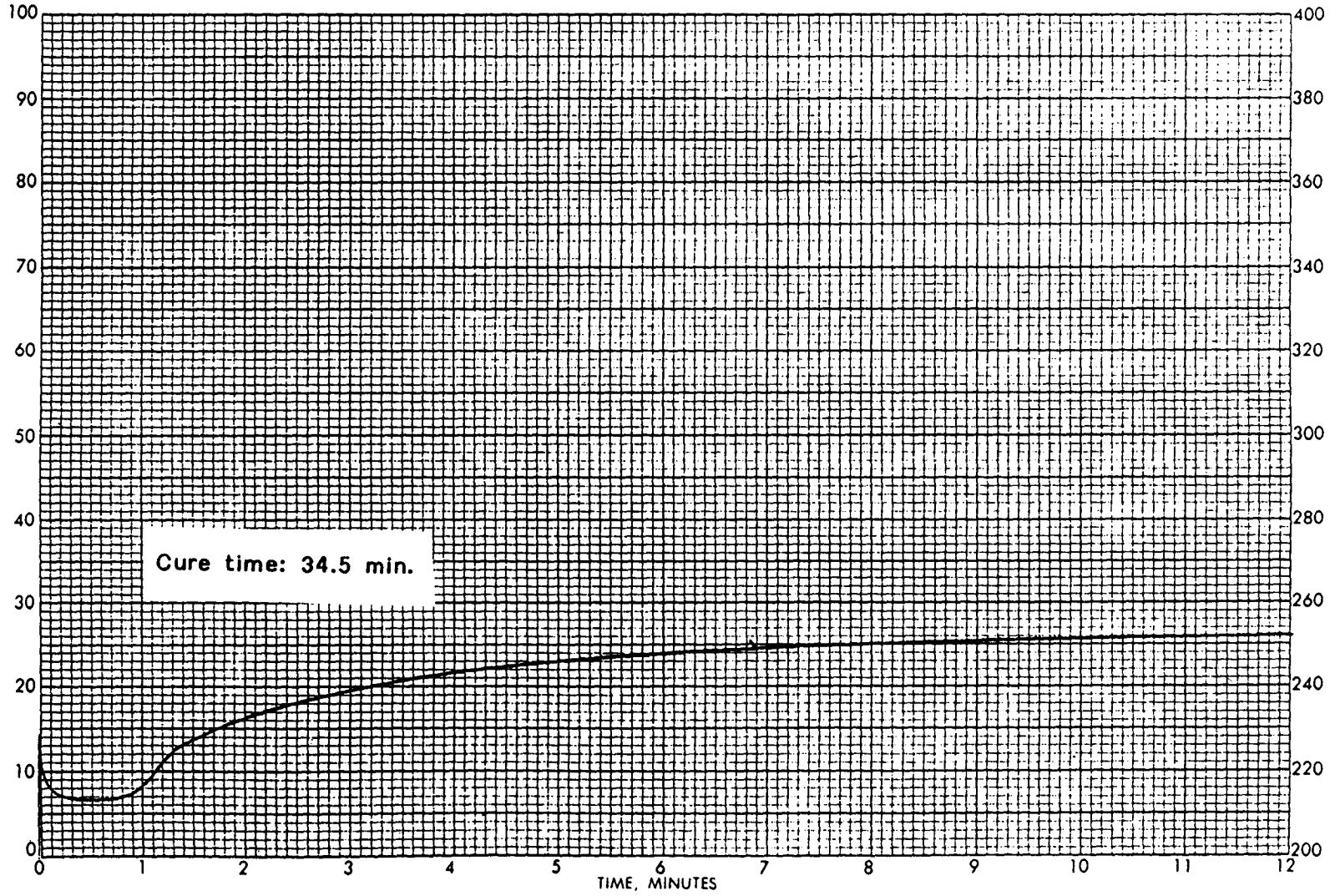
Monsanto ODR

60 Minute Chart Motor
200 Range Selector

Stock: Hydrogenated Nitrile
3 Degree Arc

Formulation # 24
Operator: P. Greene

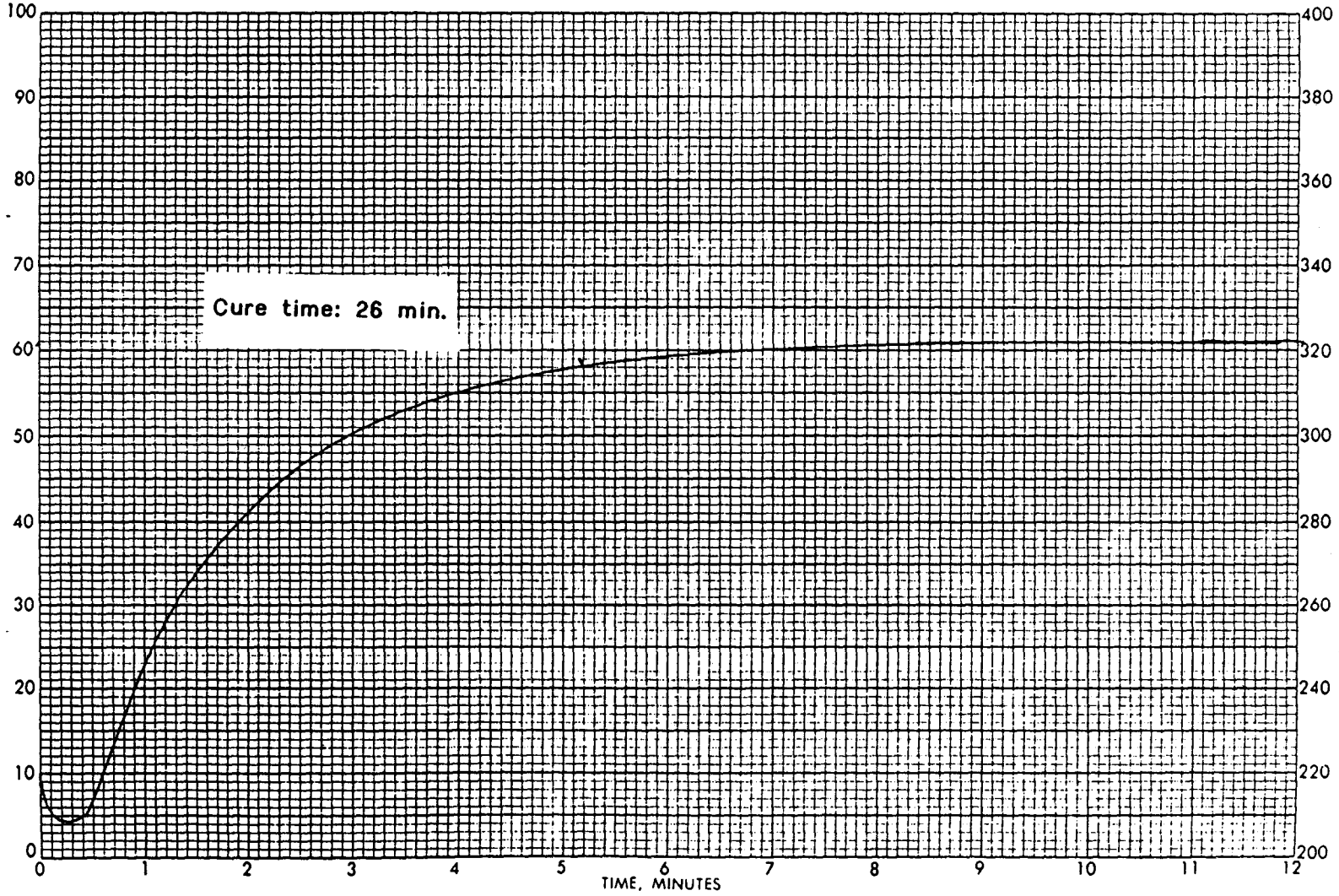
Temperature: 330F



Monsanto ODR

60 minute Chart Motor **Stock: Hyd. Nitrile** **Formulation # 25** **Date: 7/13/92**

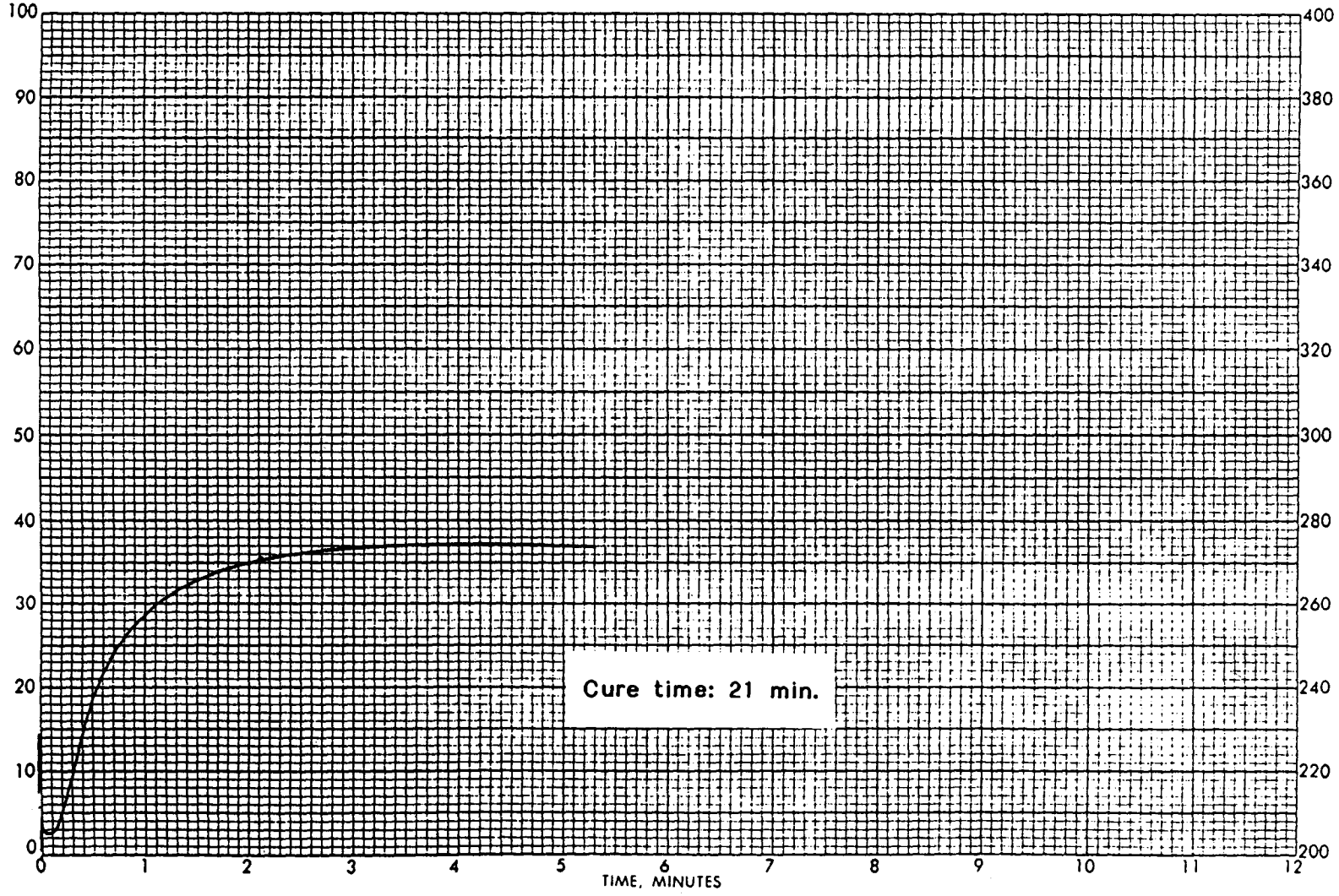
200 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 330 F**



Monsanto ODR

120 minute Chart Motor | **Stock: Hyd. Nitrile** | **Formulation # 26** | **Date: 9/11/92**

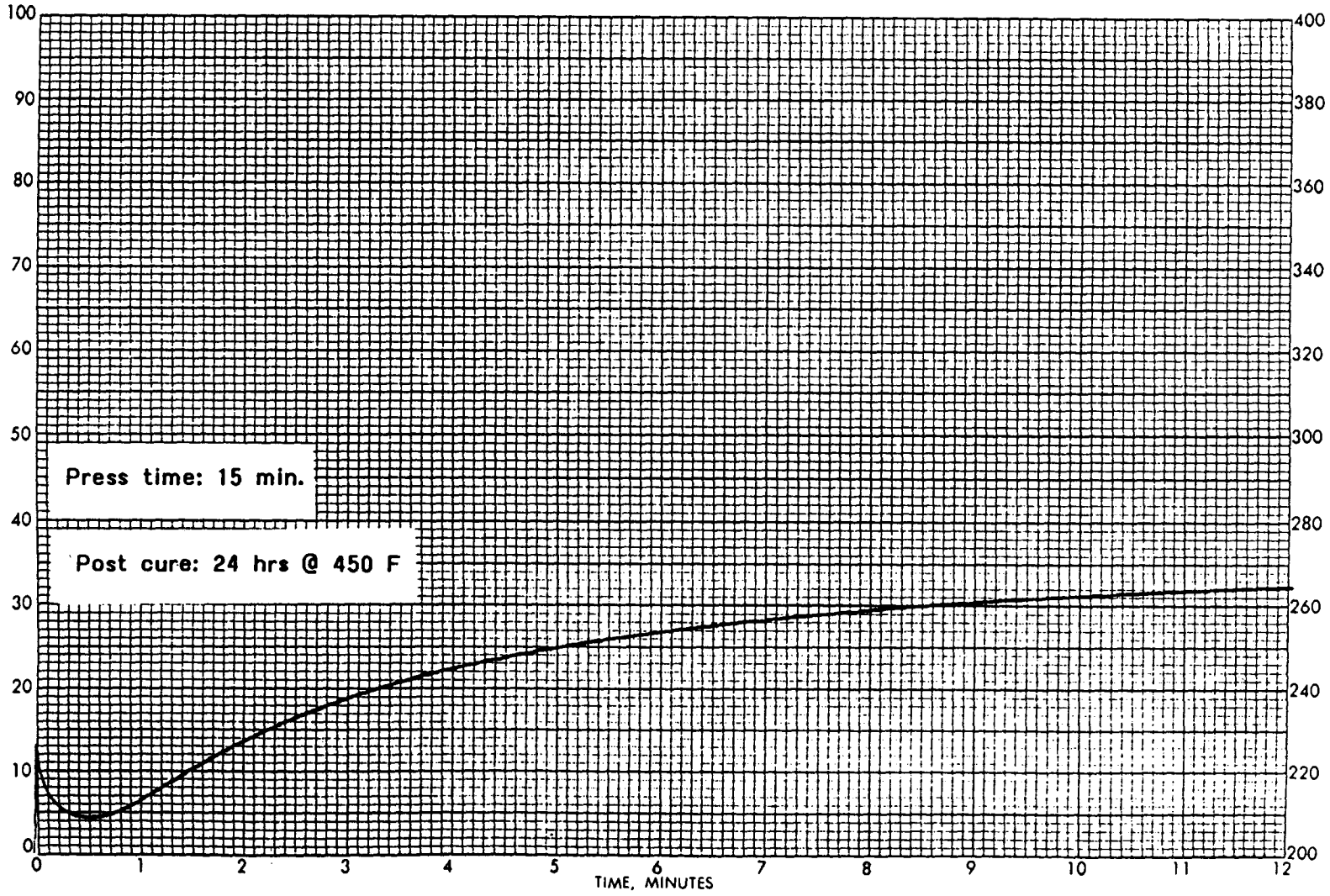
200 Range Selector | **1 Degree Arc** | **Operator: P. Greene** | **Temperature: 330 F**



Monsanto ODR

60 minute Chart Motor **Stock: Viton A** **Formulation # 27** **Date: 6/26/92**

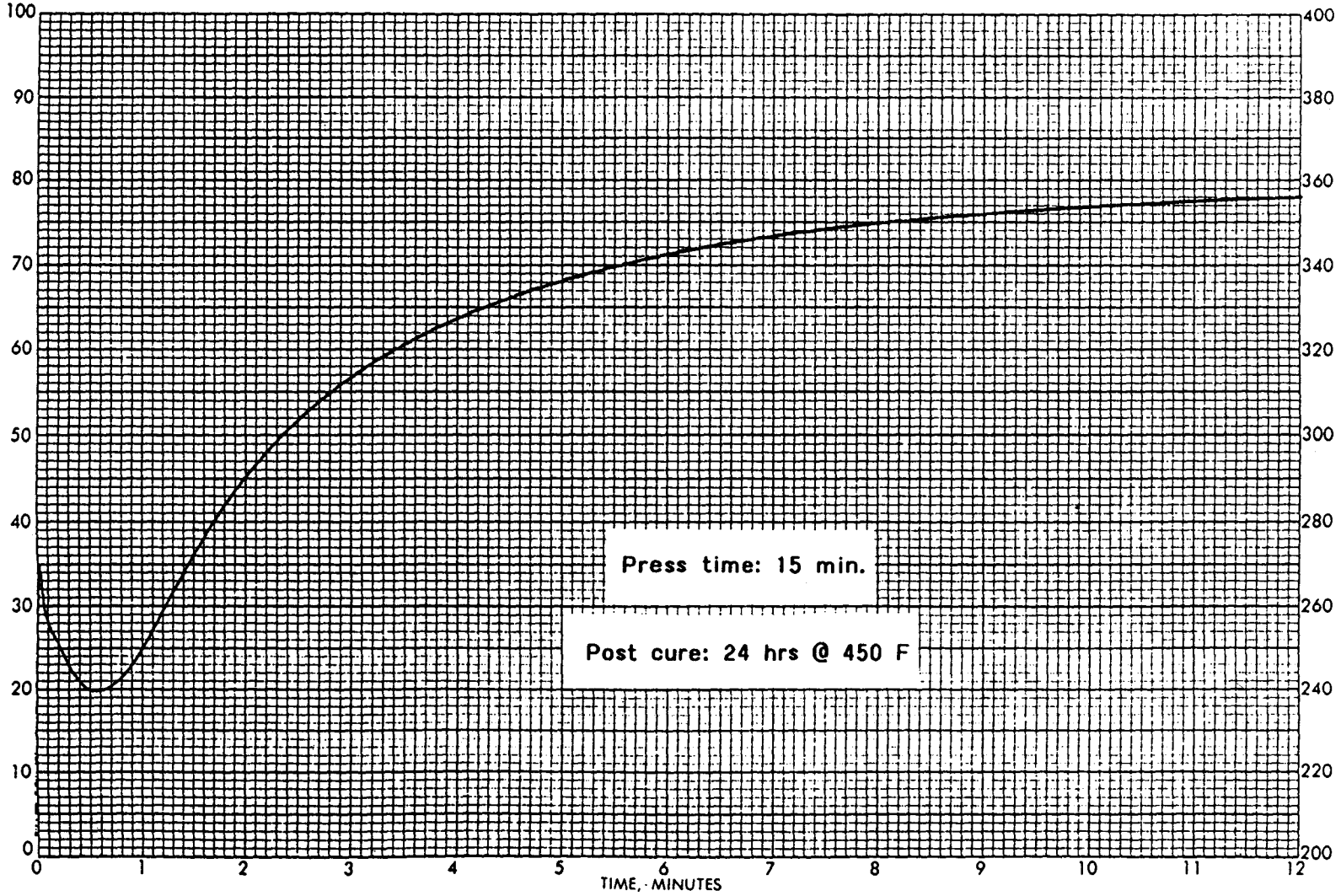
100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 350 F**



Monsanto ODR

60 minute Chart Motor **Stock: Viton B** **Formulation # 28** **Date: 6/29/92**

100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 350 F**



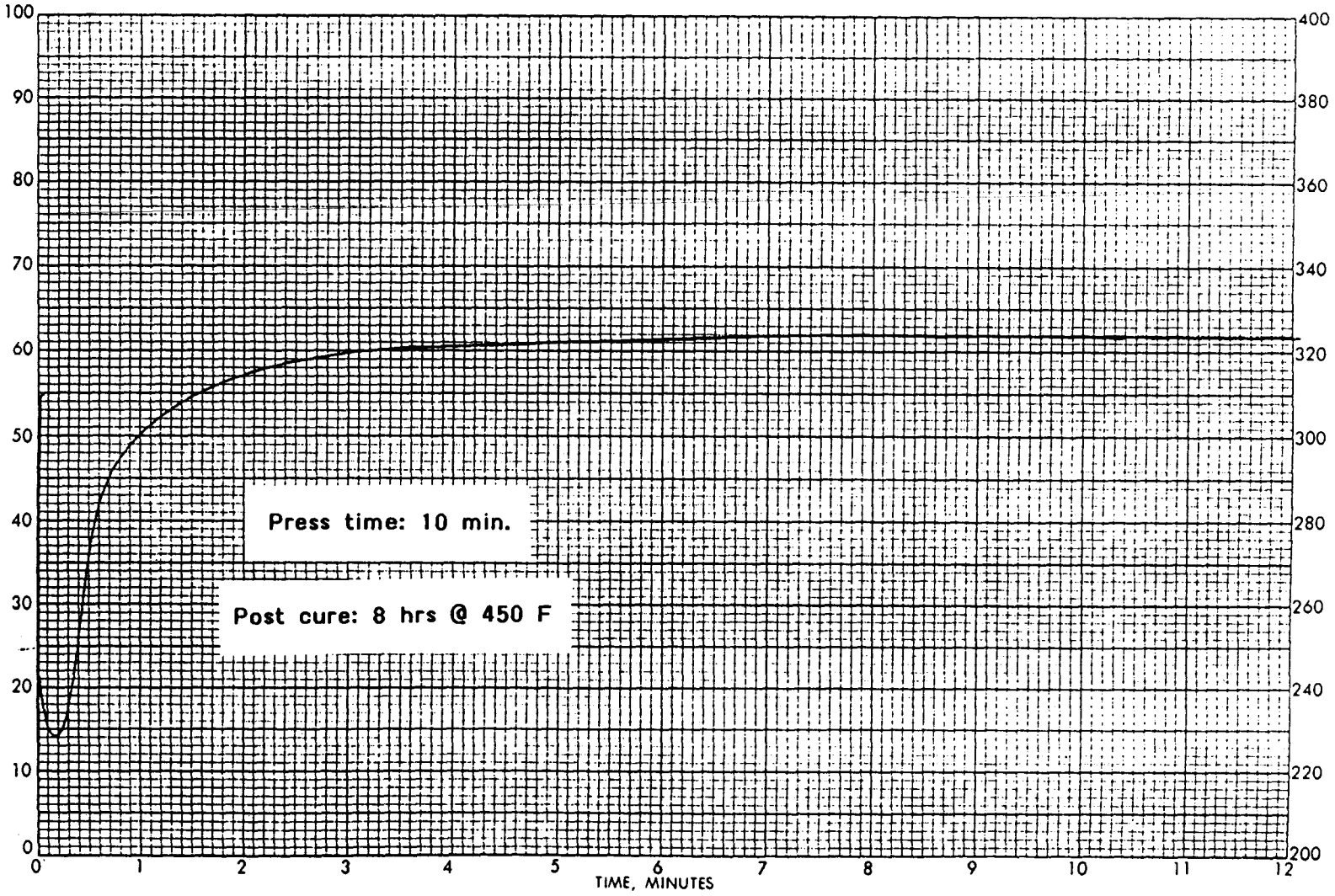
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Fluoroelastomer
3 Degree Arc

Formulation # 29
Operator: P. Greene

Temperature: 350F



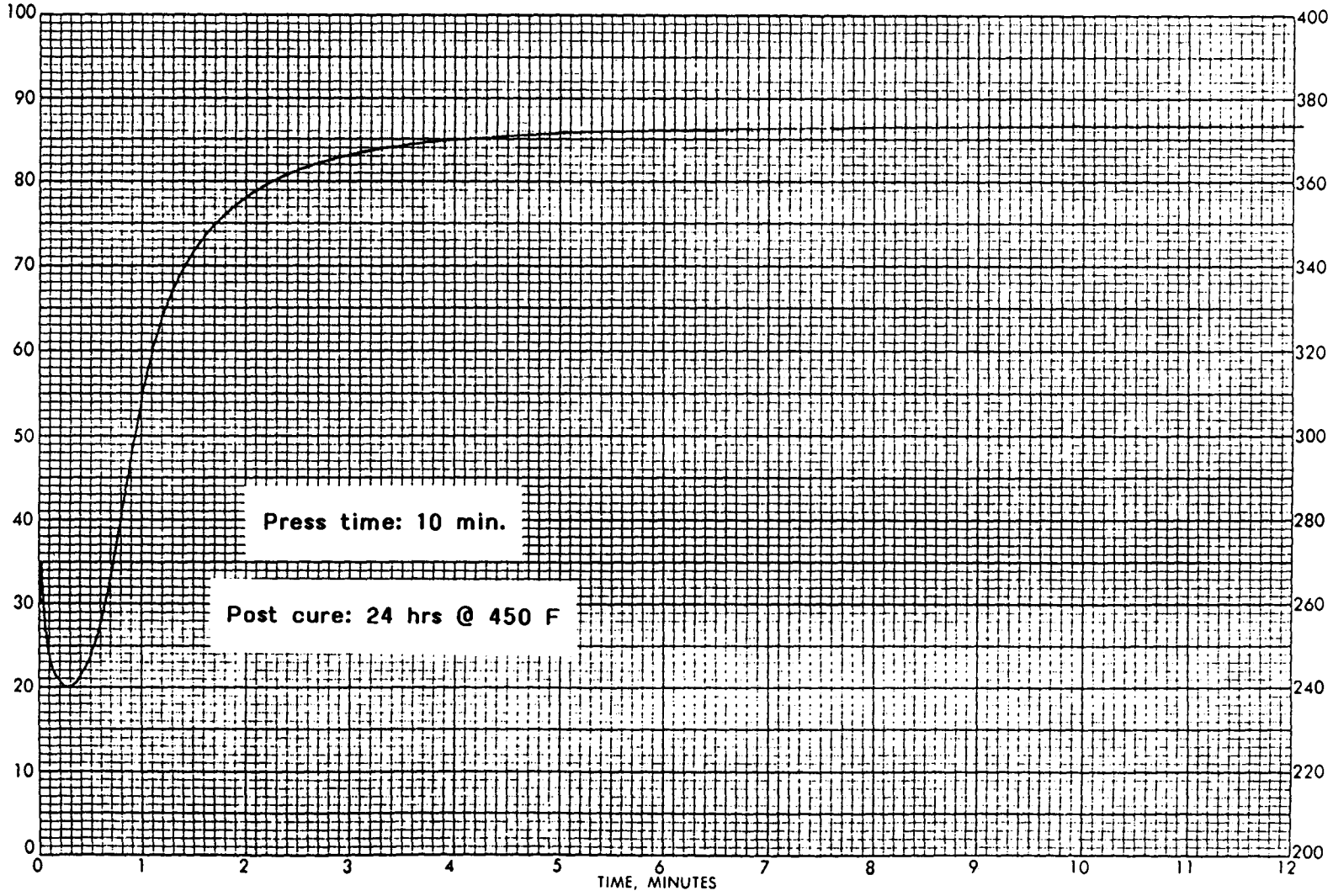
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Fluoroelastomer
3 Degree Arc

Formulation # 30
Operator: P. Greene

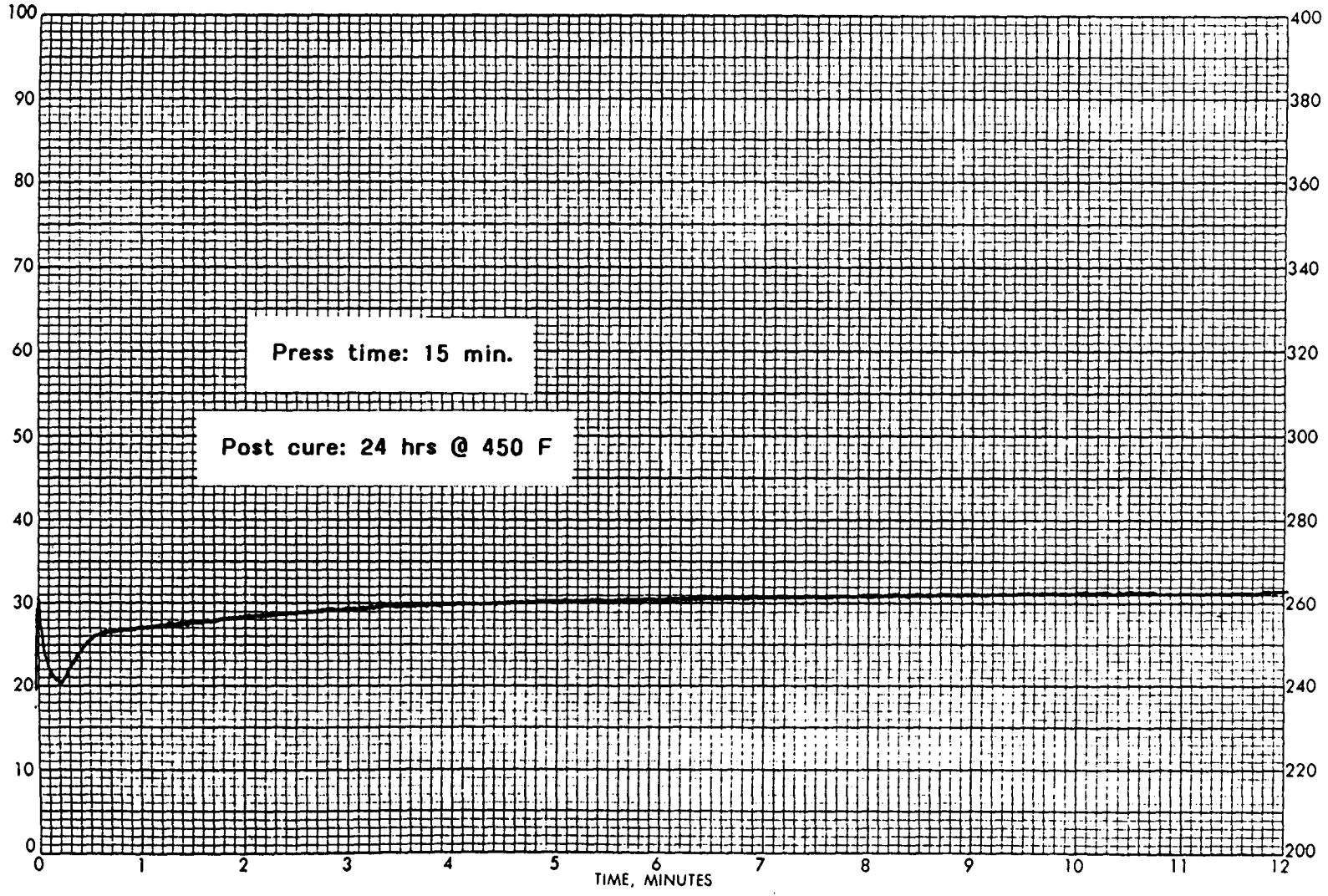
Temperature: 350F



Monsanto ODR

60 Minute Chart Motor | **Stock: Fluoro/chloroelastomer** | **Formulation # 31**

100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 350F**



Monsanto ODR

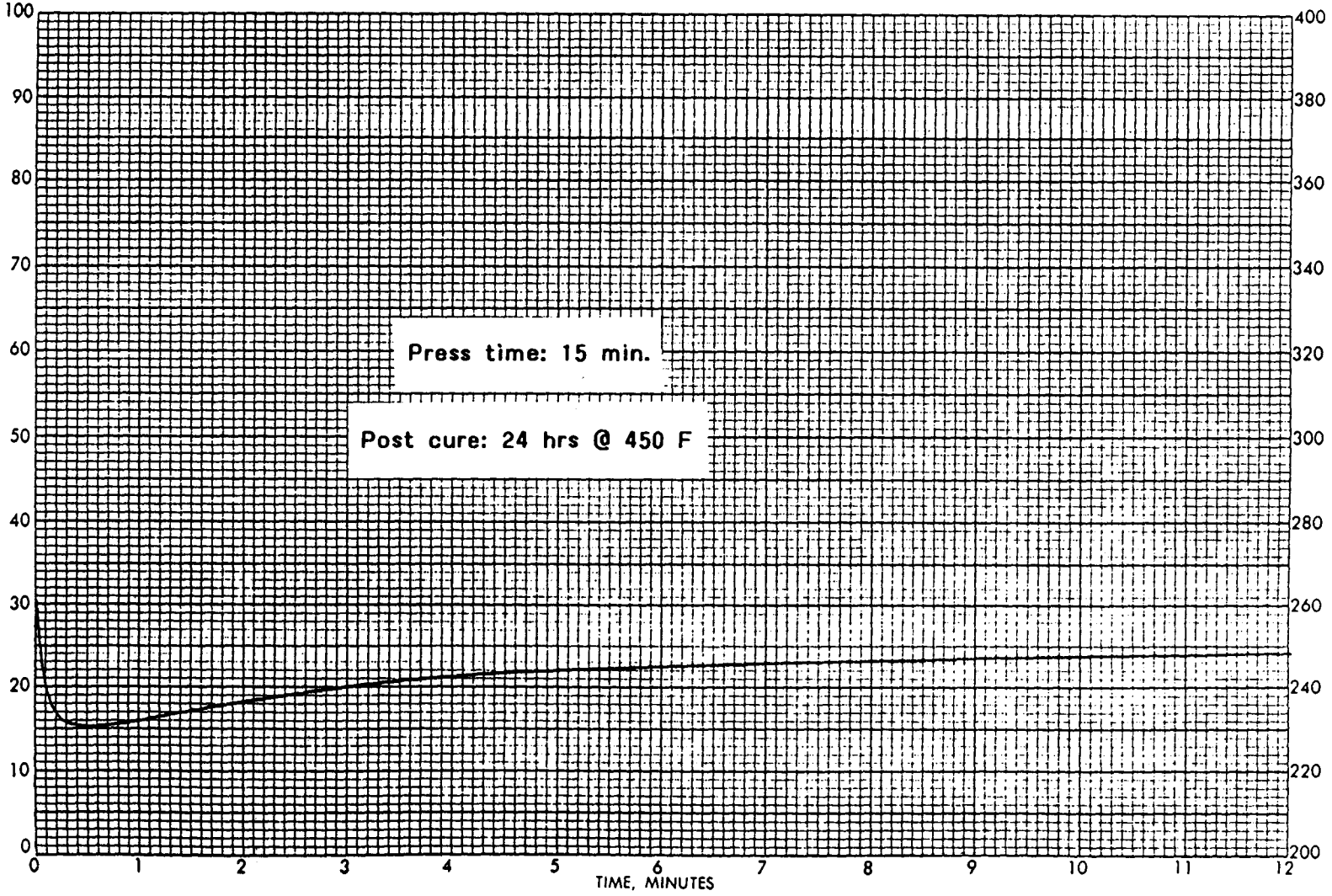
60 minute Chart Motor
100 Range Selector

Stock: Fluoroelastomer
3 Degree Arc

Formulation # 32
Operator: P. Greene

Date: 6/26/92

Temperature: 350 F



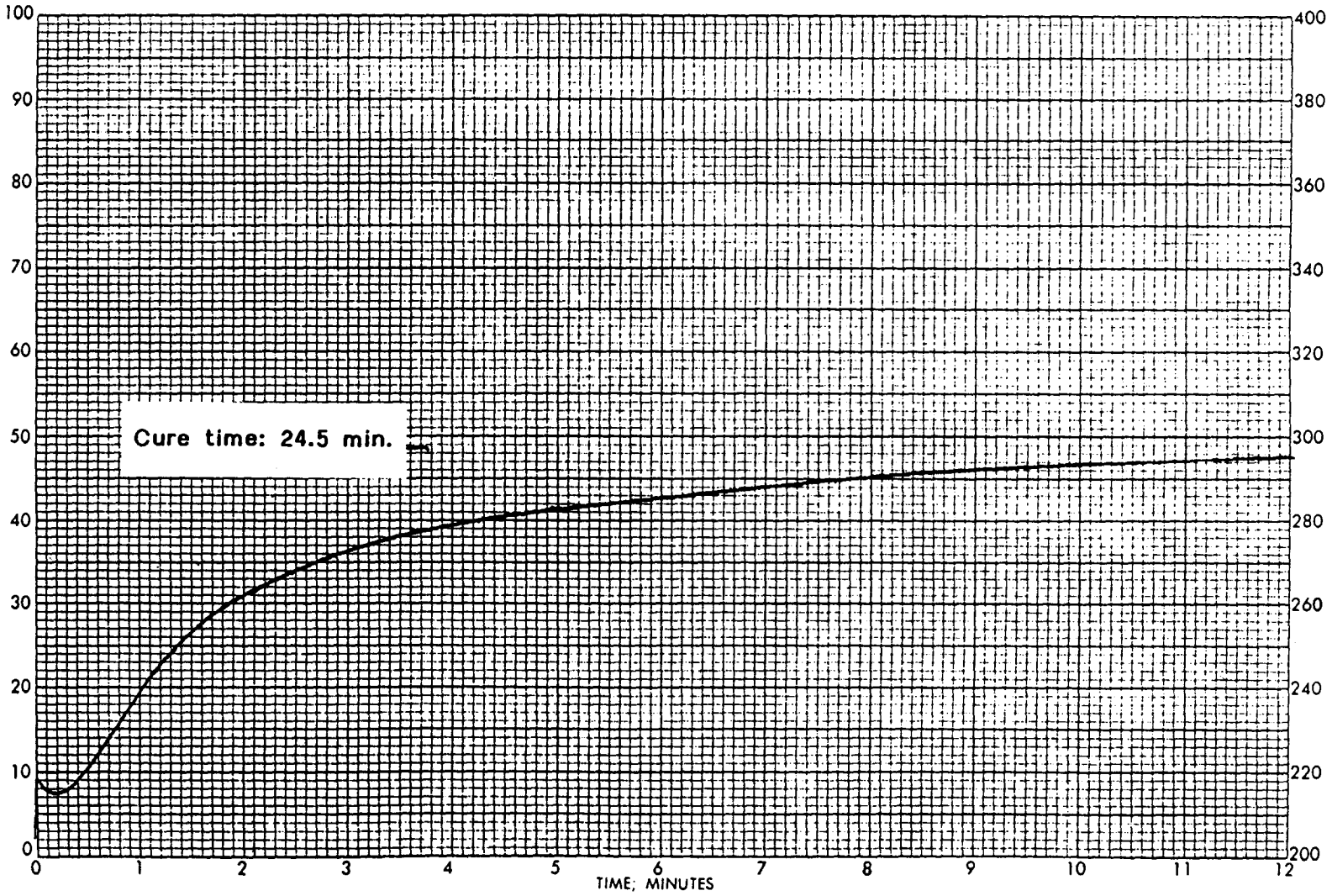
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Epichlorohydrin
3 Degree Arc

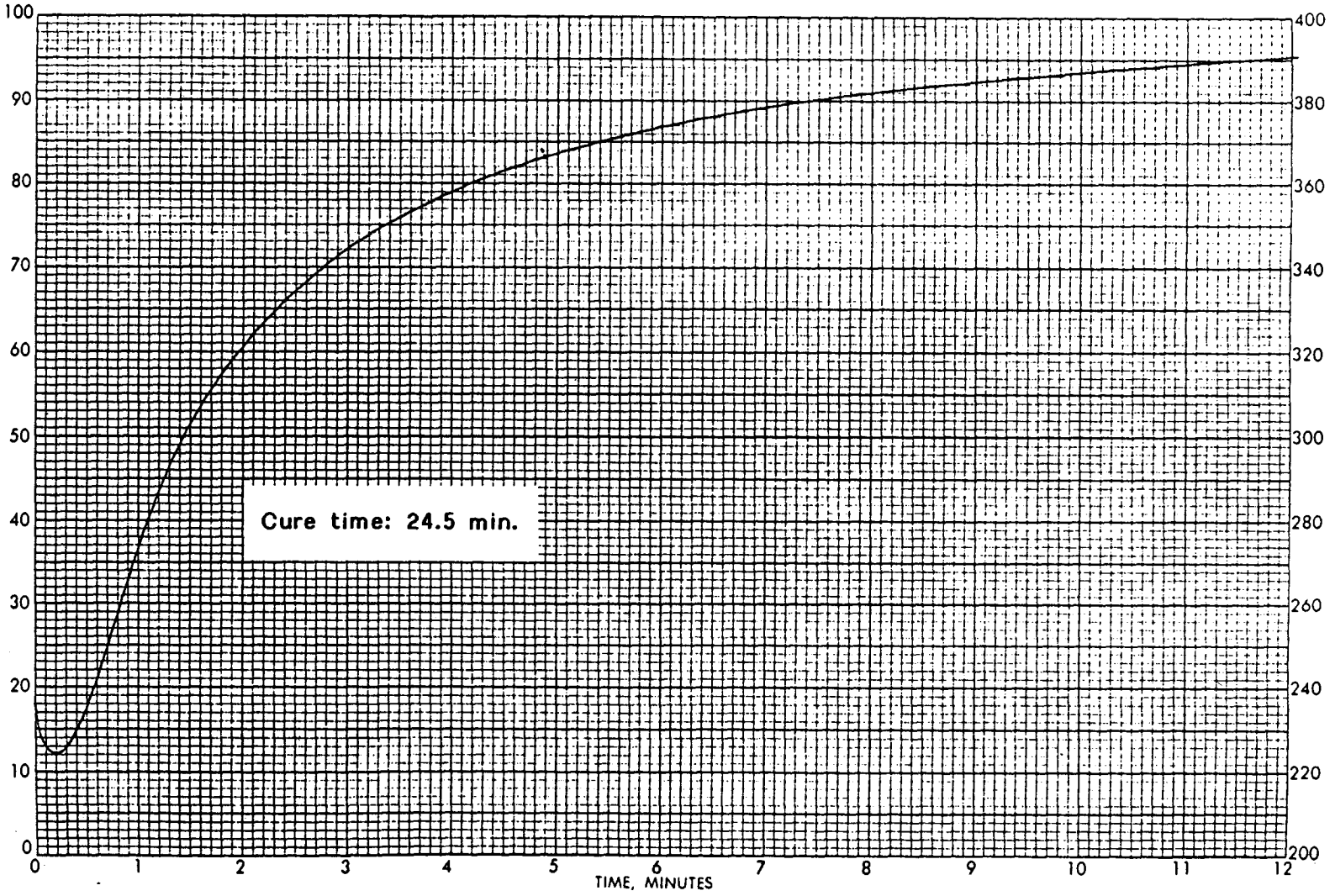
Formulation # 34
Operator: P. Greene

Temperature: 320F



Monsanto ODR

60 Minute Chart Motor | **Stock: Epichlorohydrin** | **Formulation # 35**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



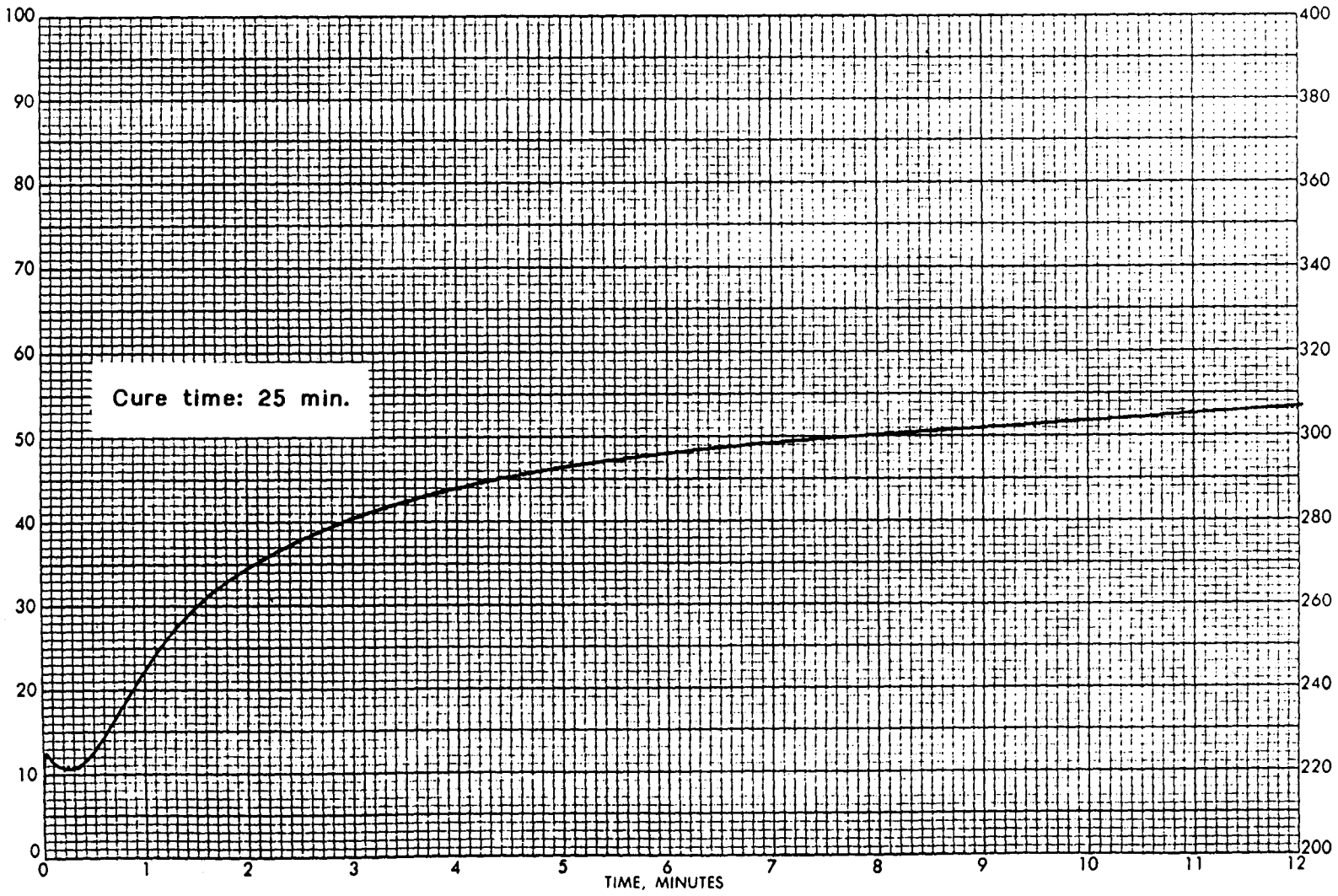
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Epichlorohydrin
3 Degree Arc

Formulation # 36
Operator: P. Greene

Temperature: 320F



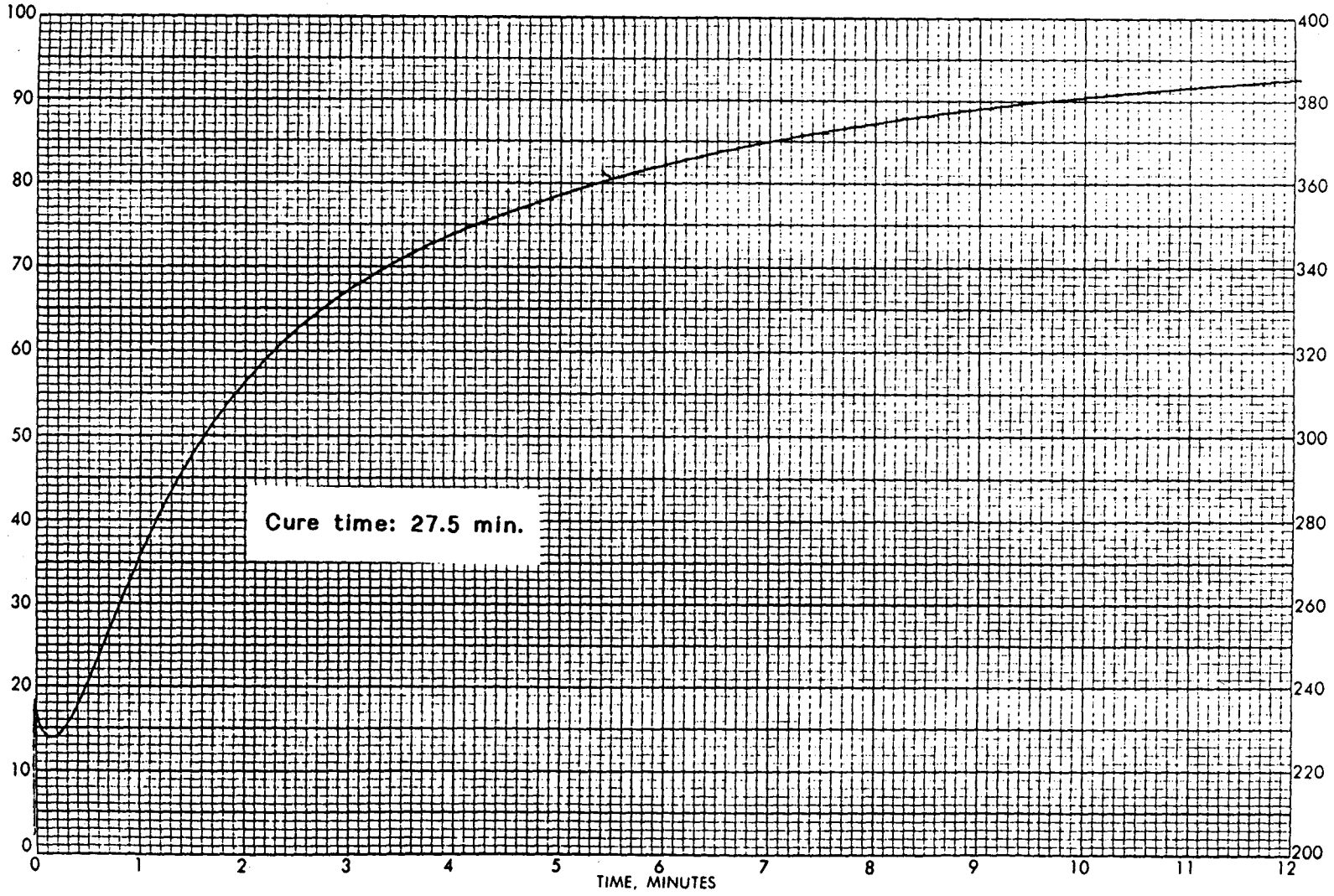
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Epichlorohydrin
3 Degree Arc

Formulation # 37
Operator: P. Greene

Temperature: 320F



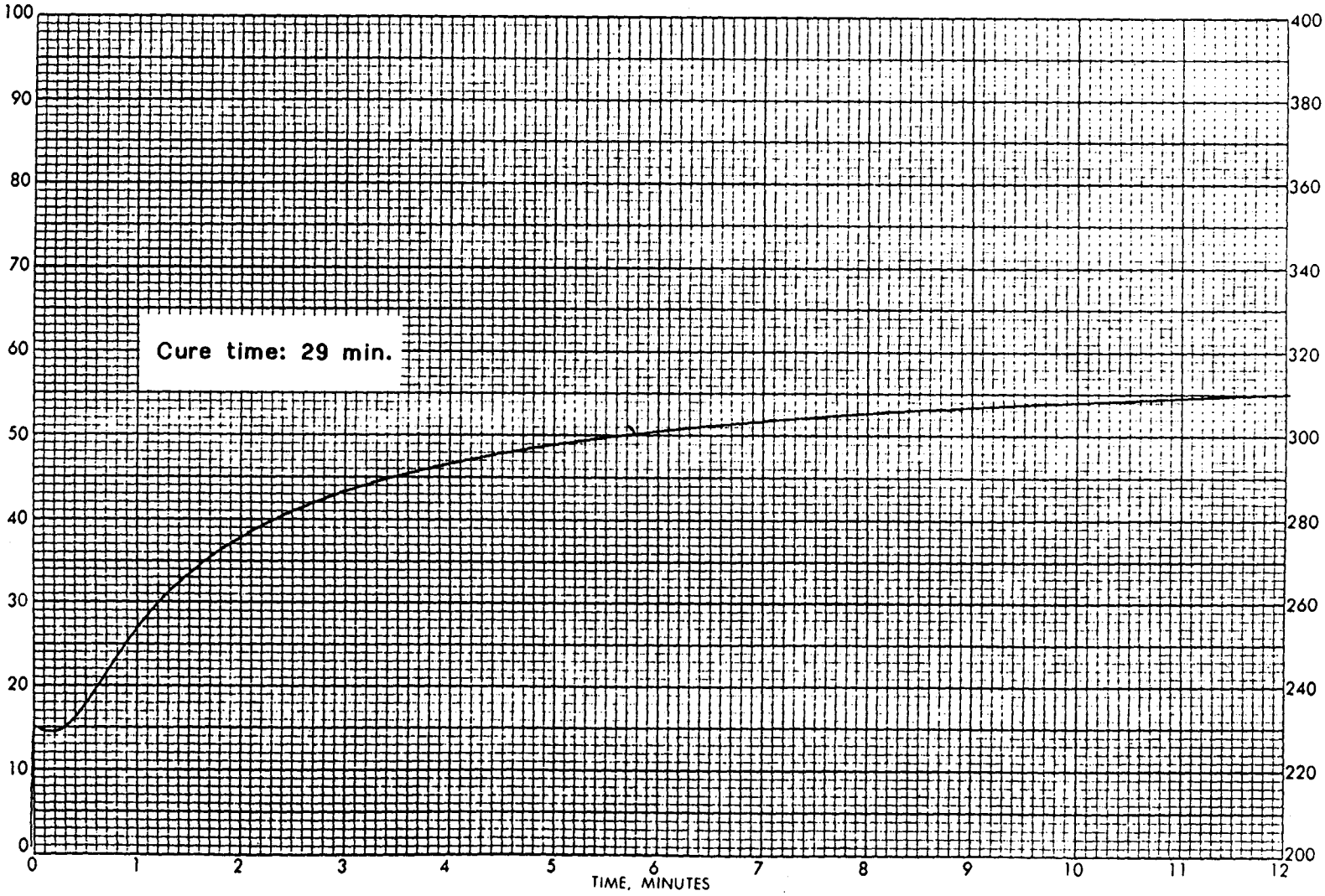
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Epichlorohydrin
3 Degree Arc

Formulation # 38
Operator: P. Greene

Temperature: 320F



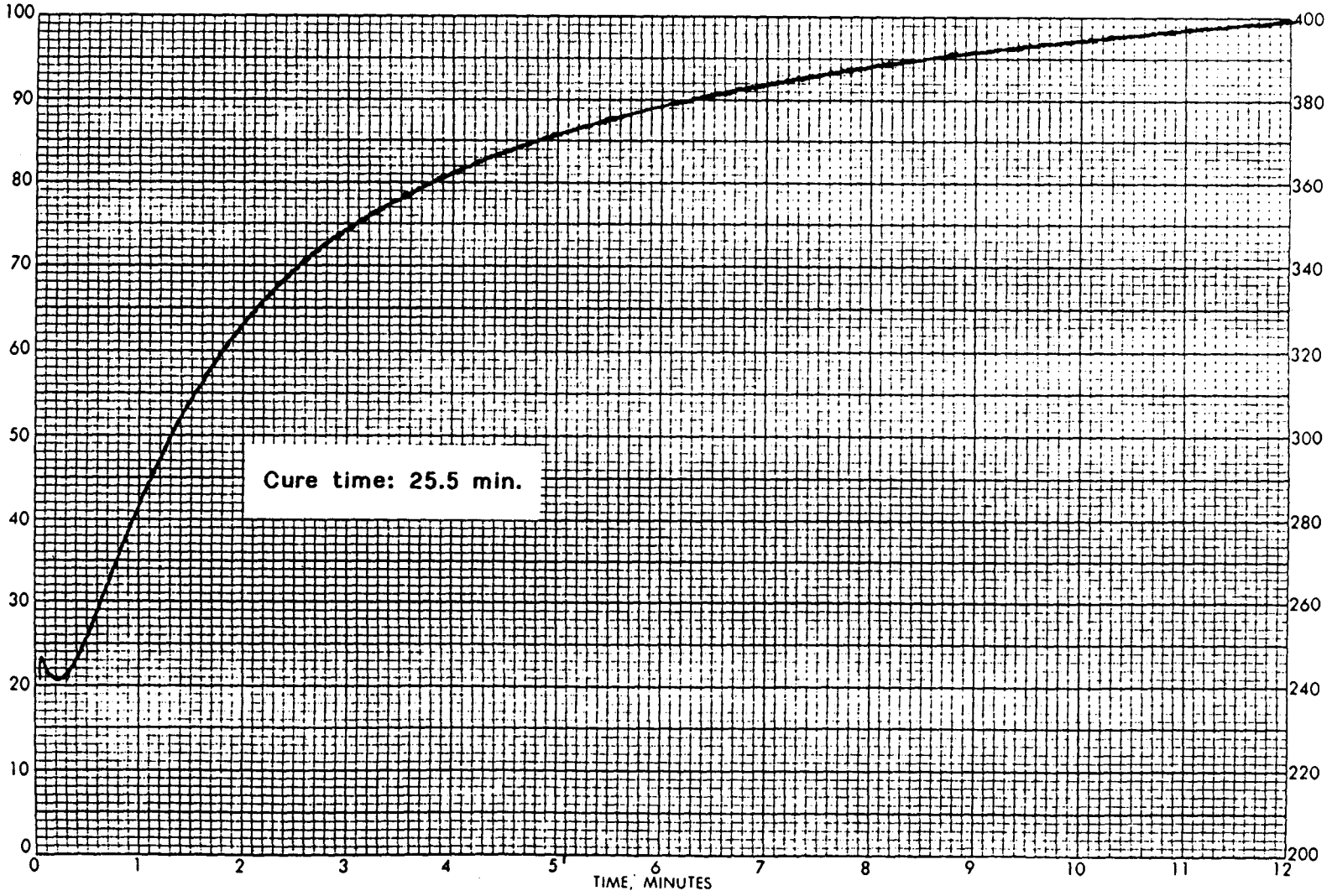
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Epichlorohydrin
3 Degree Arc

Formulation # 39
Operator: P. Greene

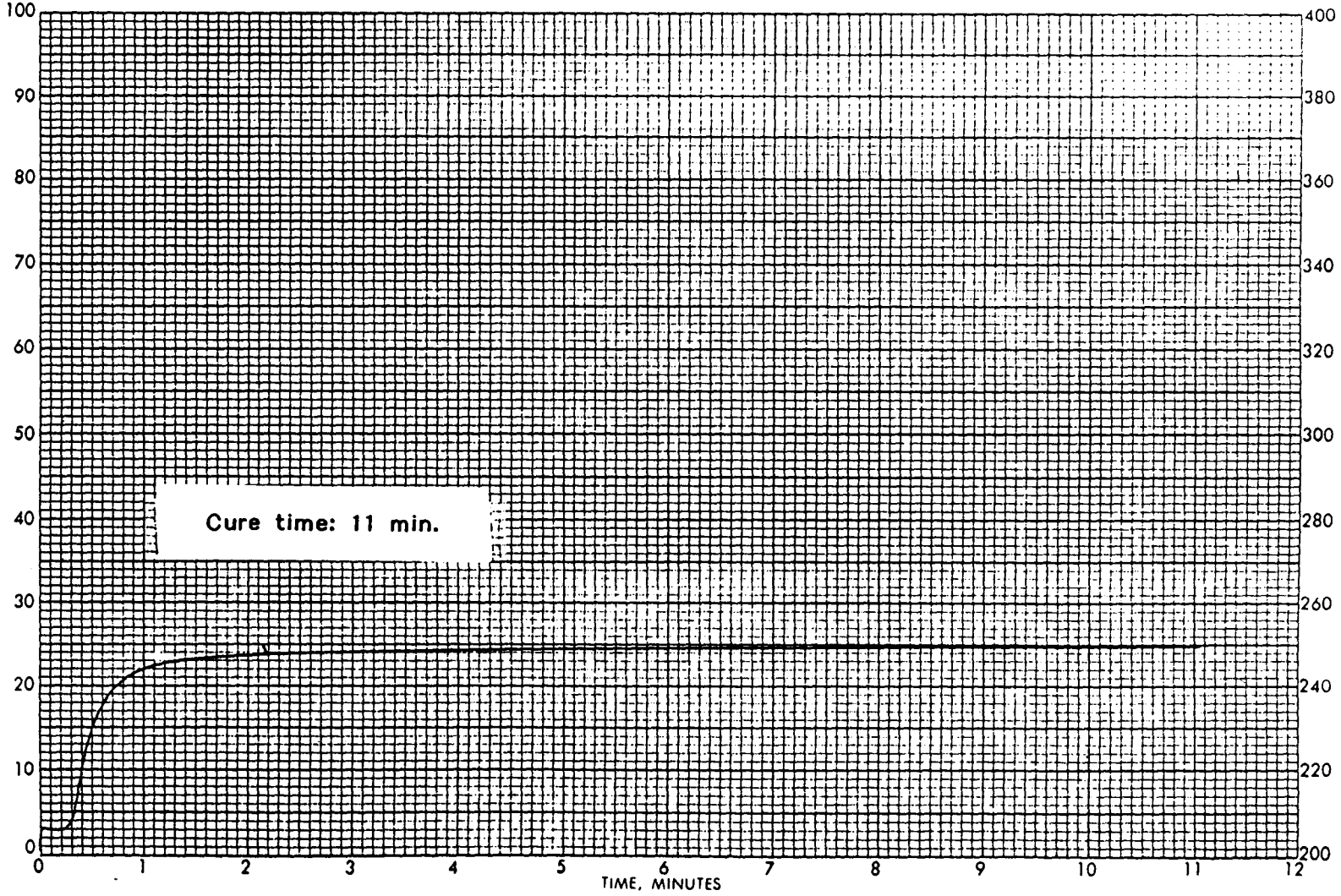
Temperature: 320F



Monsanto ODR

60 minute Chart Motor | Stock: Silicone E. | Formulation # 40 | Date: 8/10/92

100 Range Selector | 3 Degree Arc | Operator: P. Greene | Temperature: 240 F



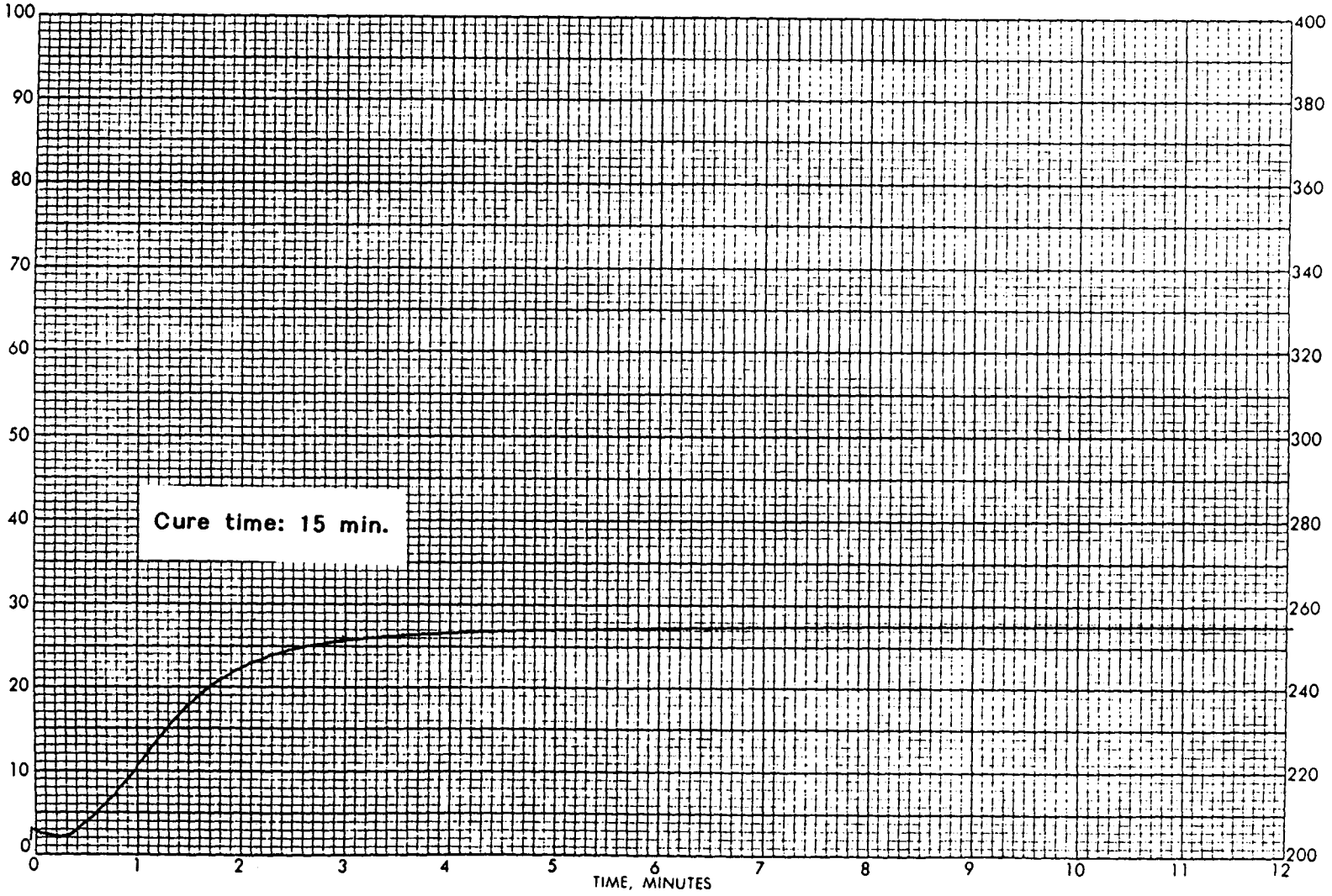
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Silicone (high strength)
3 Degree Arc

Formulation # 41
Operator: P. Greene

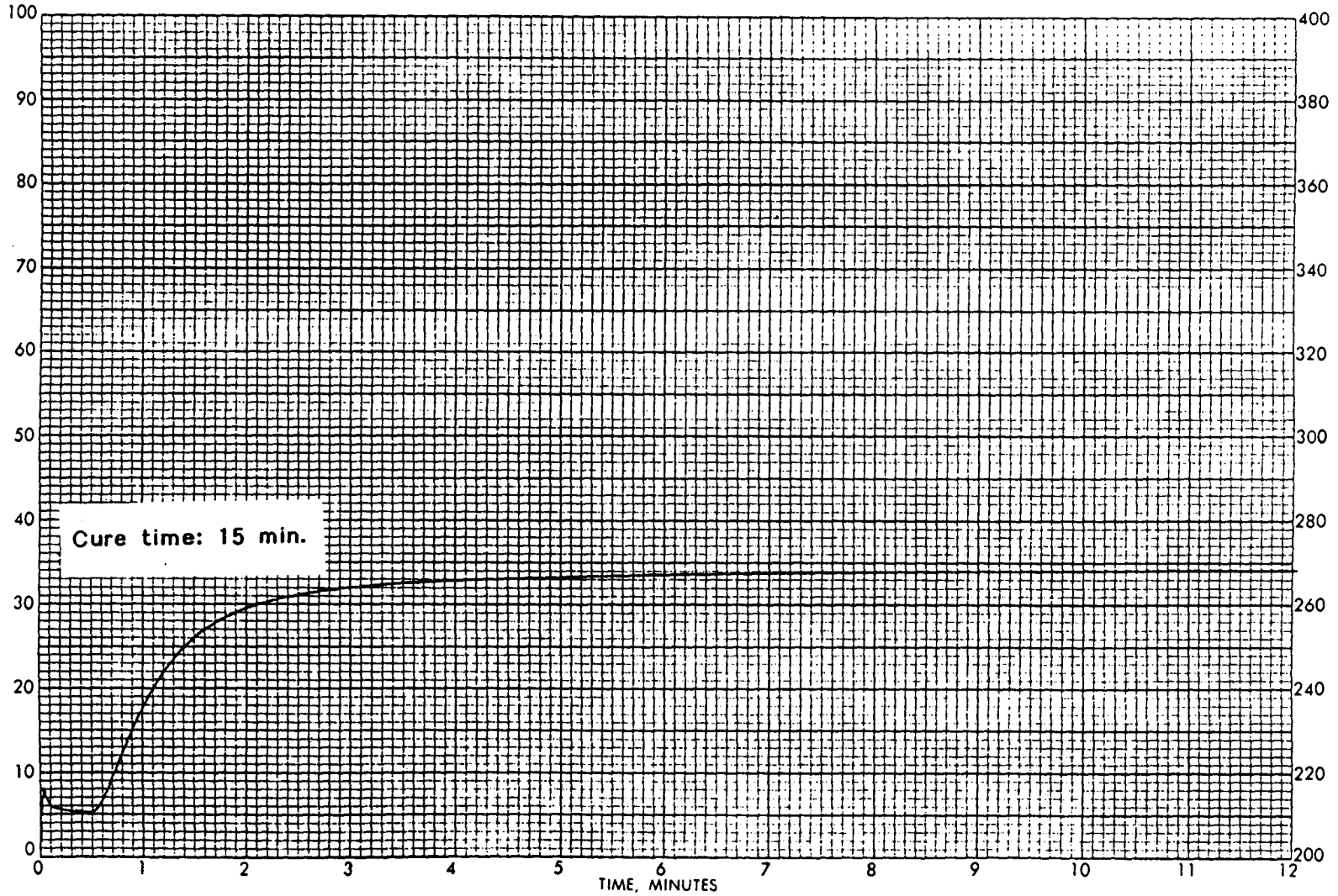
Temperature: 320F



Monsanto ODR

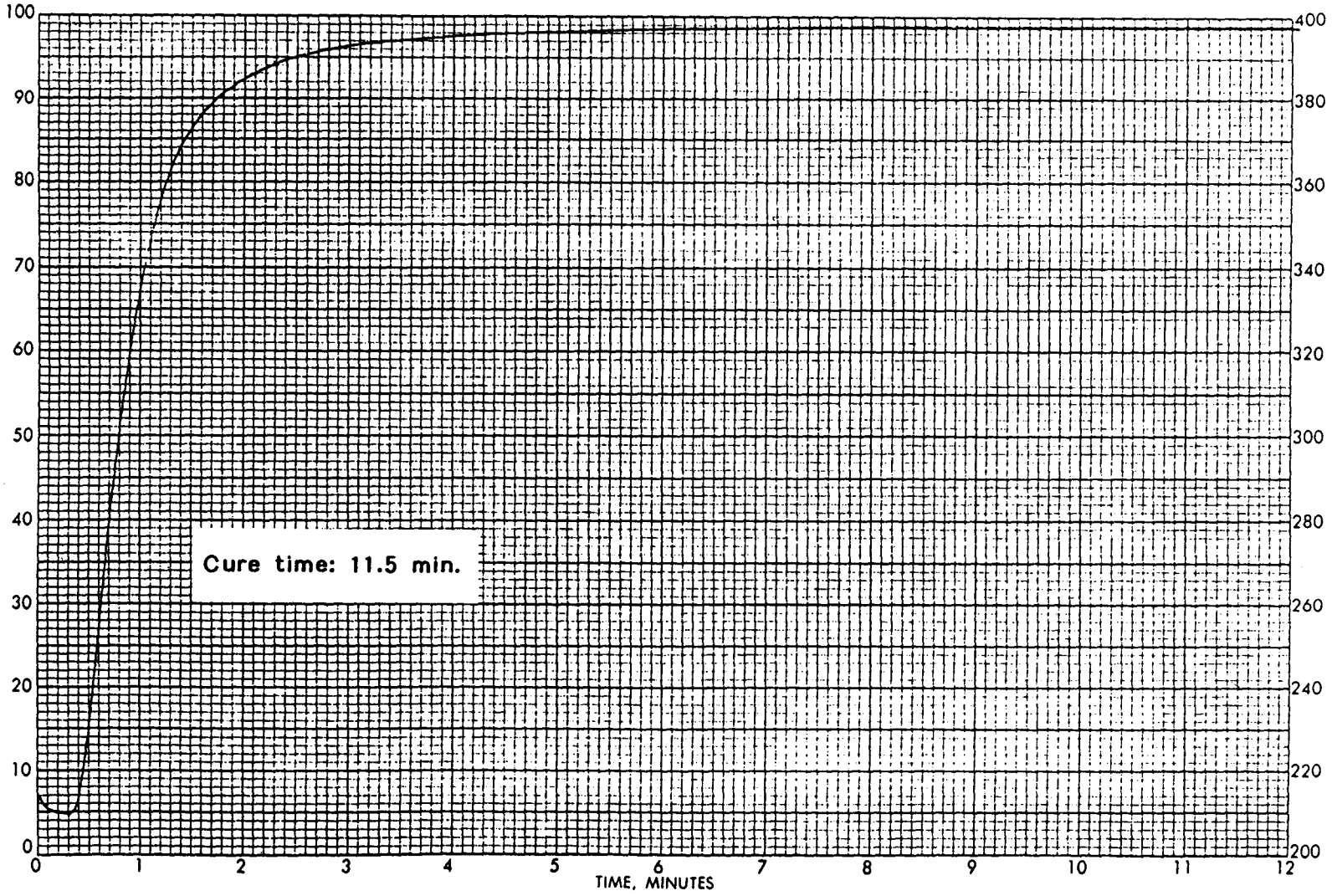
60 Minute Chart Motor | **Stock: Silicone** | **Formulation # 42**

100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



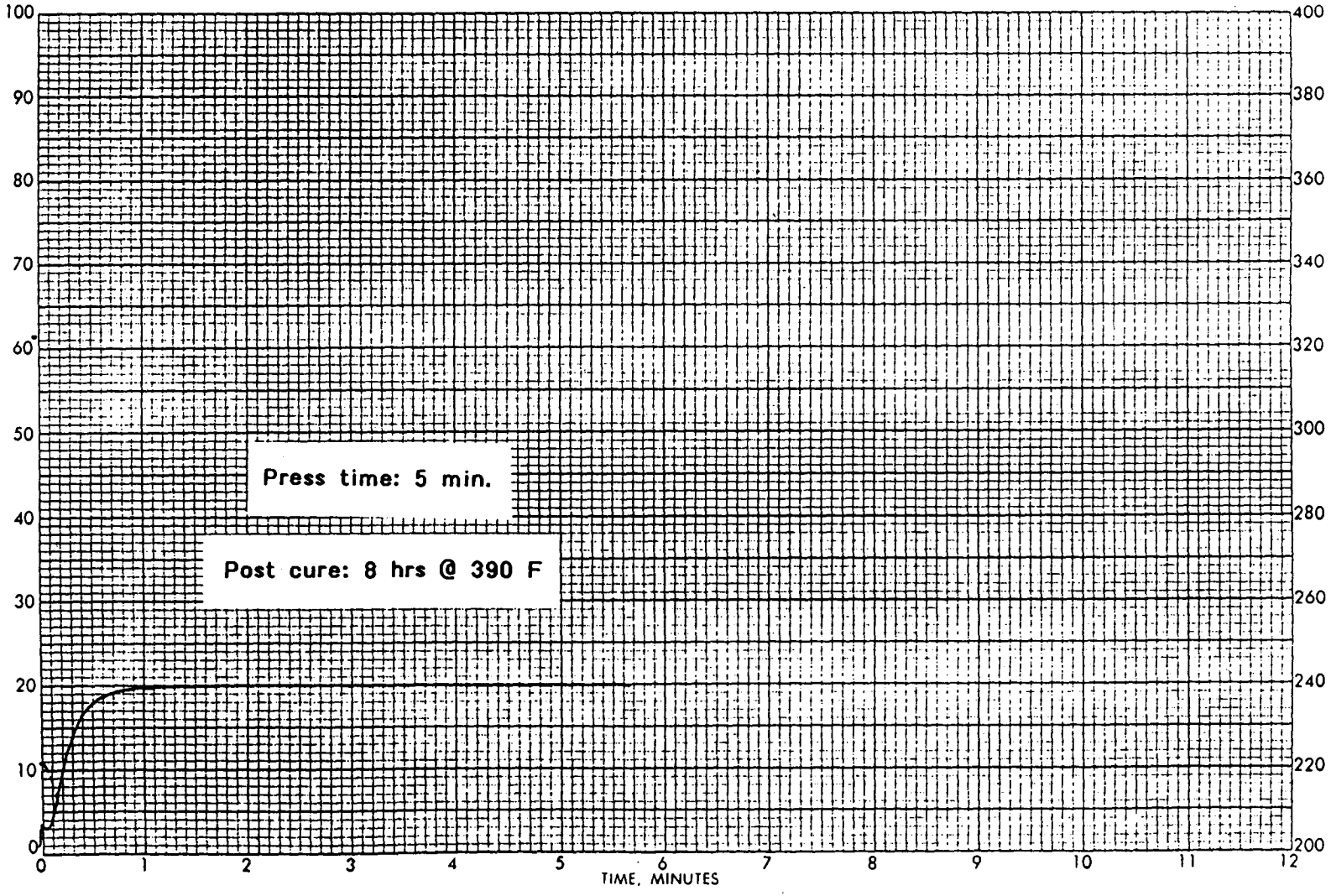
Monsanto ODR

60 Minute Chart Motor | **Stock: Silicone** | **Formulation # 43**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



Monsanto ODR

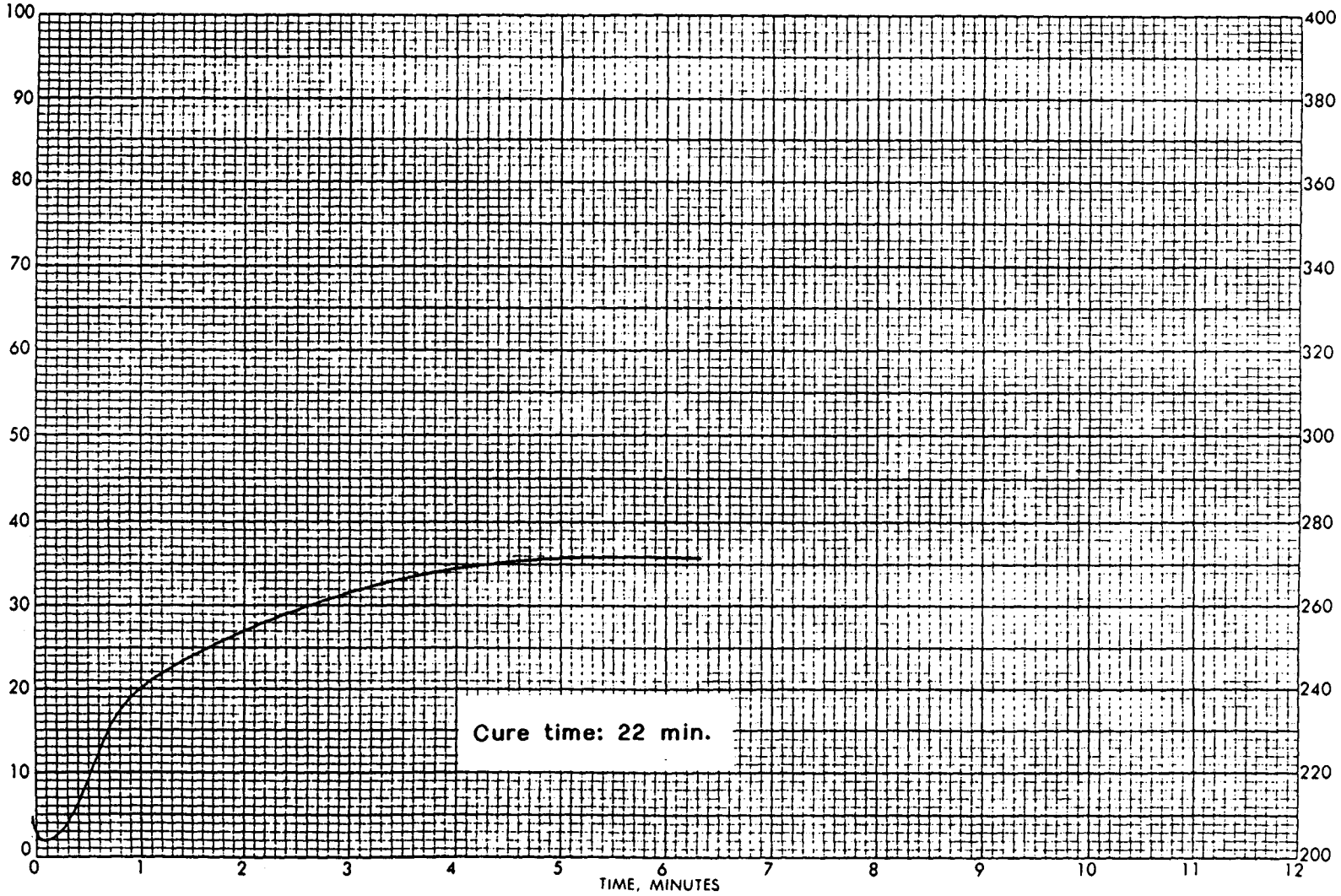
60 Minute Chart Motor | **Stock: Fluorosilicone** | **Formulation # 44**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 240F**



Monsanto ODR

120 minute Chart Motor **Stock: Polysulfide** **Formulation # 56** **Date: 11/4/92**

100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 300 F**



Monsanto ODR

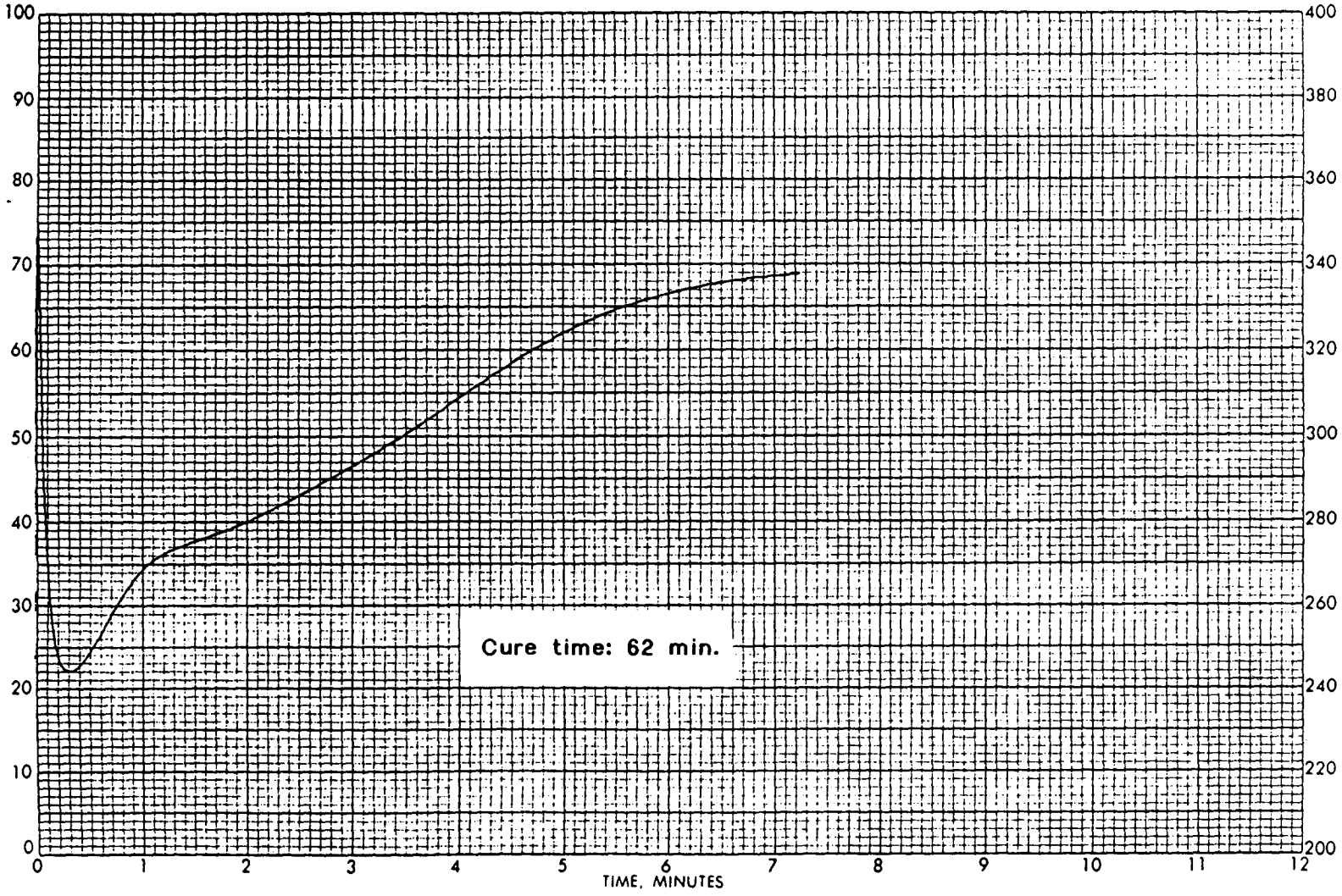
120 minute Chart Motor
100 Range Selector

Stock: Polysulfide
3 Degree Arc

Formulation # 57
Operator: P. Greene

Date: 11/4/92

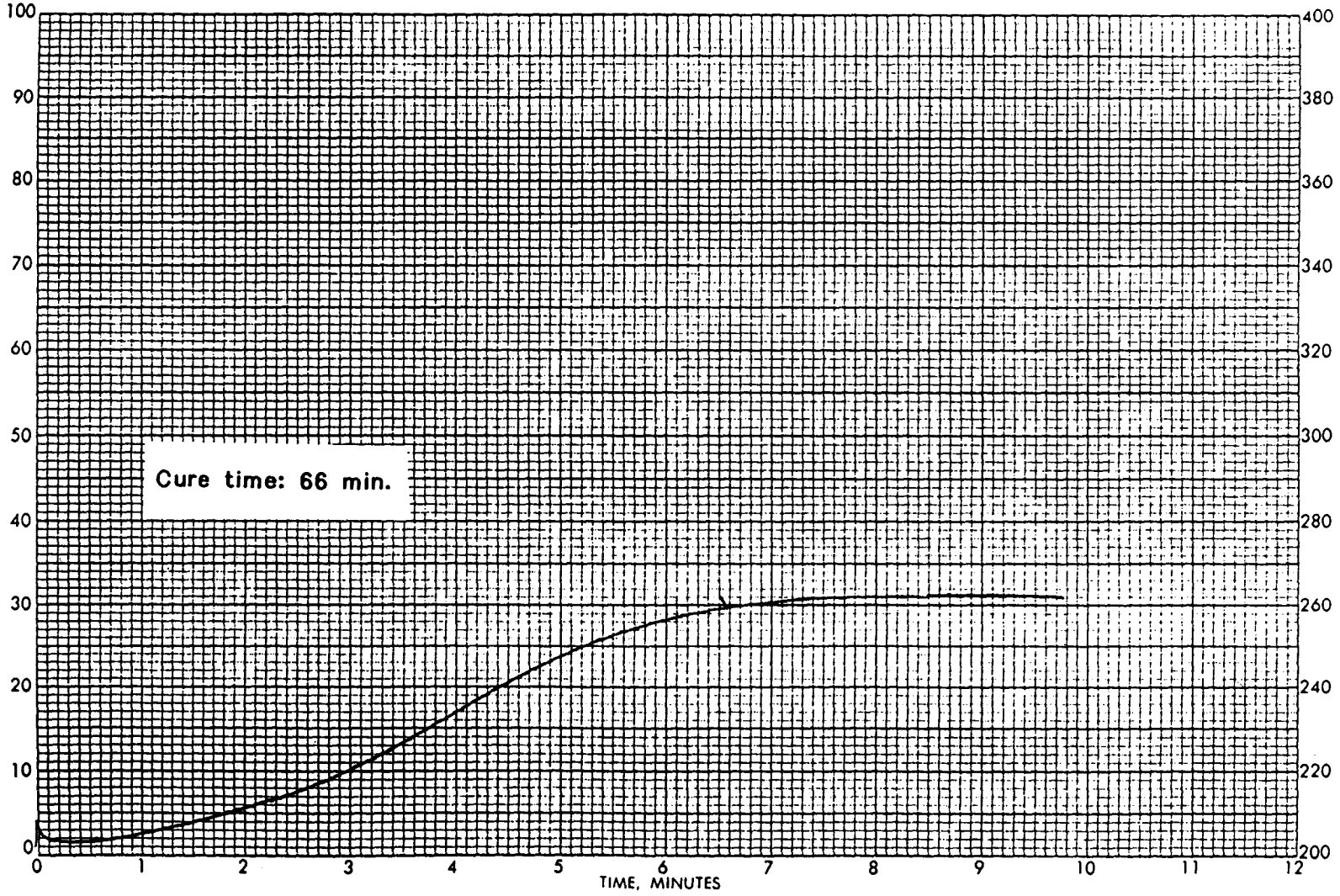
Temperature: 300 F



Monsanto ODR

120 minute Chart Motor | Stock: Polysulfide | Formulation # 58 | Date: 8/12/92

100 Range Selector | 3 Degree Arc | Operator: P. Greene | Temperature: 320 F



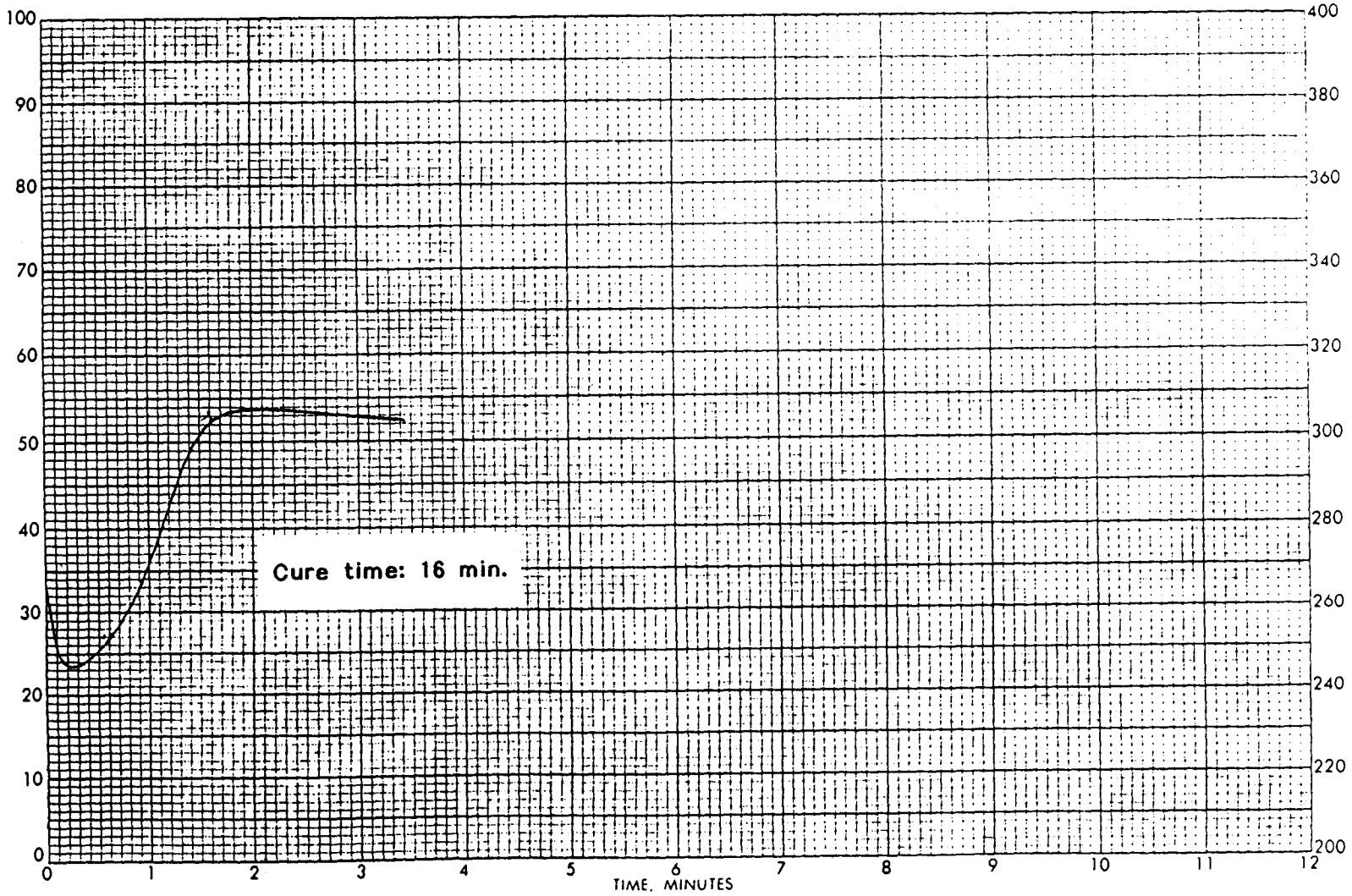
Monsanto ODR

120 Minute Chart Motor
200 Range Selector

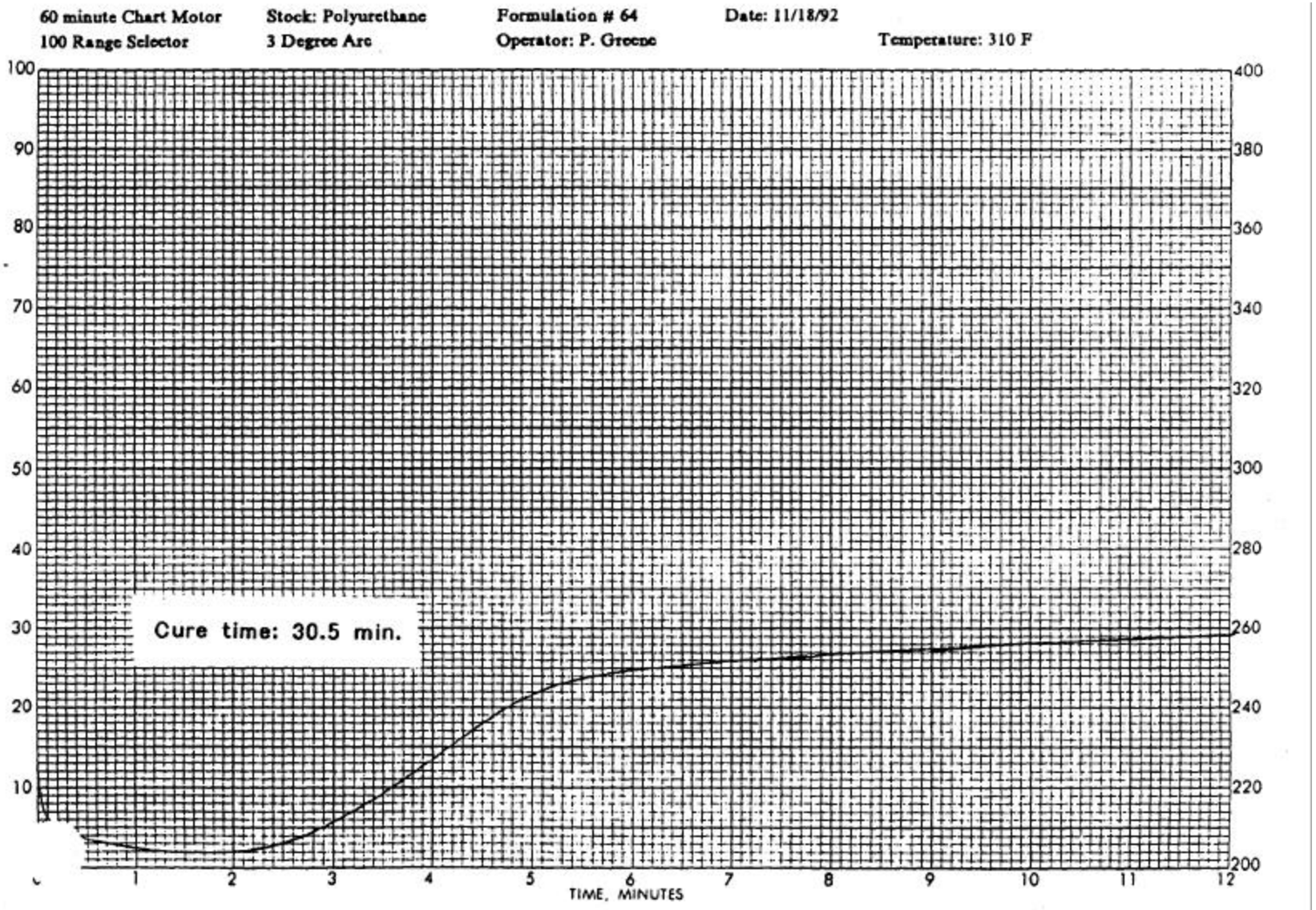
Stock: Polysulfide
3 Degree Arc

Formulation # 59
Operator: P. Greene

Temperature: 320F



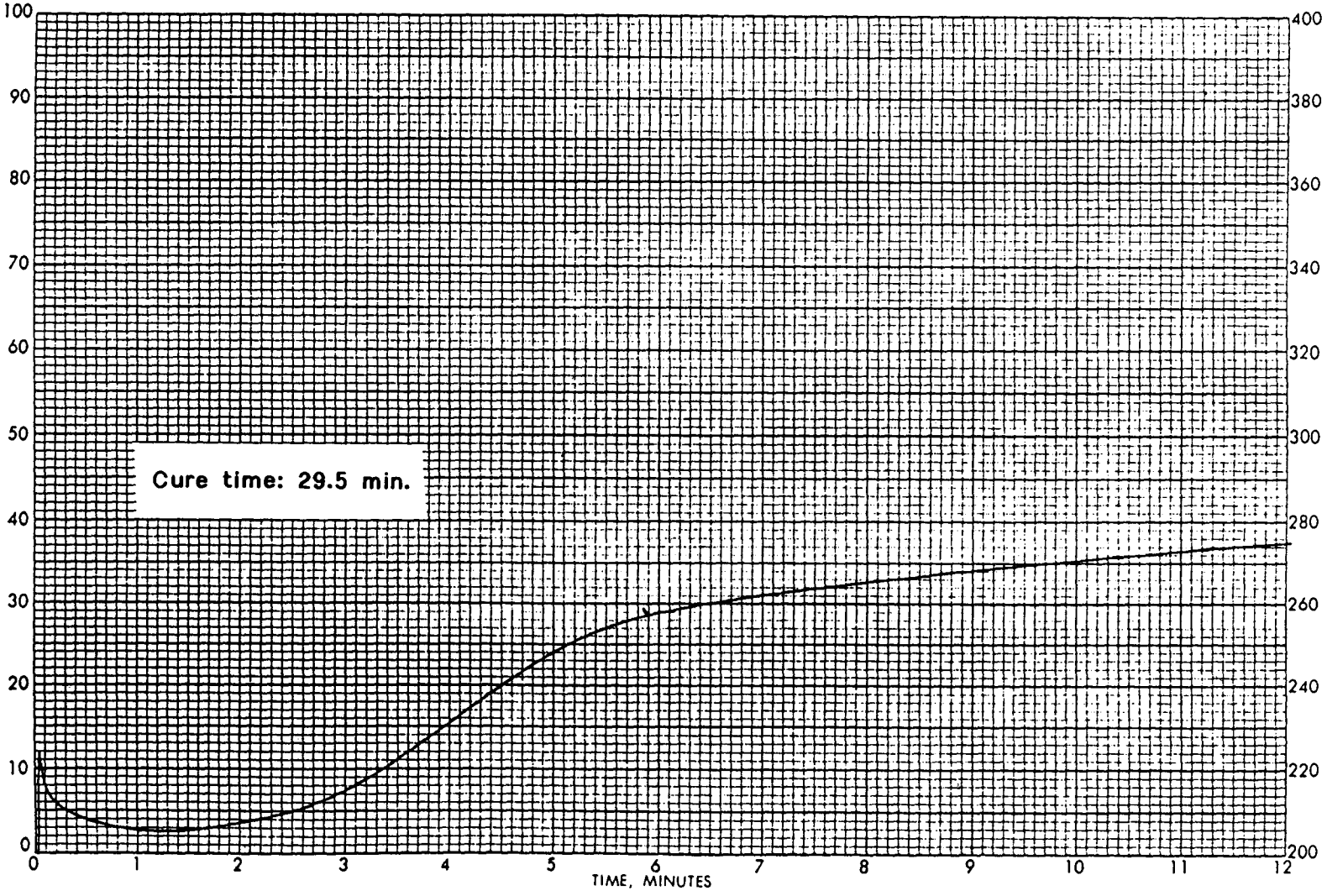
Monsanto ODR



Monsanto ODR

60 minute Chart Motor **Stock: Polyurethane** **Formulation # 65** **Date: 7/13/92**

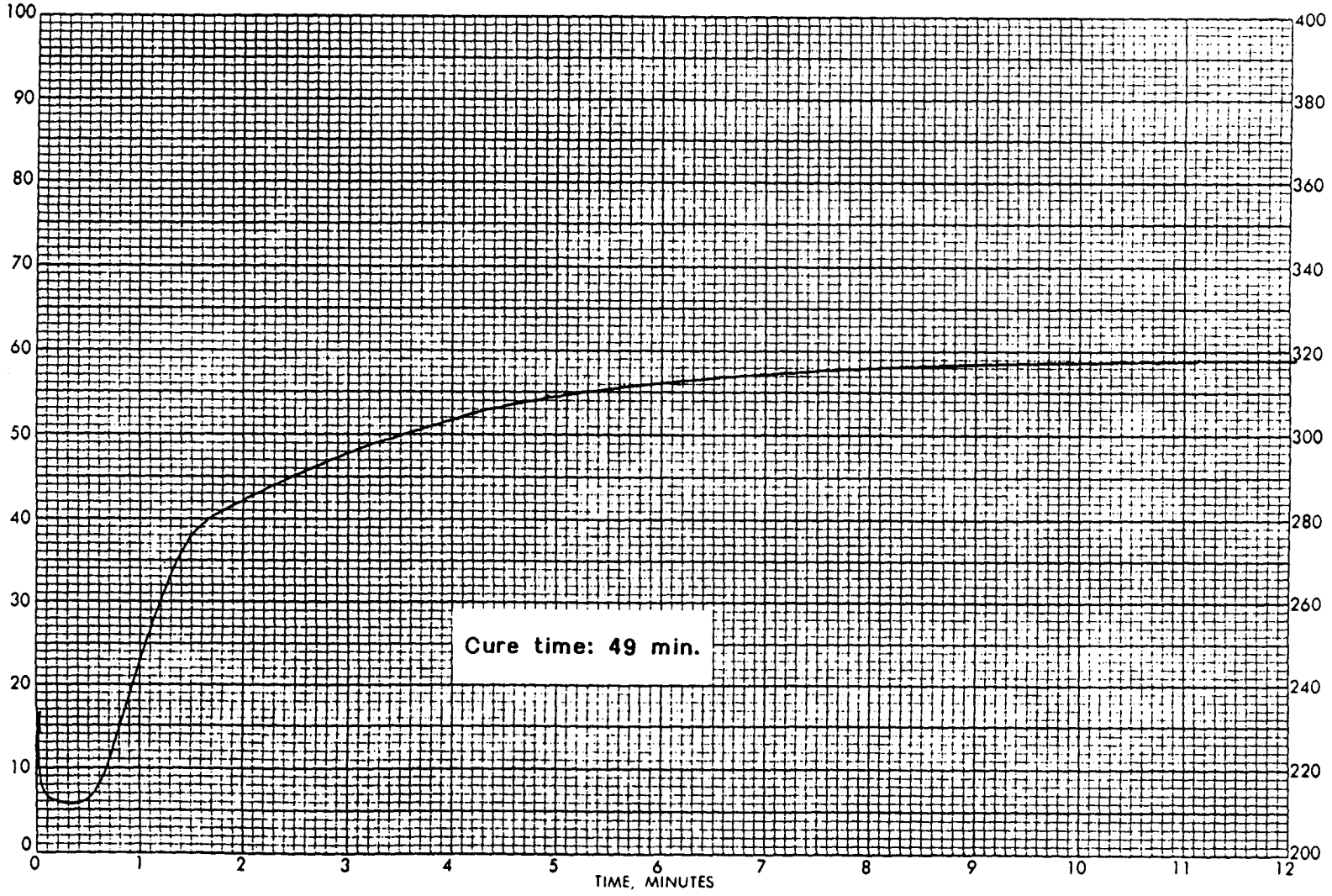
100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 310 F**



Monsanto ODR

120 minute Chart Motor **Stock: Polyurethane** **Formulation # 66** **Date: 9/10/92**

100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 310 F**



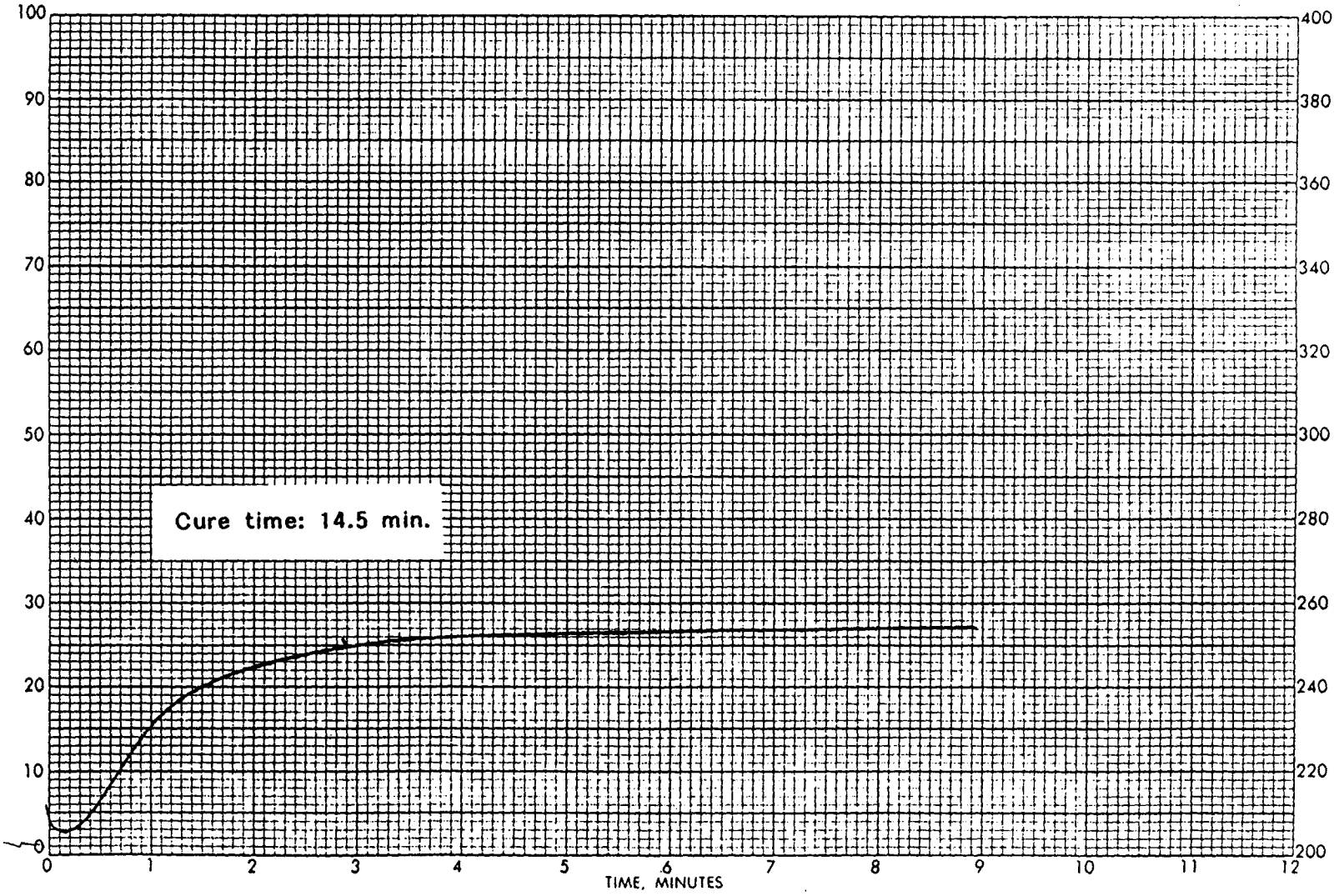
Monsanto ODR

60 Minute Chart Motor
200 Range Selector

Stock: Clorosulfonated PE
3 Degree Arc

Formulation # 67
Operator: P. Greene

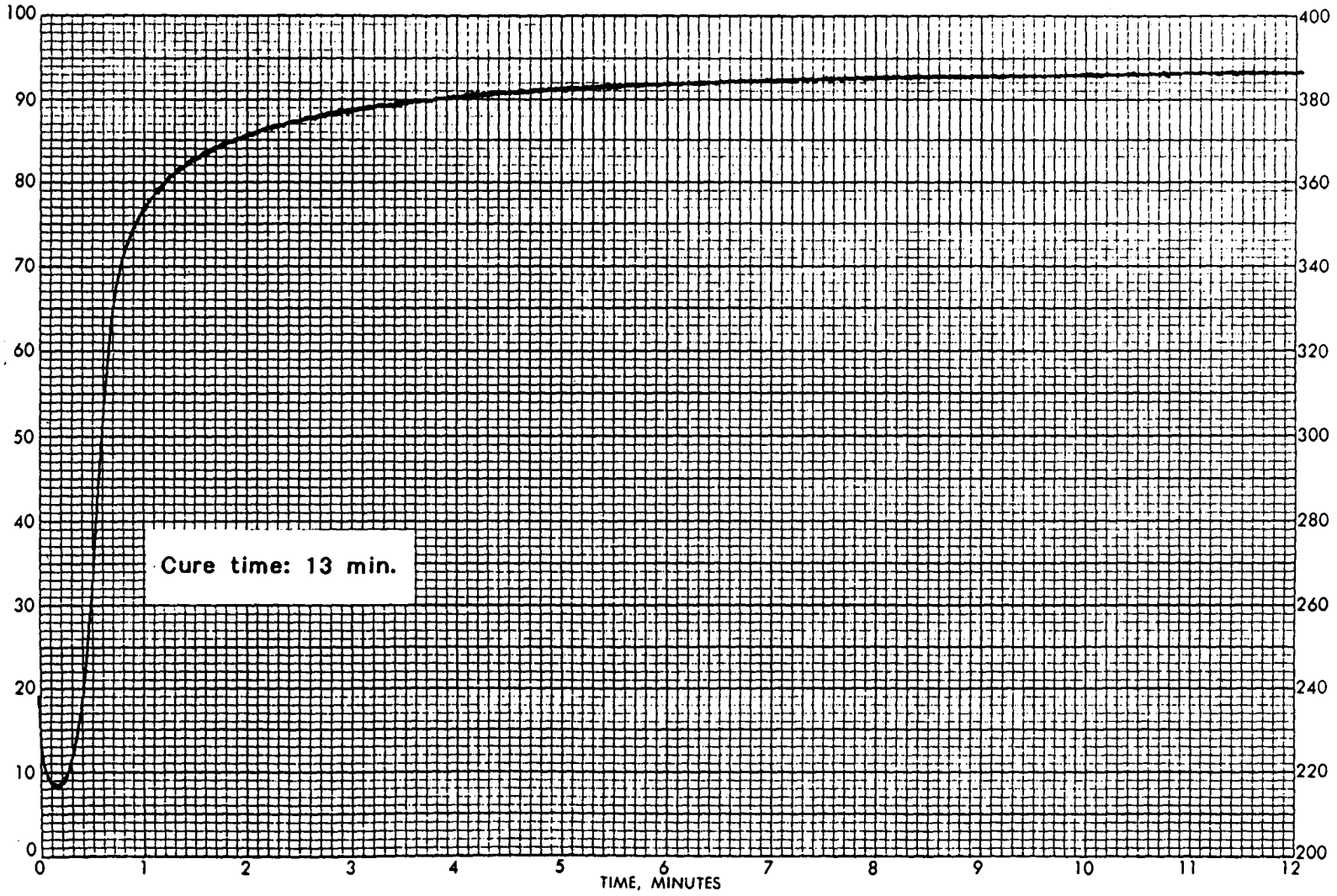
Temperature: 320F



Monsanto ODR

60 Minute Chart Motor | **Stock: Clorosulfonated PE** | **Formulation # 68**

100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



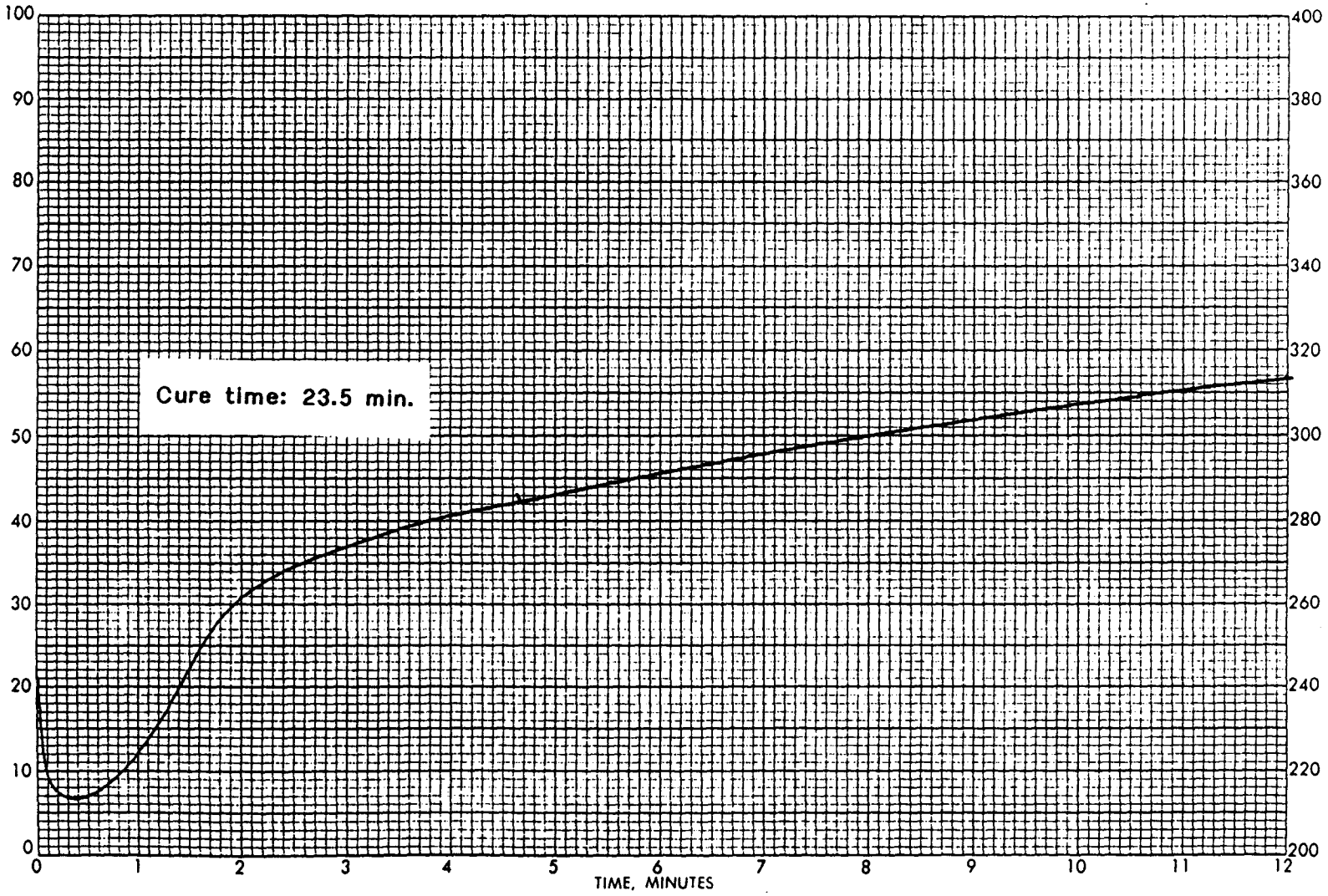
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Clorosulfonated PE
3 Degree Arc

Formulation # 69
Operator: P. Greene

Temperature: 320F



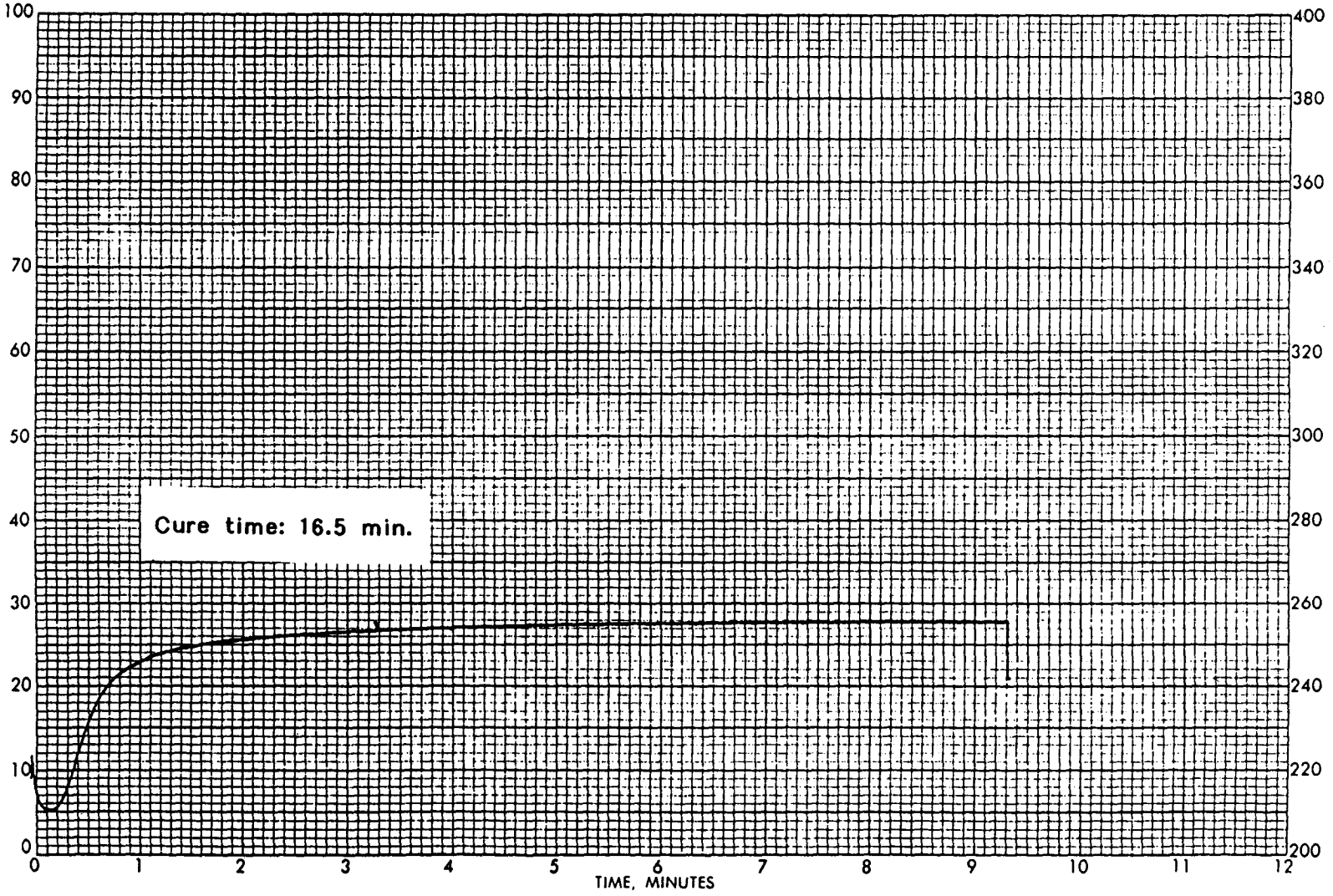
Monsanto ODR

60 Minute Chart Motor
200 Range Selector

Stock: Clorosulfonated PE
3 Degree Arc

Formulation # 70
Operator: P. Greene

Temperature: 320F



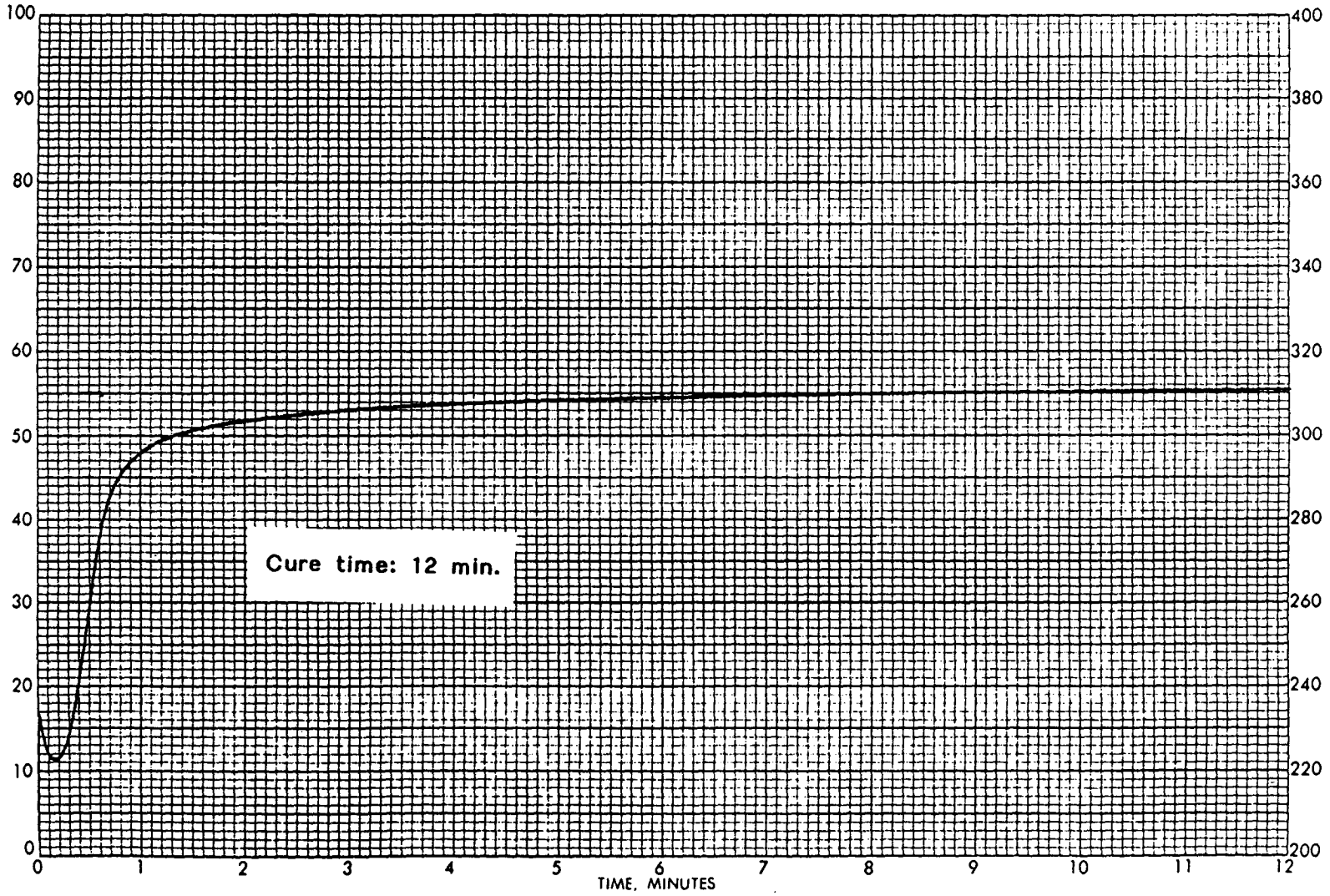
Monsanto ODR

60 Minute Chart Motor
200 Range Selector

Stock: Clorosulfonated PE
3 Degree Arc

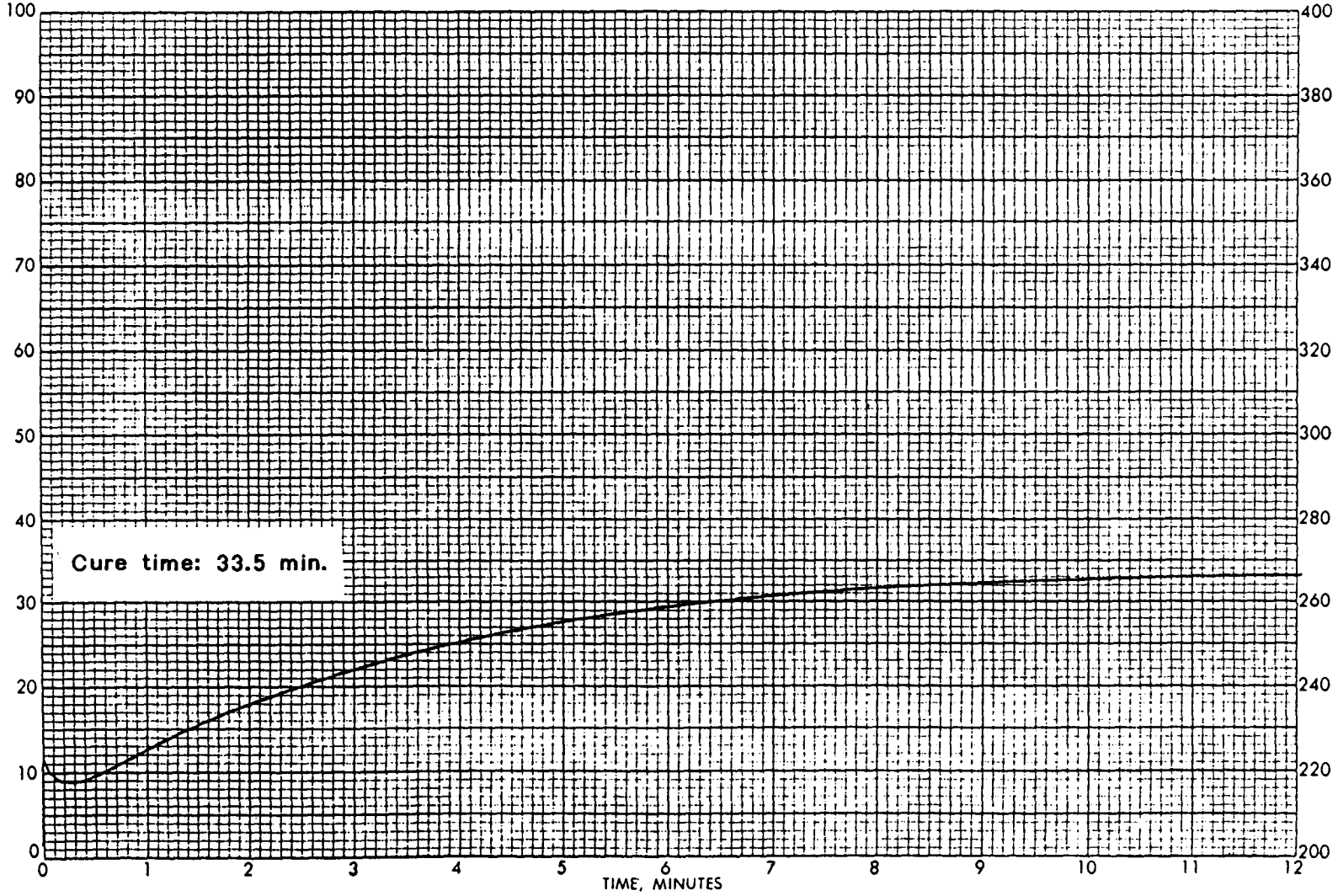
Formulation # 71
Operator: P. Greene

Temperature: 320F



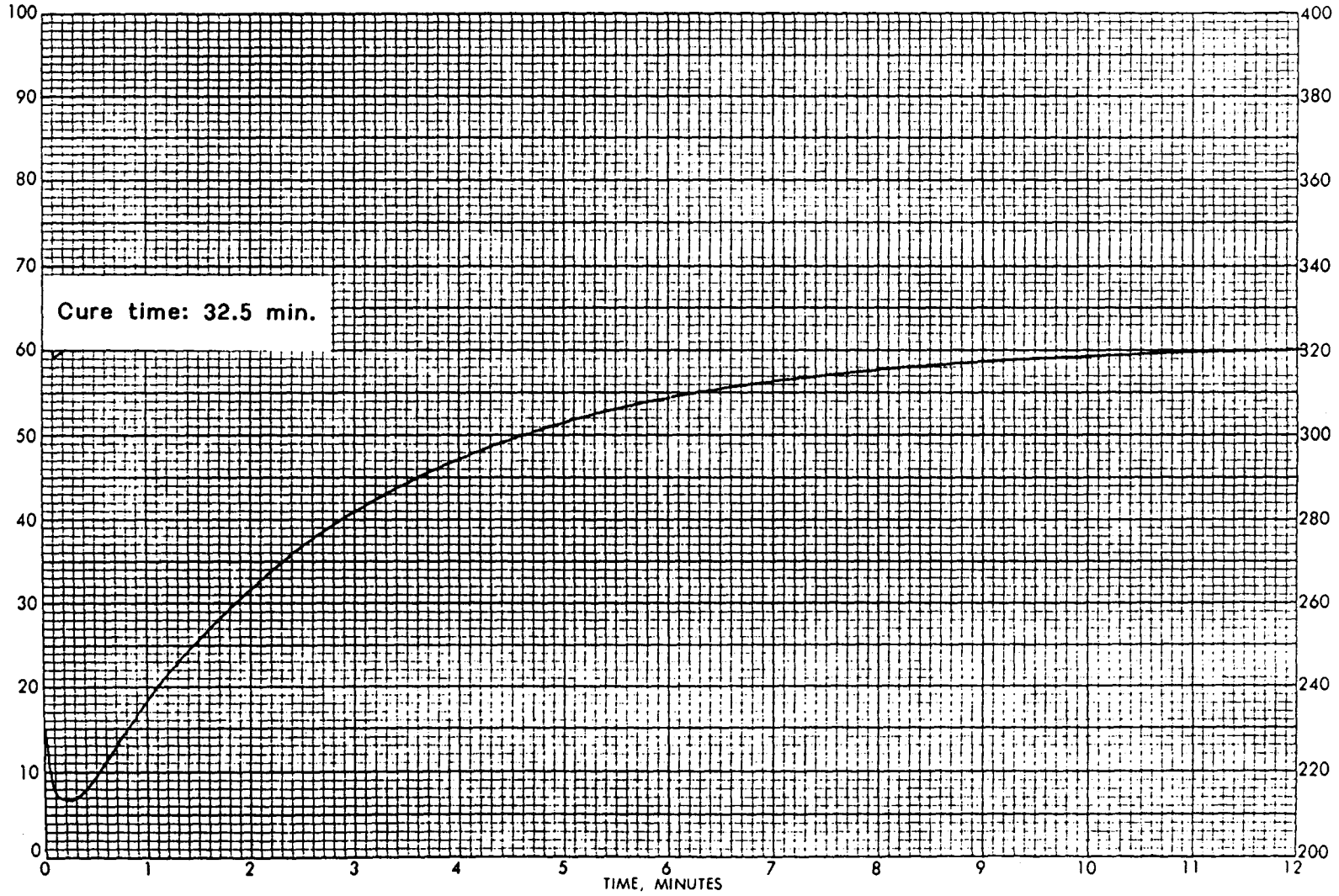
Monsanto ODR

60 Minute Chart Motor | **Stock: EPM** | **Formulation # 72**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



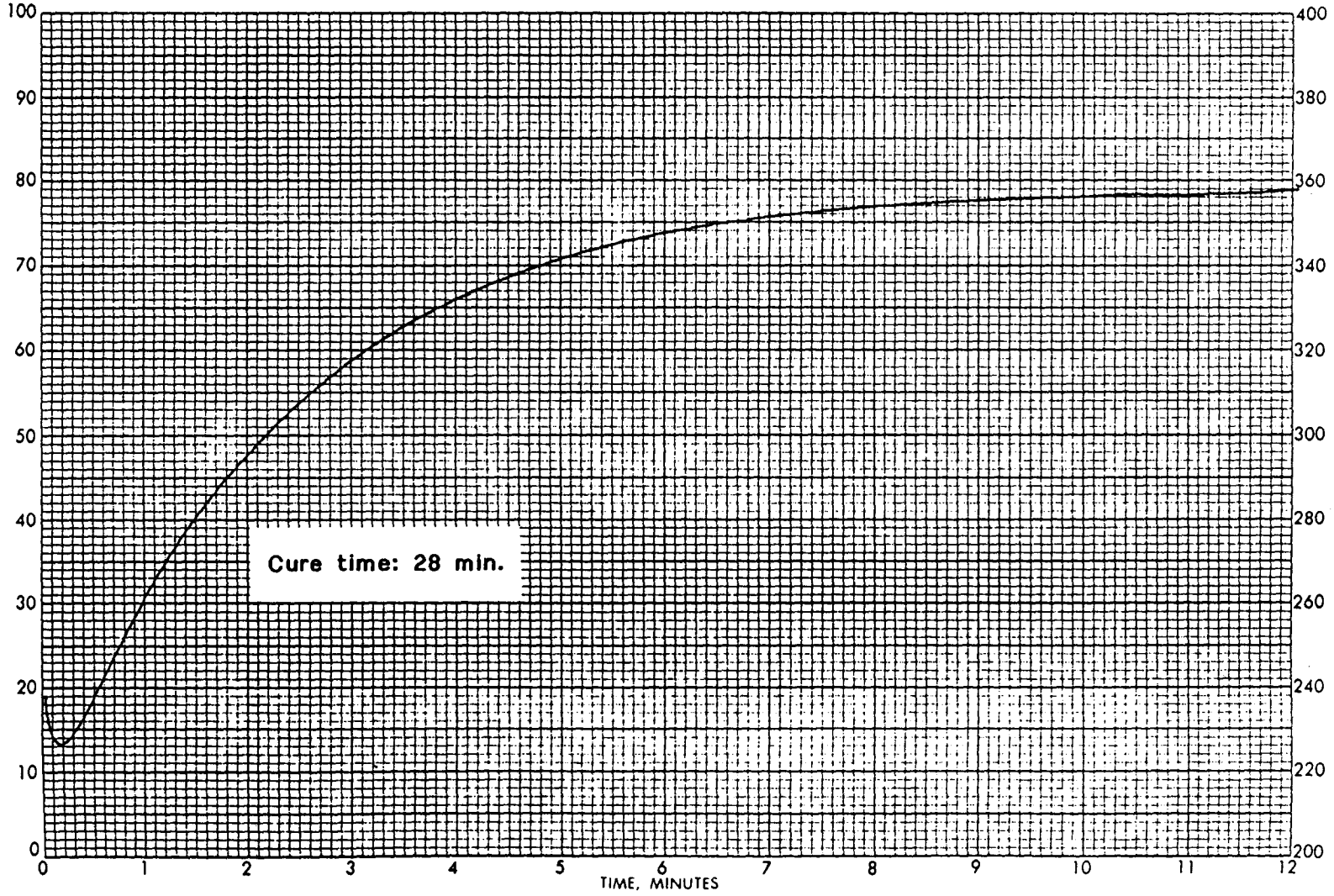
Monsanto ODR

60 Minute Chart Motor **Stock: EPM** **Formulation # 73**
100 Range Selector **3 Degree Arc** **Operator: P. Greene** **Temperature: 320F**



Monsanto ODR

60 Minute Chart Motor | **Stock: BPM** | **Formulation # 74**
100 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



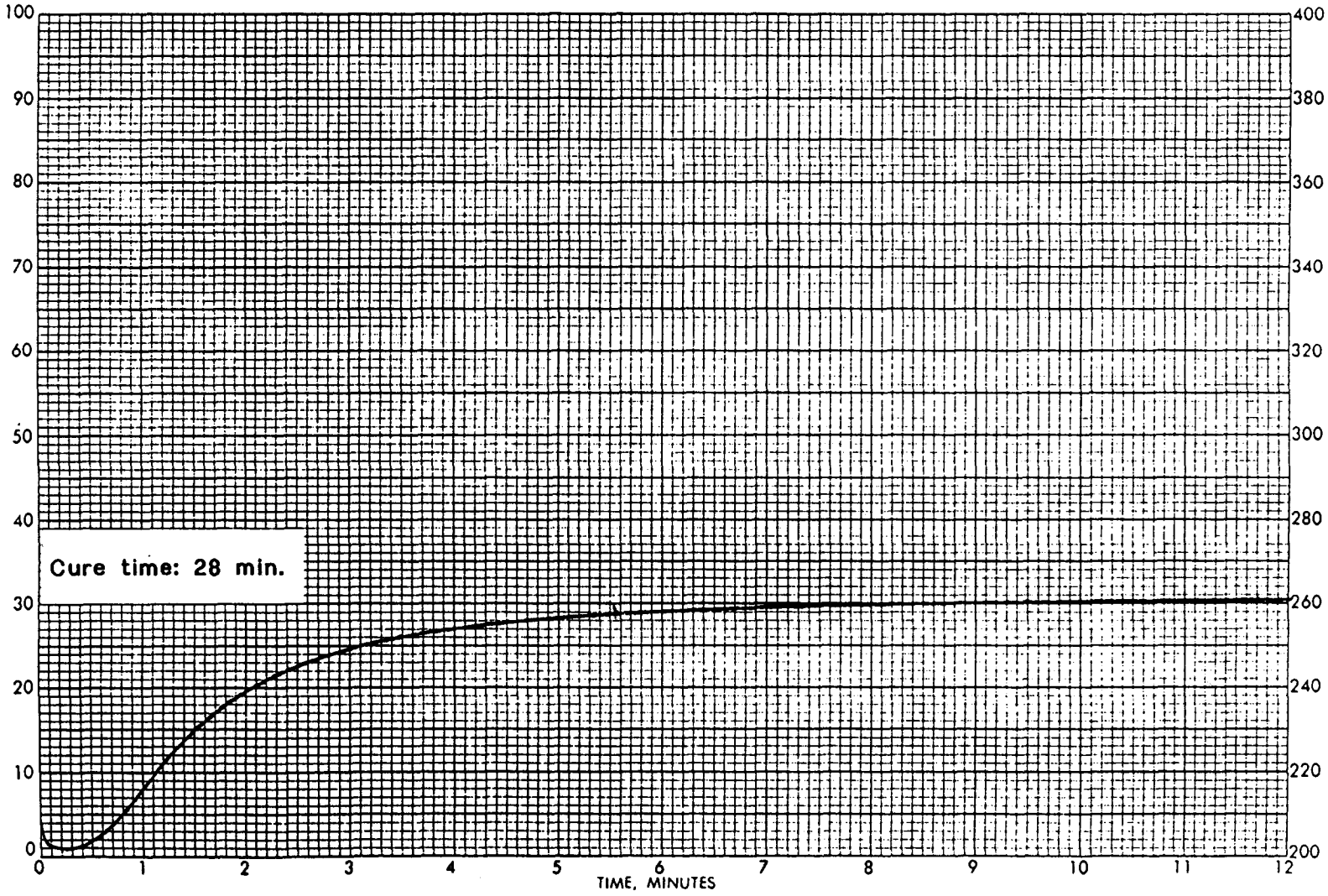
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: Ethylene/Acrylic
3 Degree Arc

Formulation # 75
Operator: P. Greene

Temperature: 350F



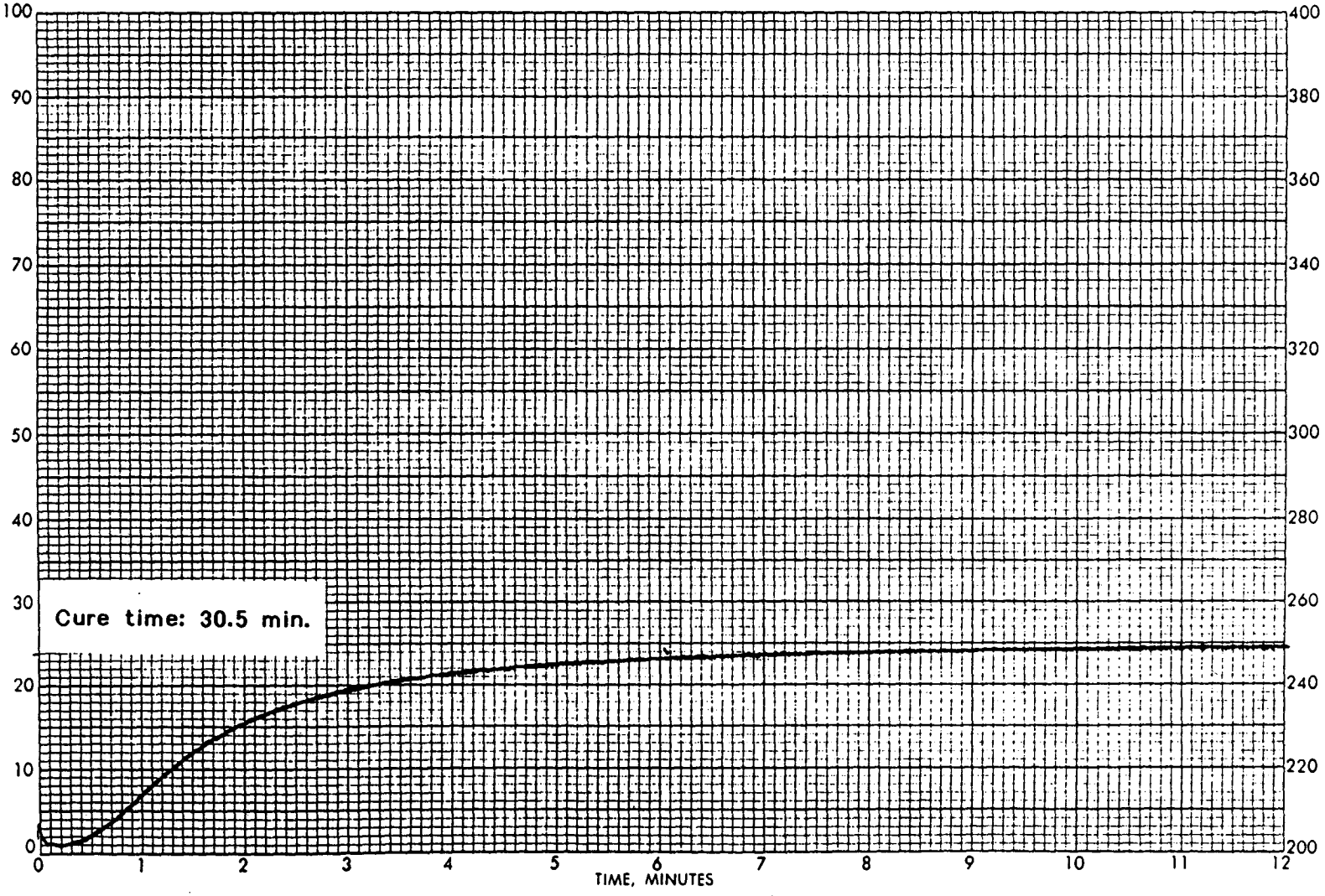
Monsanto ODR

60 Minute Chart Motor
200 Range Selector

Stock: Ethylene/Acrylic
3 Degree Arc

Formulation # 76
Operator: P. Greene

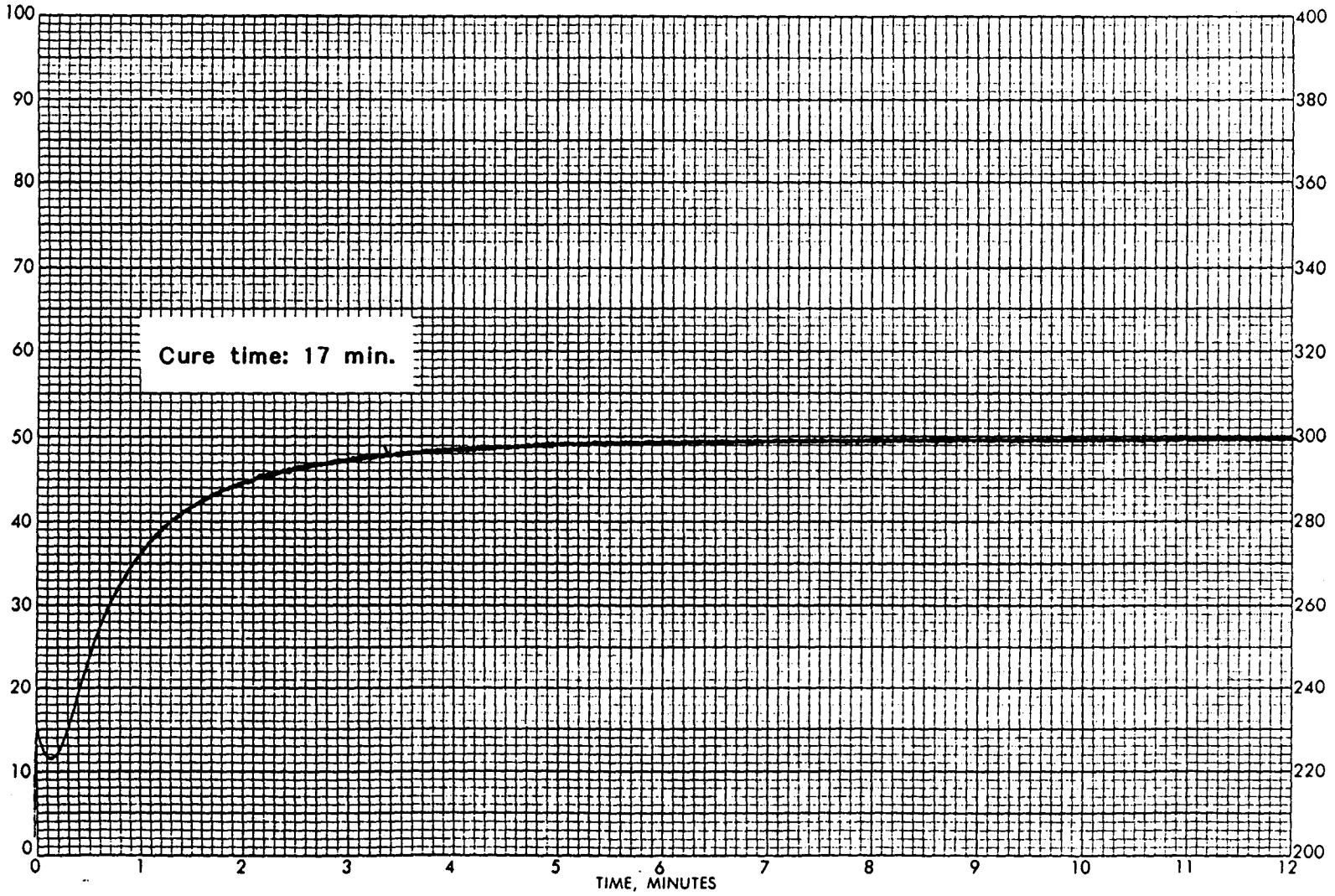
Temperature: 350F



Monsanto ODR

60 Minute Chart Motor | **Stock: Chlorinated PE** | **Formulation # 77**

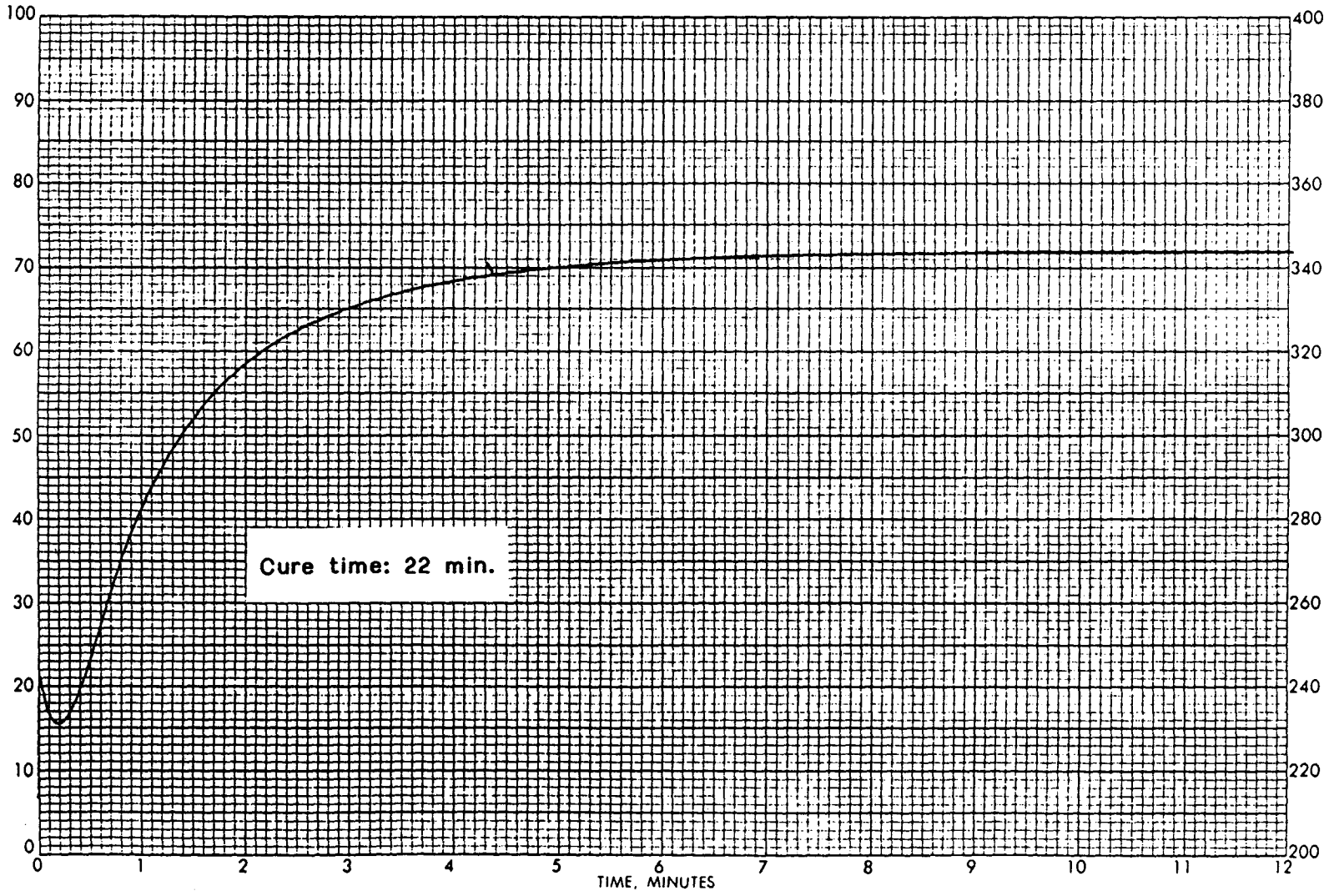
200 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



Monsanto ODR

60 Minute Chart Motor | **Stock: Chlorinated PE** | **Formulation # 78**

200 Range Selector | **3 Degree Arc** | **Operator: P. Greene** | **Temperature: 320F**



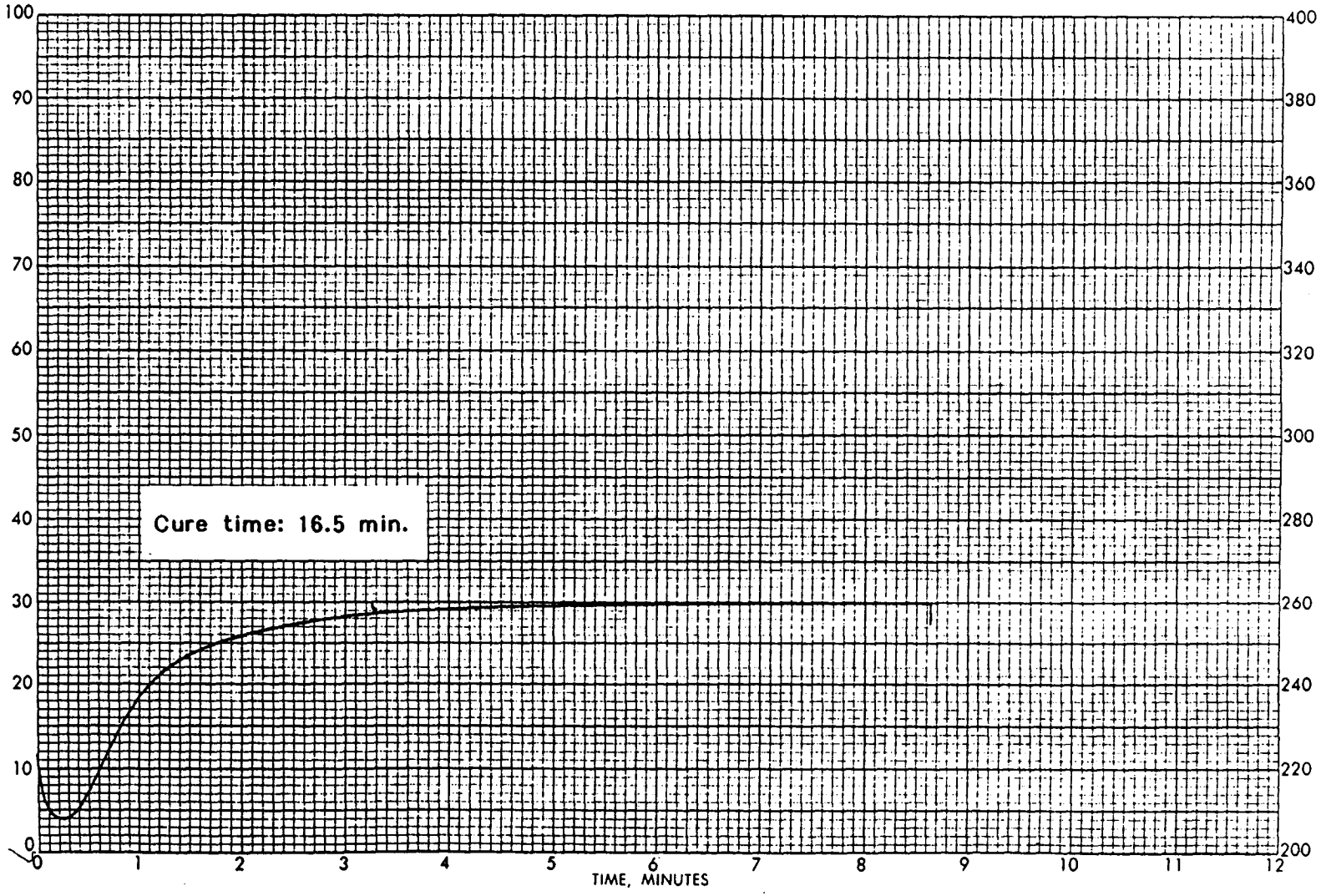
Monsanto ODR

60 Minute Chart Motor
200 Range Selector

Stock: Chlorinated PE
3 Degree Arc

Formulation # 79
Operator: P. Greene

Temperature: 320F



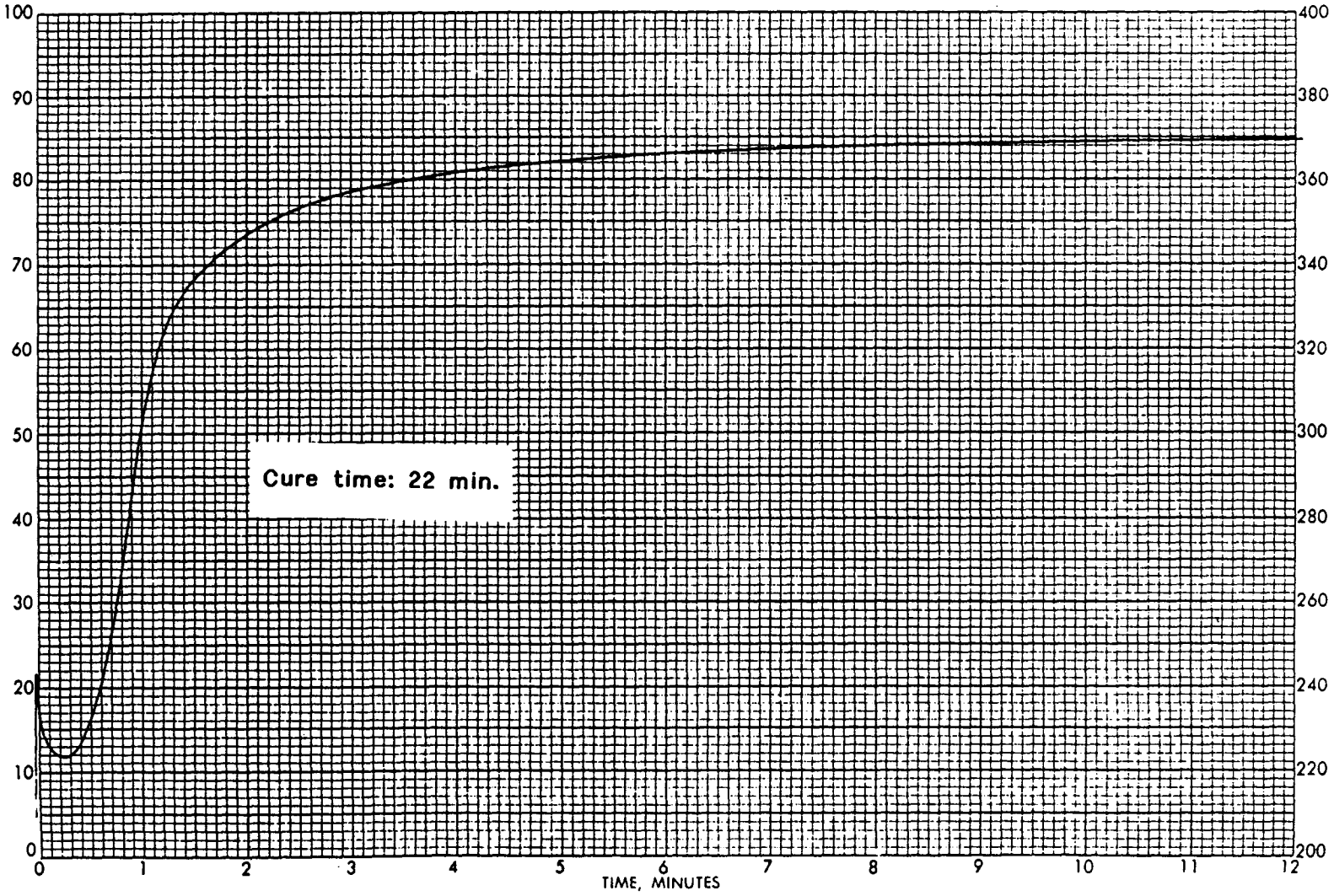
Monsanto ODR

60 minute Chart Motor
100 Range Selector

Stock: Royalene EPDM
3 Degree Arc

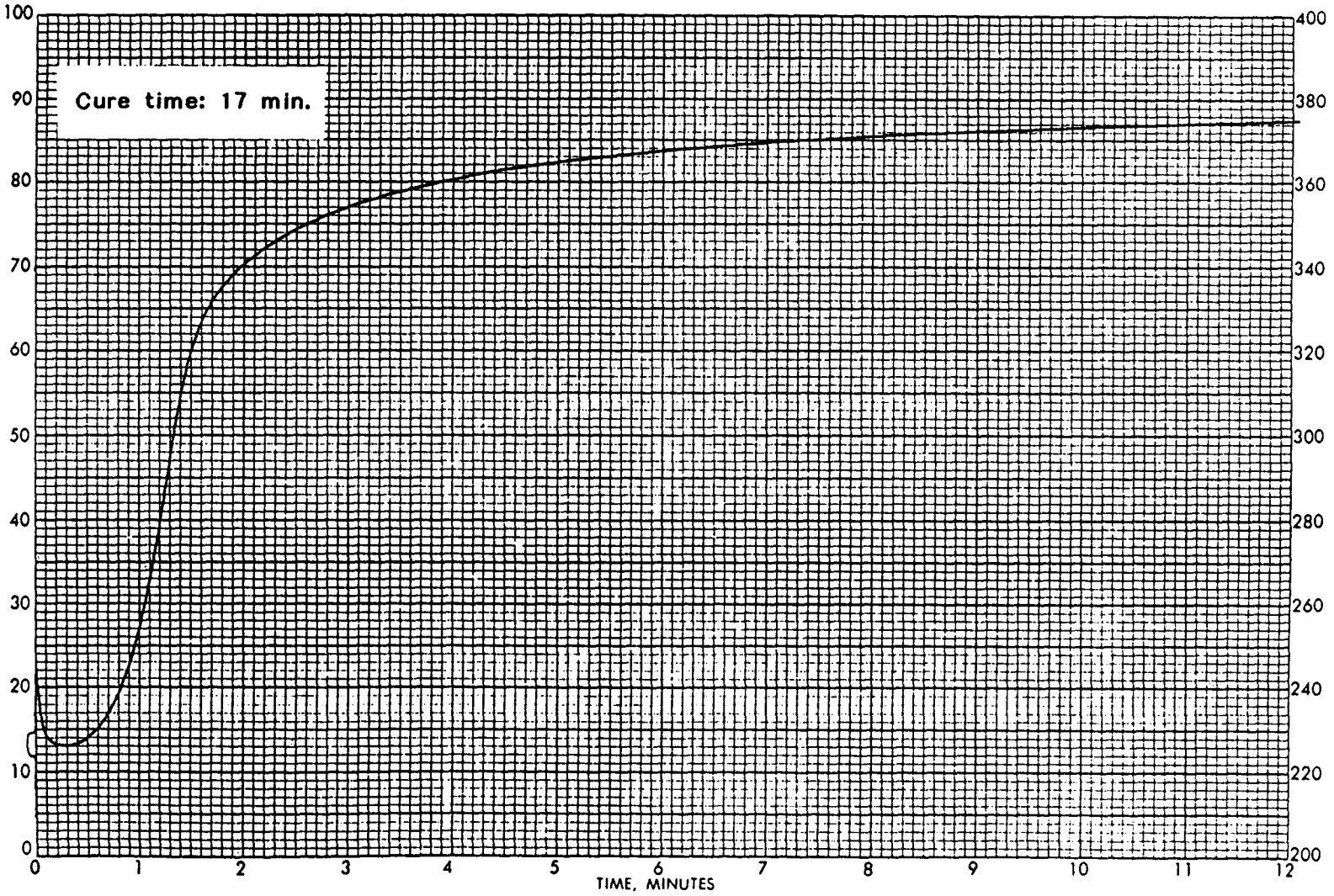
Formulation # 80
Operator: P. Greene

Date: 4/1/92
Temperature: 320 F



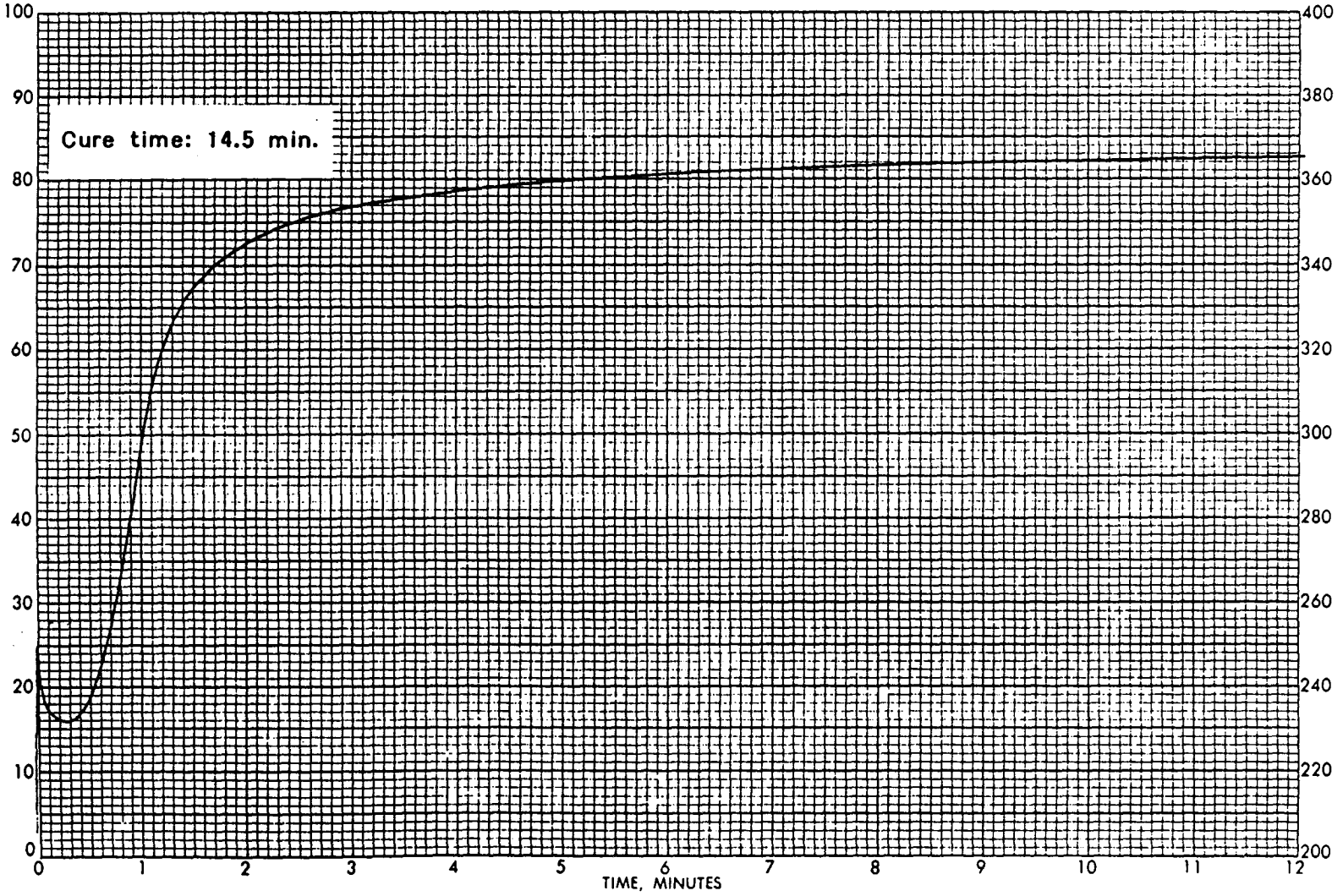
Monsanto ODR

60 minute Chart Motor	**Stock: EPDM**	**Formulation # 81**	**Date: 3/30/92**
100 Range Selector	**3 Degree Arc**	**Operator: P. Greene**	**Temperature: 320 F**



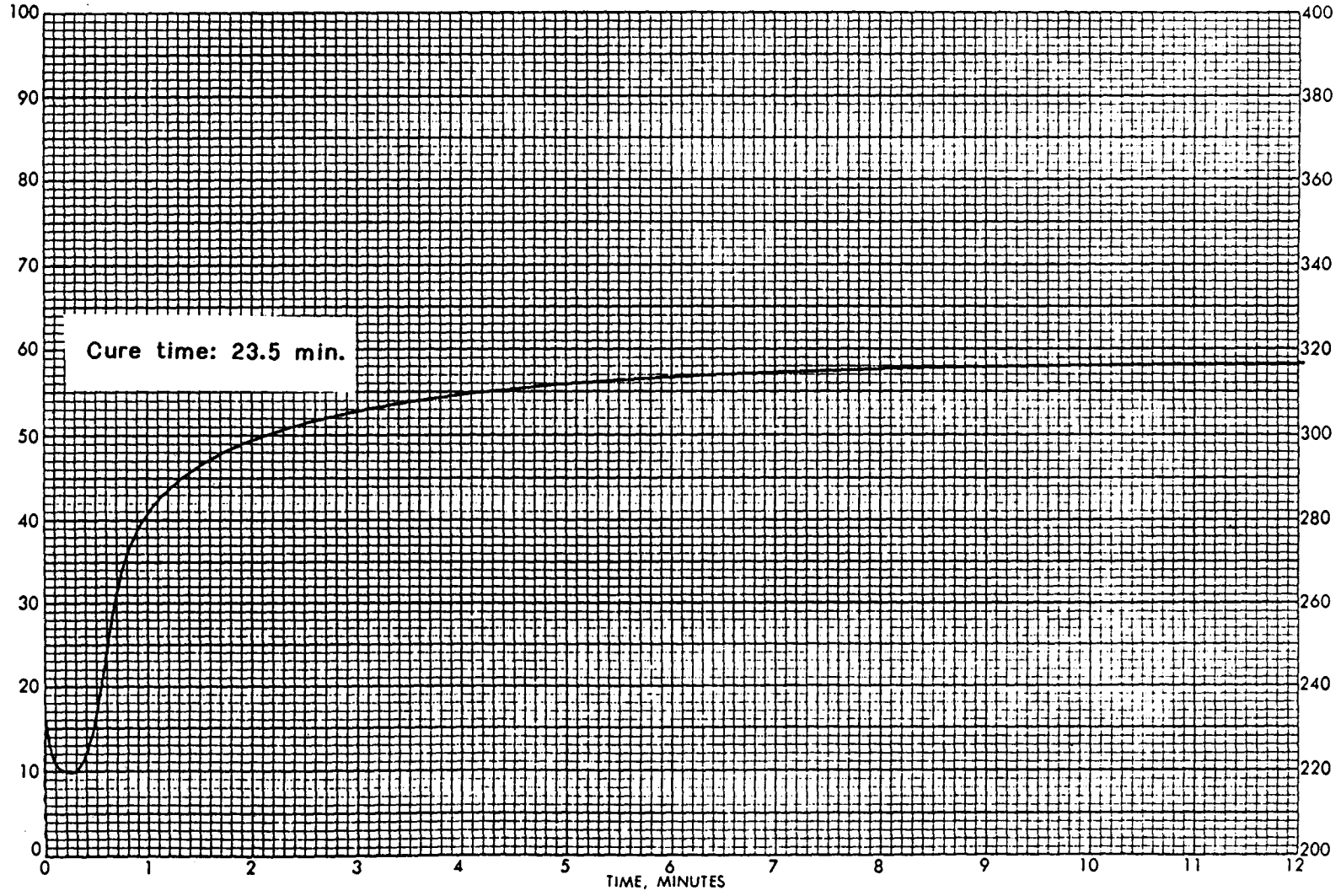
Monsanto ODR

60 minute Chart Motor	Stock: EPDM	Formulation # 82	Date: 3/30/92
100 Range Selector	3 Degree Arc	Operator: P. Greene	Temperature: 320 F



Monsanto ODR

60 minute Chart Motor	**Stock: EPDM**	**Formulation # 83**	**Date: 3/31/92**
200 Range Selector	**3 Degree Arc**	**Operator: P. Greene**	**Temperature: 320 F**



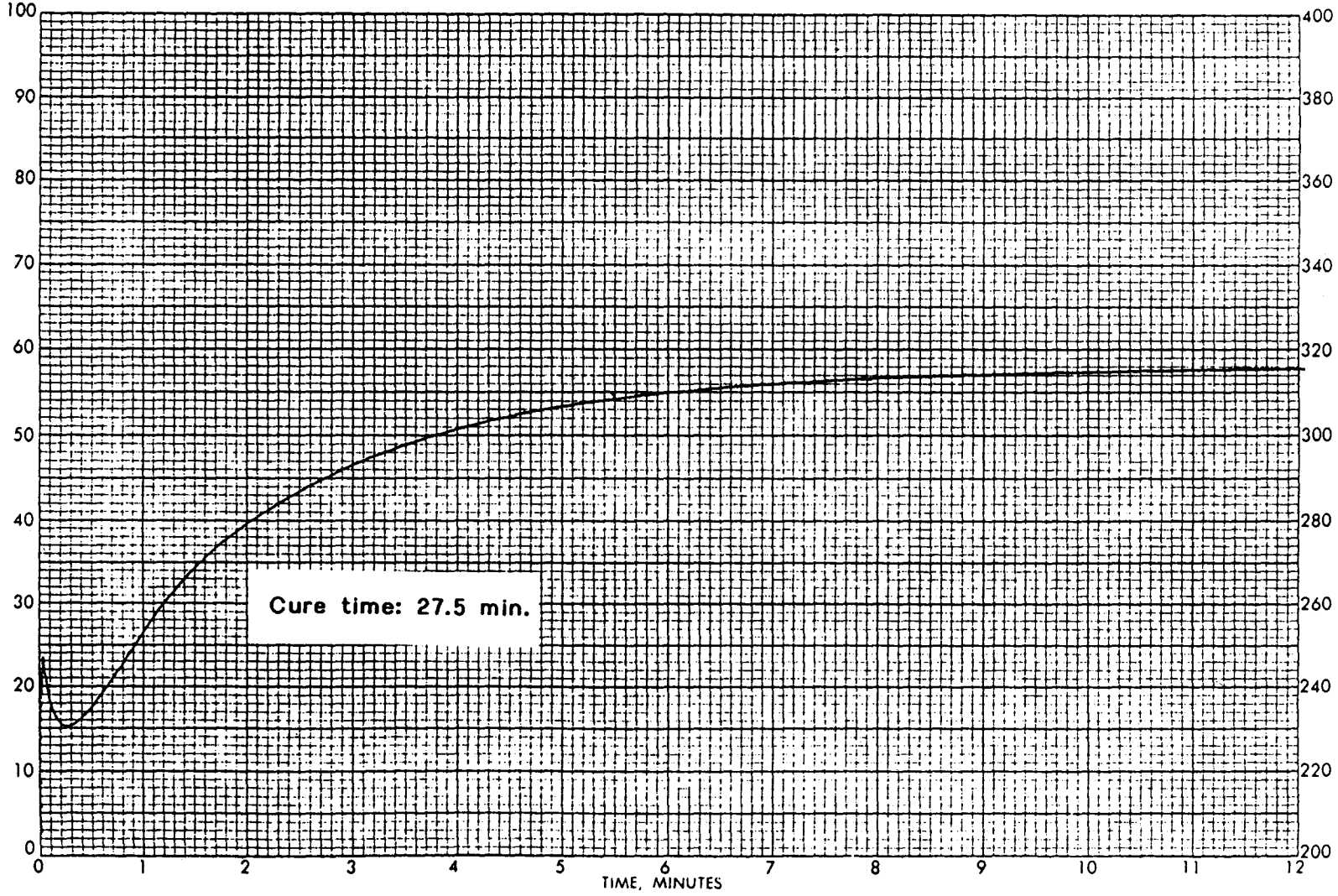
Monsanto ODR

60 Minute Chart Motor
100 Range Selector

Stock: EPDM
3 Degree Arc

Formulation # 84
Operator: P. Greene

Temperature: 320F



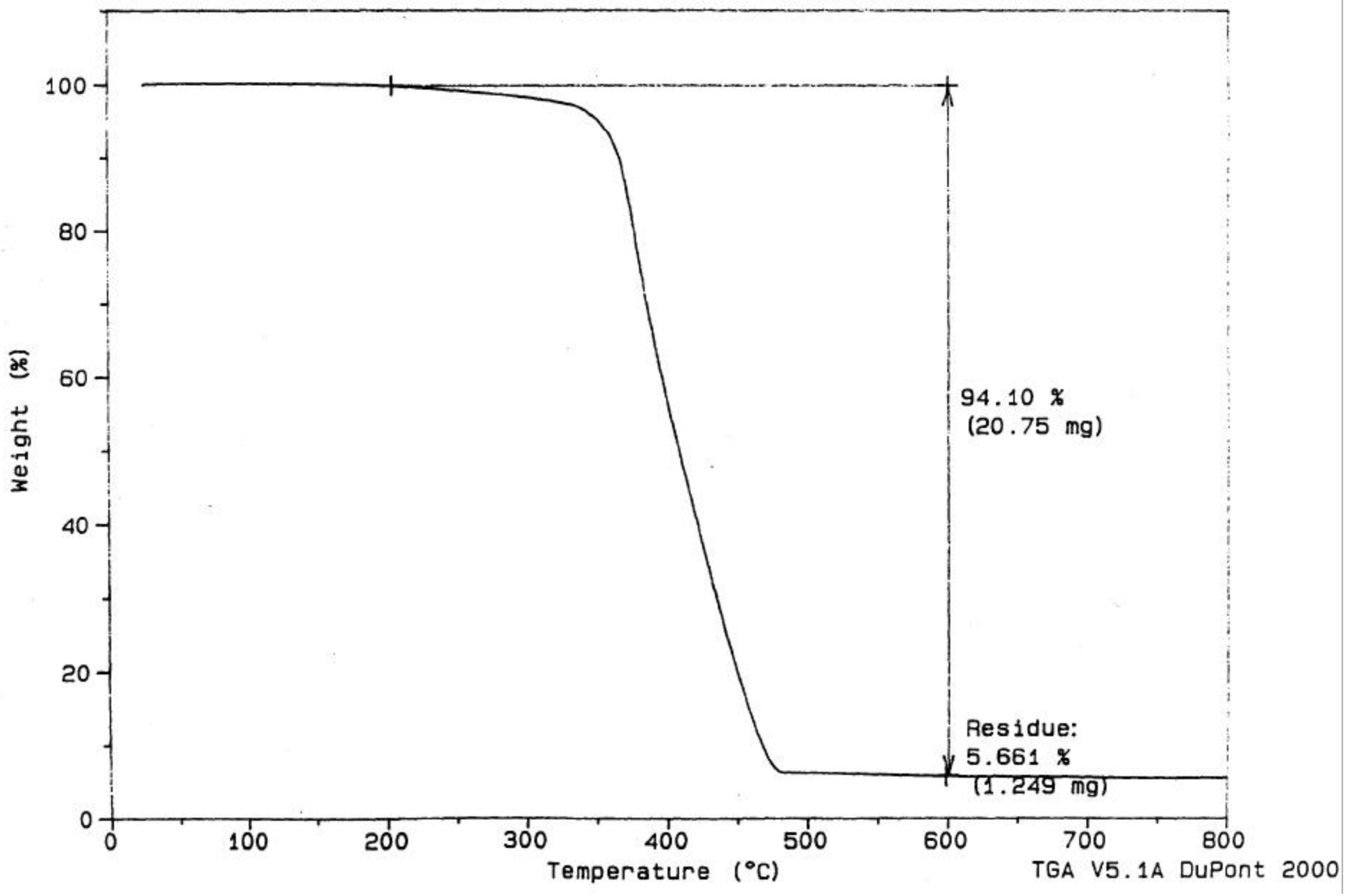
APPENDIX H

THERMOGRAVIMETRIC ANALYSIS OF TEST MATERIALS

Sample: #1: UNFILLED
Size: 22.0550 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

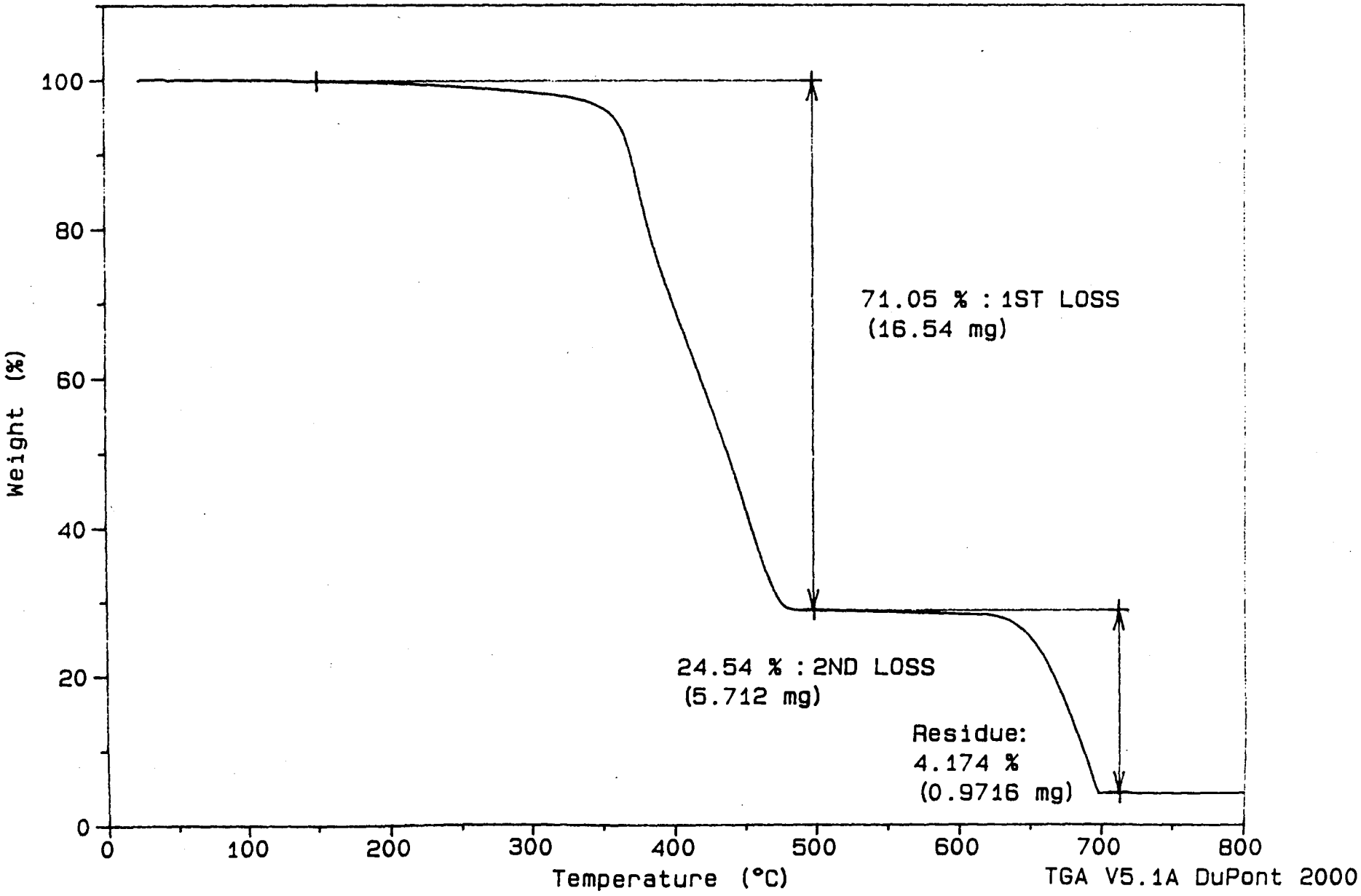
File: C:TGA.04
Operator: SKL
Run Date: 6-May-92 11:22



Sample: #2: FILLED
Size: 23.2780 mg
Method: TGA
Comment: RM TO 600°C BY 20°C/MIN IN N2 THEN SWITCHED TO AIR

TGA

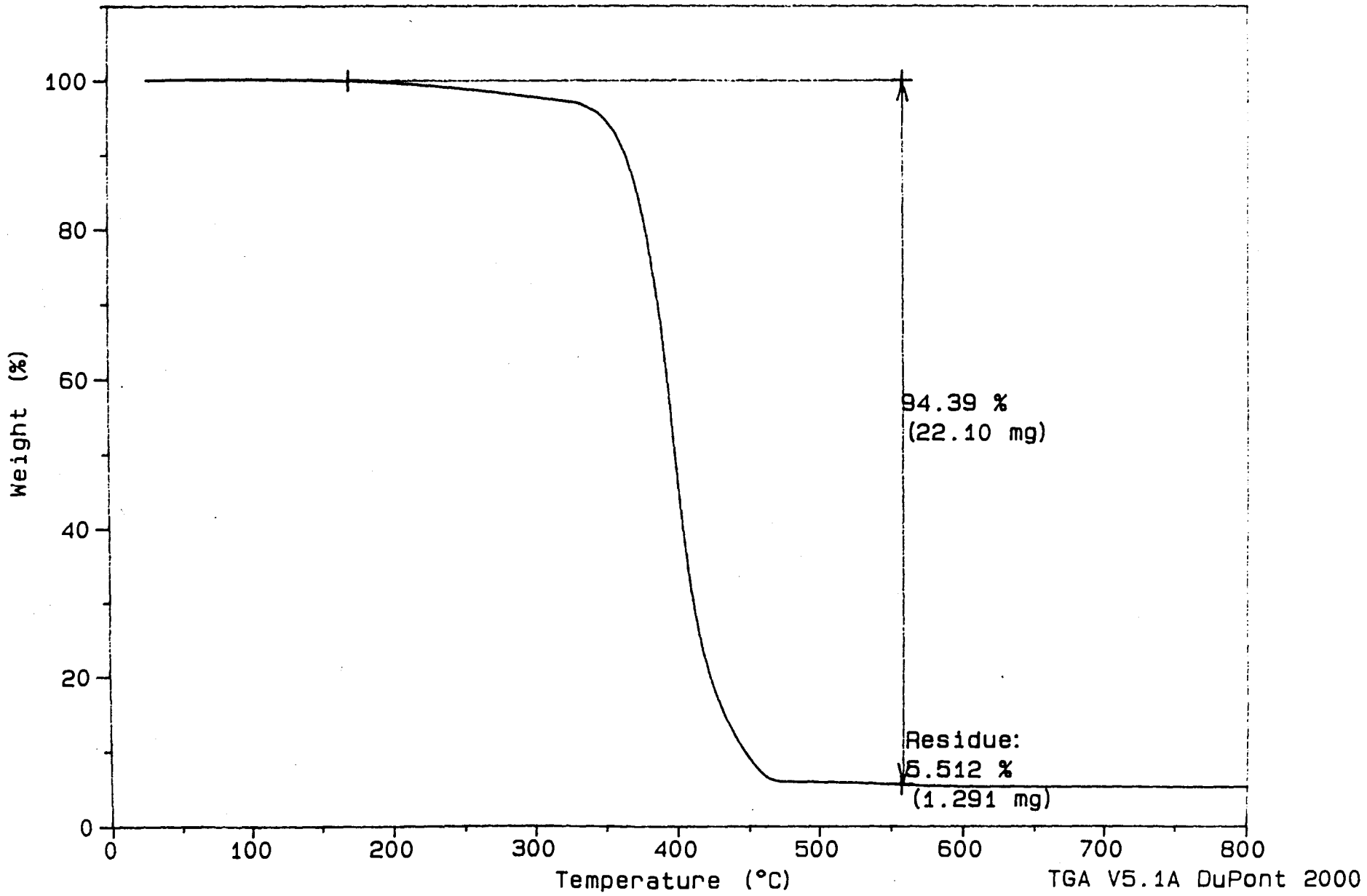
File: C:TGA.05
Operator: SKL
Run Date: 6-May-92 14:17



Sample: #3: UNFILLED
Size: 23.4170 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

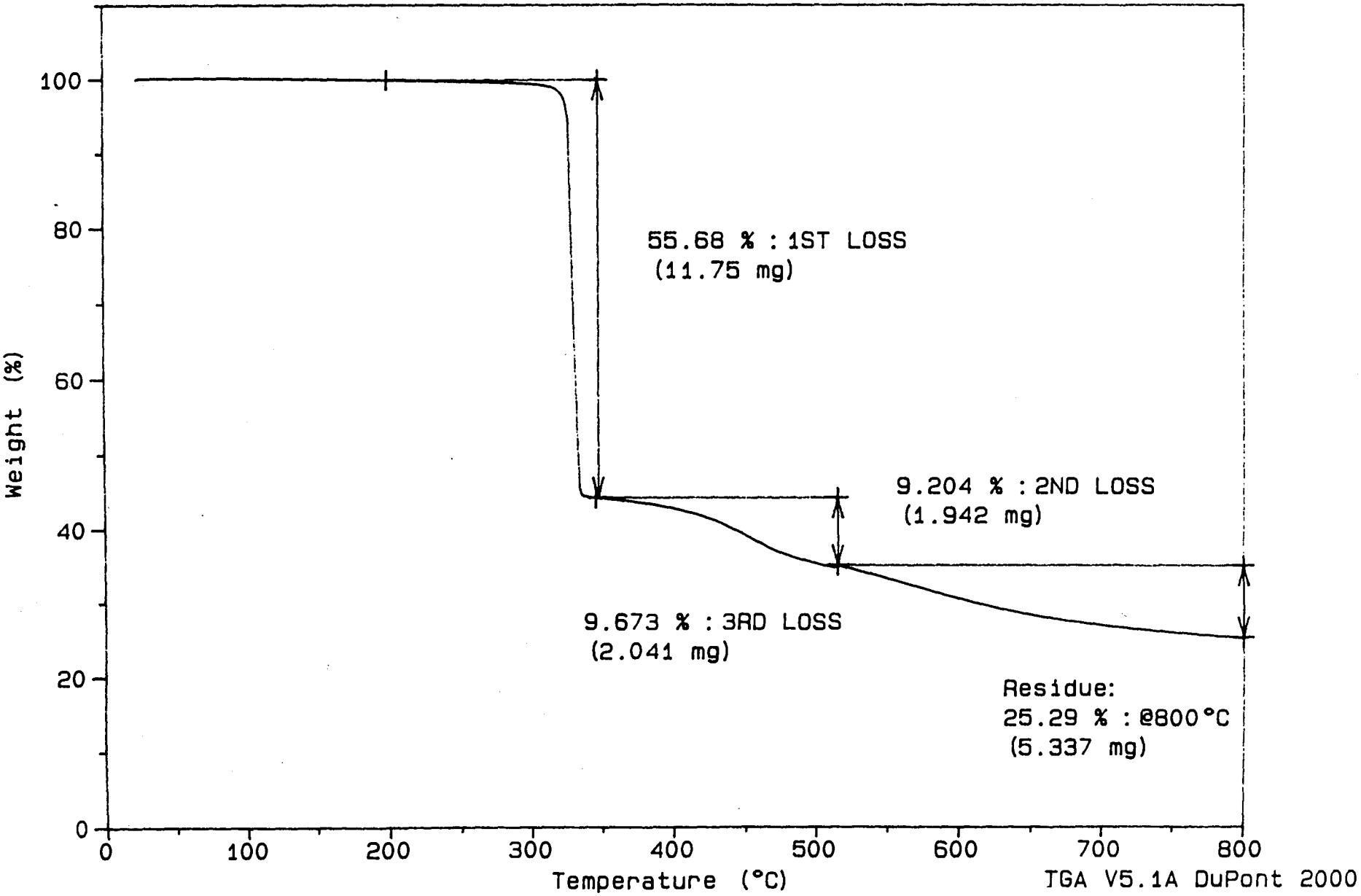
File: C:TGA.06
Operator: SKL
Run Date: 6-May-92 15:58



Sample: #4 FILLED
Size: 21.1020 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

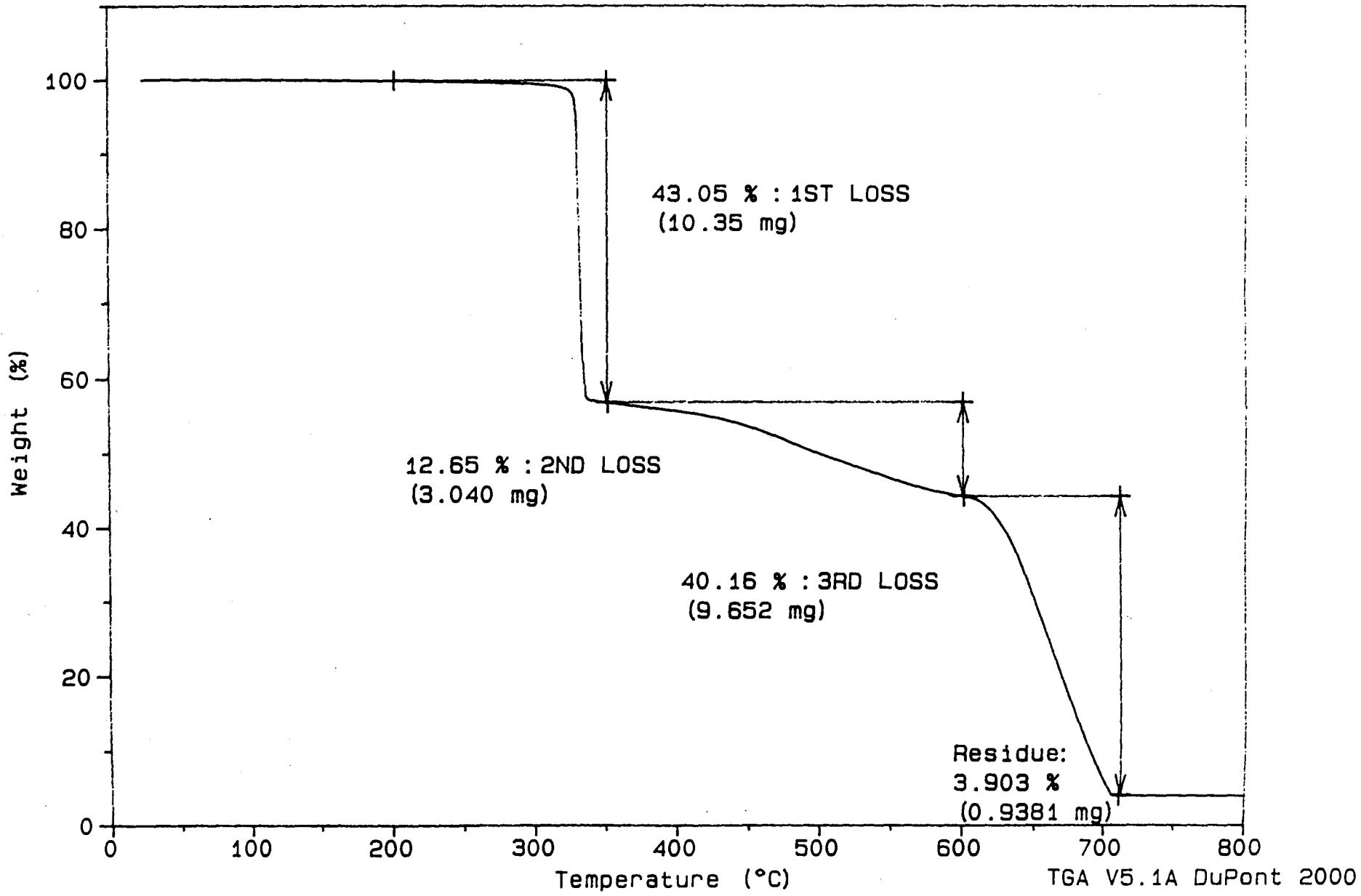
File: C:TGA.66
Operator: SKL
Run Date: 1-Jun-92 13:47



Sample: #5 FILLED
Size: 24.0340 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

File: C:TGA.68
Operator: SKL
Run Date: 2-Jun-92 10:00

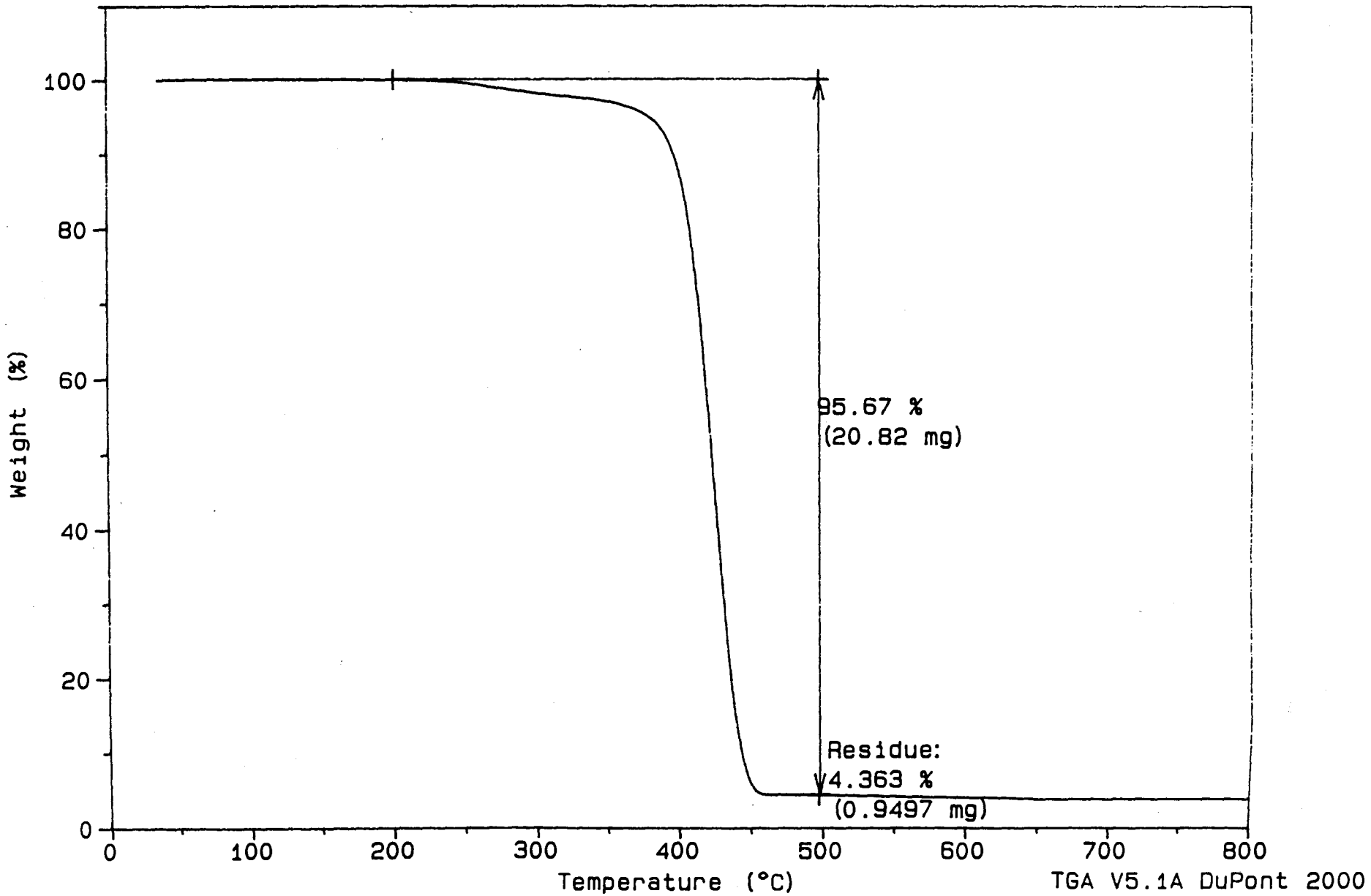


TGA V5.1A DuPont 2000

Sample: #6 UNFILLED
Size: 21.7670 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

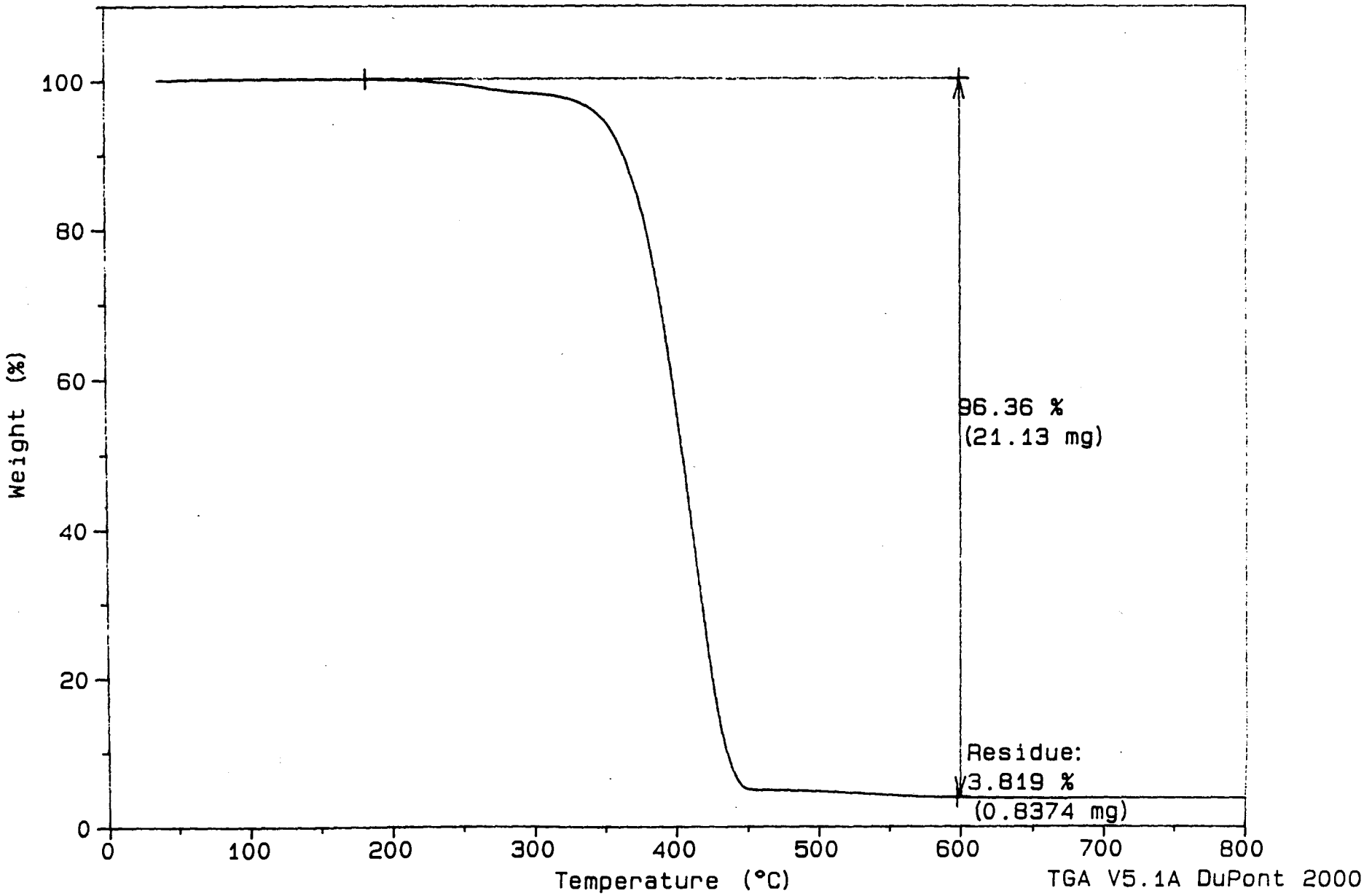
File: C:TGA.16
Operator: SKL
Run Date: 18-May-92 10:30



Sample: #7 UNFILLED
Size: 21.9250 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

File: C:TGA.38
Operator: SKL
Run Date: 22-May-92 10:12

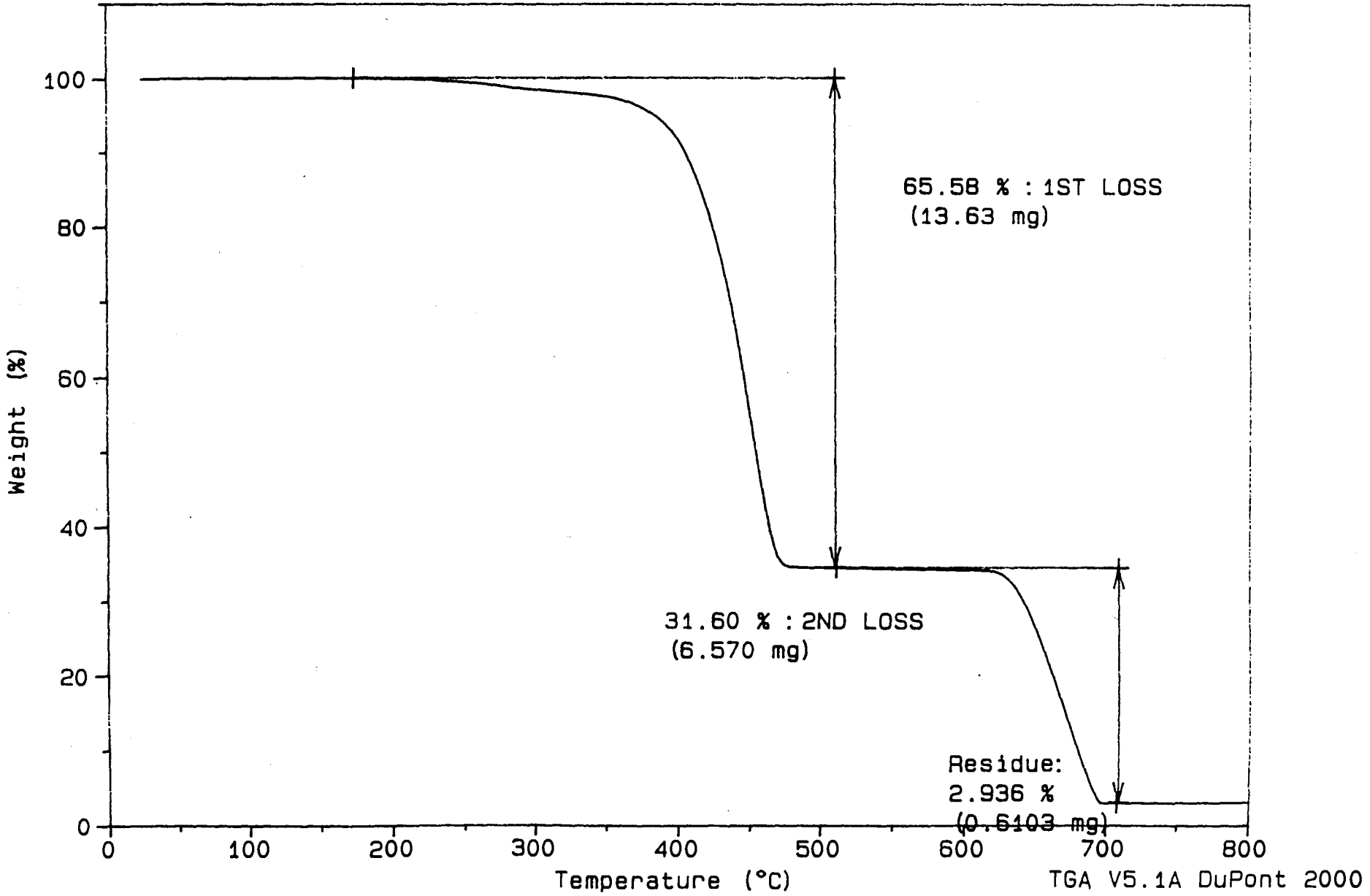


TGA V5.1A DuPont 2000

Sample: #8 FILLED
Size: 20.7900 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

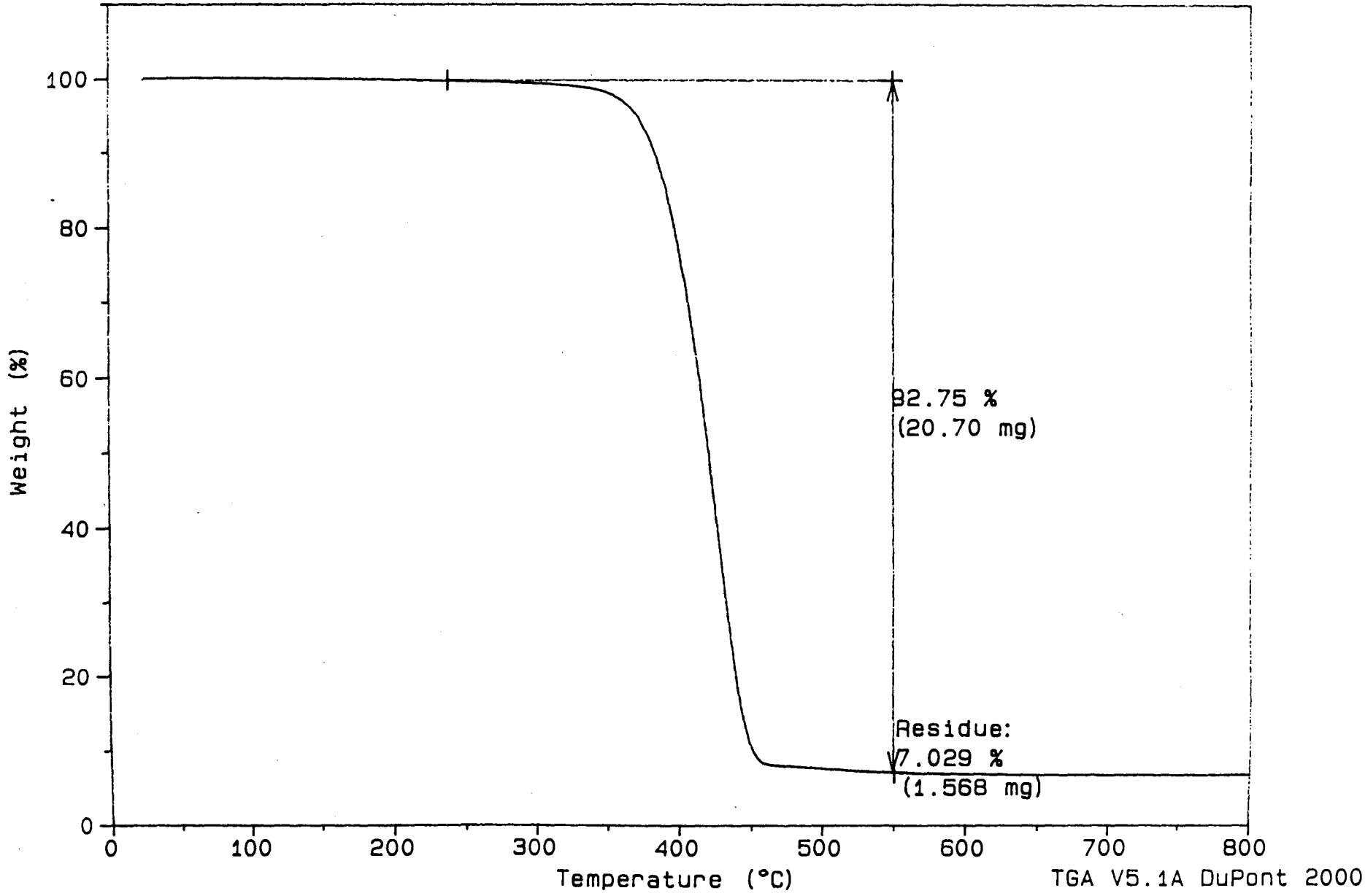
File: C:TGA.53
Operator: SKL
Run Date: 28-May-92 11:12



Sample: #9 UNFILLED
Size: 22.3140 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

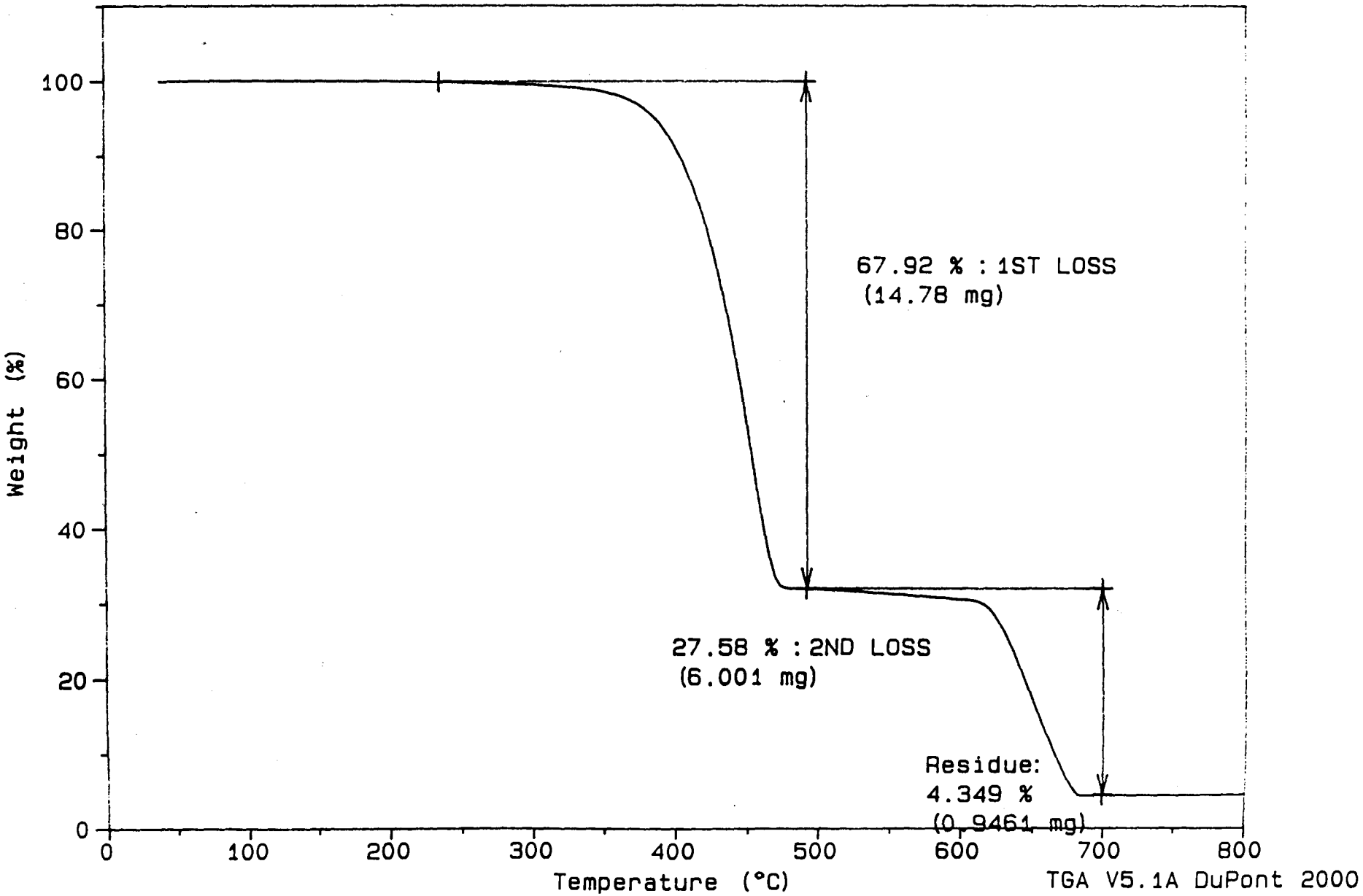
File: C:TGA.17
Operator: SKL
Run Date: 18-May-92 13:27



Sample: #10 FILLED
Size: 21.7540 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

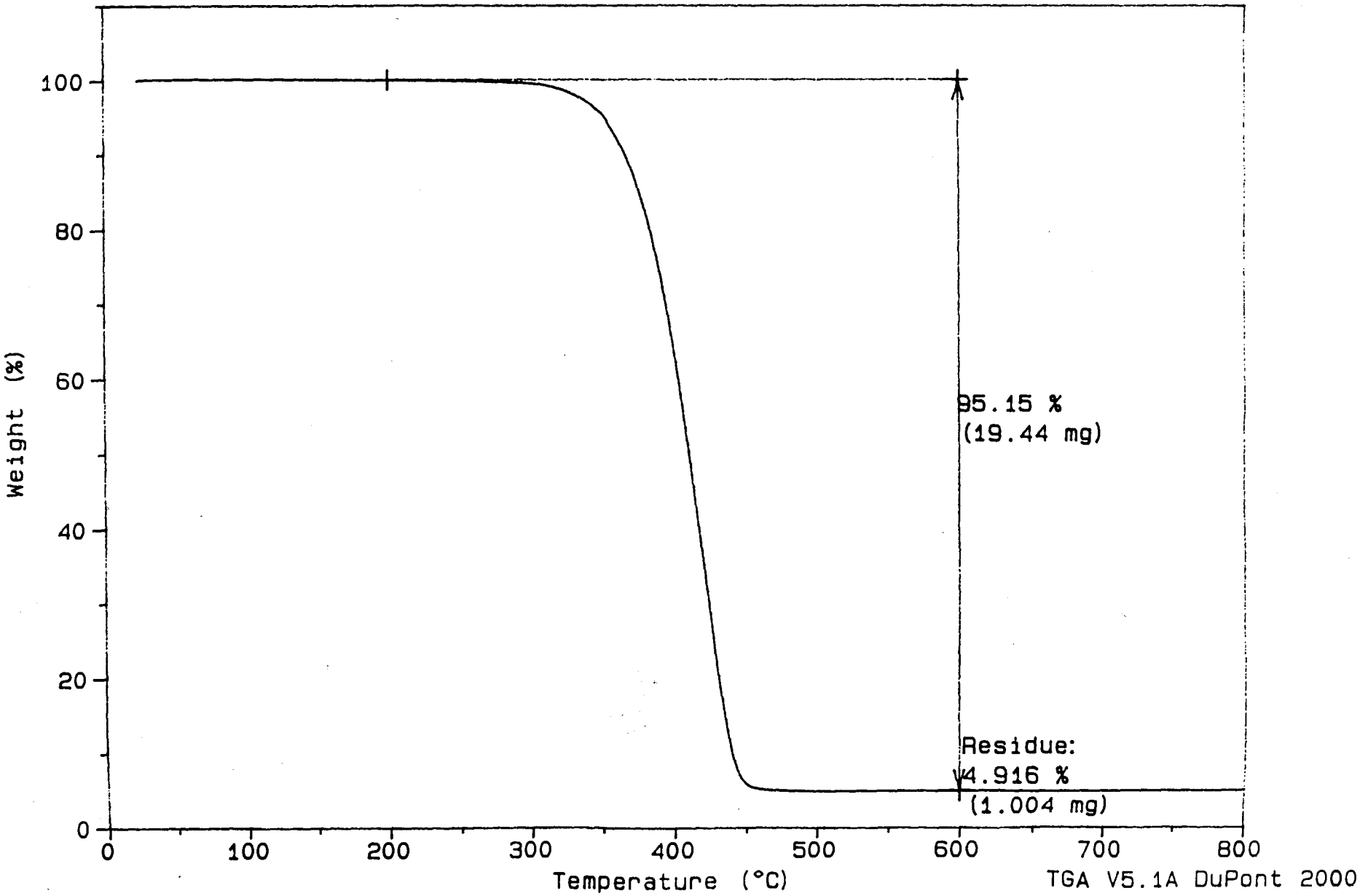
File: C:TGA.54
Operator: SKL
Run Date: 28-May-92 12:19



Sample: #11 UNFILLED
Size: 20.4270 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

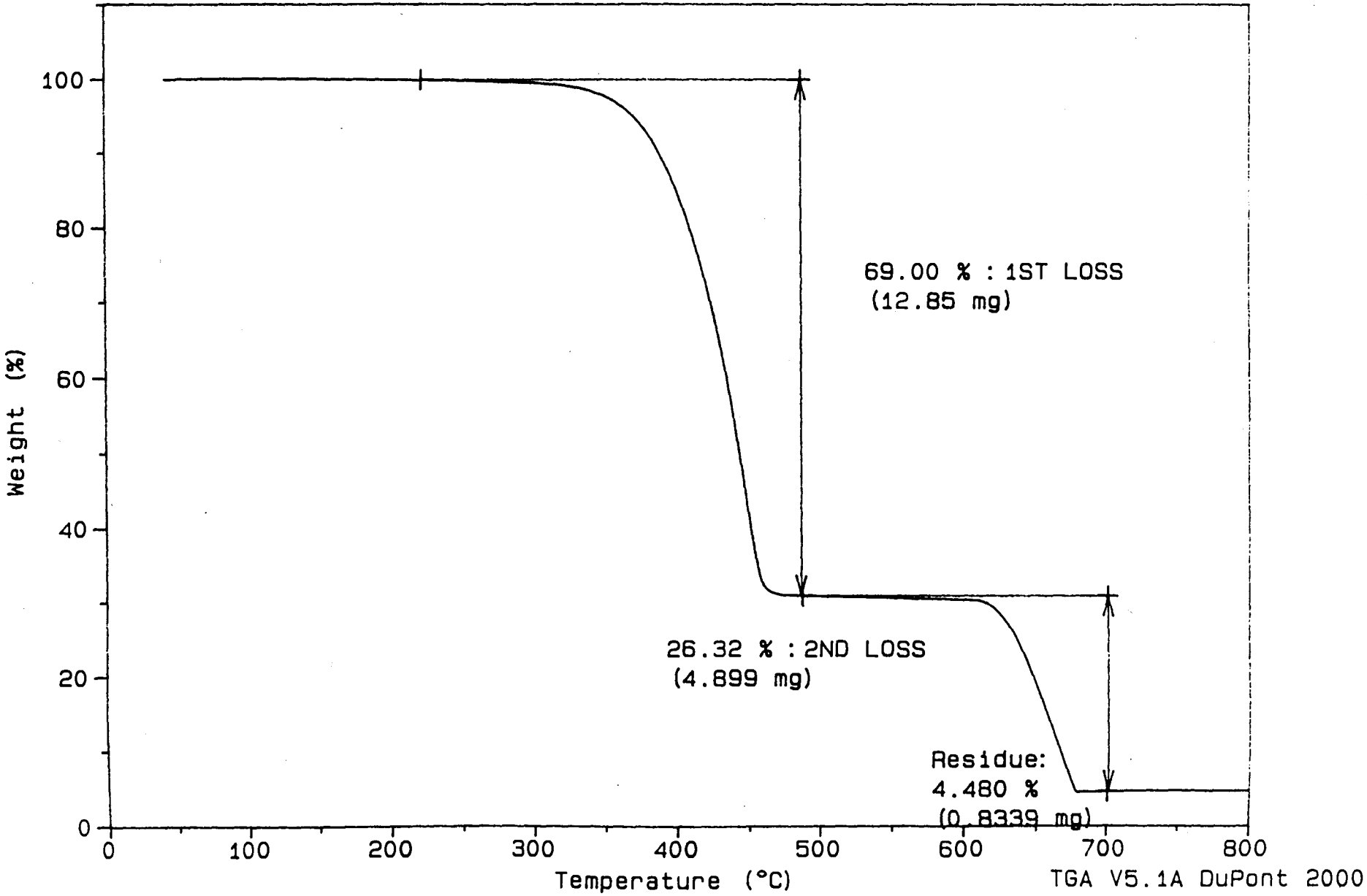
File: C:TGA.39
Operator: SKL
Run Date: 22-May-92 12:15



Sample: #12 FILLED
Size: 18.6150 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

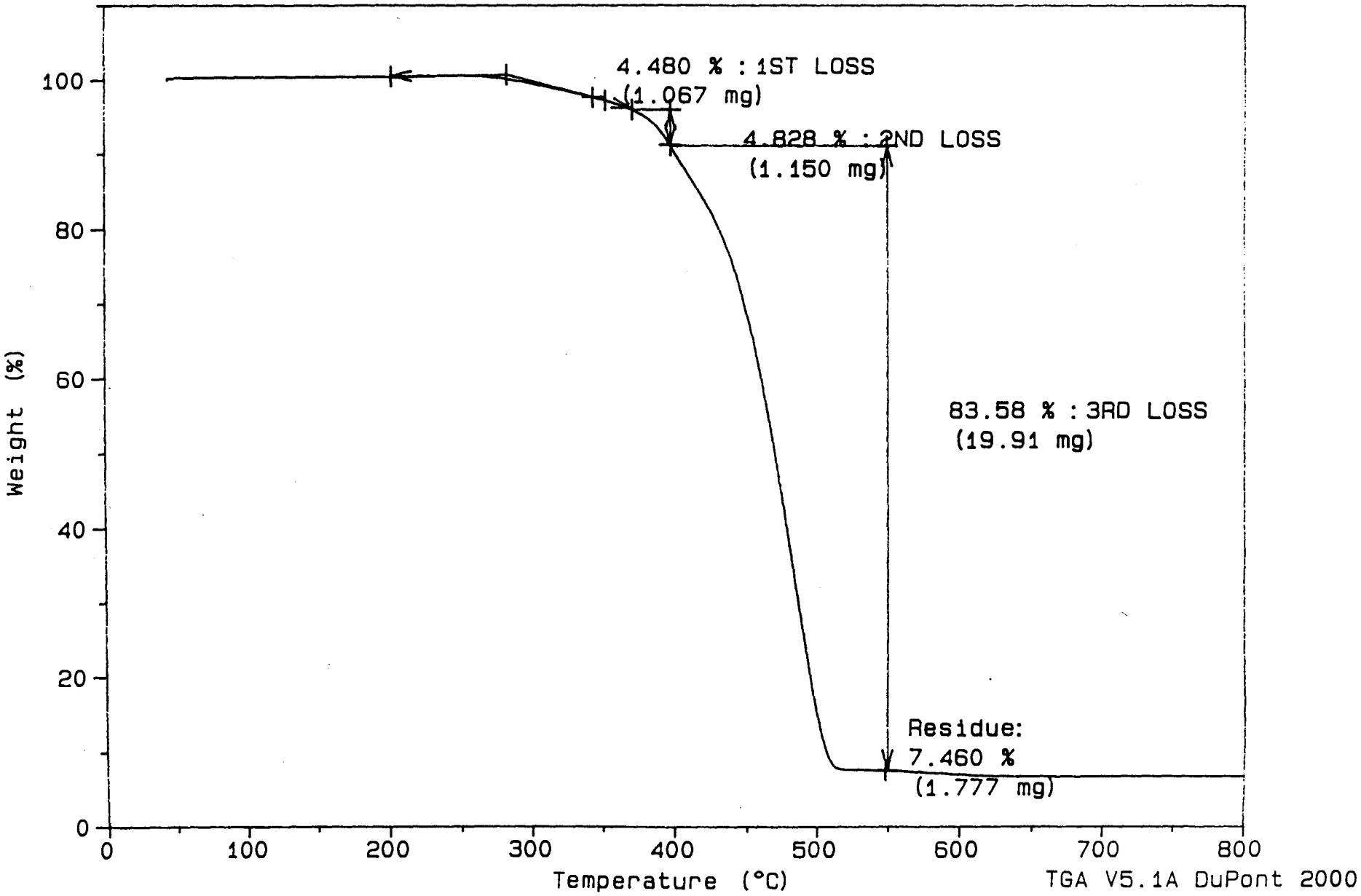
File: C:TGA.56
Operator: SKL
Run Date: 28-May-92 15:34



Sample: #13 UNFILLED
Size: 23.8180 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

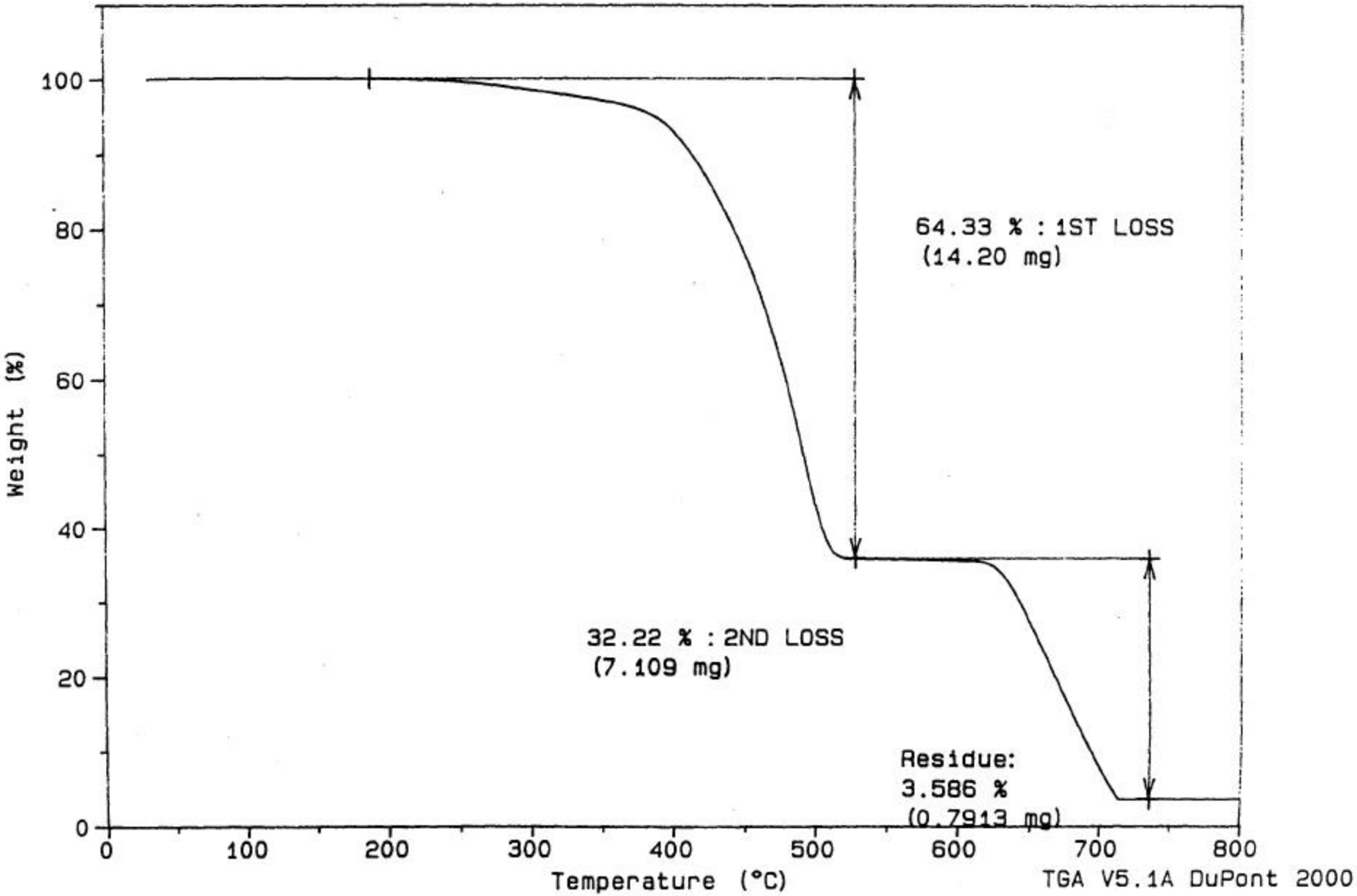
File: C:TGA.62
Operator: SKL
Run Date: 29-May-92 16:37



Sample: #14 FILLED
Size: 22.0670 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

File: C:TGA.61
Operator: SKL
Run Date: 29-May-92 14:39

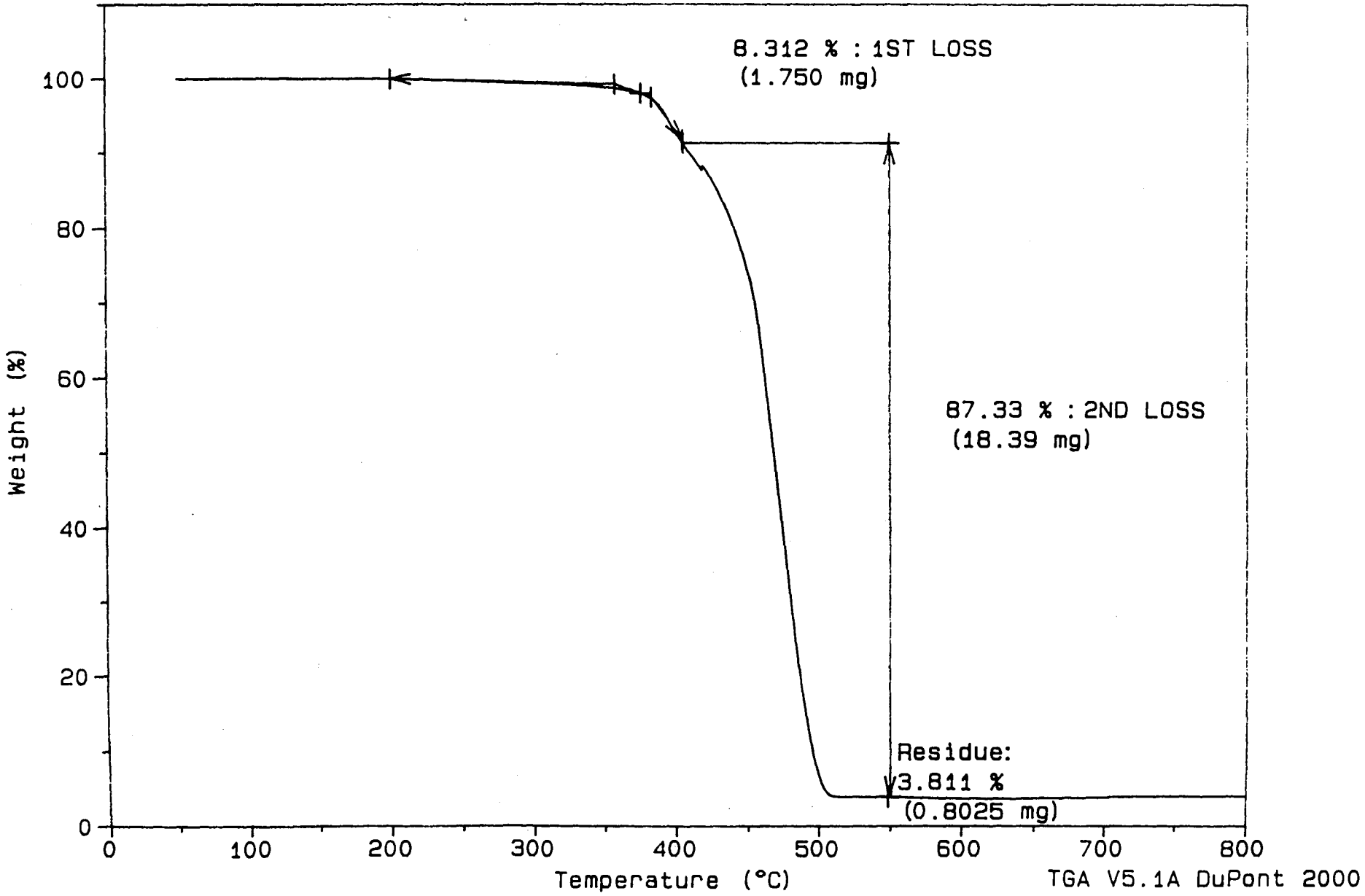


TGA V5.1A DuPont 2000

Sample: #15 UNFILLED
Size: 21.0580 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

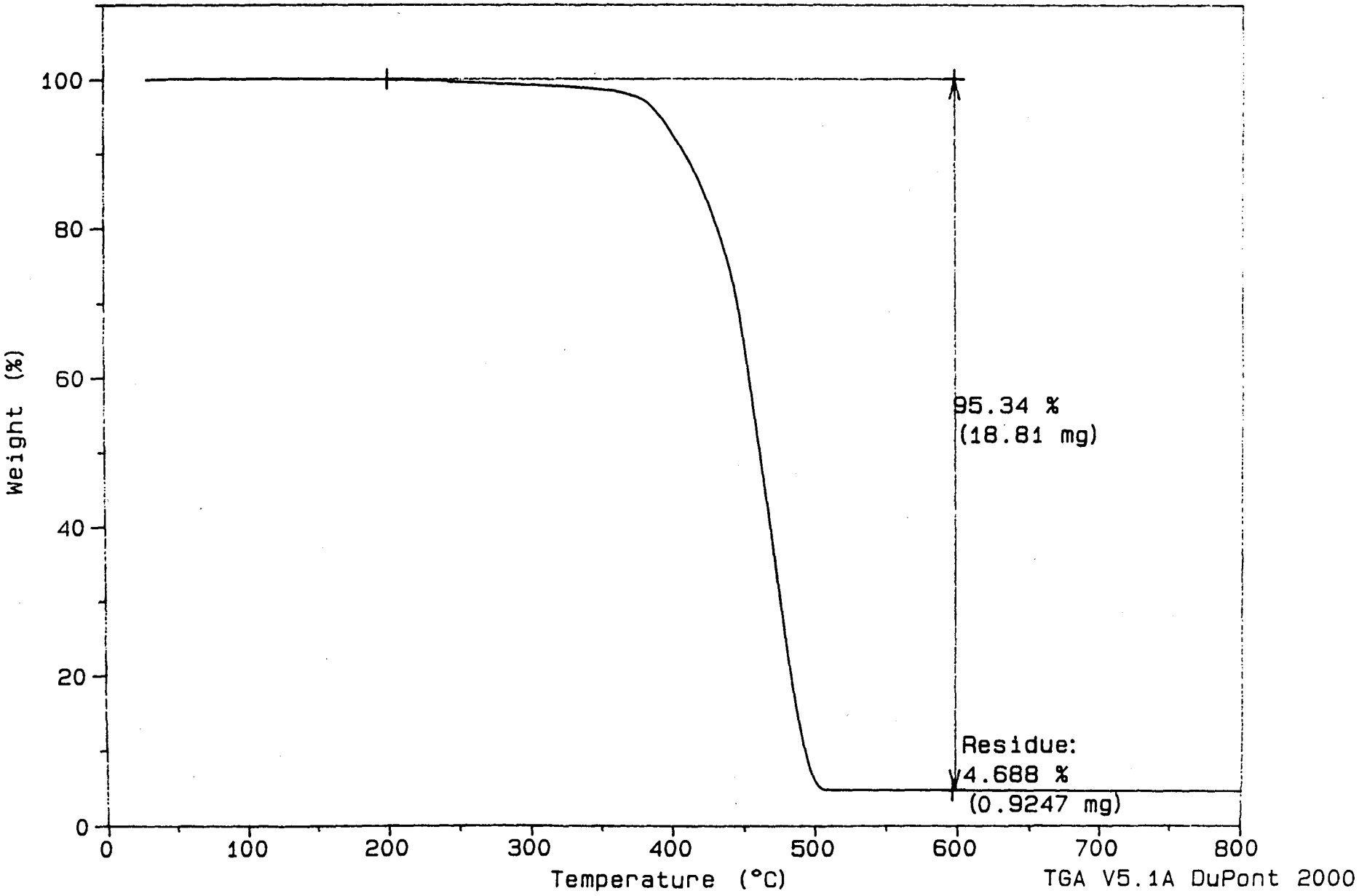
File: C:TGA.70
Operator: SKL
Run Date: 9-Jun-92 10:00



Sample: #16 UNFILLED
Size: 19.7240 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

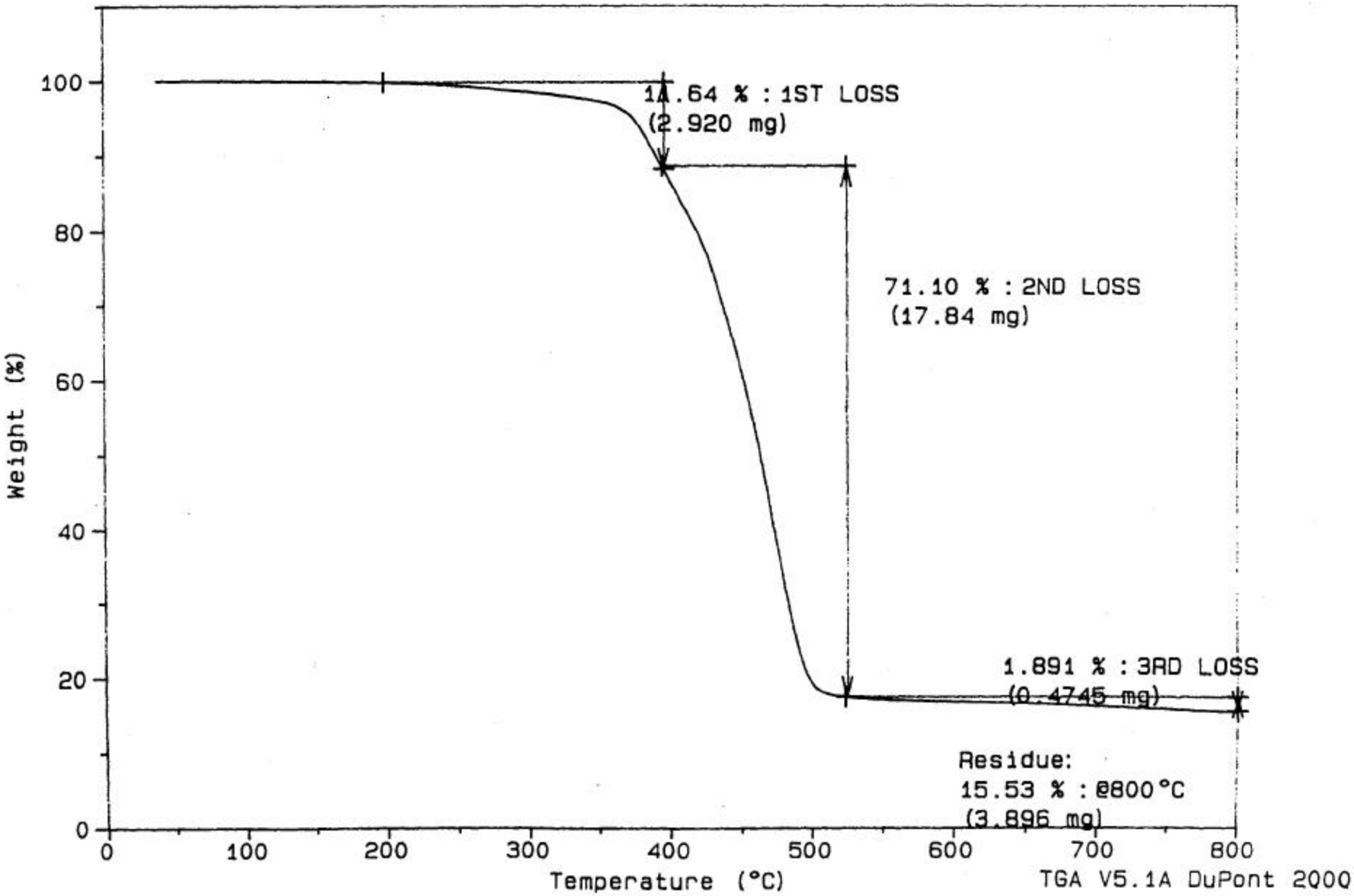
File: C:TGA.71
Operator: SKL
Run Date: 9-Jun-92 11:14



Sample: #17 UNFILLED
Size: 25.0910 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

File: C:TGA.40
Operator: SKL
Run Date: 22-May-92 13:24

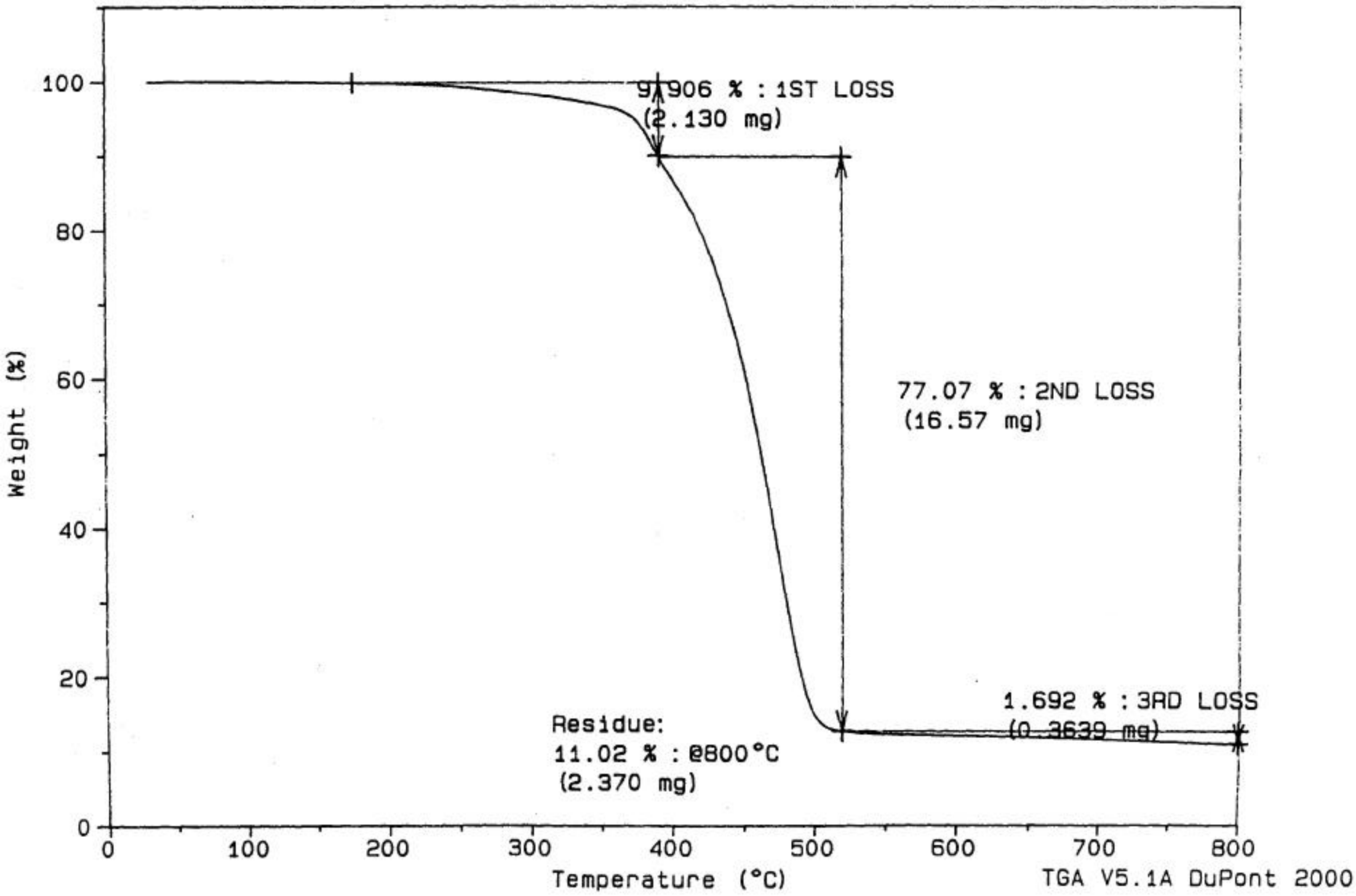


TGA V5.1A DuPont 2000

Sample: #18 UNFILLED
Size: 21.5010 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

File: C:TGA.42
Operator: SKL
Run Date: 22-May-92 15:46

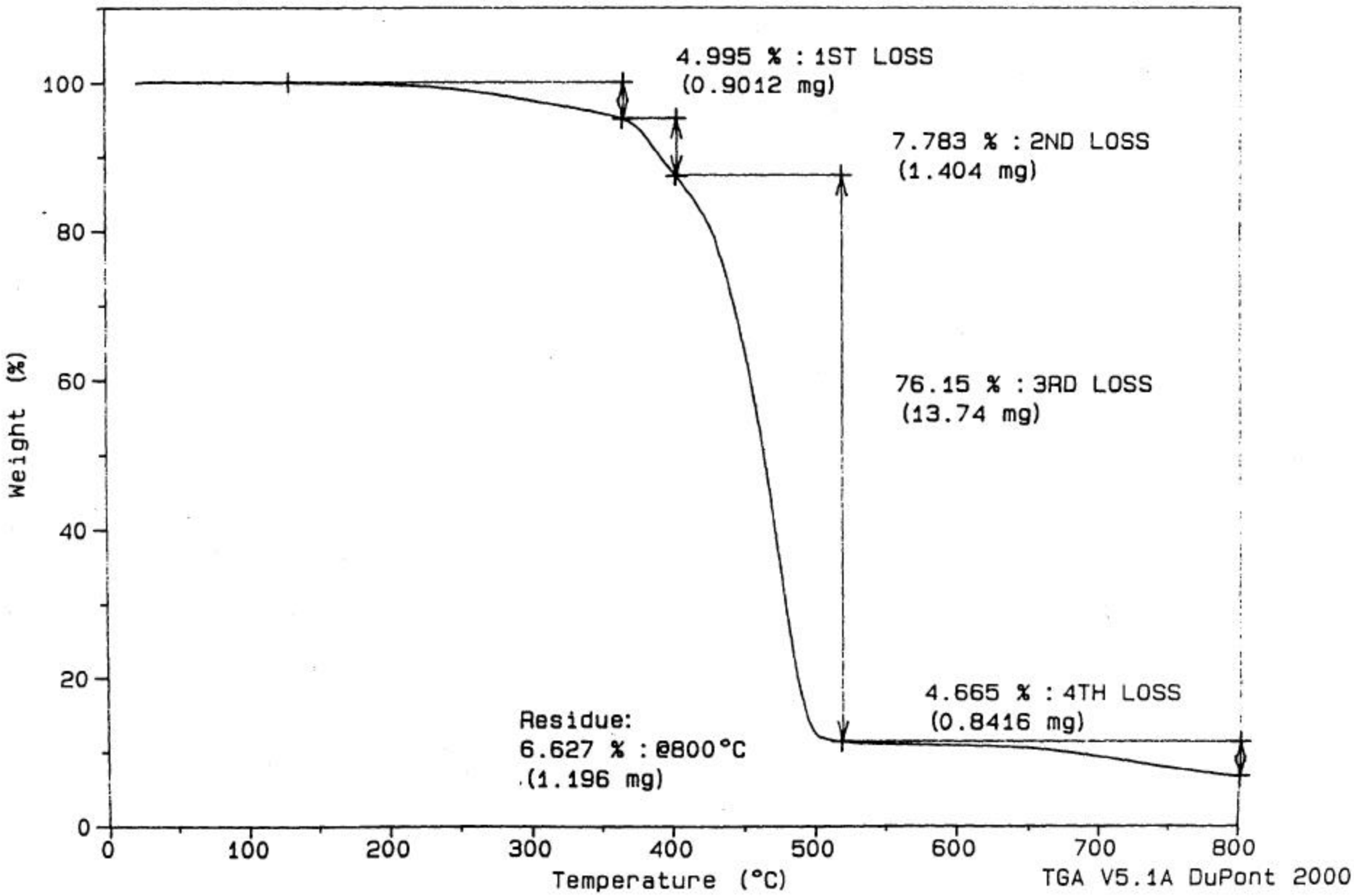


TGA V5.1A DuPont 2000

Sample: #19 UNFILLED
Size: 18.0420 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

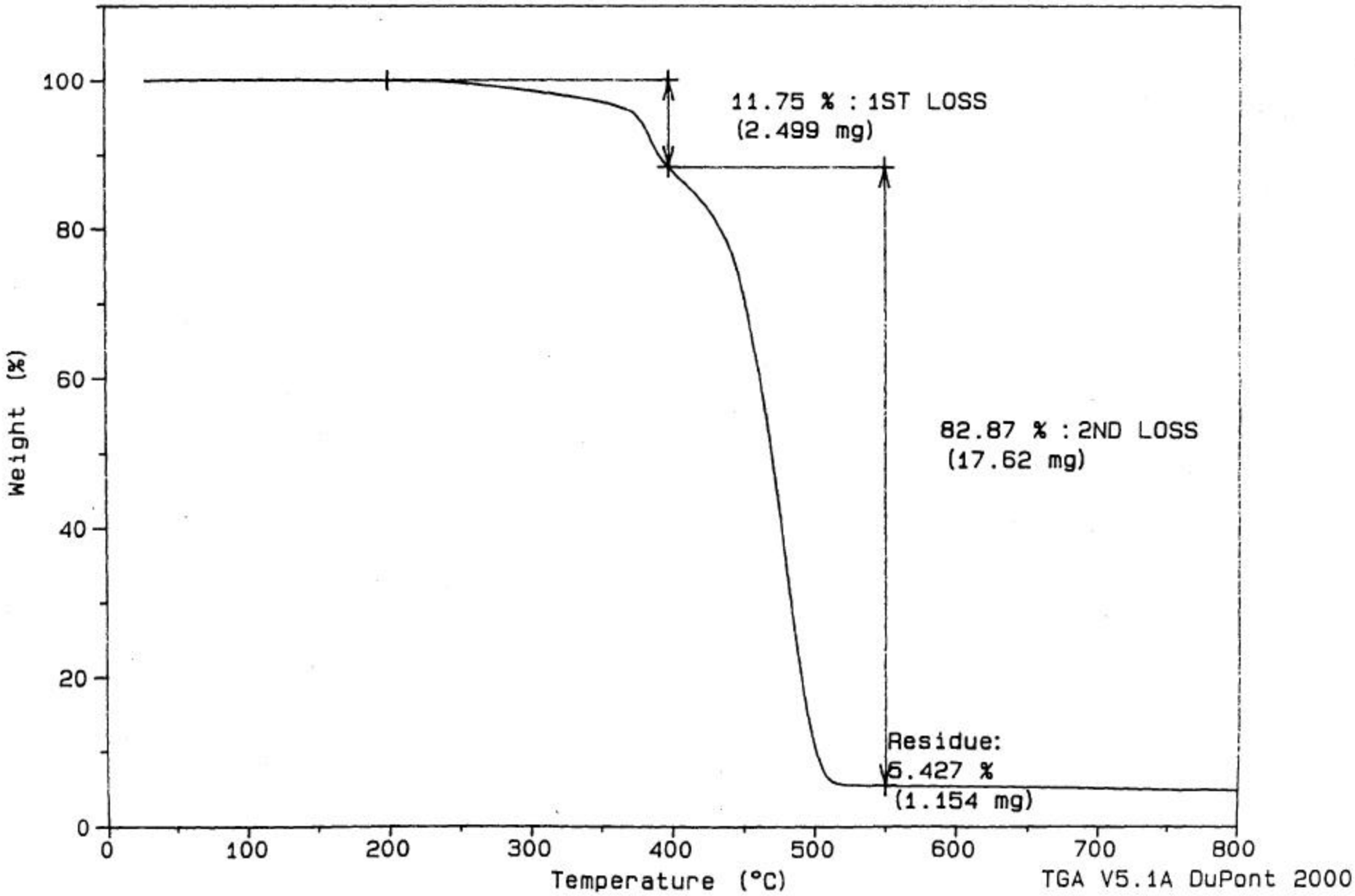
File: C:TGA.43
Operator: SKL
Run Date: 26-May-92 09:42



Sample: #20 UNFILLED
Size: 21.2650 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

File: C:TGA.44
Operator: SKL
Run Date: 26-May-92 10:53

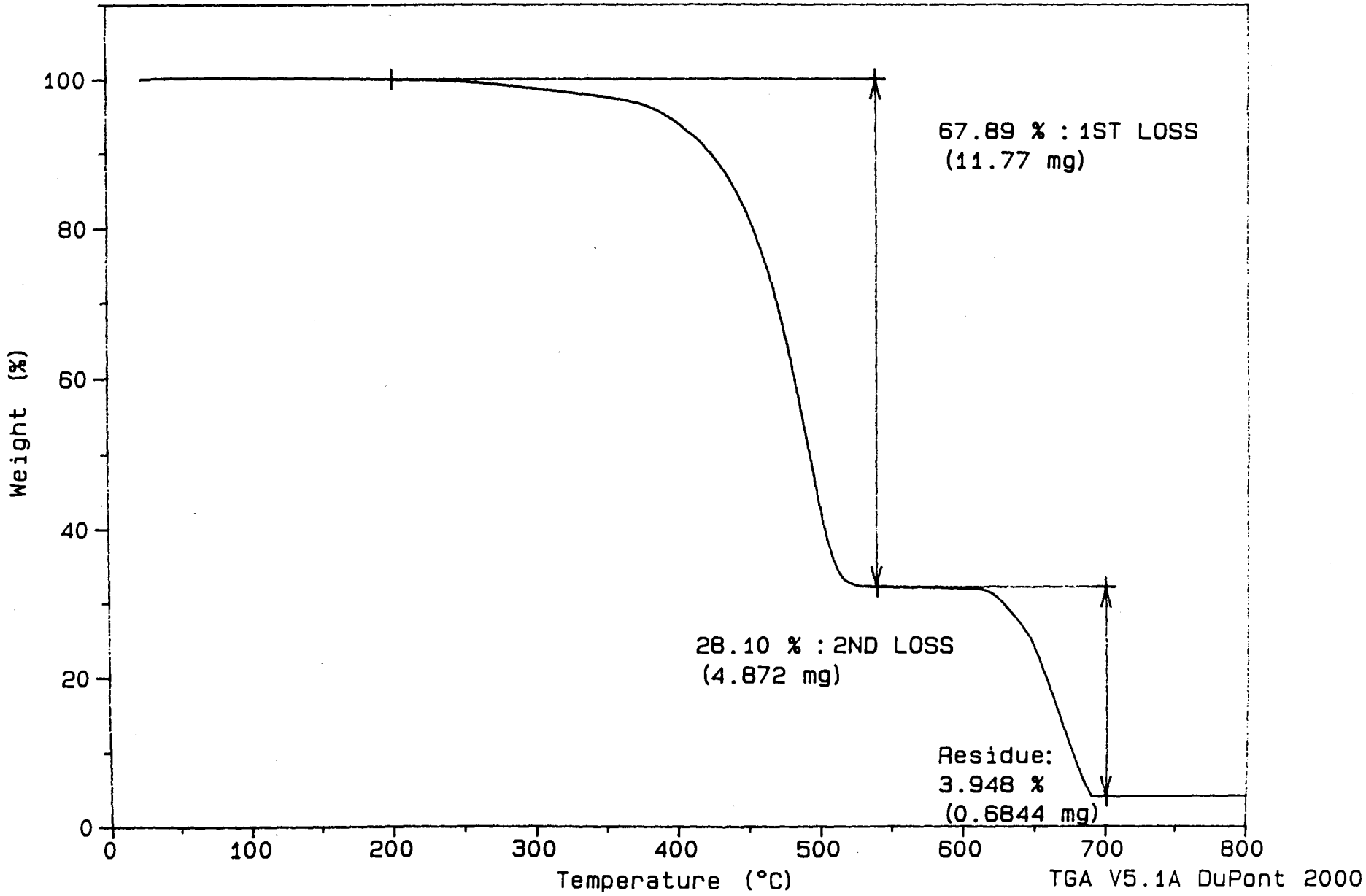


TGA V5.1A DuPont 2000

Sample: #21 FILLED
Size: 17.3340 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

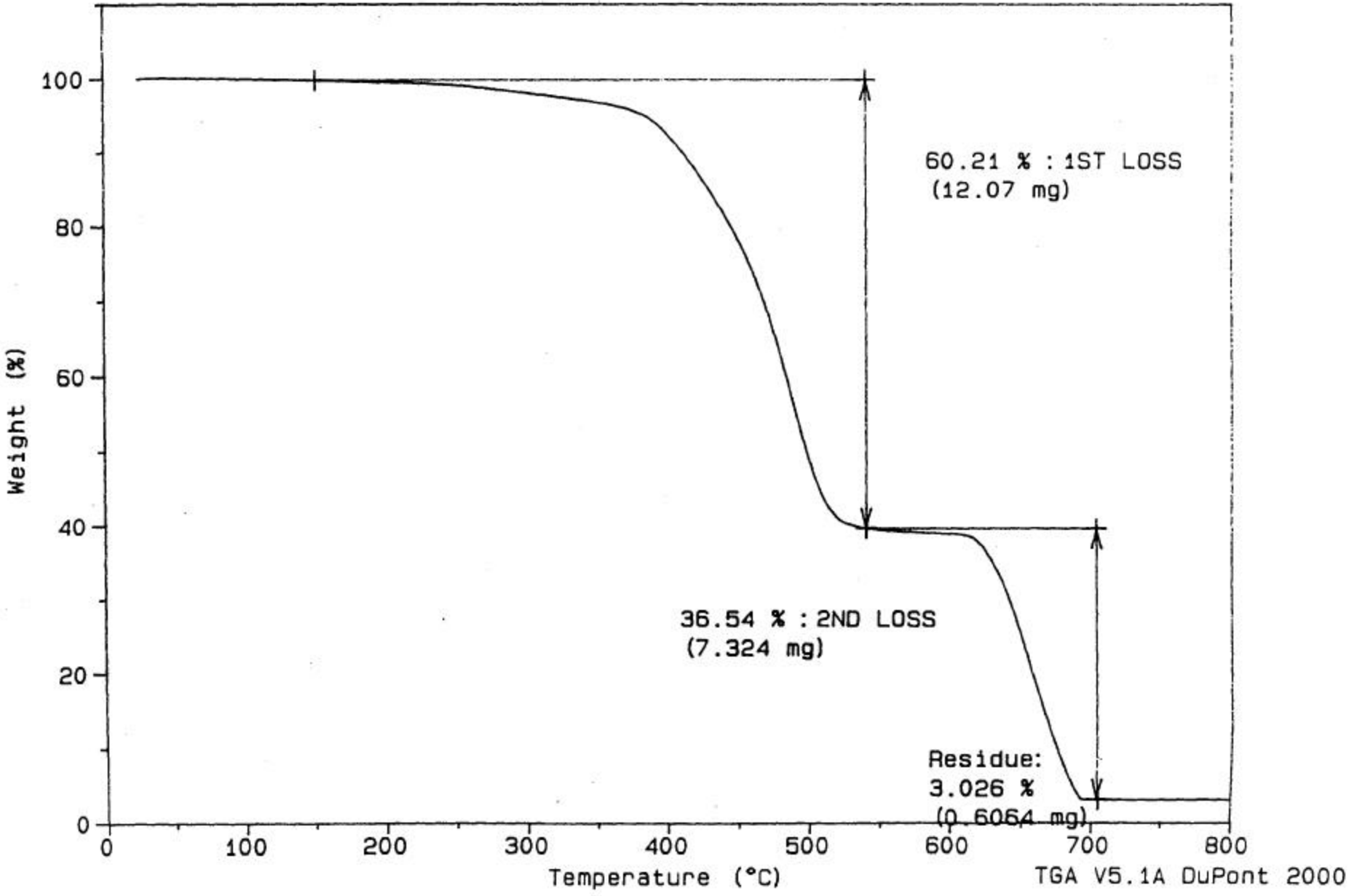
File: C:TGA.87
Operator: SKL
Run Date: 17-Jun-92 08:54



Sample: #22 FILLED
Size: 20.0410 mg
Method: TGA
Comment: HEAT UPTO 600°C BY 20°C/MIN IN N2 THEN SWITCH TO AIR

TGA

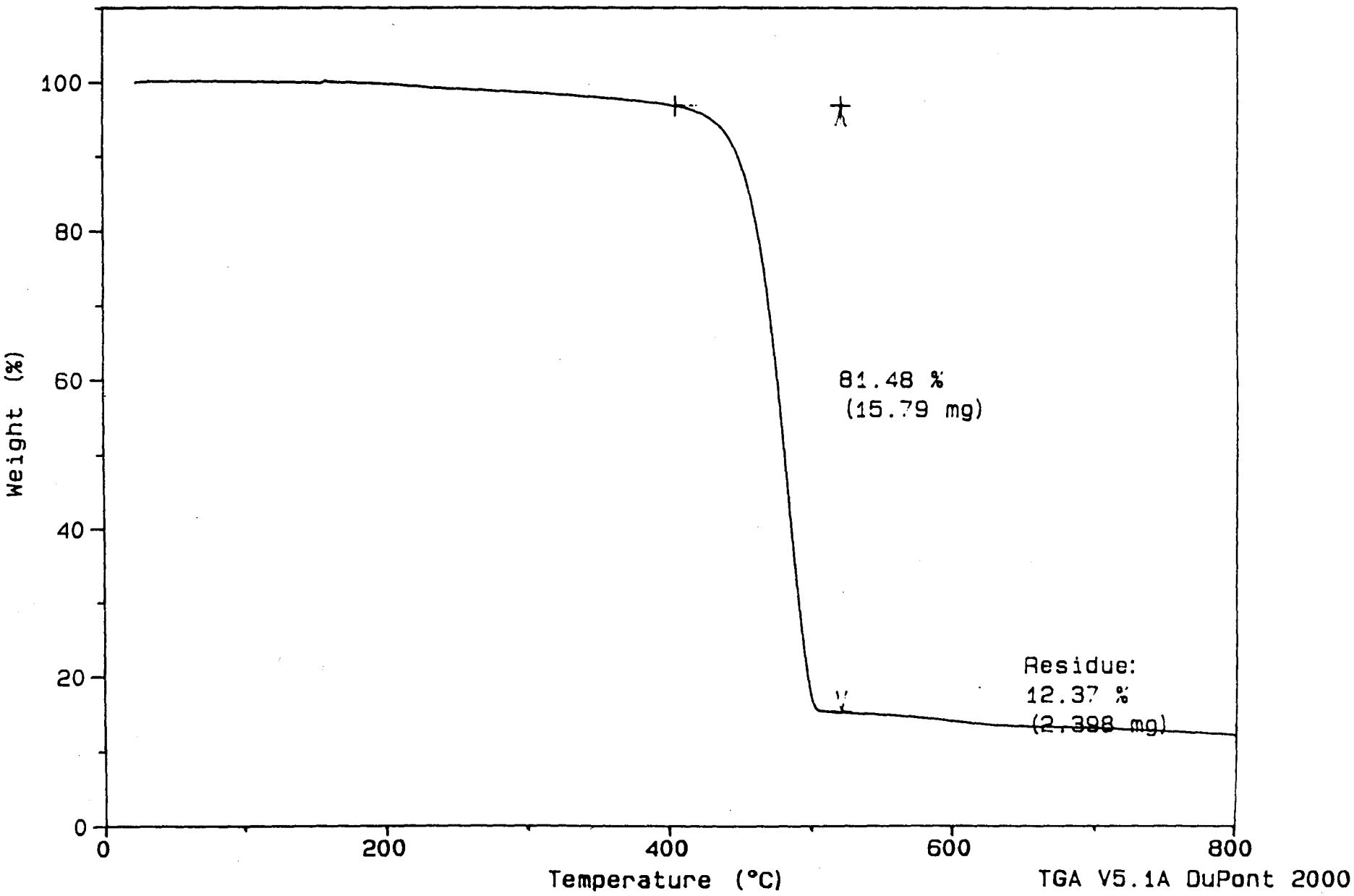
File: C:TGA.98
Operator: SKL
Run Date: 24-Jun-92 10:42



Sample: #23 UNFILLED
Size: 19.3820 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

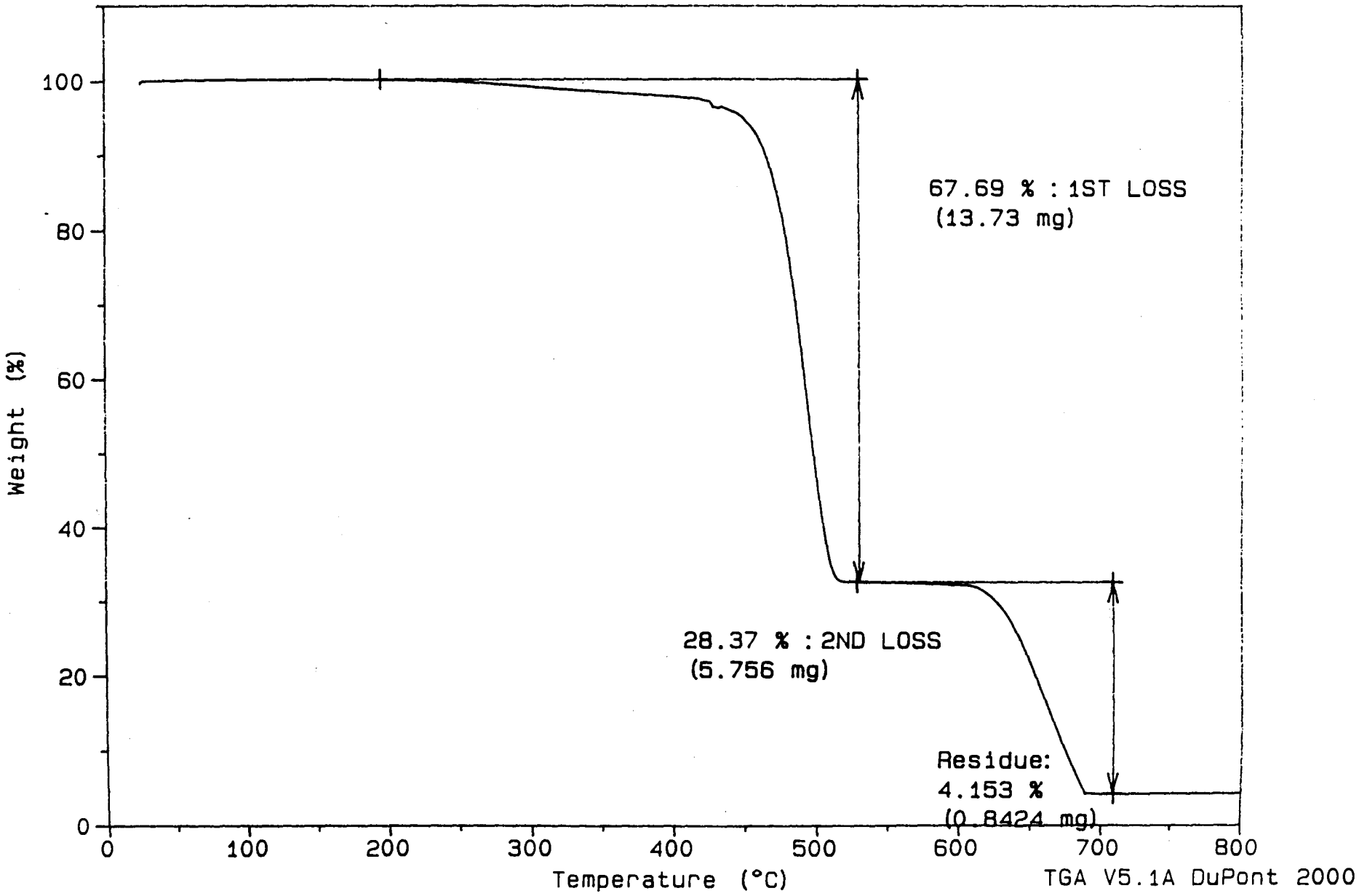
File: C:ARTI.023
Operator: GJM
Run Date: 19-Jan-93 15:53



Sample: #24 FILLED
Size: 20.2860 mg
Method: TGA
Comment: HEAT BY 20°C/MIN IN N2 AND SWITCH TO AIR @ 600°C

TGA

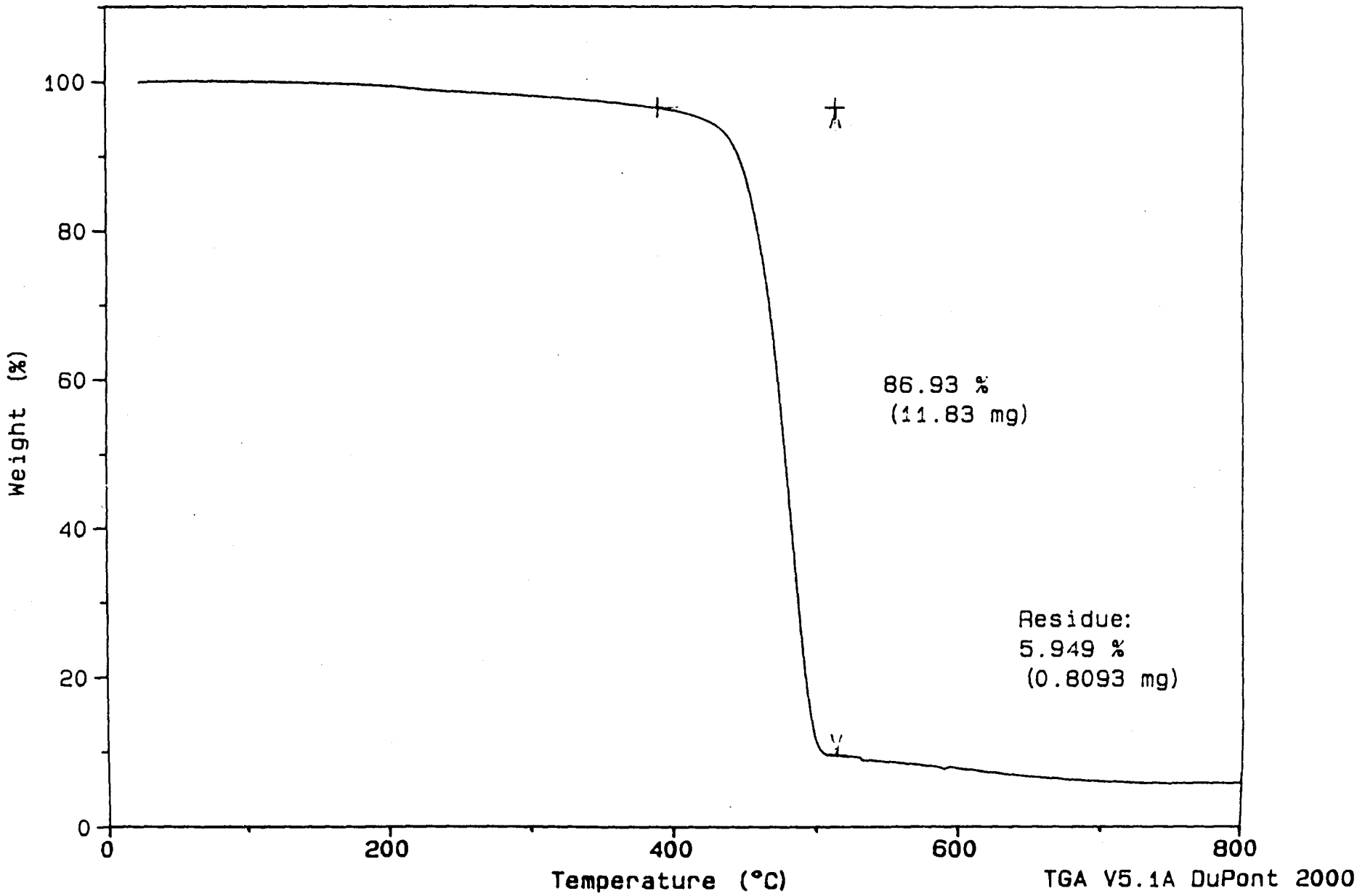
File: C:TGA.89
Operator: SKL
Run Date: 17-Jun-92 15:04



Sample: #25 UNFILLED
Size: 13.6040 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

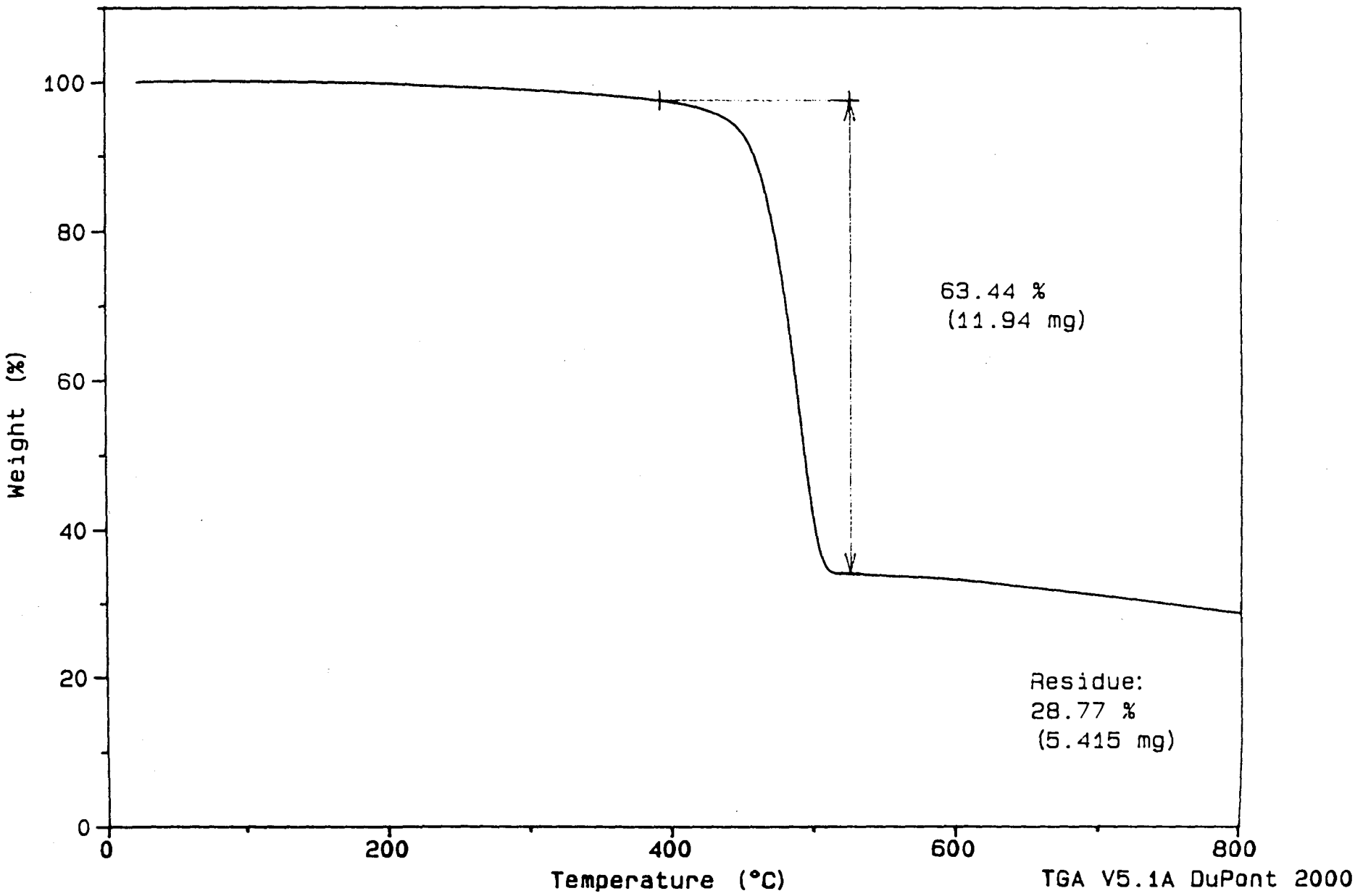
File: C:ARTI.025
Operator: GJM
Run Date: 21-Jan-93 14:05



Sample: #26 FILLED PET NUCLEATED
Size: 18.8200 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

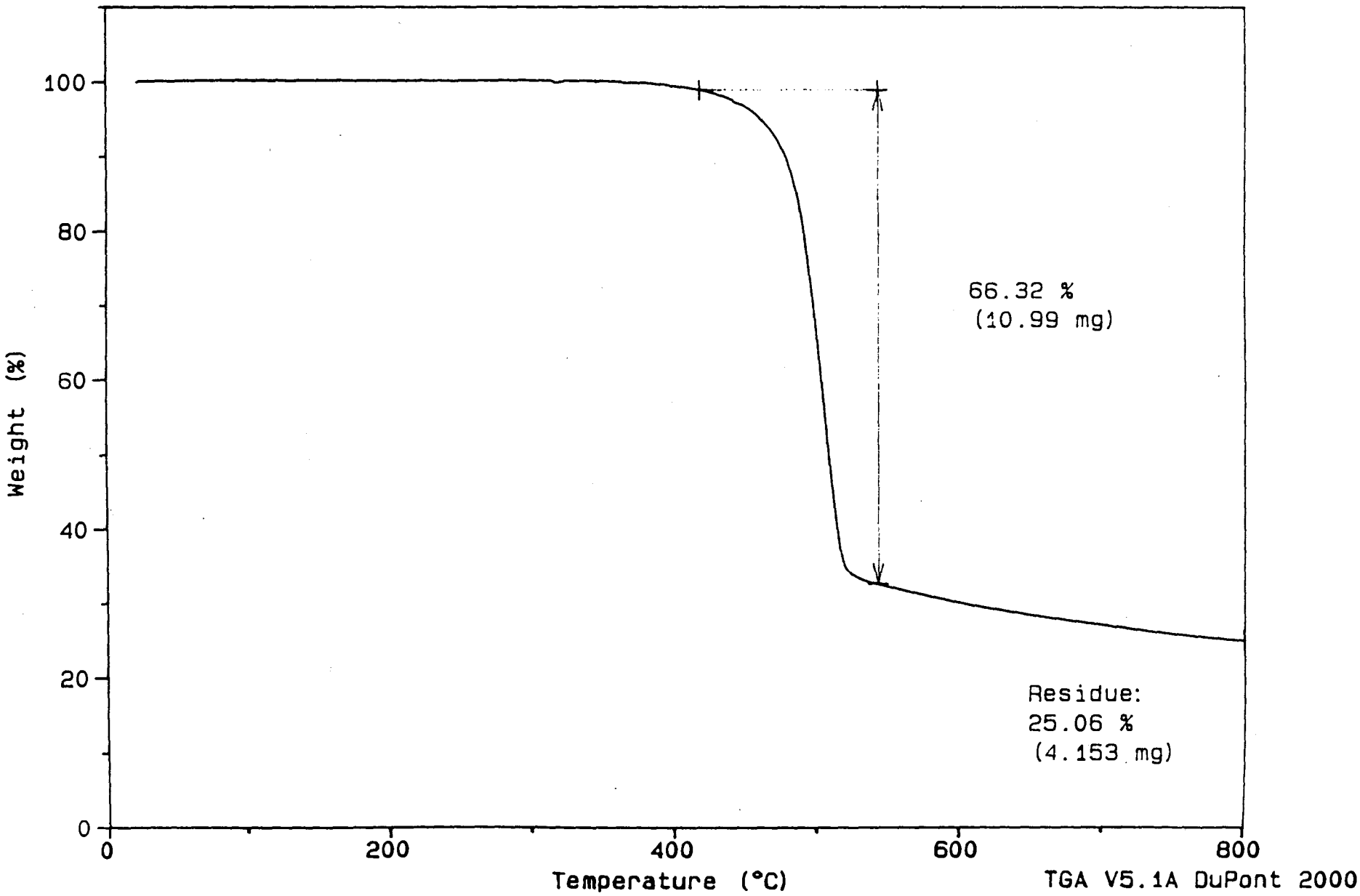
File: C:ARTI.026
Operator: GJM
Run Date: 25-Jan-93 09:35



Sample: #27
Size: 16.5725 mg
Method: TGA
Comment: HEAT BY 20C/MIN UPTO 800°C IN N2

TGA

File: C:ARTI.027
Operator: GJM
Run Date: 25-Jan-93 11:40

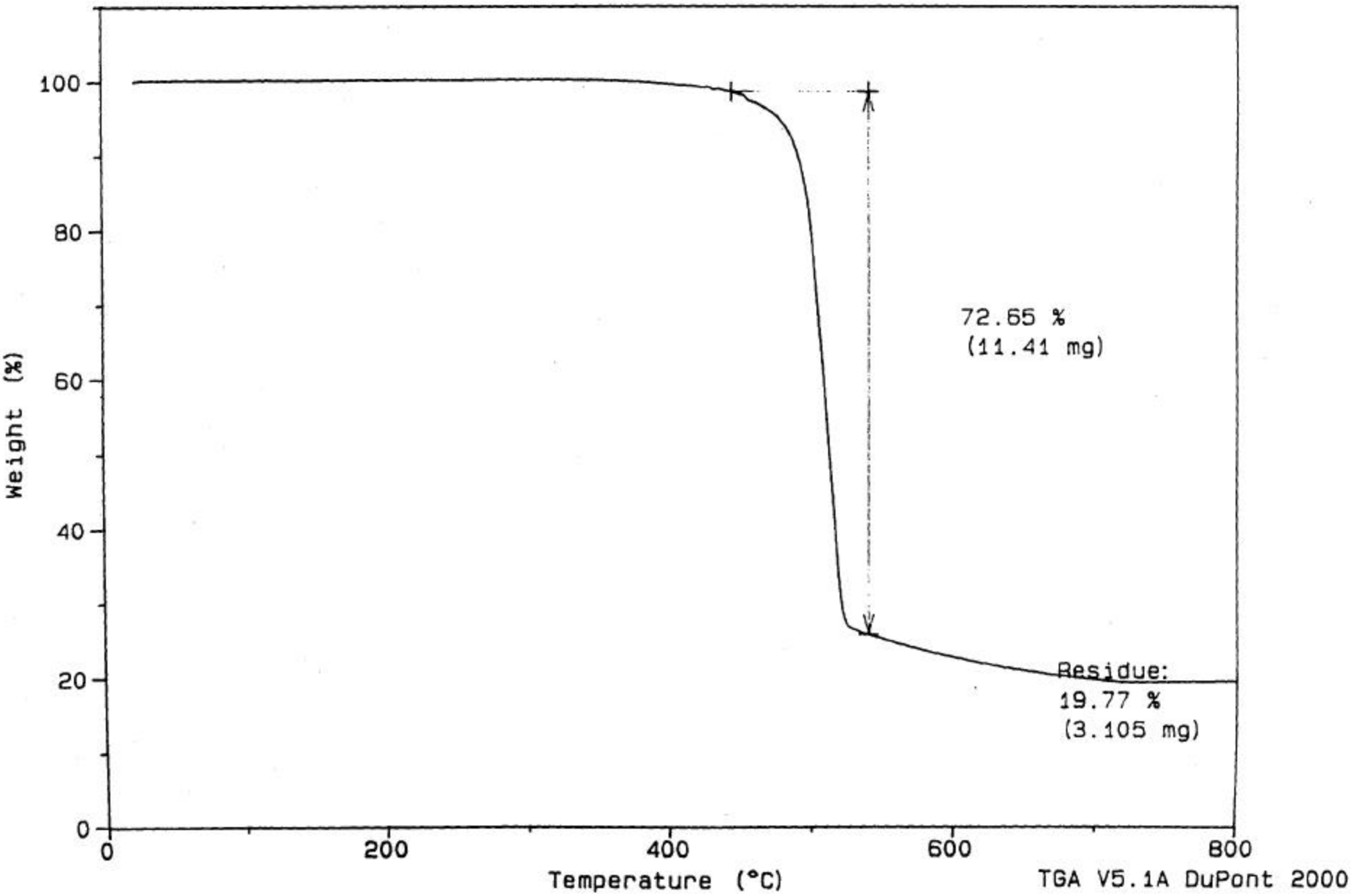


[

Sample: #28
Size: 15.7050 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

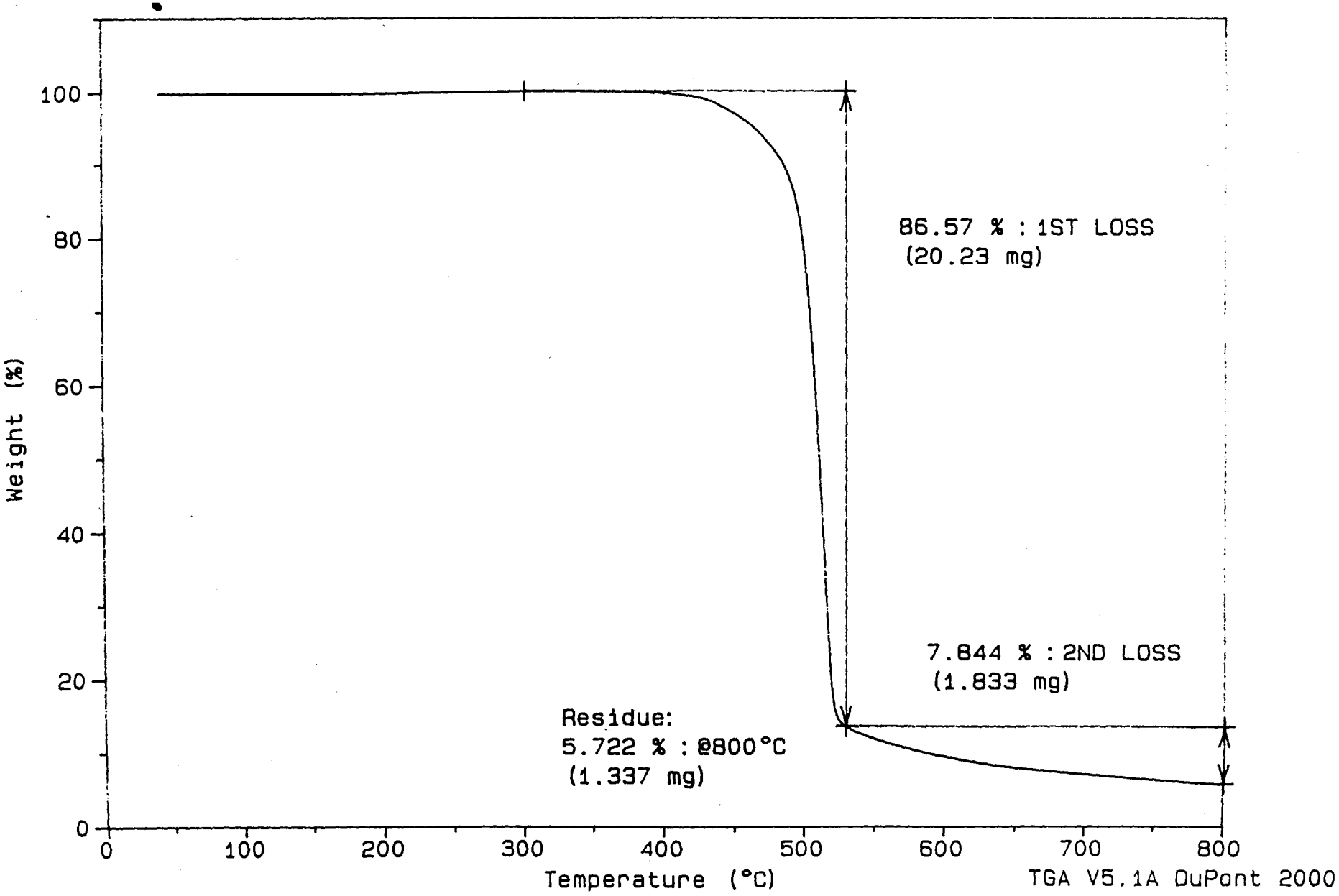
File: C:ARTI.028
Operator: GJM
Run Date: 28-Jan-93 11:10



Sample: #29 UNFILLED
Size: 23.3690 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

File: C:TGA.45
Operator: SKL
Run Date: 26-May-92 13:10

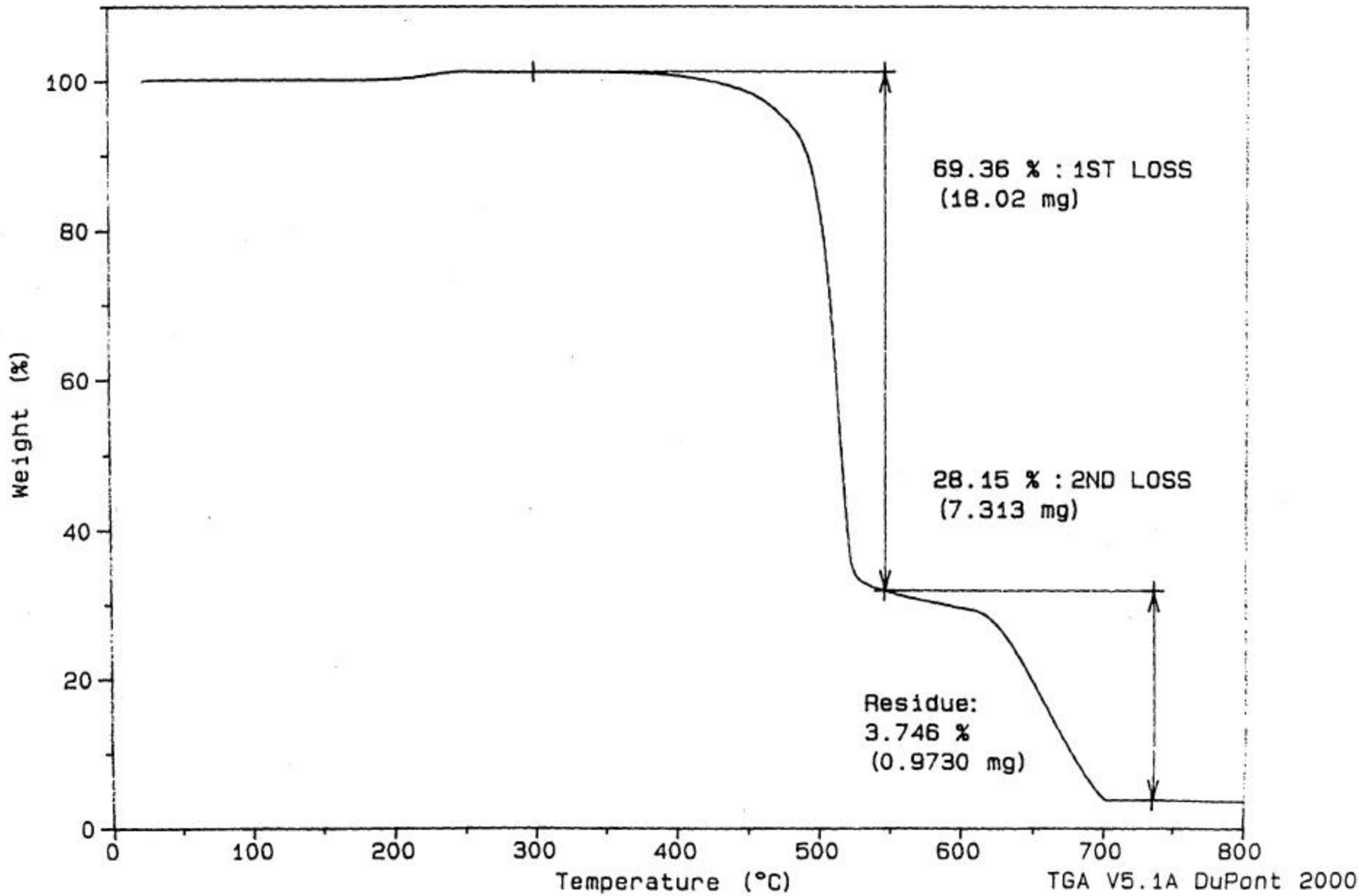


TGA V5.1A DuPont 2000

Sample: #30 FILLED
Size: 25.9760 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

File: C:TGA.58
Operator: SKL
Run Date: 29-May-92 09:34

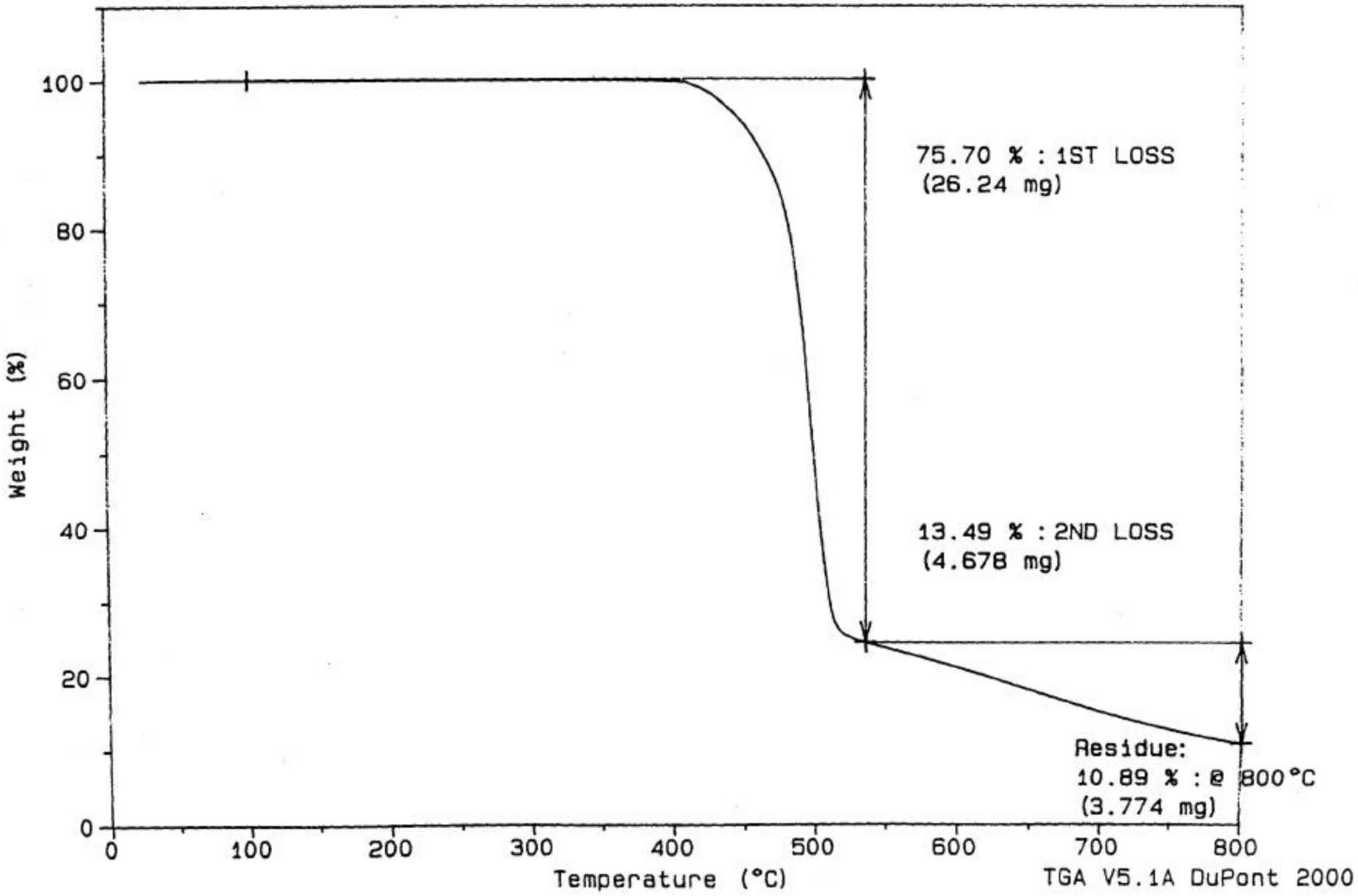


TGA V5.1A DuPont 2000

Sample: #31 UNFILLED
Size: 34.6690 mg
Method: TGA
Comment: HEAT UPTO 800°C BY 20°C/MIN IN N2

TGA

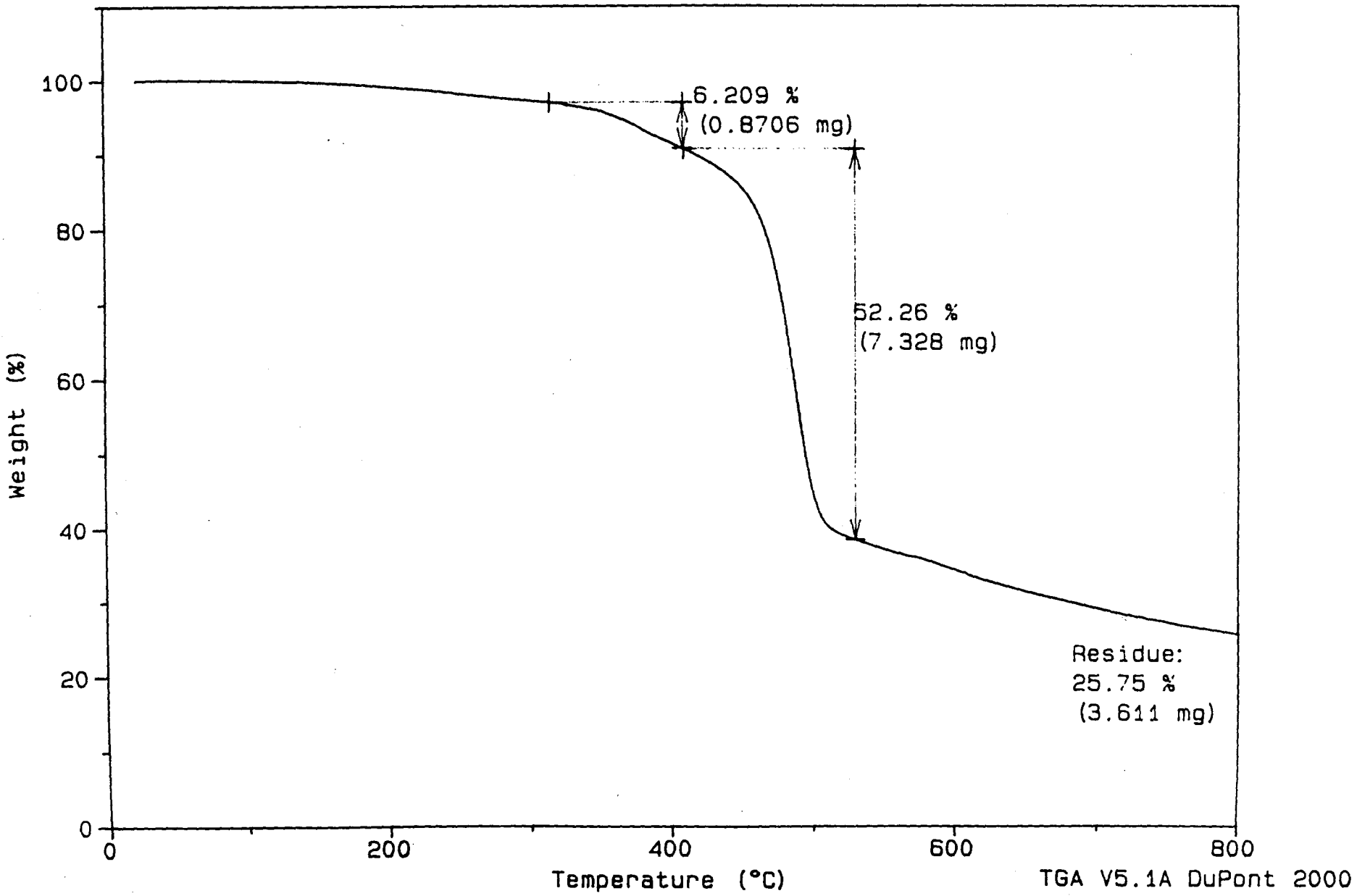
File: C:TGA.92
Operator: SKL
Run Date: 18-Jun-92 16:43



Sample: #32
Size: 14.0210 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

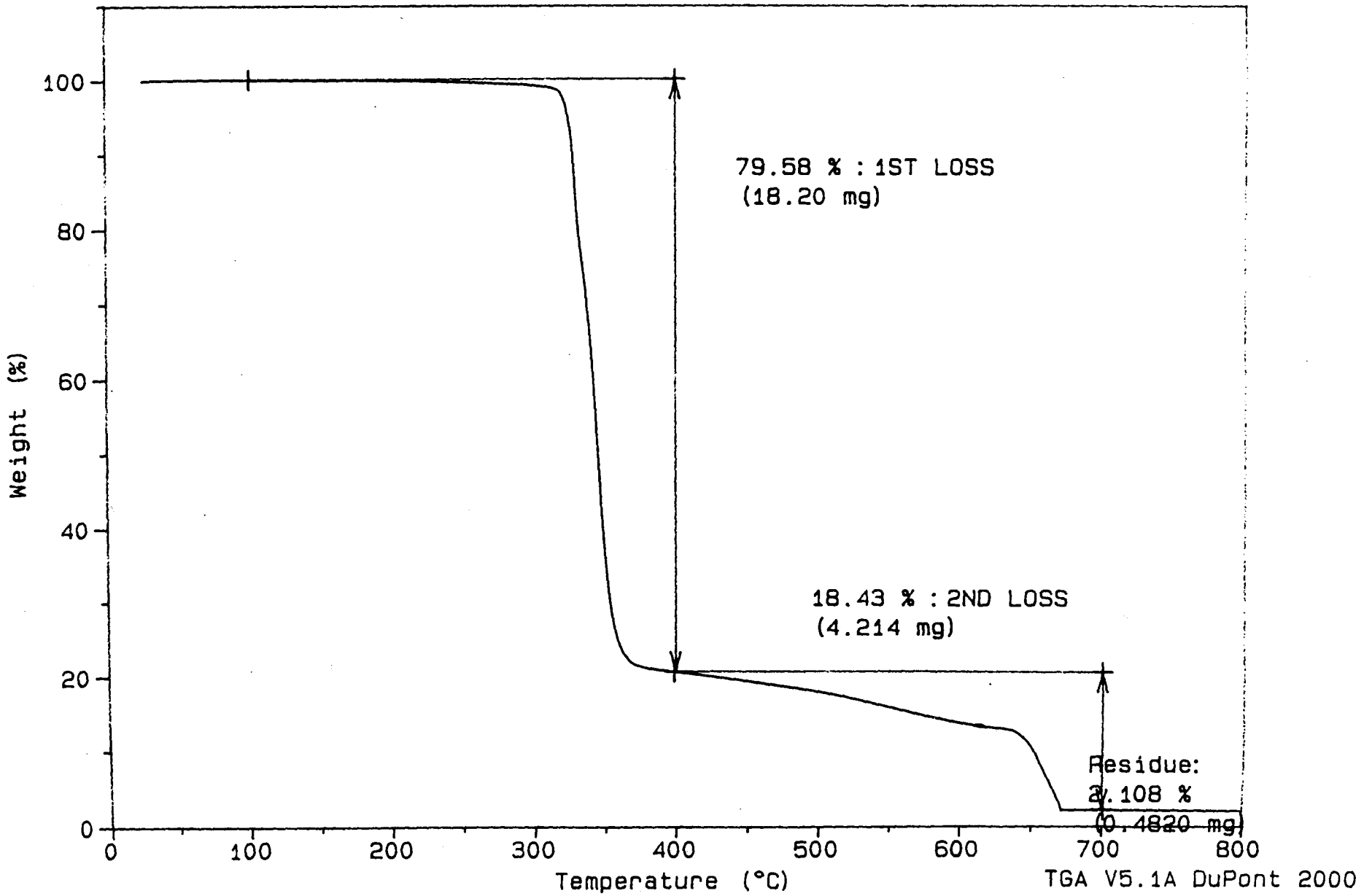
File: C:ARTI.032
Operator: GJM
Run Date: 28-Jan-93 12:58



Sample: #34 FILLED
Size: 22.8680 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCHED TO AIR

TGA

File: C:TGA.72
Operator: SKL
Run Date: 9-Jun-92 13:04

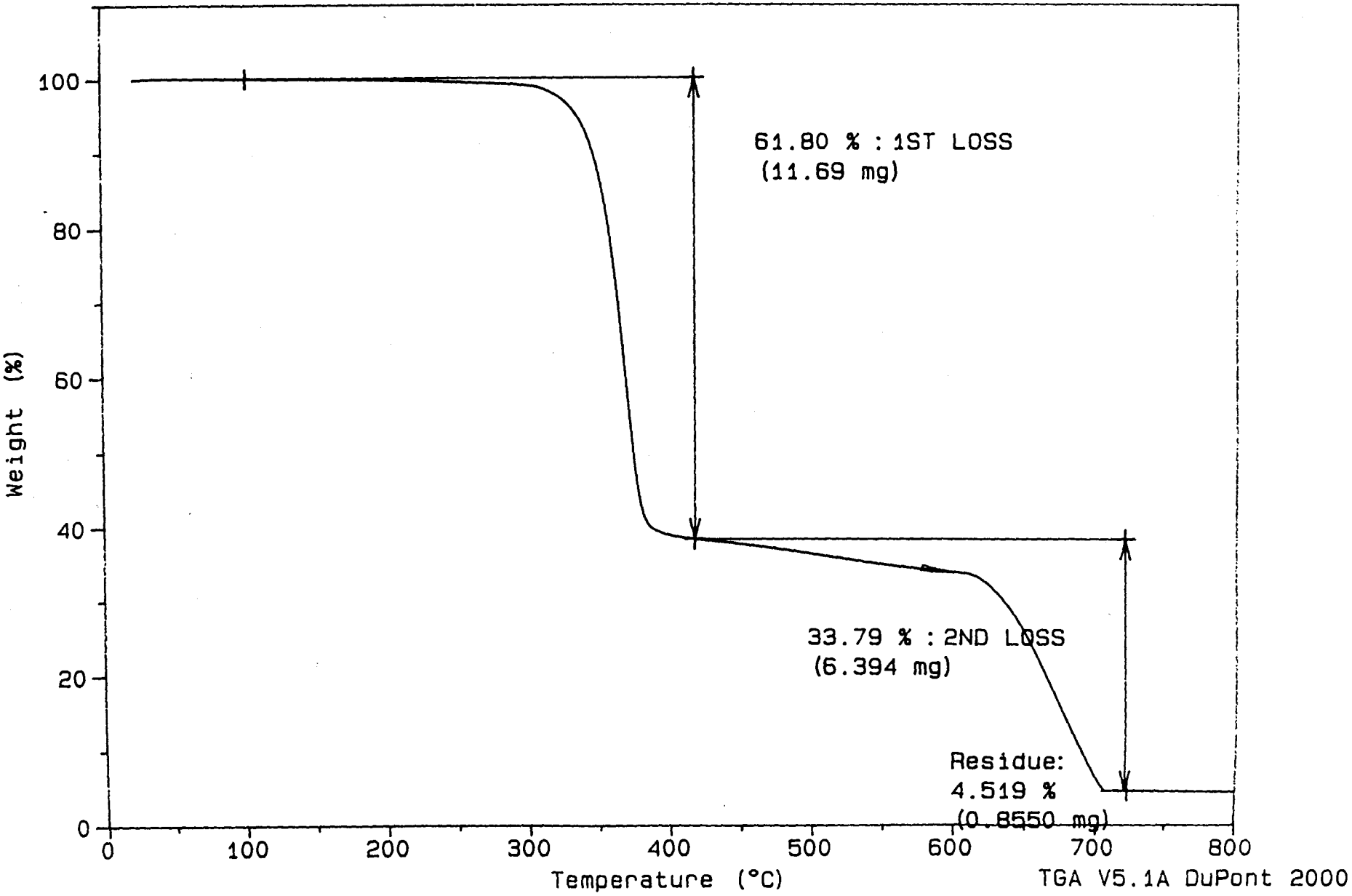


TGA V5.1A DuPont 2000

Sample: #35 FILLED
Size: 18.9220 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCHED TO AIR

TGA

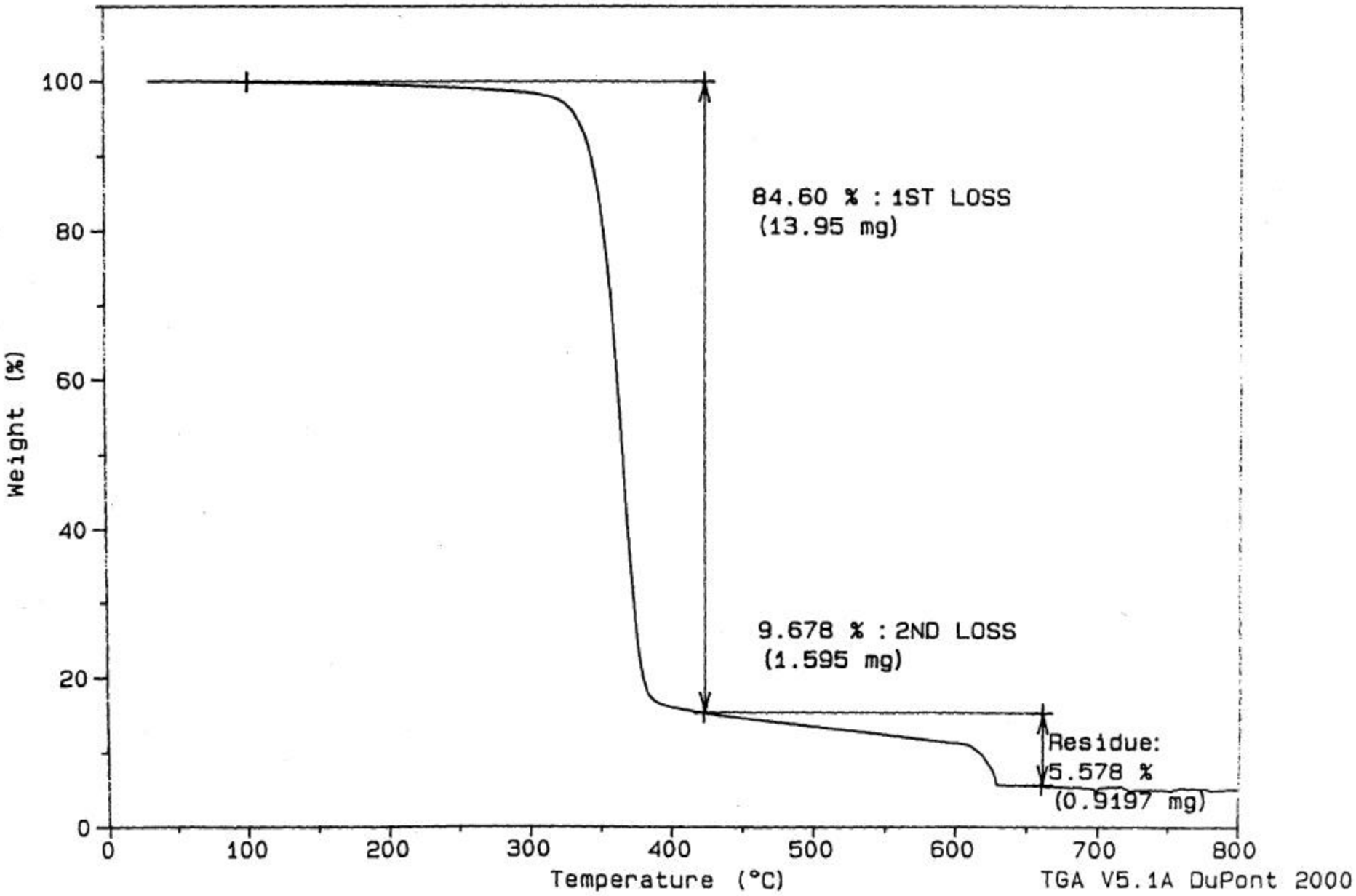
File: C:TGA.75
Operator: SKL
Run Date: 10-Jun-92 09:41



Sample: #36 FILLED
Size: 16.4860 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCHED TO AIR

TGA

File: C:TGA.76
Operator: SKL
Run Date: 10-Jun-92 10:58

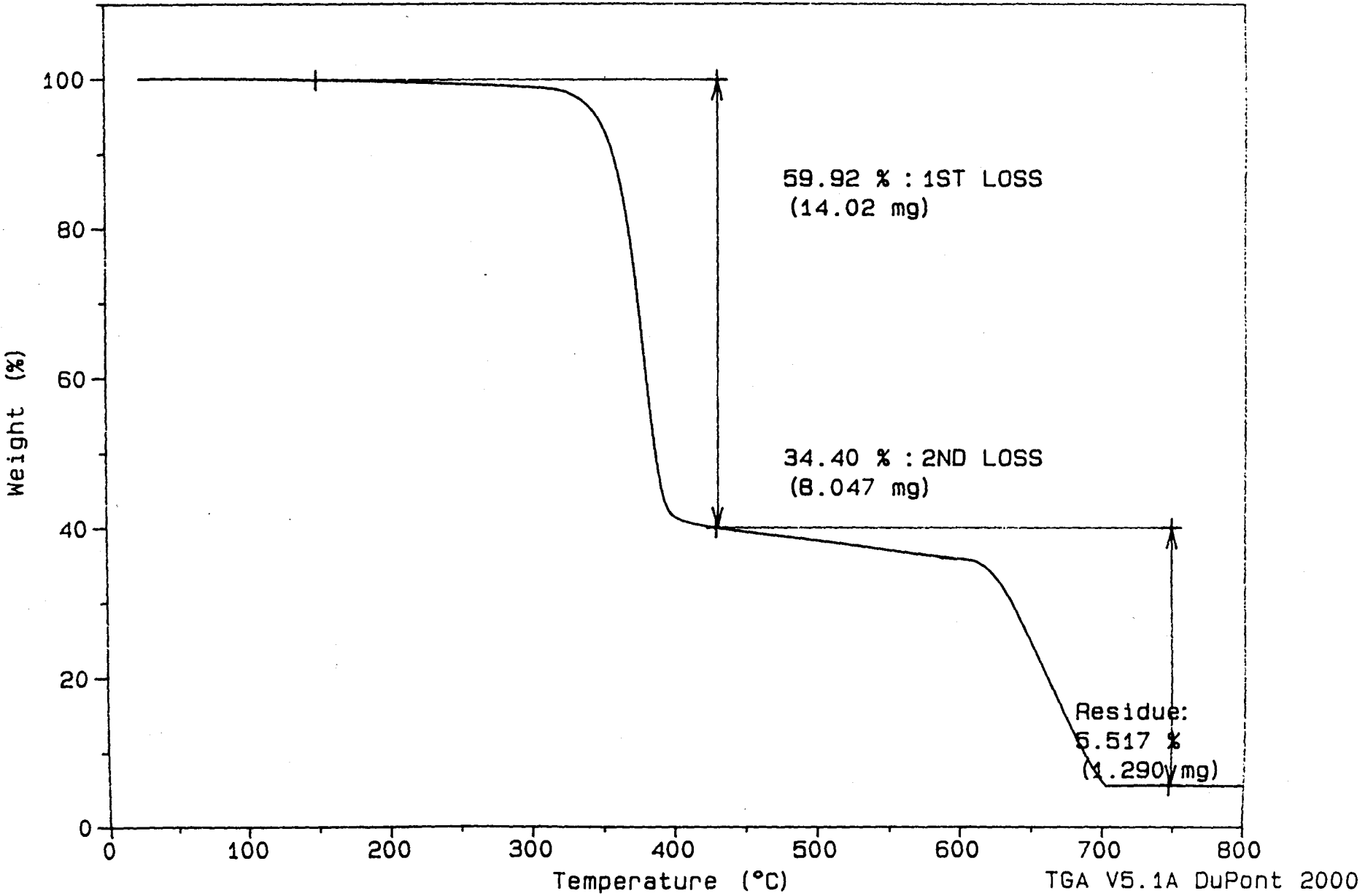


TGA V5.1A DuPont 2000

Sample: #37 FILLED
Size: 23.3930 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

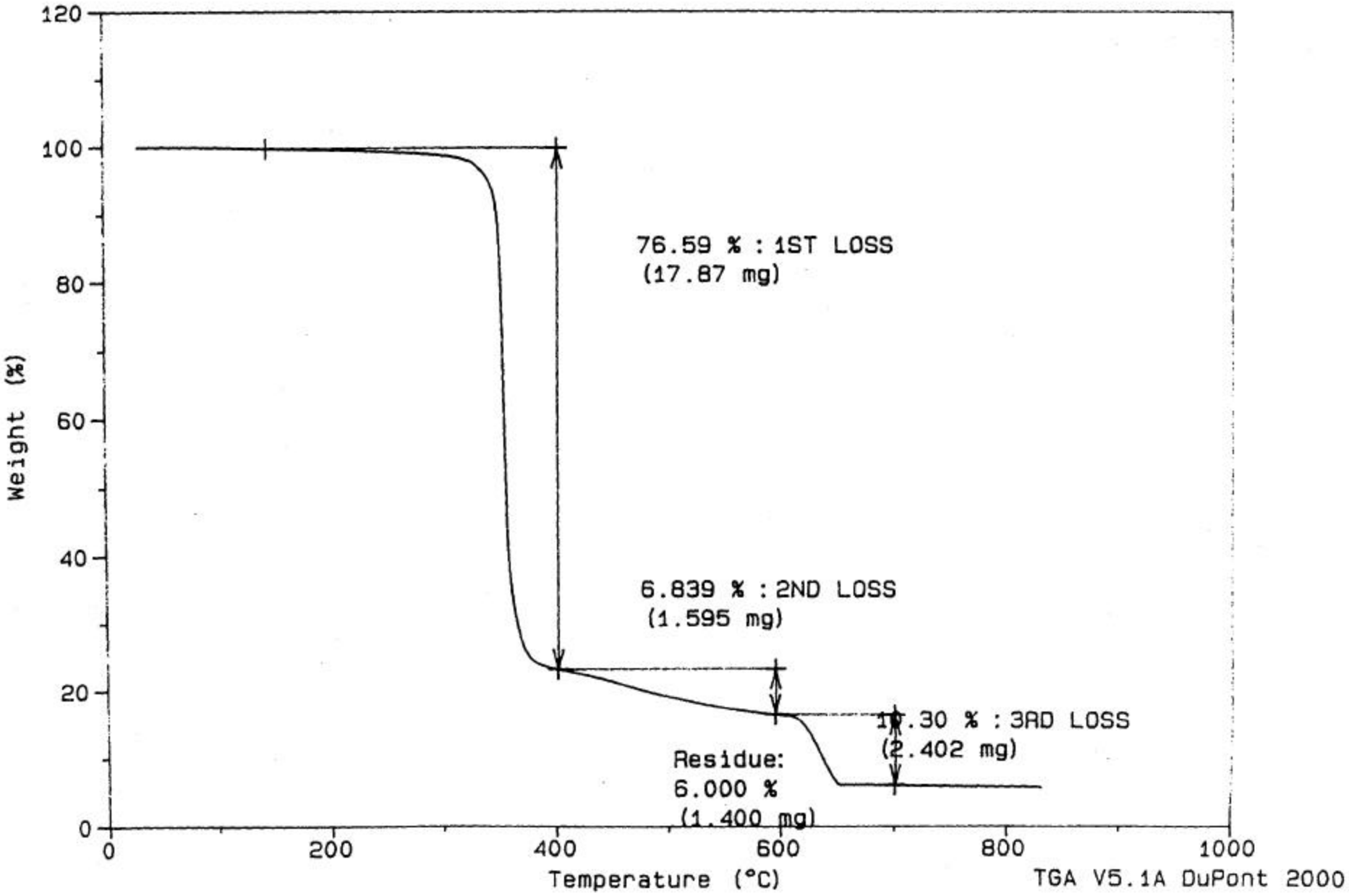
File: C:TGA.79
Operator: SKL
Run Date: 11-Jun-92 08:51



Sample: #38 FILLED
Size: 23.3280 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

File: C:TGA.80
Operator: SKL
Run Date: 11-Jun-92 10:05

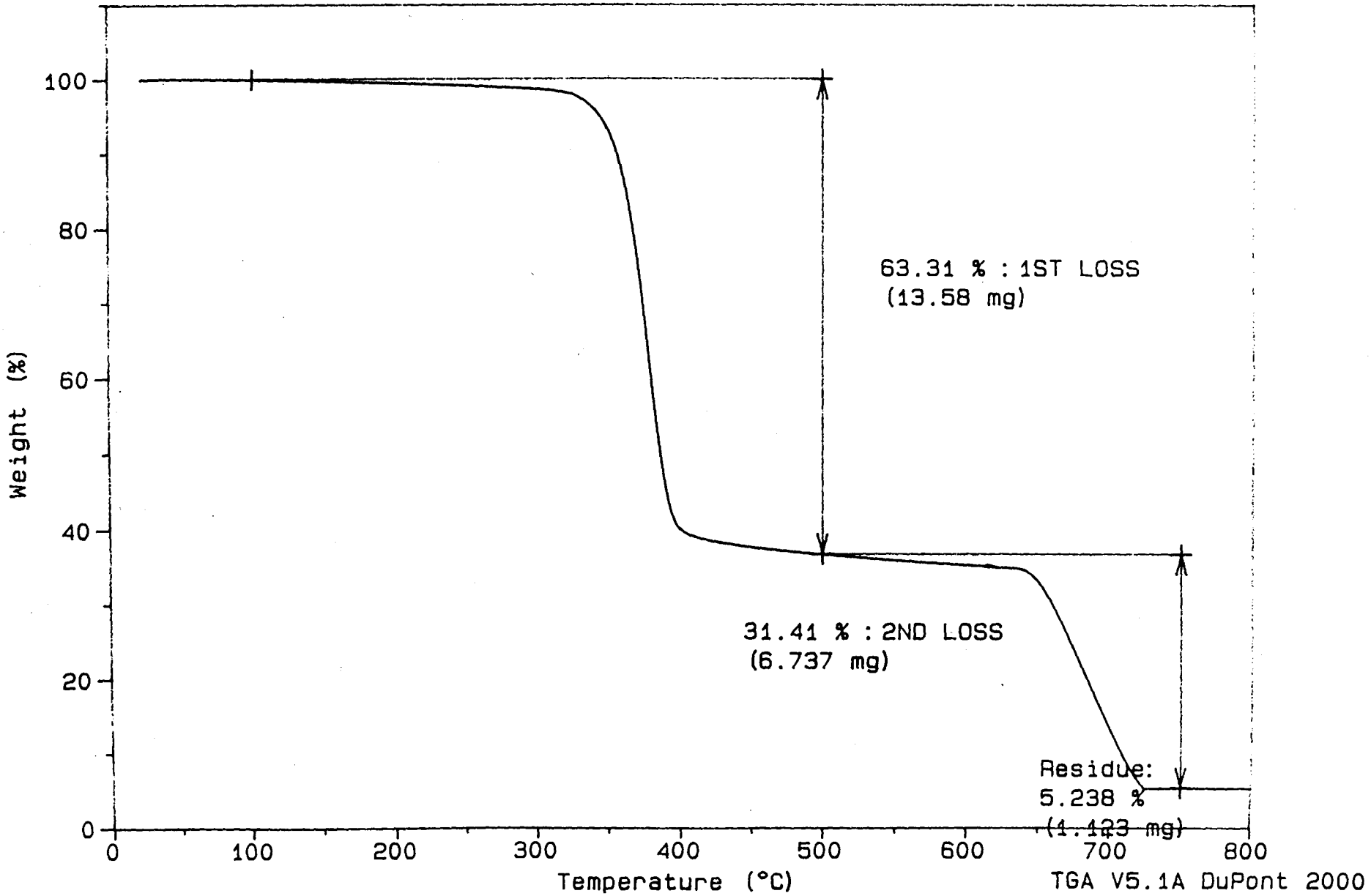


TGA V5.1A DuPont 2000

Sample: #39 FILLED
Size: 21.4480 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

File: C:TGA.81
Operator: SKL
Run Date: 11-Jun-92 13:24

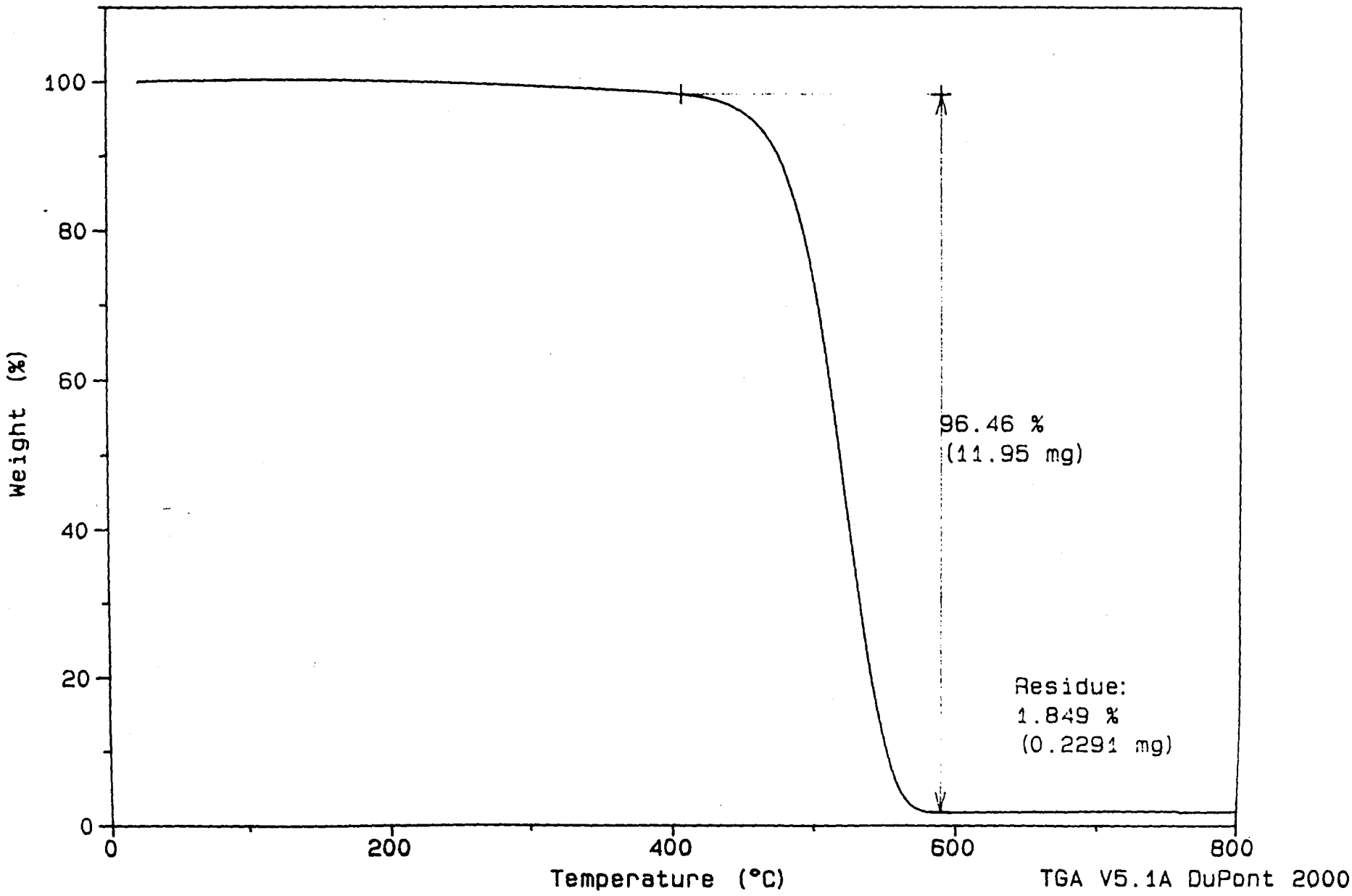


TGA V5.1A DuPont 2000

Sample: #40
Size: 12.3860 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

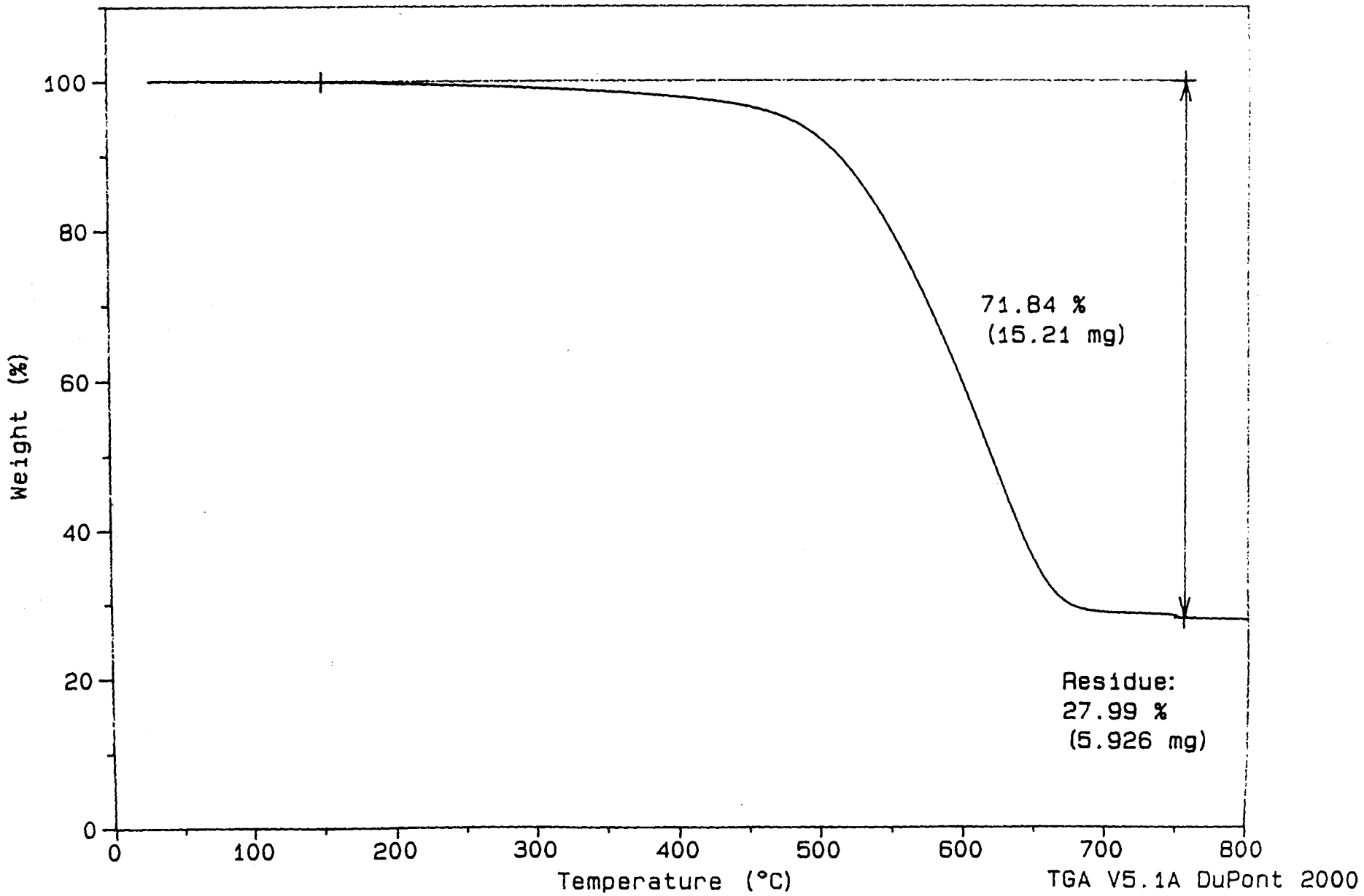
File: C:ARTI.040
Operator: GJM
Run Date: 28-Jan-93 14:39



Sample: #41 UNFILLED
Size: 21.1740 mg
Method: TGA
Comment: HEAT BY 20°C/MIN IN N2 UPTO 800°C

TGA

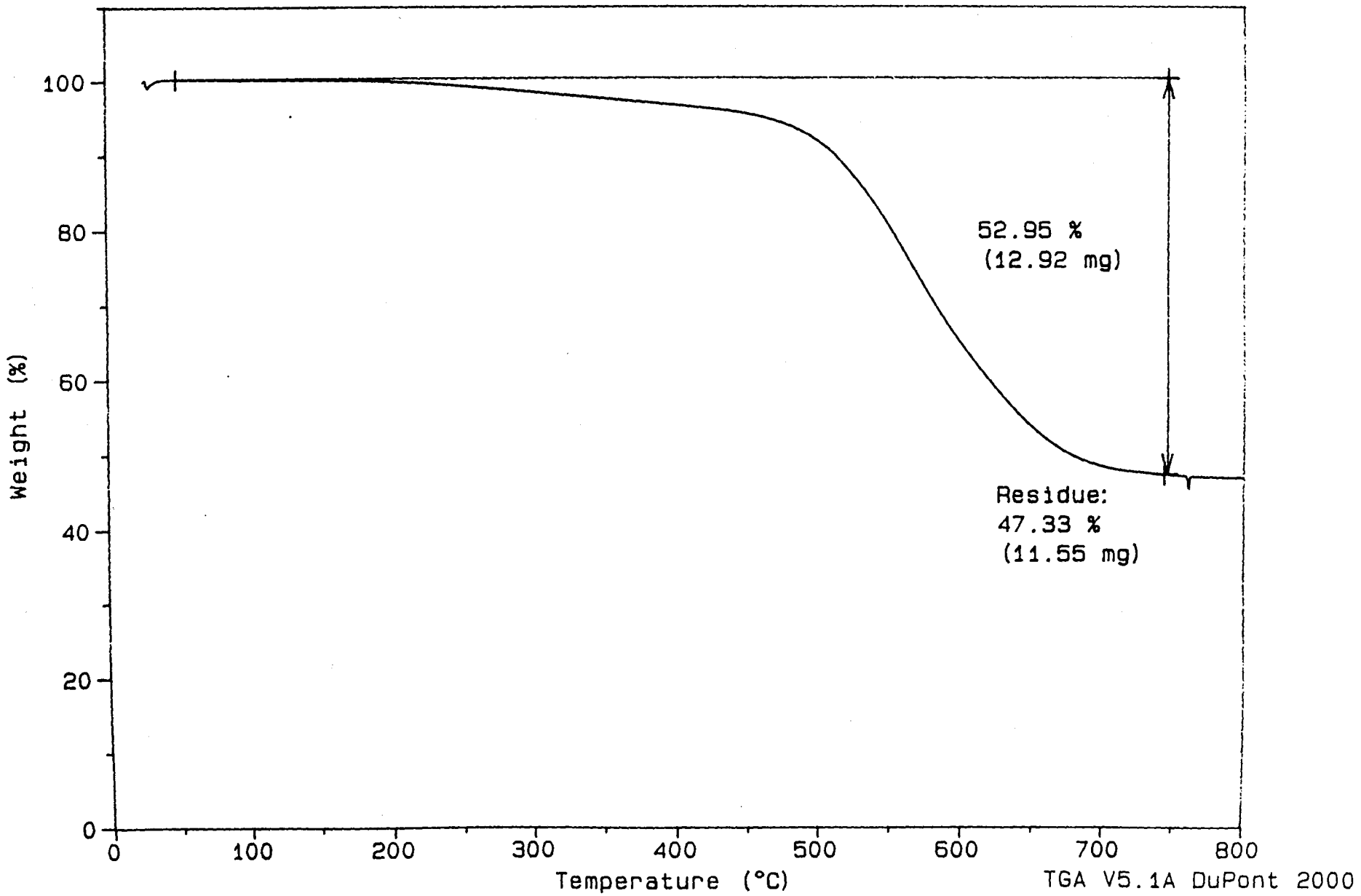
File: C:TGA.18
Operator: SKL
Run Date: 18-May-92 14:37



Sample: #42 UNFILLED
Size: 24.3960 mg
Method: TGA
Comment: HEAT BY 20°C/MIN IN N2 UPTO 800°C

TGA

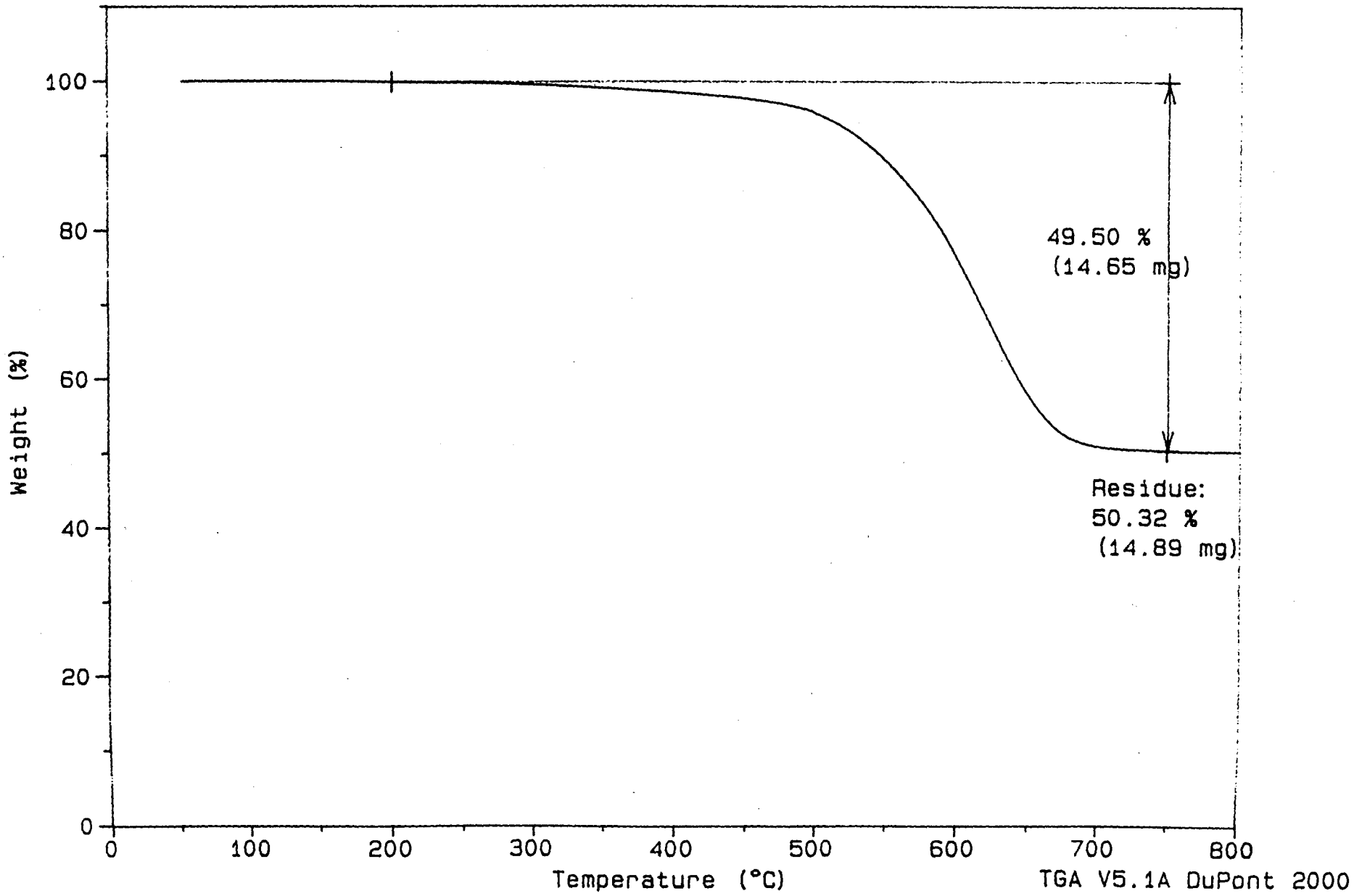
File: C:TGA.26
Operator: SKL
Run Date: 20-May-92 11:13



Sample: #43 UNFILLED
Size: 29.5880 mg
Method: TGA
Comment: HEAT BY 20°C/MIN IN N2 UPTO 800°C

TGA

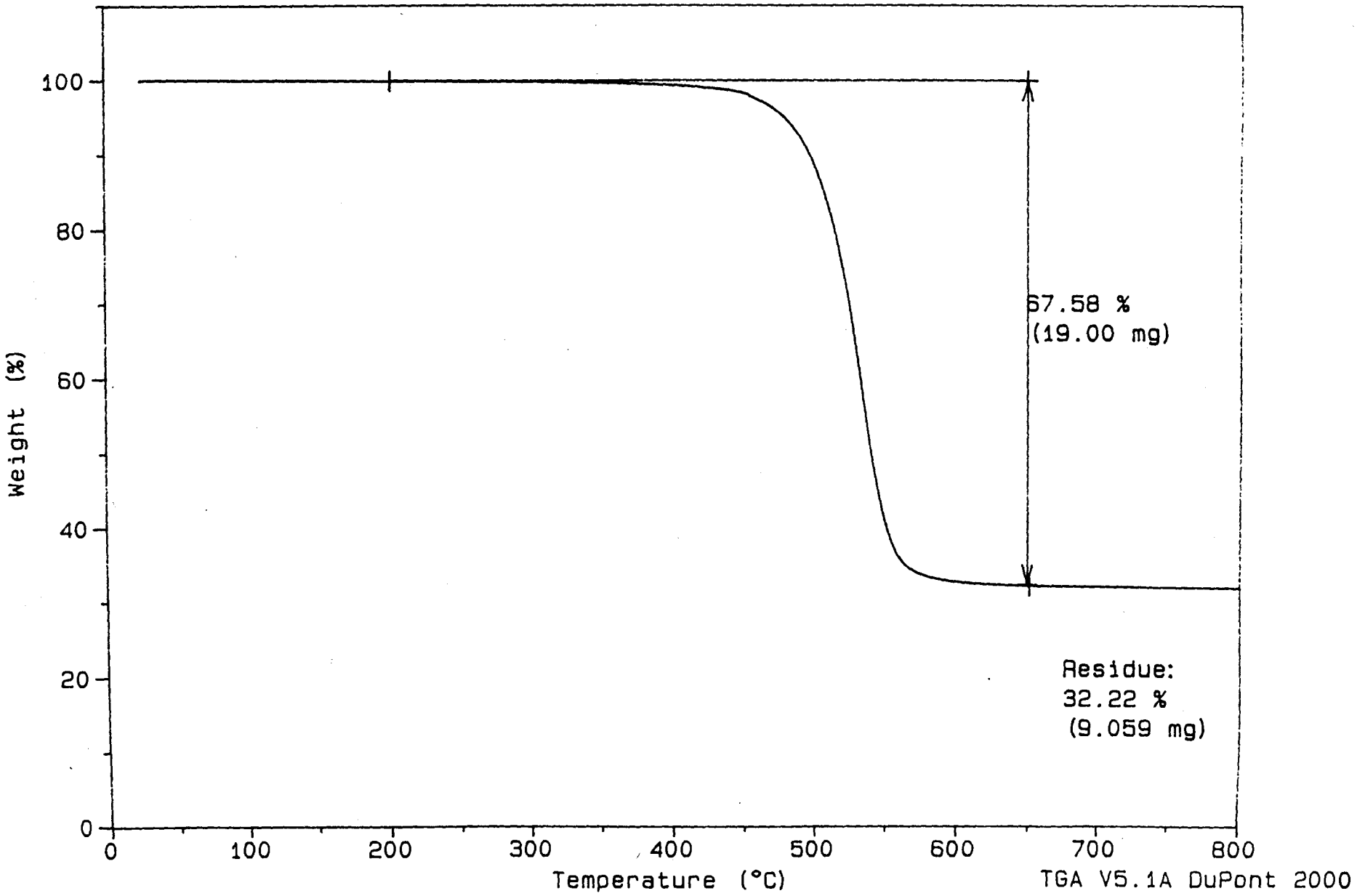
File: C:TGA.27
Operator: SKL
Run Date: 20-May-92 12:28



Sample: #44 UNFILLED
Size: 28.1160 mg
Method: TGA
Comment: HEAT BY 20°C/MIN IN N2 UPTO 800°C

TGA

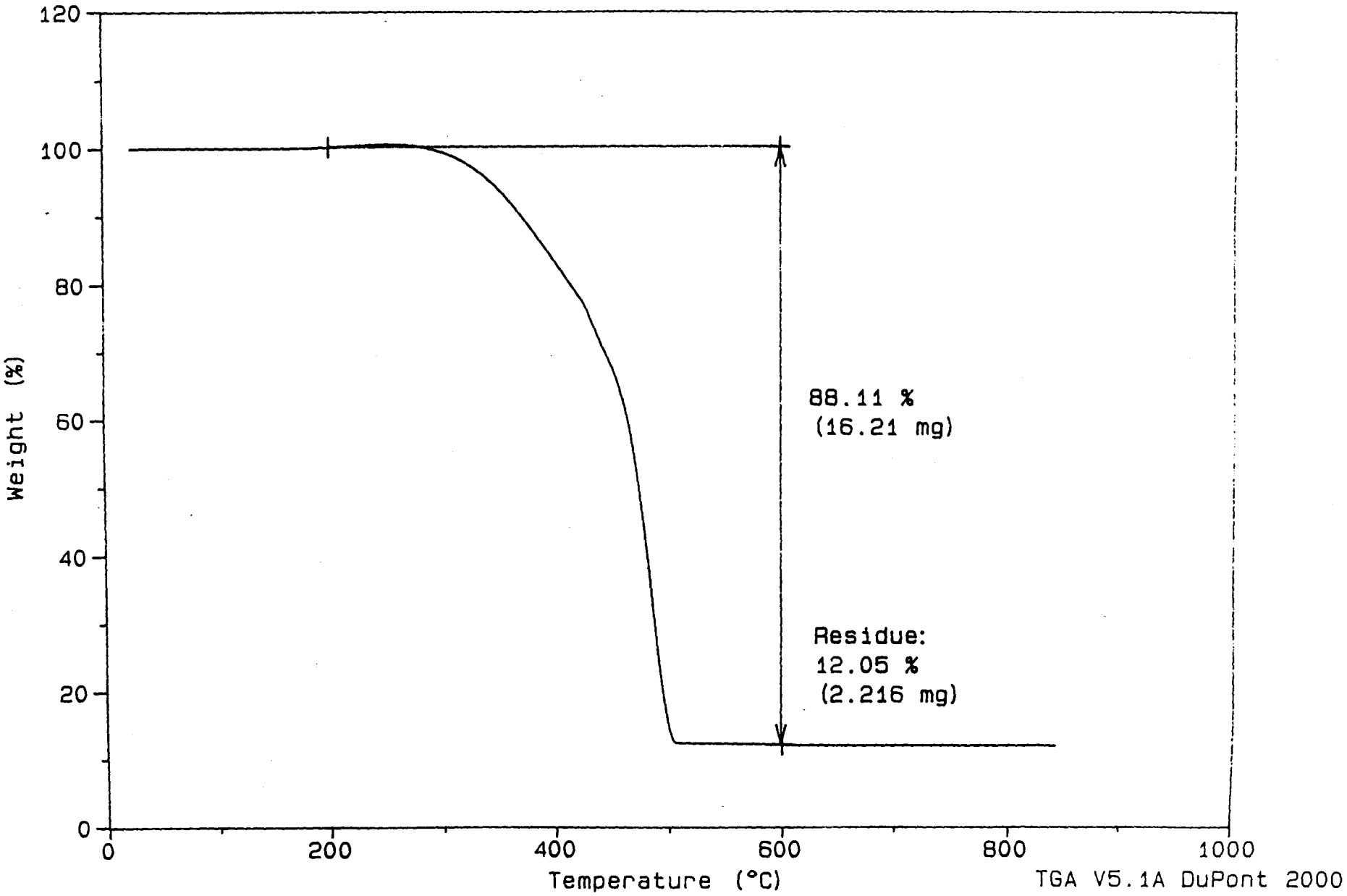
File: C:TGA.28
Operator: SKL
Run Date: 20-May-92 14:13



Sample: #45 UNFILLED
Size: 18.3950 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

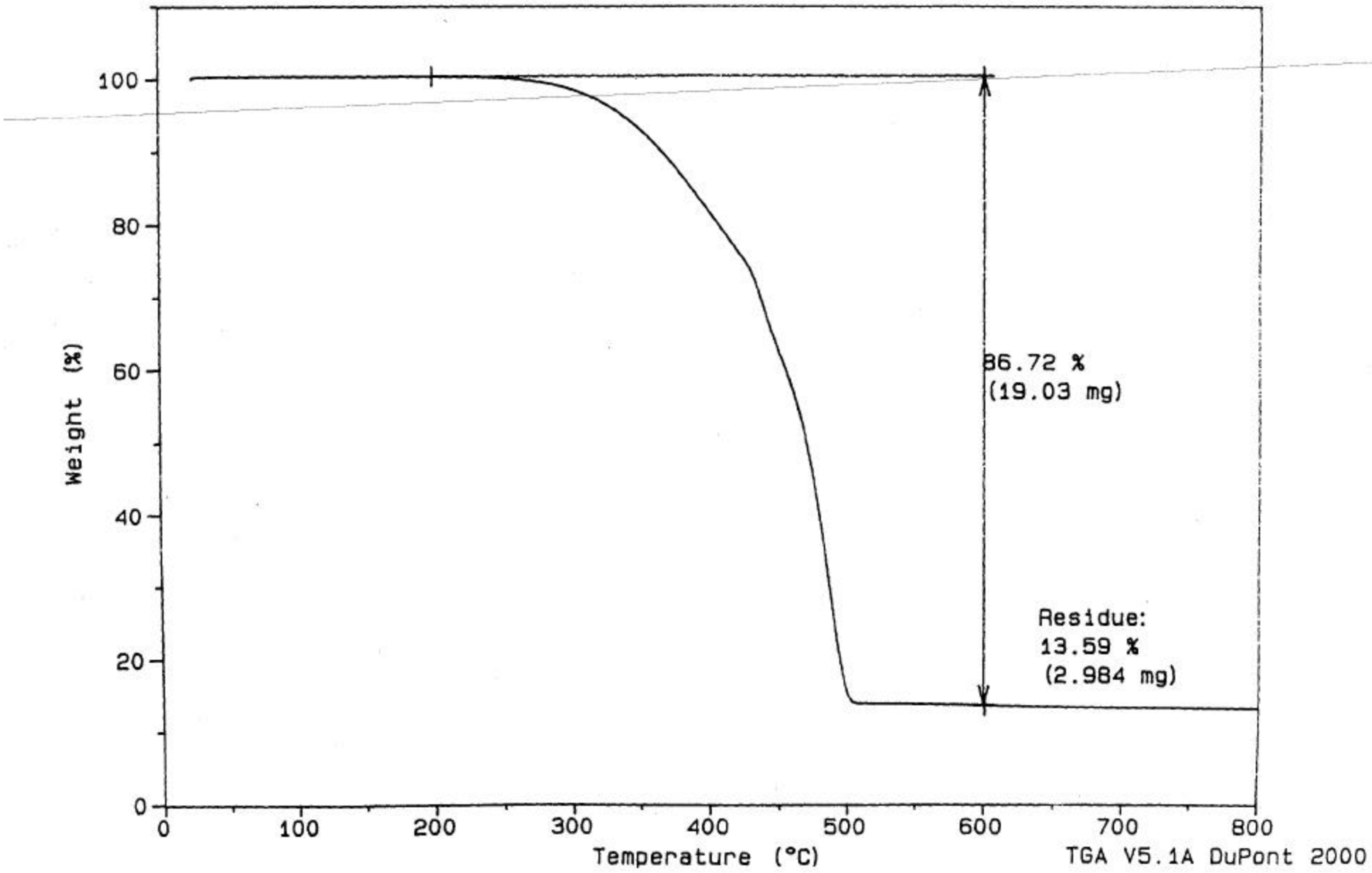
File: C:TGA.46
Operator: SKL
Run Date: 26-May-92 15:50



Sample: #46 UNFILLED
Size: 21.9470 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

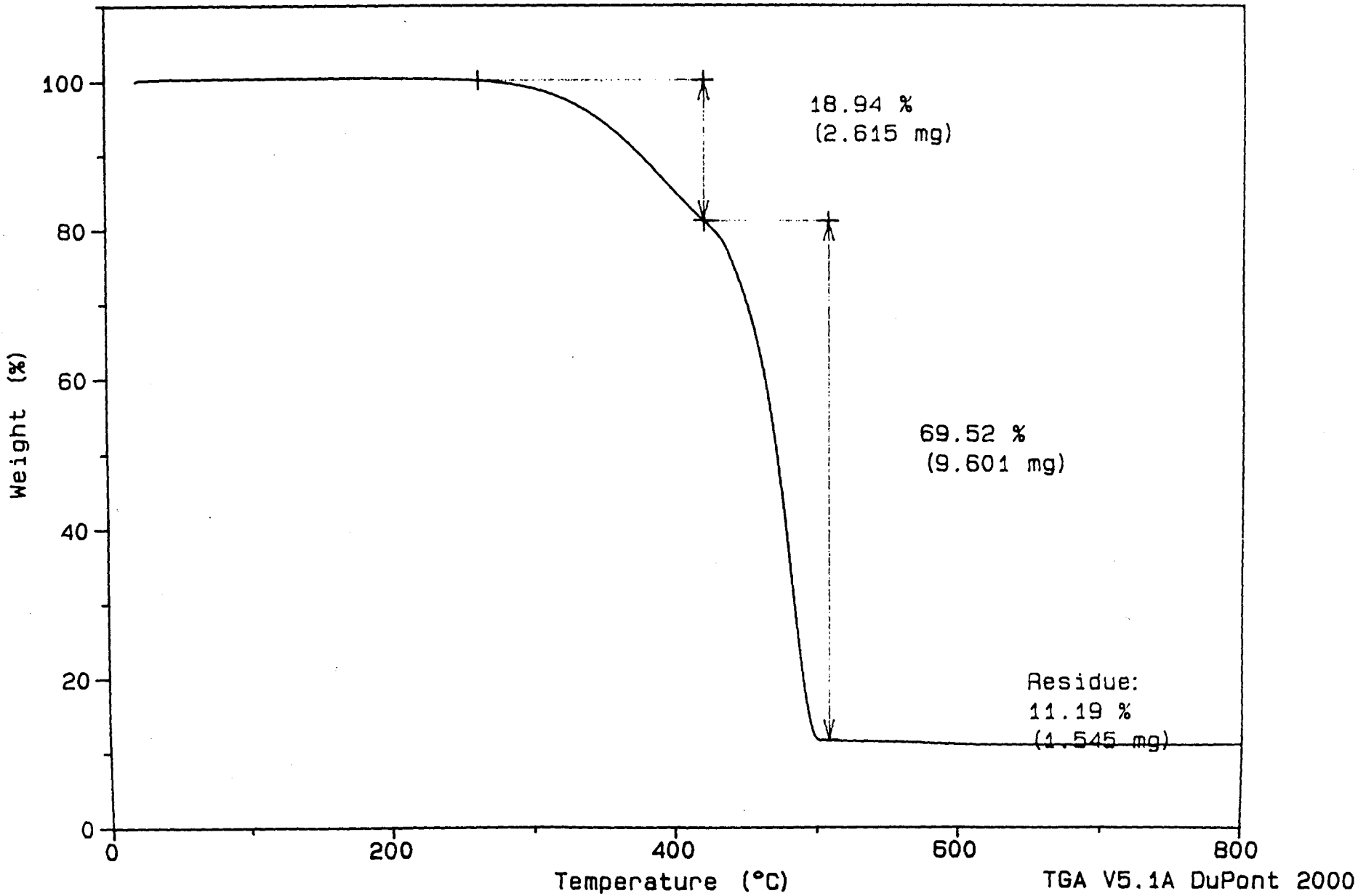
File: C:TGA.24
Operator: SKL
Run Date: 19-May-92 15:32



Sample: #47
Size: 13.8110 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

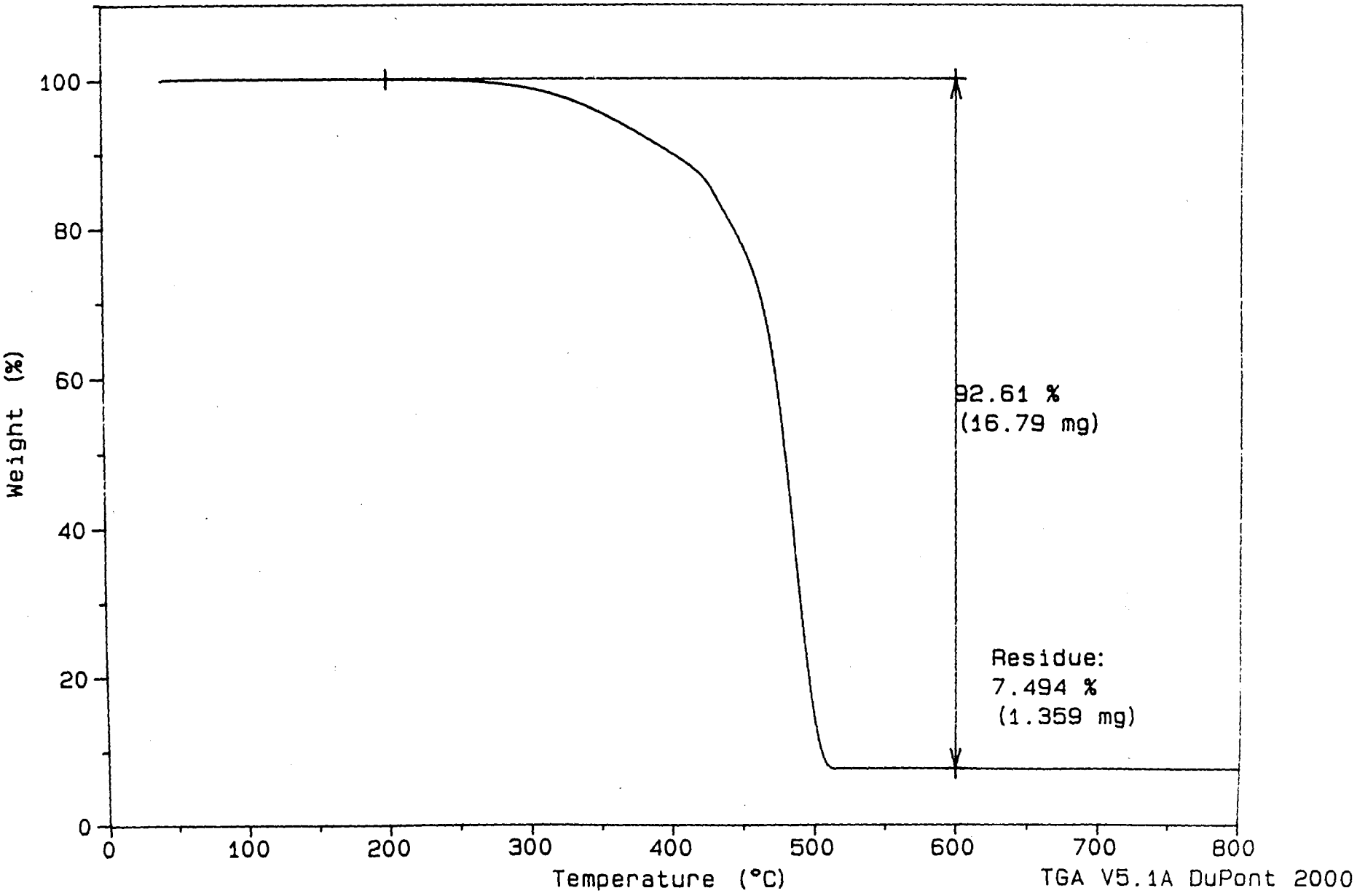
File: C:ARTI.047
Operator: GJM
Run Date: 29-Jan-93 09:20



Sample: #48 UNFILLED
Size: 18.1320 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

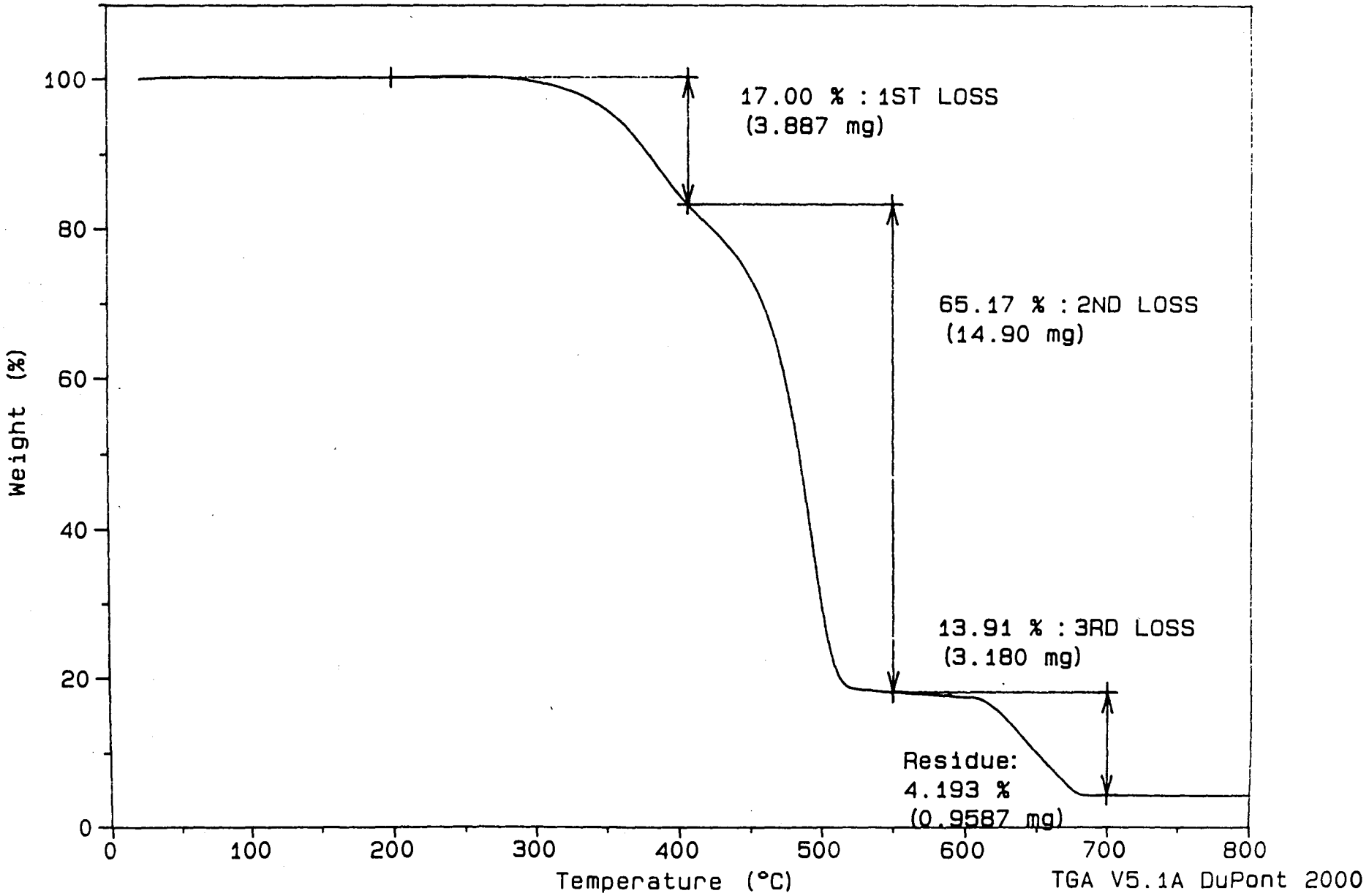
File: C:TGA.48
Operator: SKL
Run Date: 27-May-92 10:12



Sample: #49 FILLED
Size: 22.8650 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

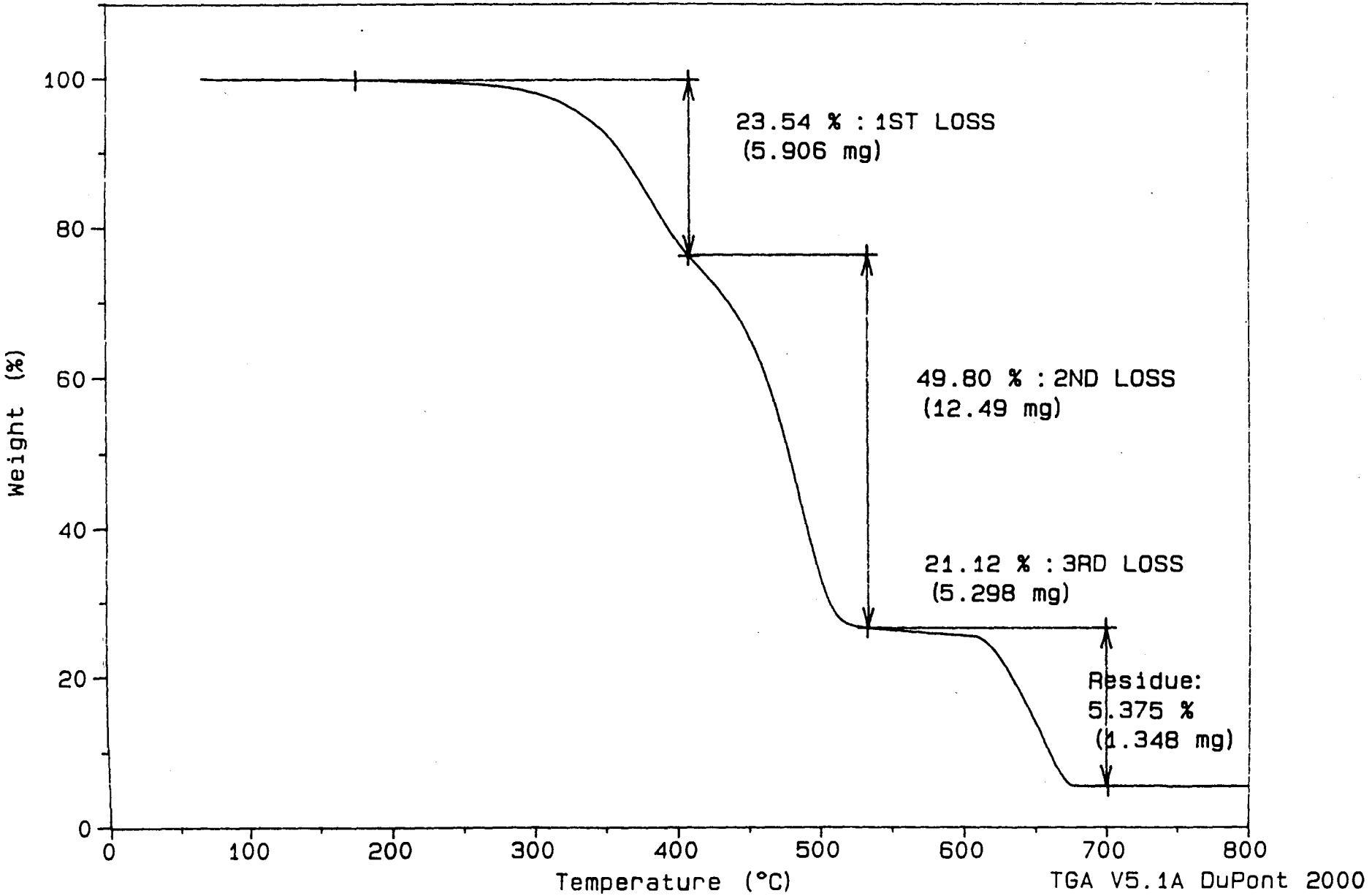
File: C:TGA.63
Operator: SKL
Run Date: 30-May-92 11:09



Sample: #50 FILLED
Size: 25.0840 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

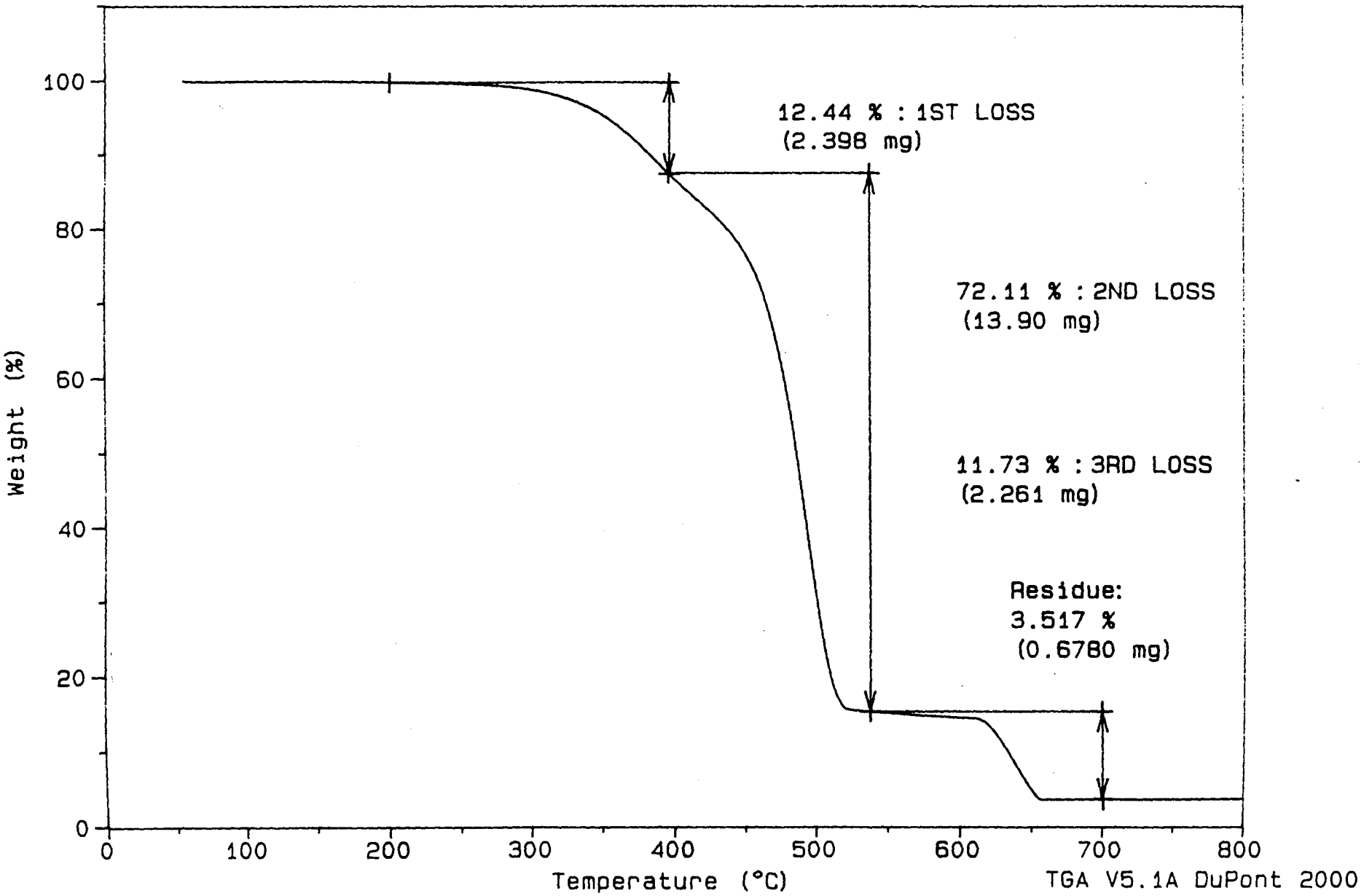
File: C:TGA.64
Operator: SKL
Run Date: 1-Jun-92 09:49



Sample: #51 FILLED
Size: 19.2750 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

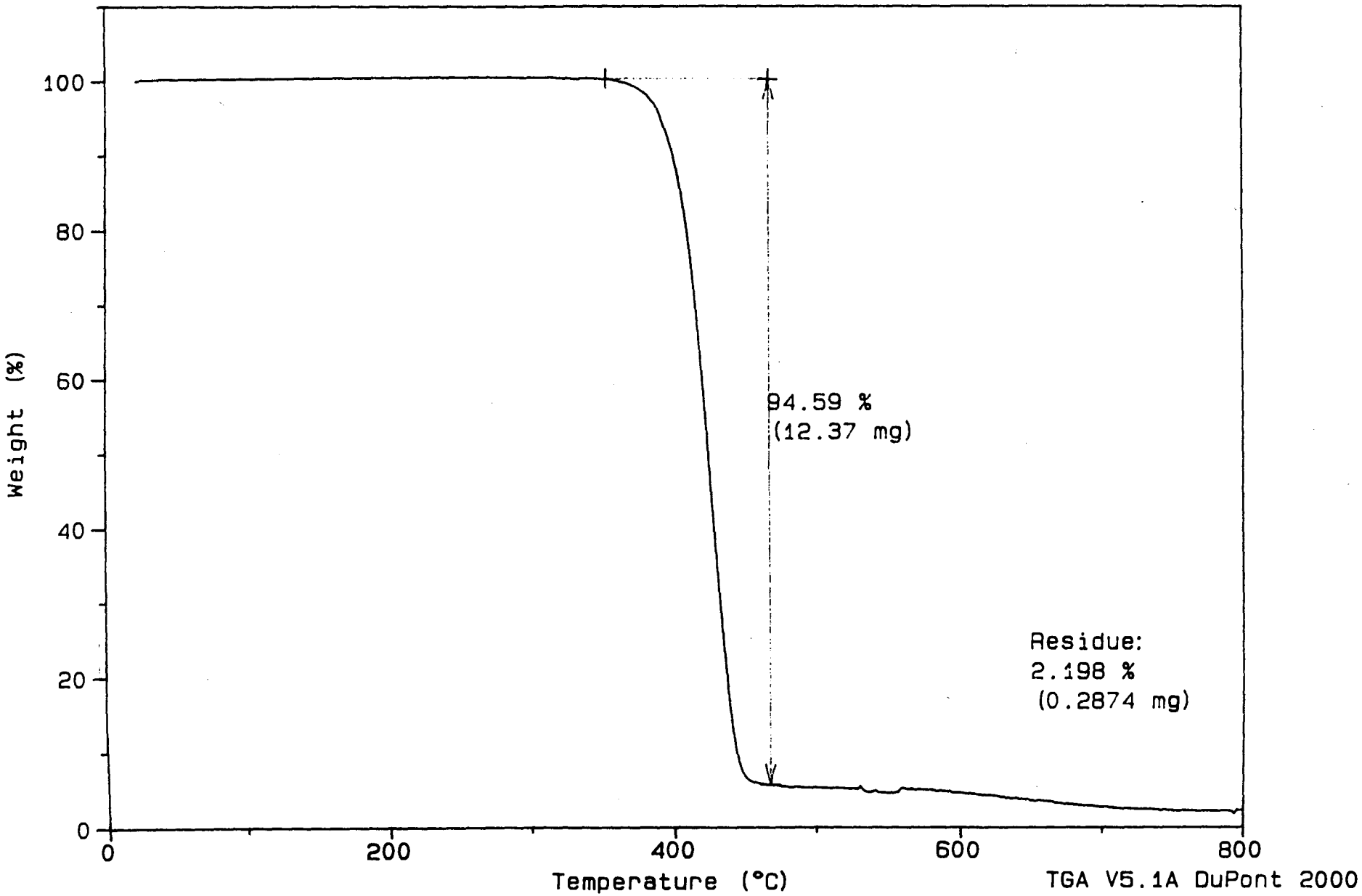
File: C:TGA.65
Operator: SKL
Run Date: 1-Jun-92 11:15



Sample: #52
Size: 13.0750 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

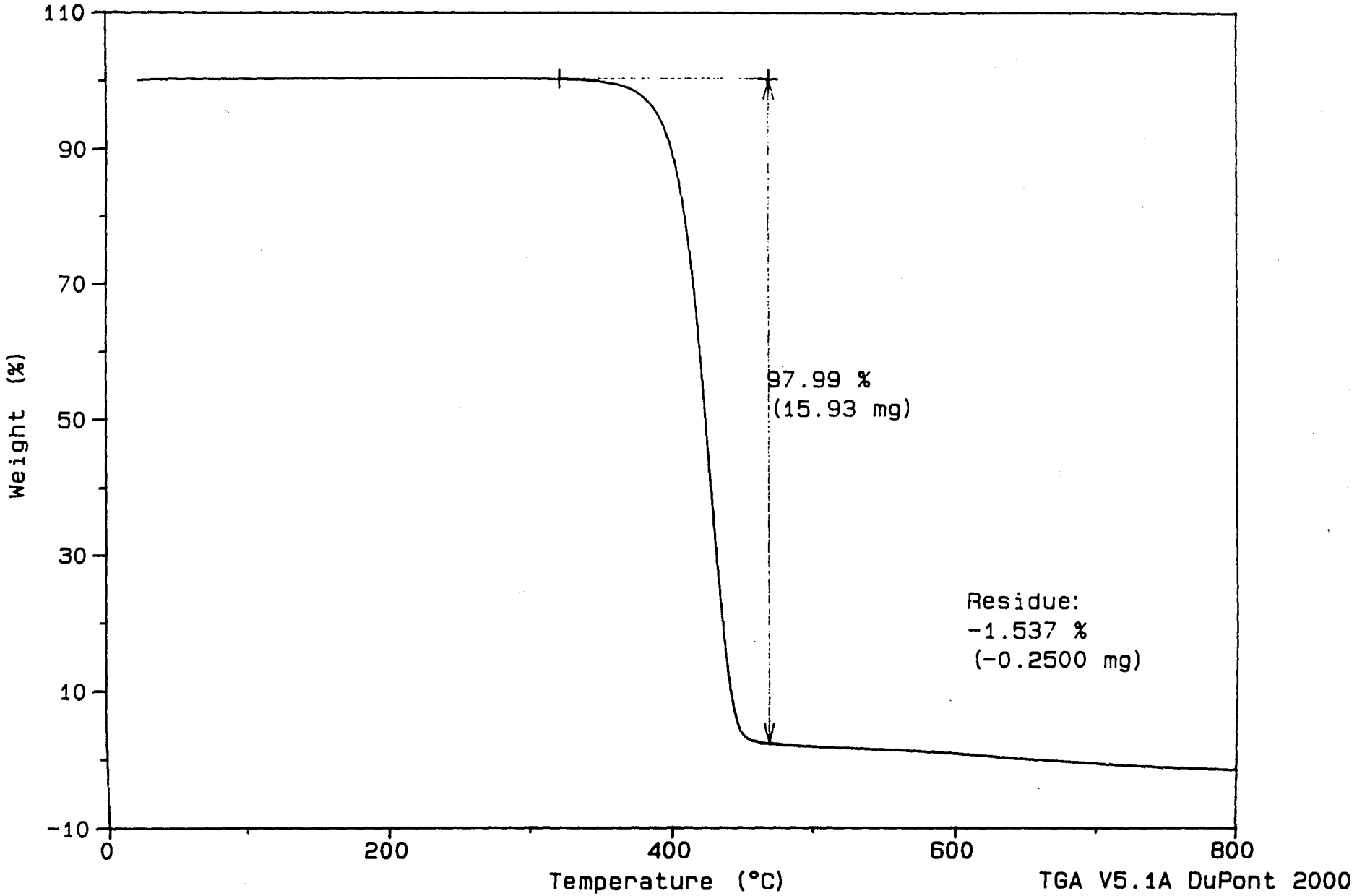
File: C:ARTI.052
Operator: GJM
Run Date: 29-Jan-93 11:09



Sample: #53
Size: 16.2600 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

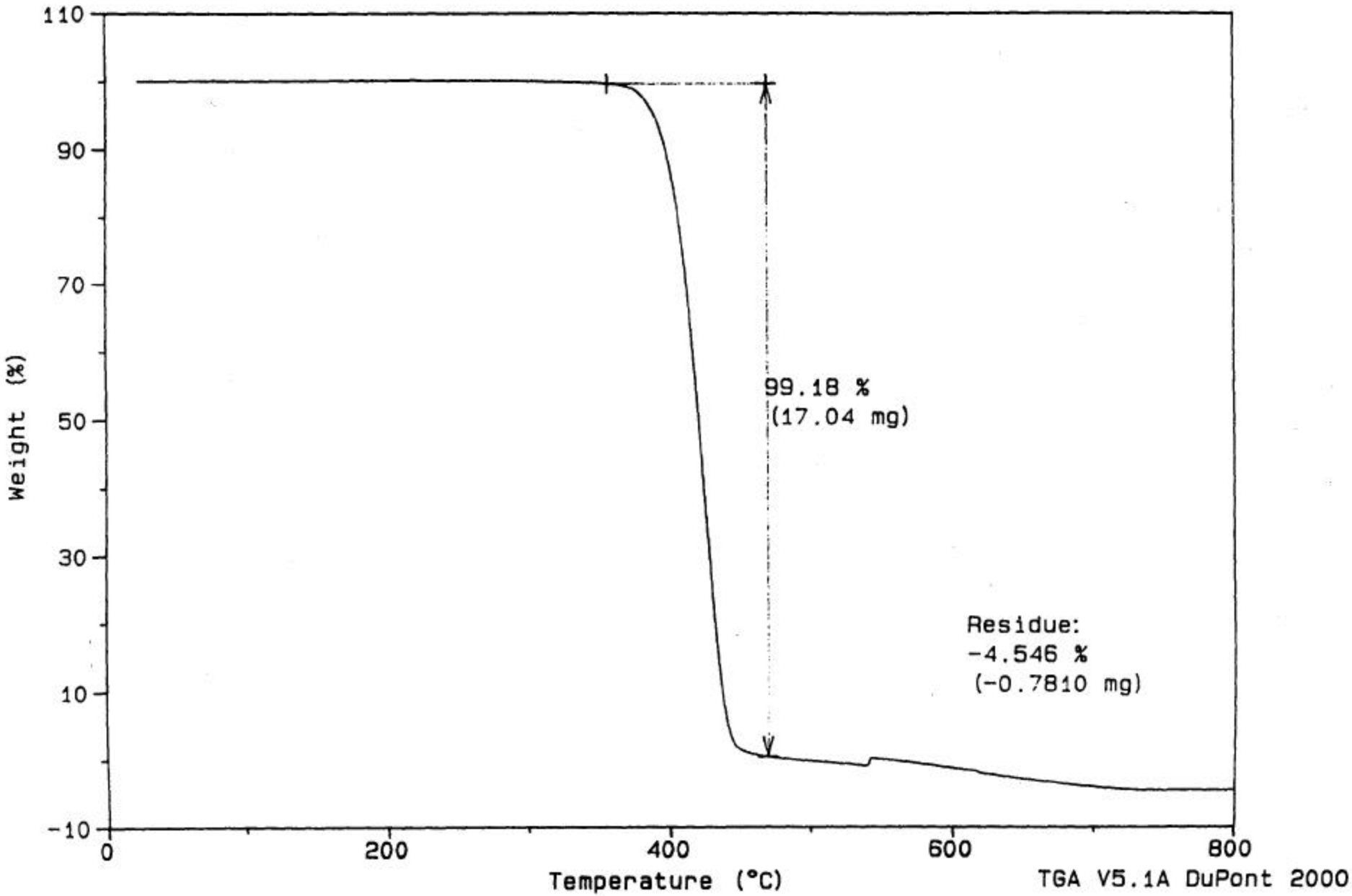
File: C:ARTI.053
Operator: GJM
Run Date: 29-Jan-93 13:29



Sample: #54
Size: 17.1820 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

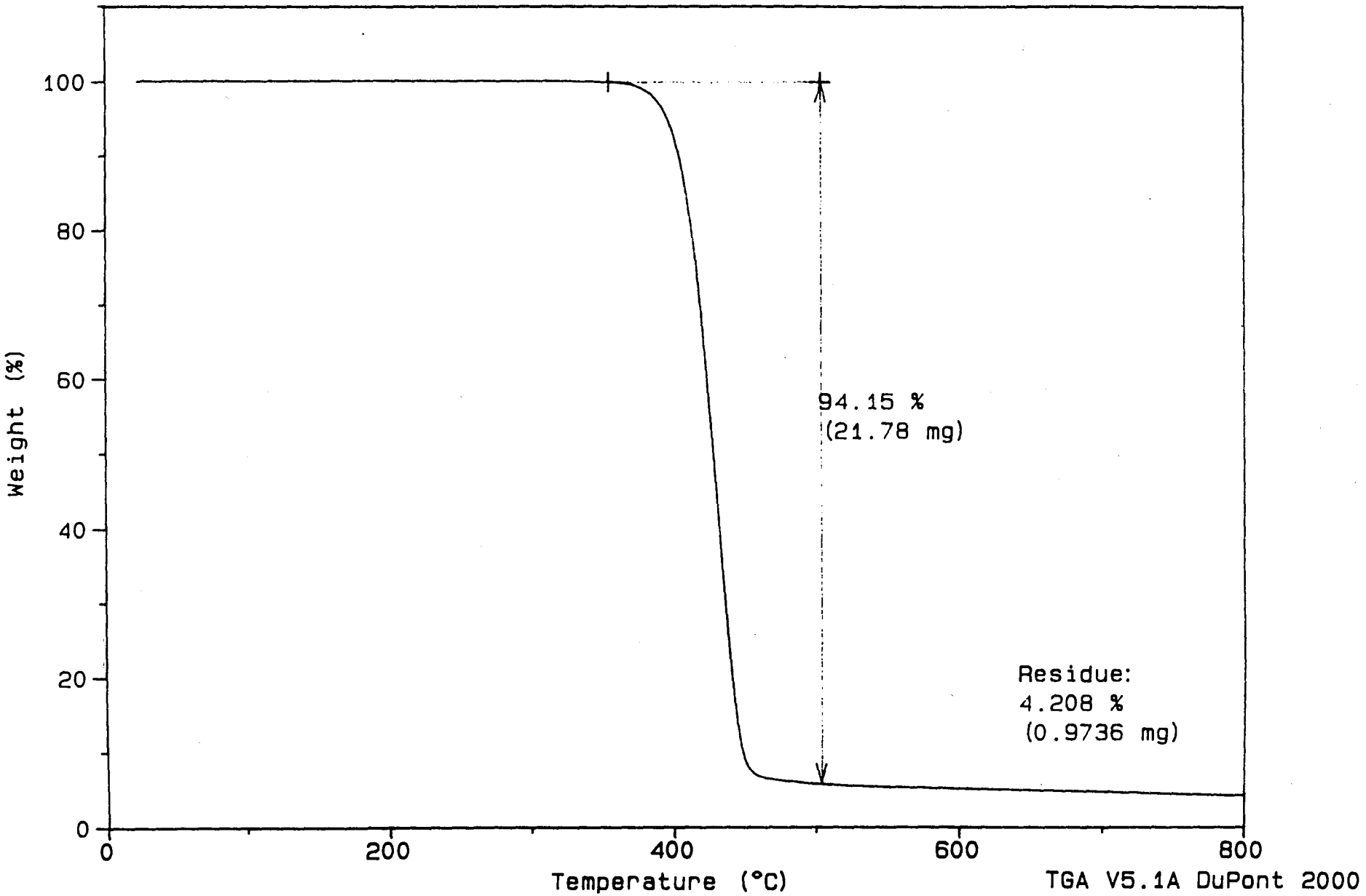
File: C:ARTI54.001
Operator: GJM
Run Date: 12-Feb-93 10:42



Sample: #55
Size: 23.1350 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

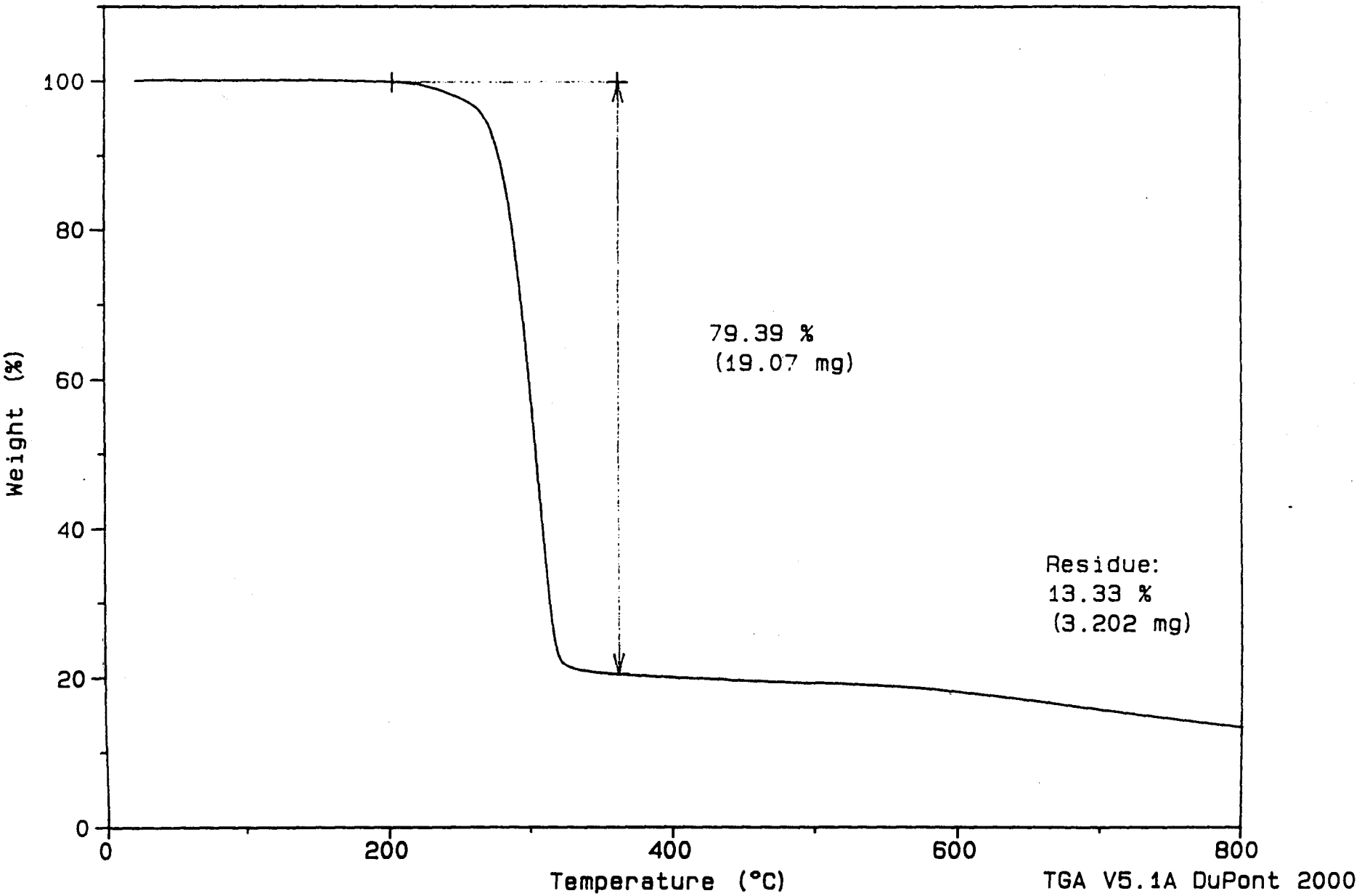
File: C:ARTI55.001
Operator: GJM
Run Date: 12-Feb-93 14:45



Sample: #56
Size: 24.0200 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

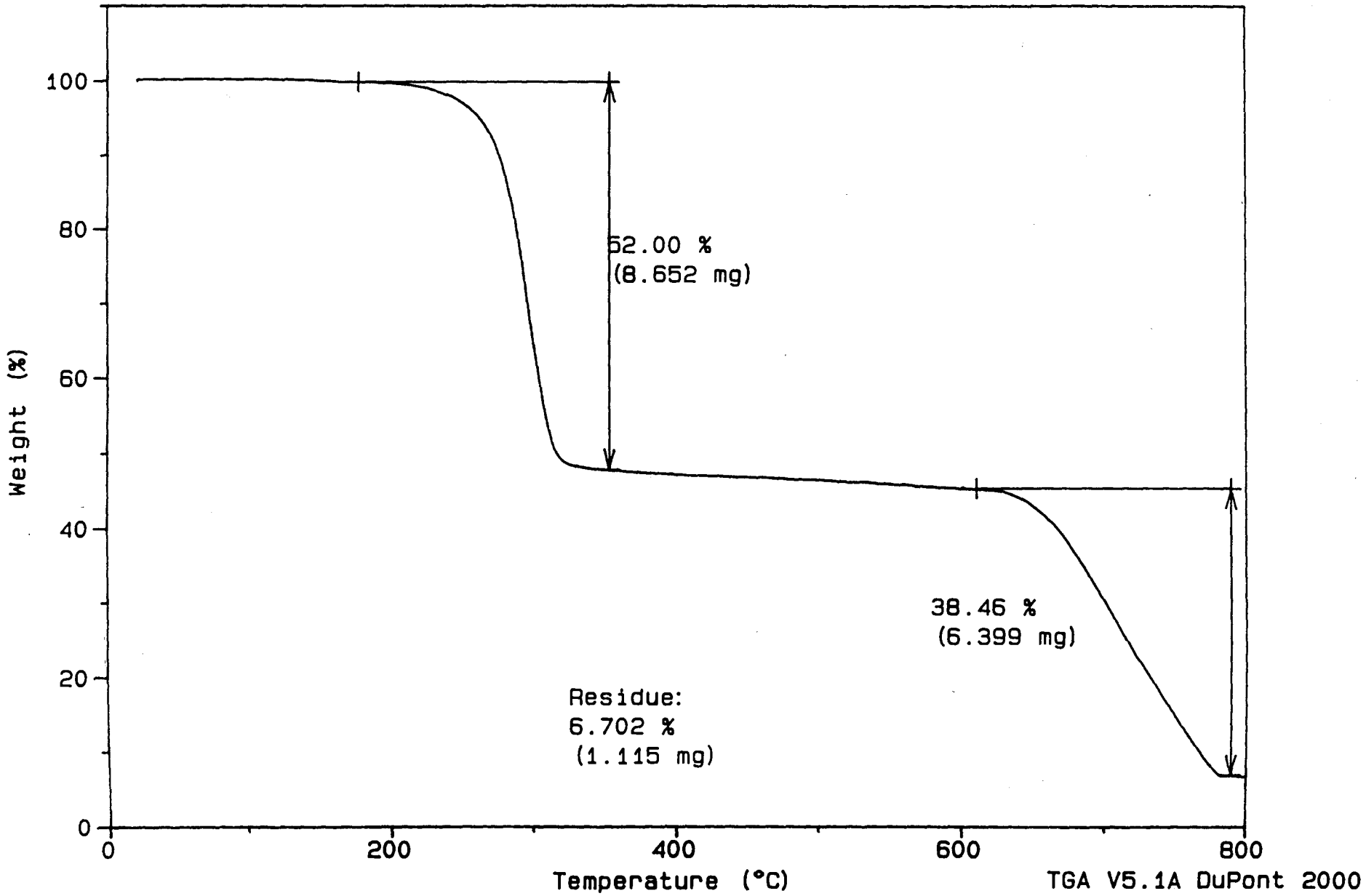
File: C:ARTI.056
Operator: GJM
Run Date: 15-Feb-93 09:30



Sample: #57
Size: 16.6390 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

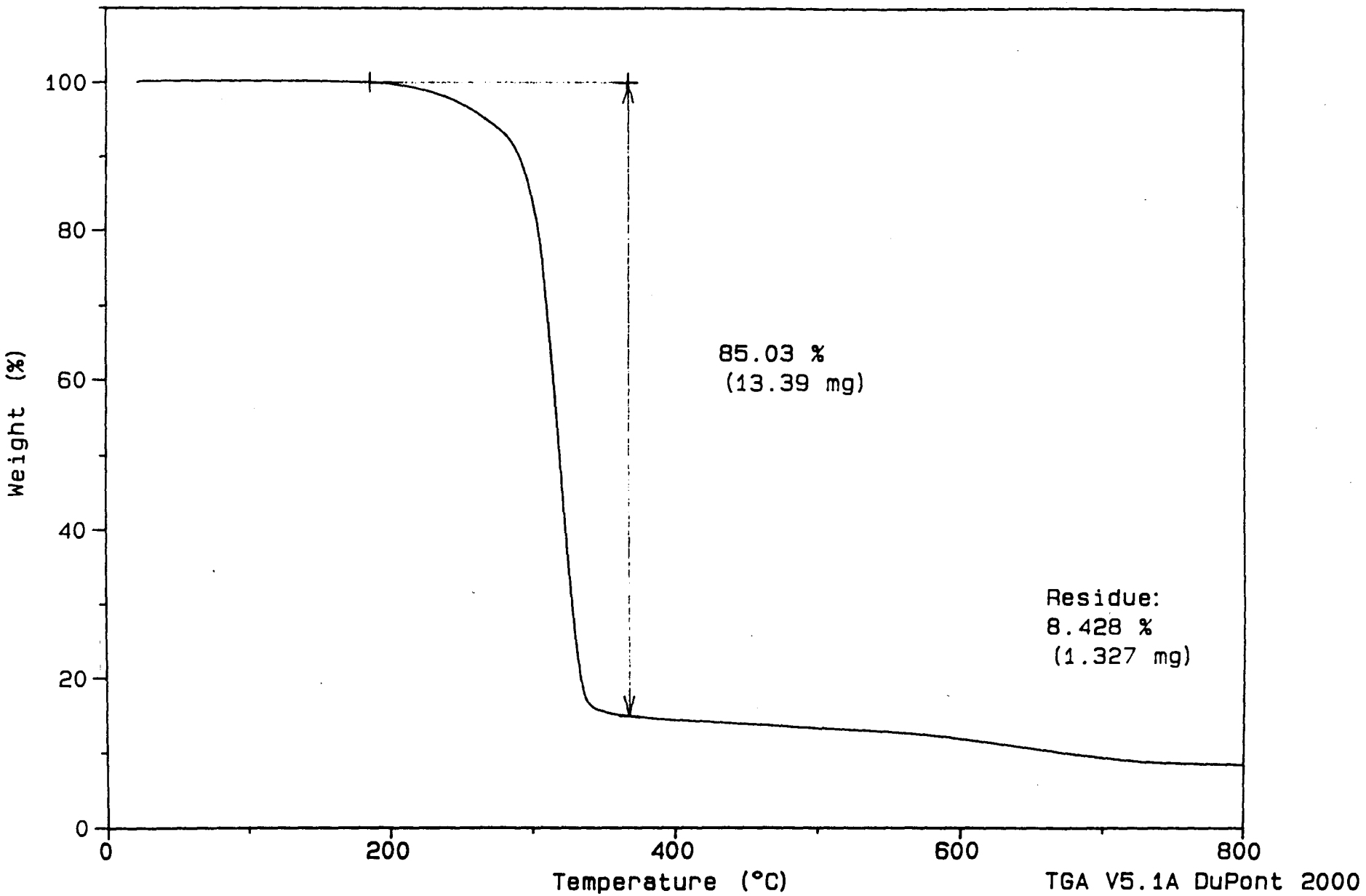
File: C:ARTI.057
Operator: GJM
Run Date: 18-Mar-93 11:29



Sample: #58
Size: 15.7475 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

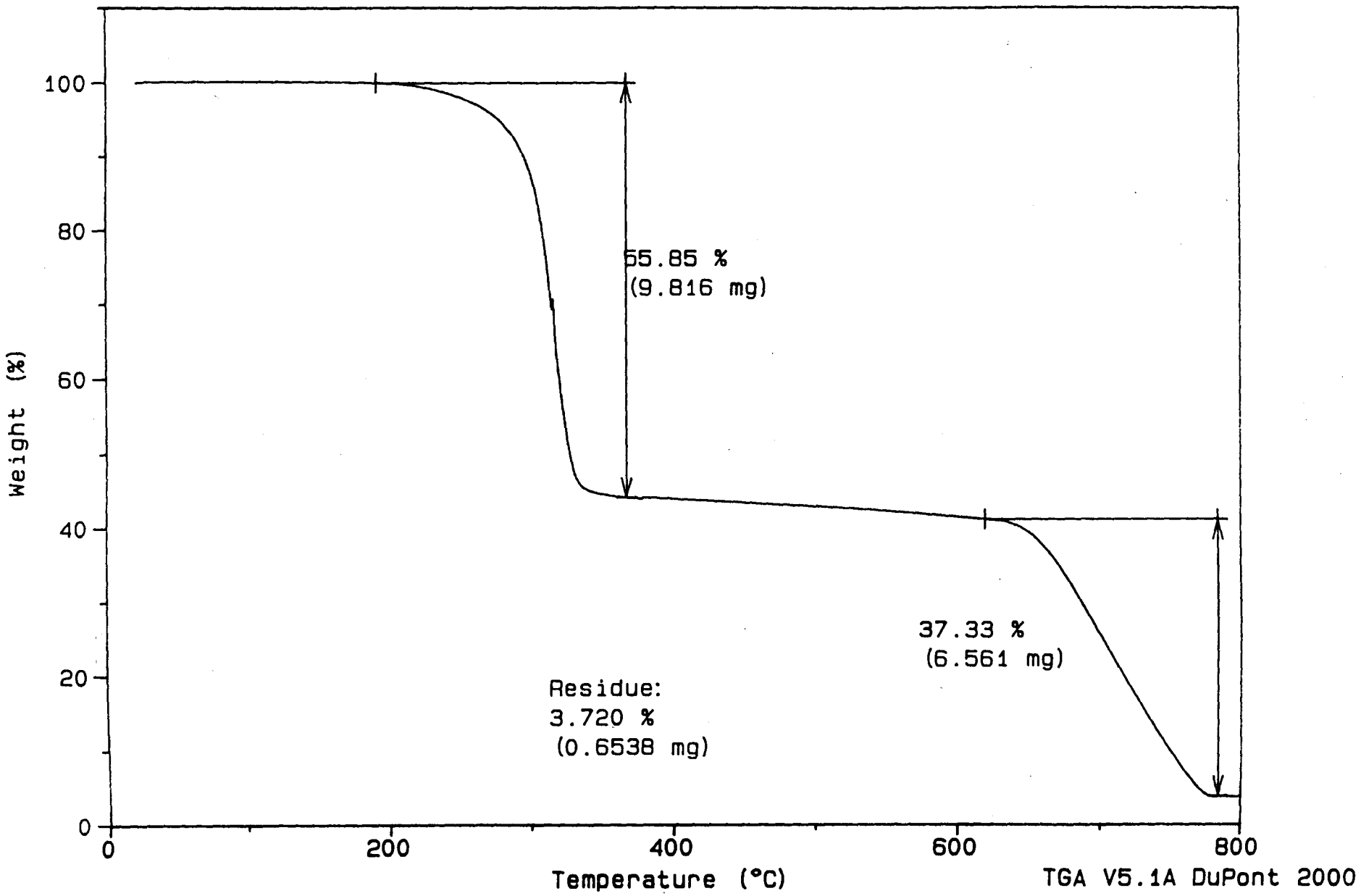
File: C:ARTI.058
Operator: GJM
Run Date: 15-Feb-93 14:46



Sample: #59
Size: 17.5760 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C/MIN IN N2 THEN SWITCH TO AIR

TGA

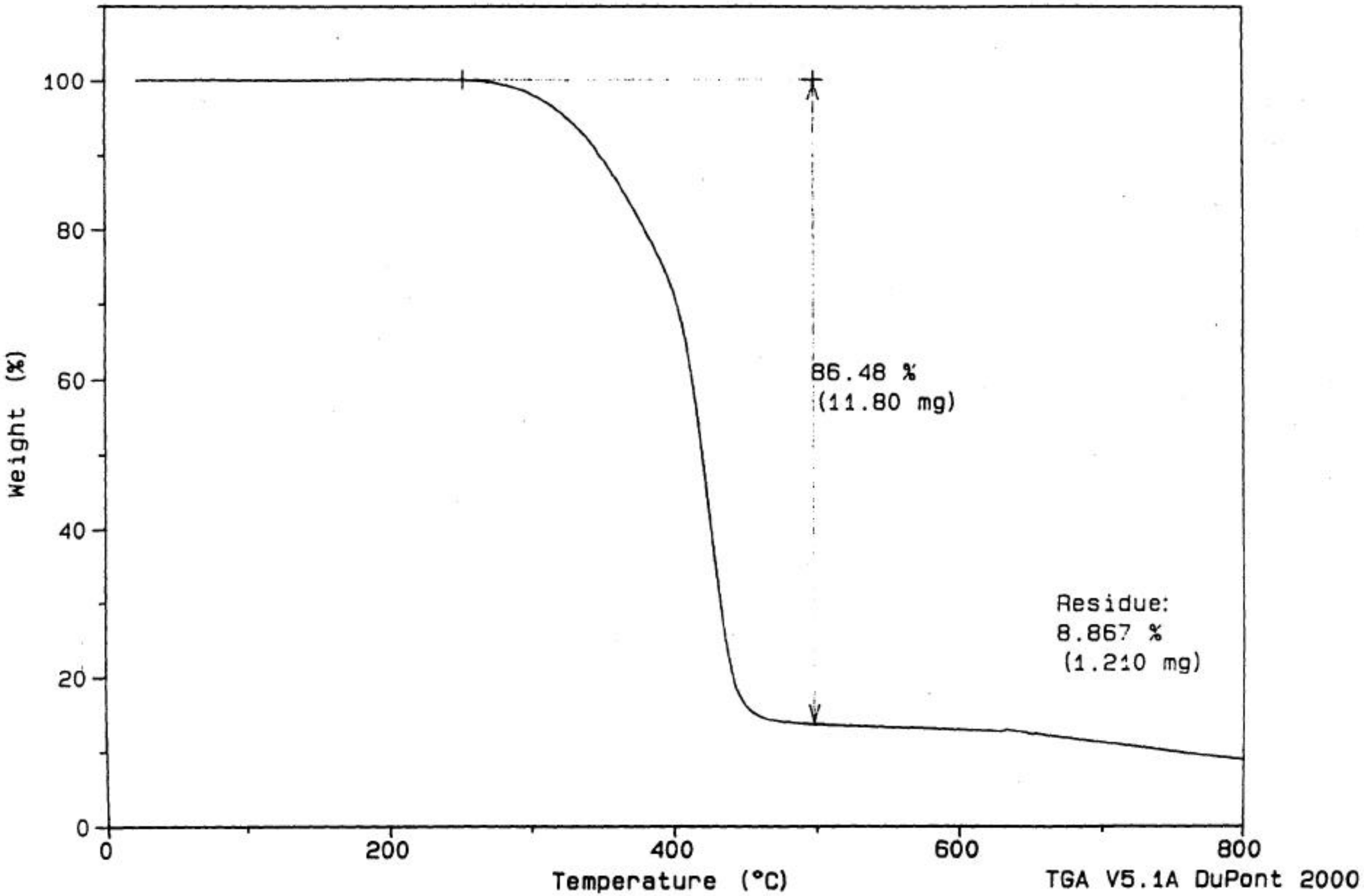
File: C:ARTI59.059
Operator: GJM
Run Date: 12-Mar-93 10:42



Sample: #60
Size: 13.6480 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

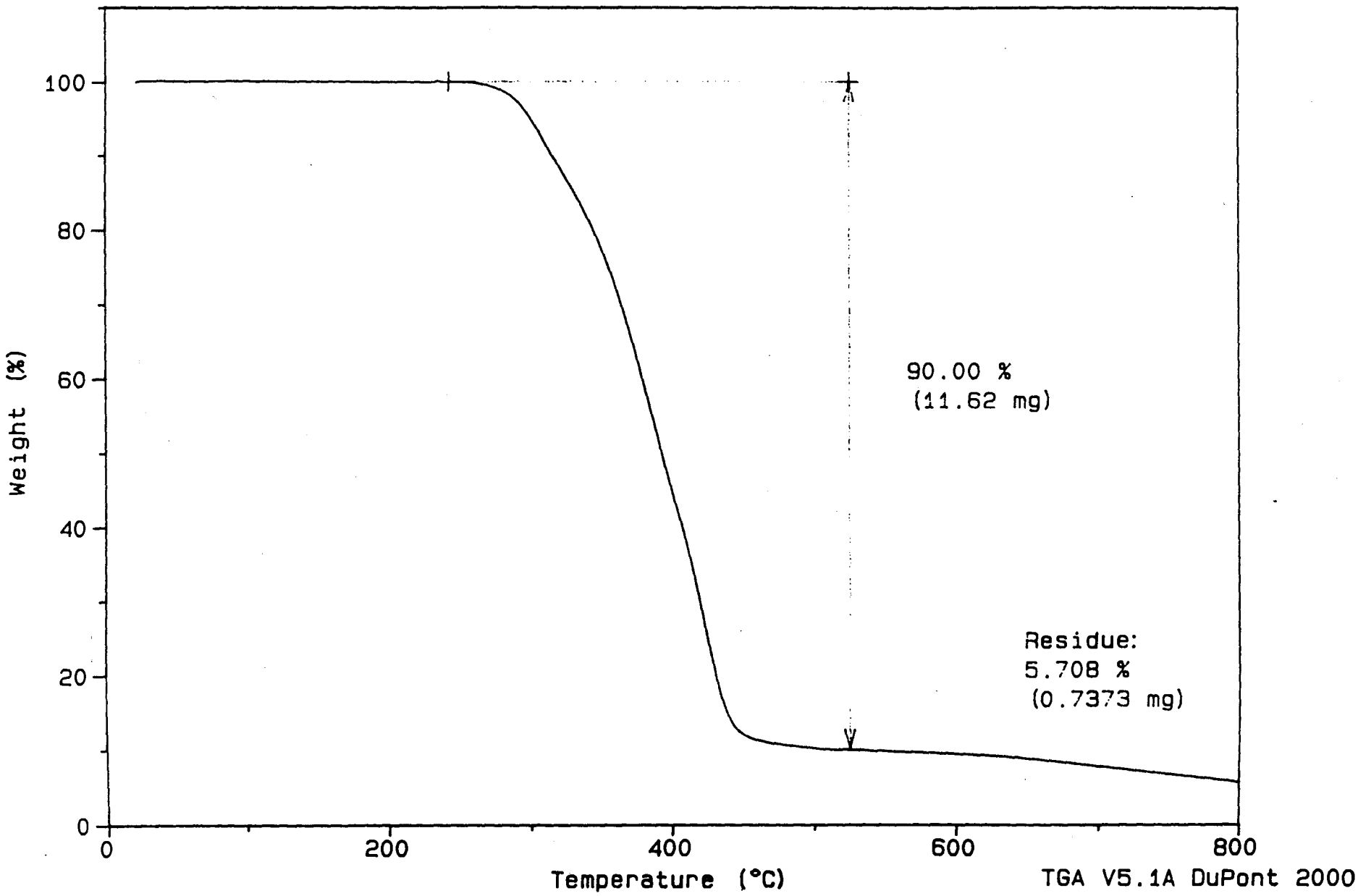
File: C:ARTI.060
Operator: GJM
Run Date: 16-Feb-93 10:14



Sample: #61
Size: 12.9160 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

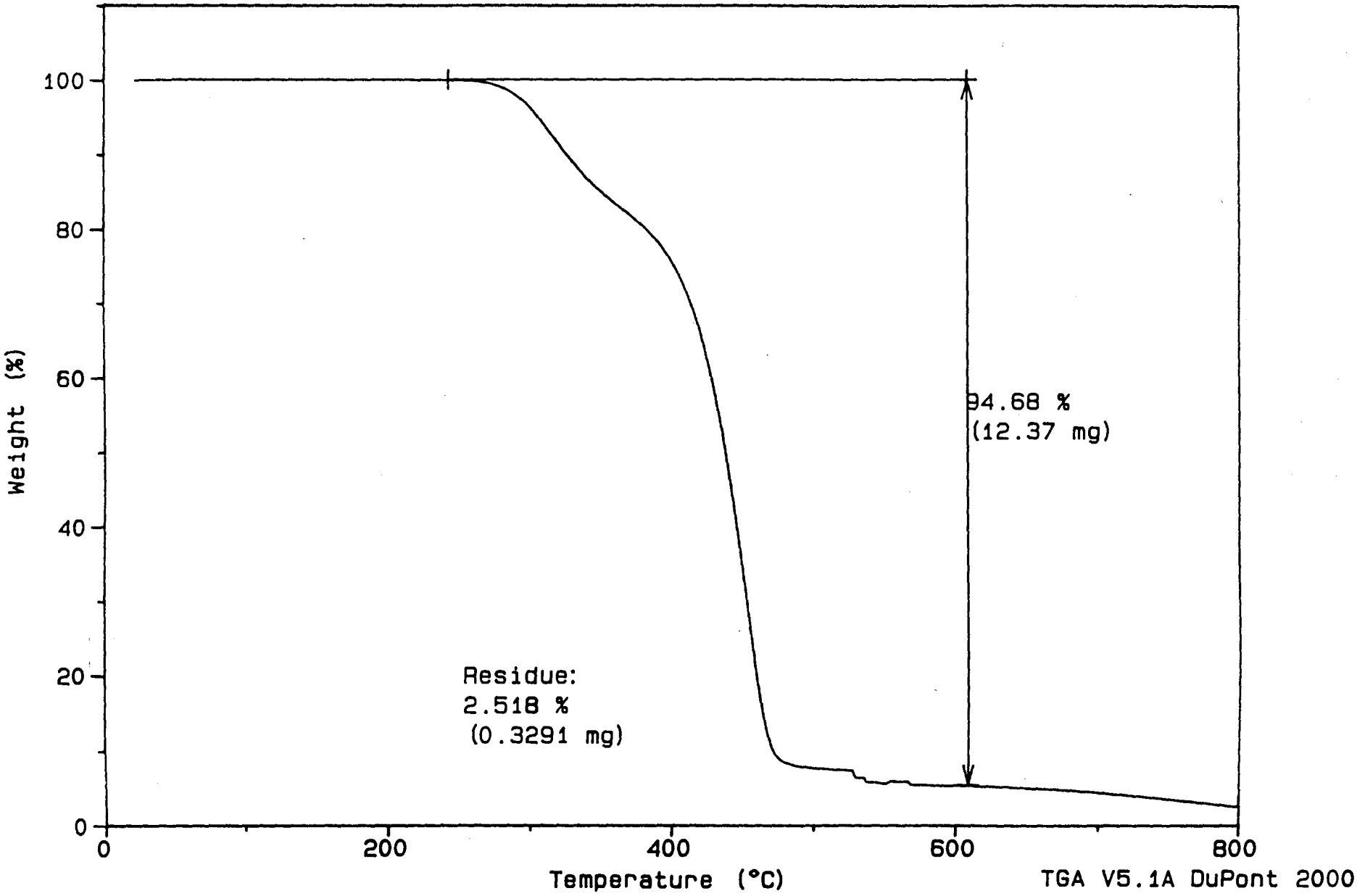
File: C:ARTI.061
Operator: GJM
Run Date: 16-Feb-93 14:51



Sample: #62
Size: 13.0700 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

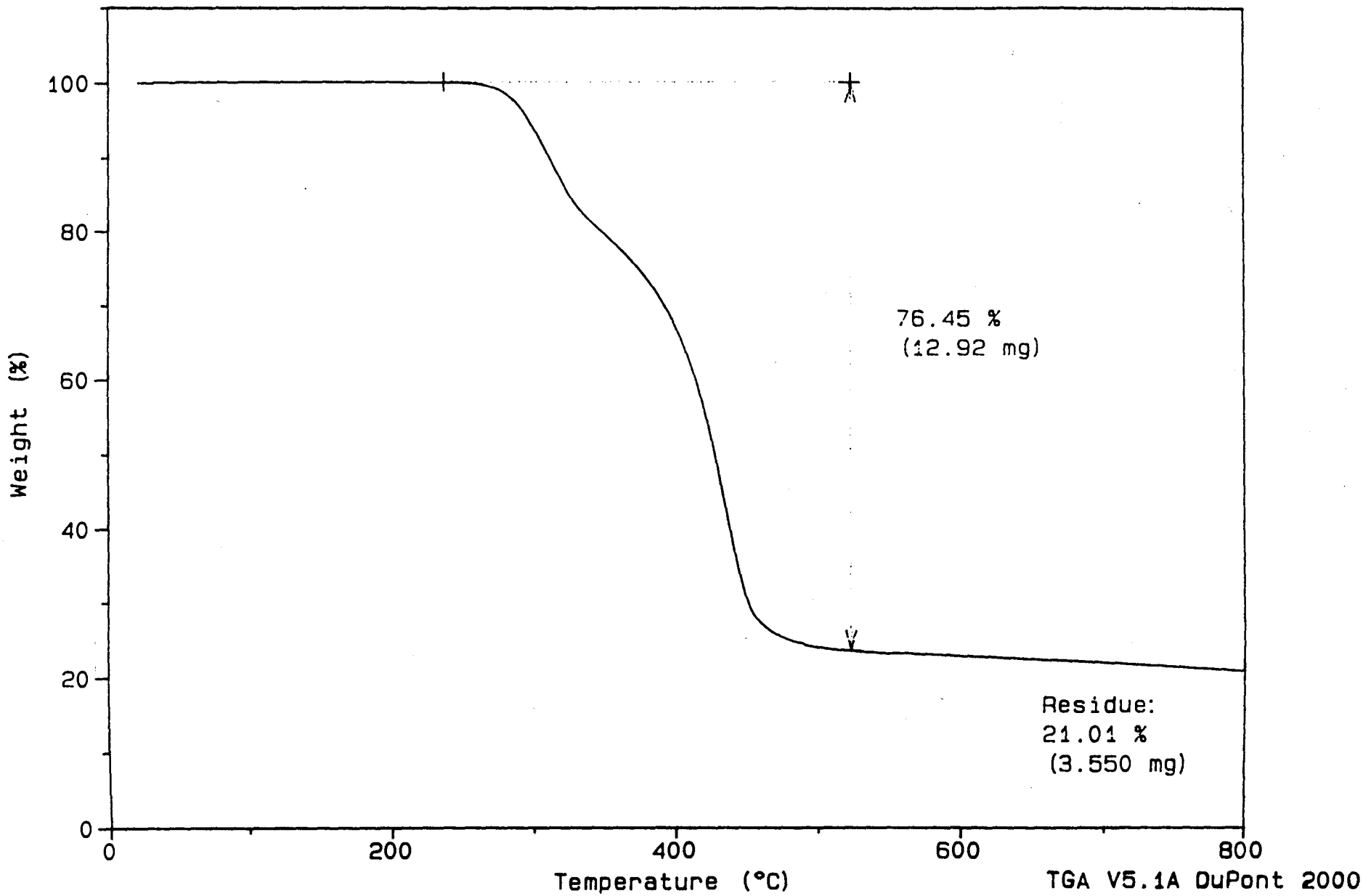
File: C:ARTI.062
Operator: GJM
Run Date: 22-Mar-93 09:54



Sample: #63
Size: 16.9010 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

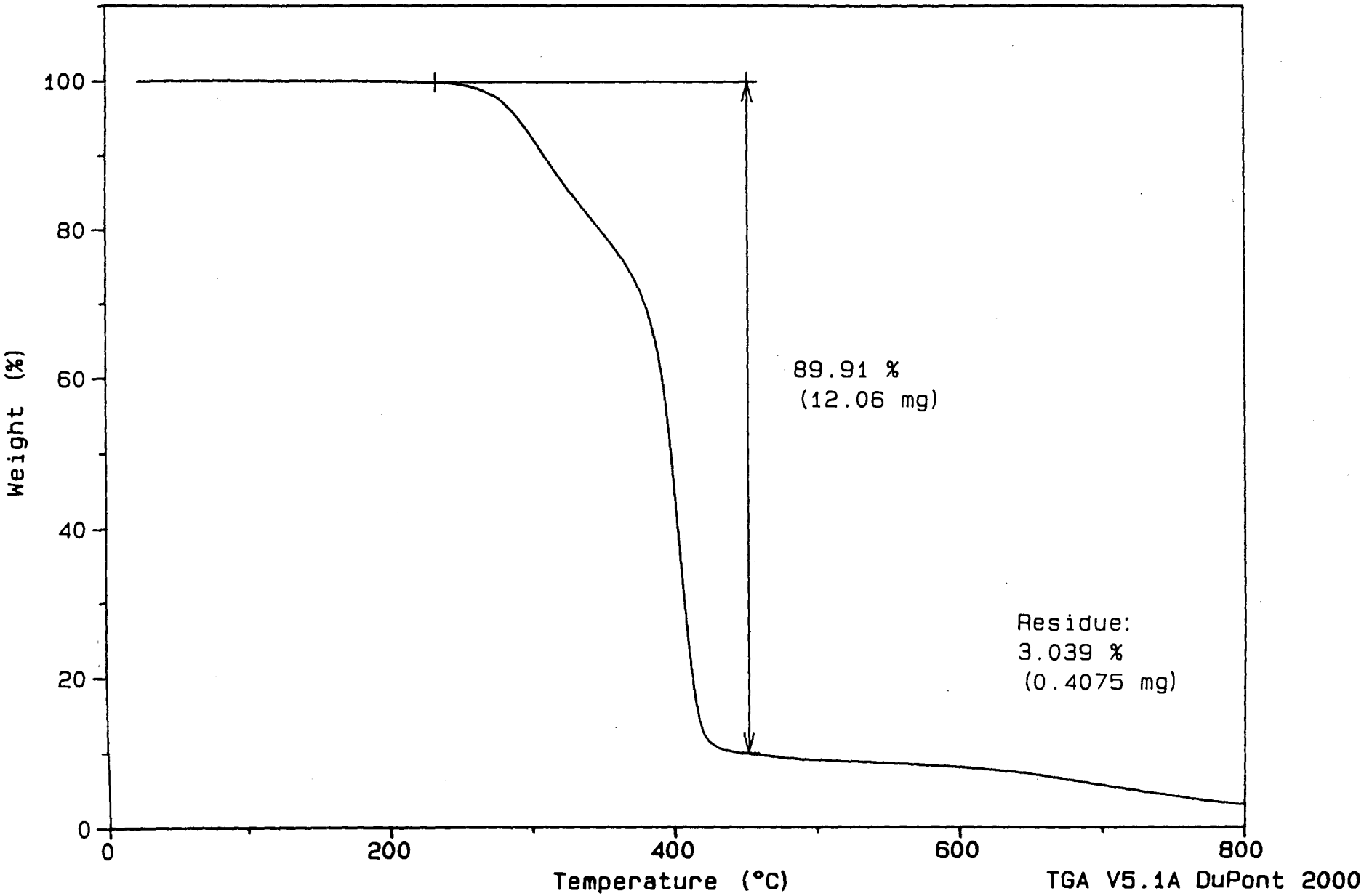
File: C:ARTI.063
Operator: GJM
Run Date: 16-Feb-93 16:34



Sample: #64
Size: 13.4115 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

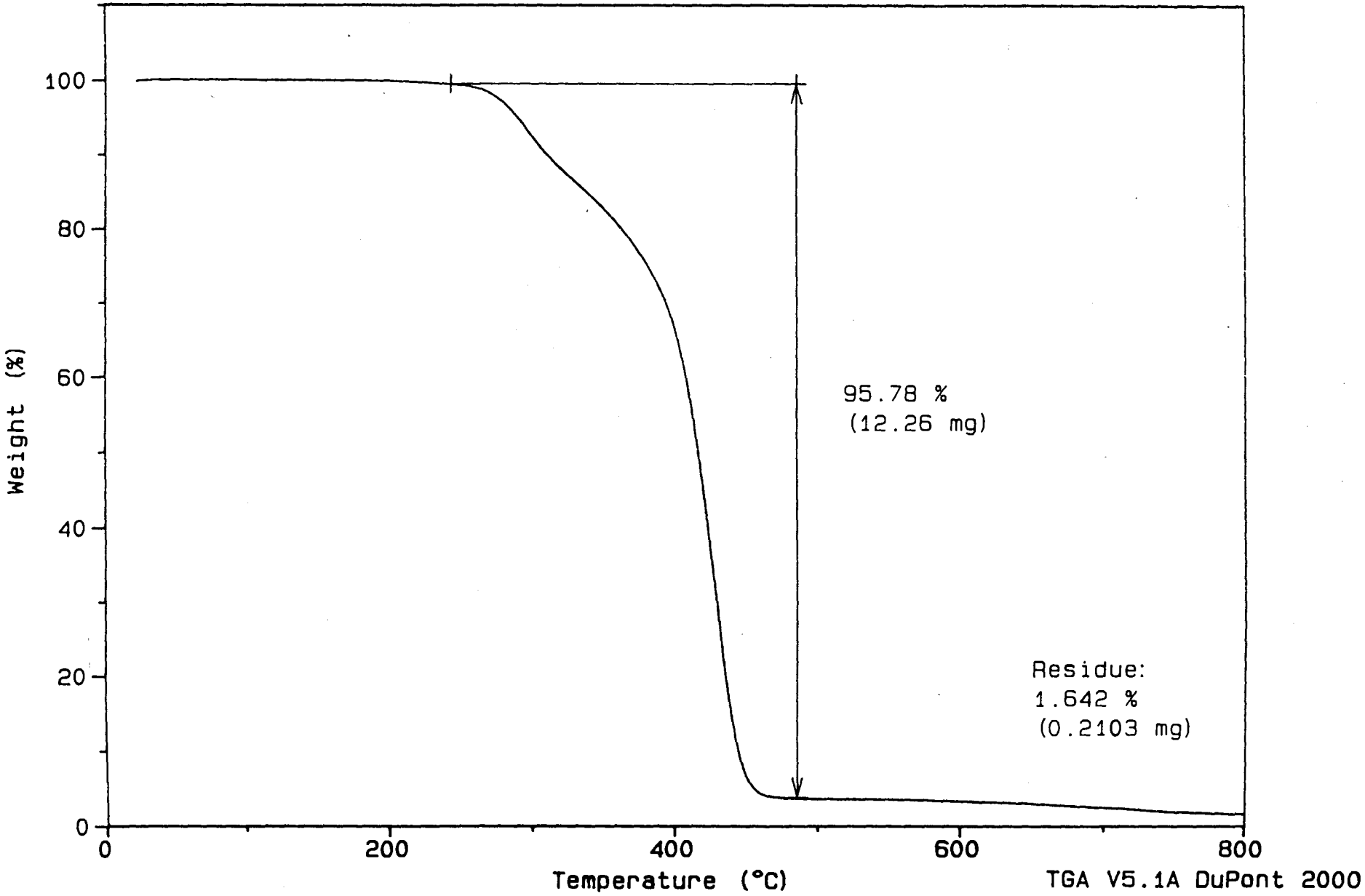
File: C:ARTI.064
Operator: GJM
Run Date: 17-Feb-93 12:40



Sample: #65
Size: 12.8025 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

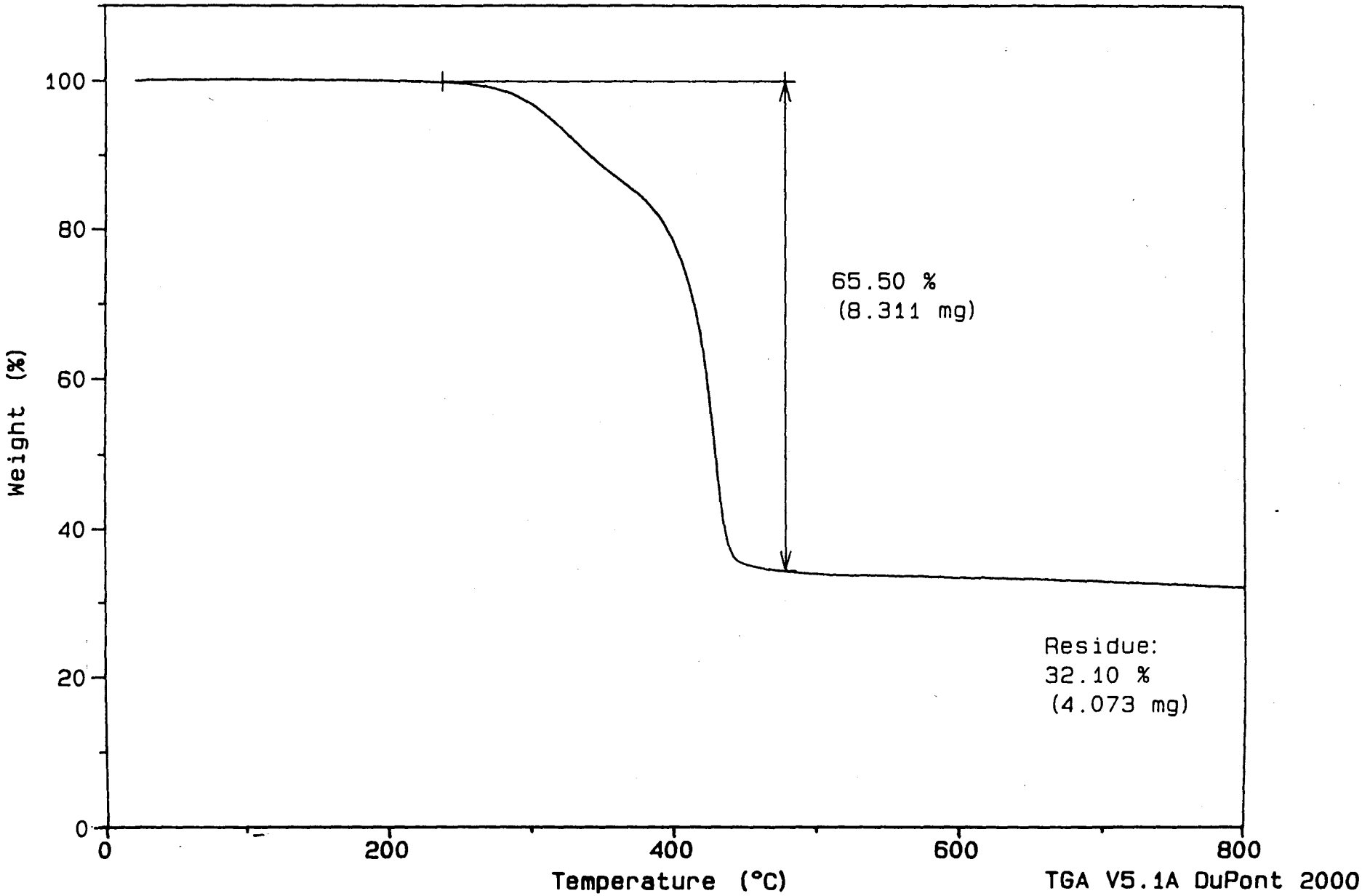
File: C:ARTI.065
Operator: GJM
Run Date: 17-Feb-93 14:42



Sample: #66
Size: 12.6880 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

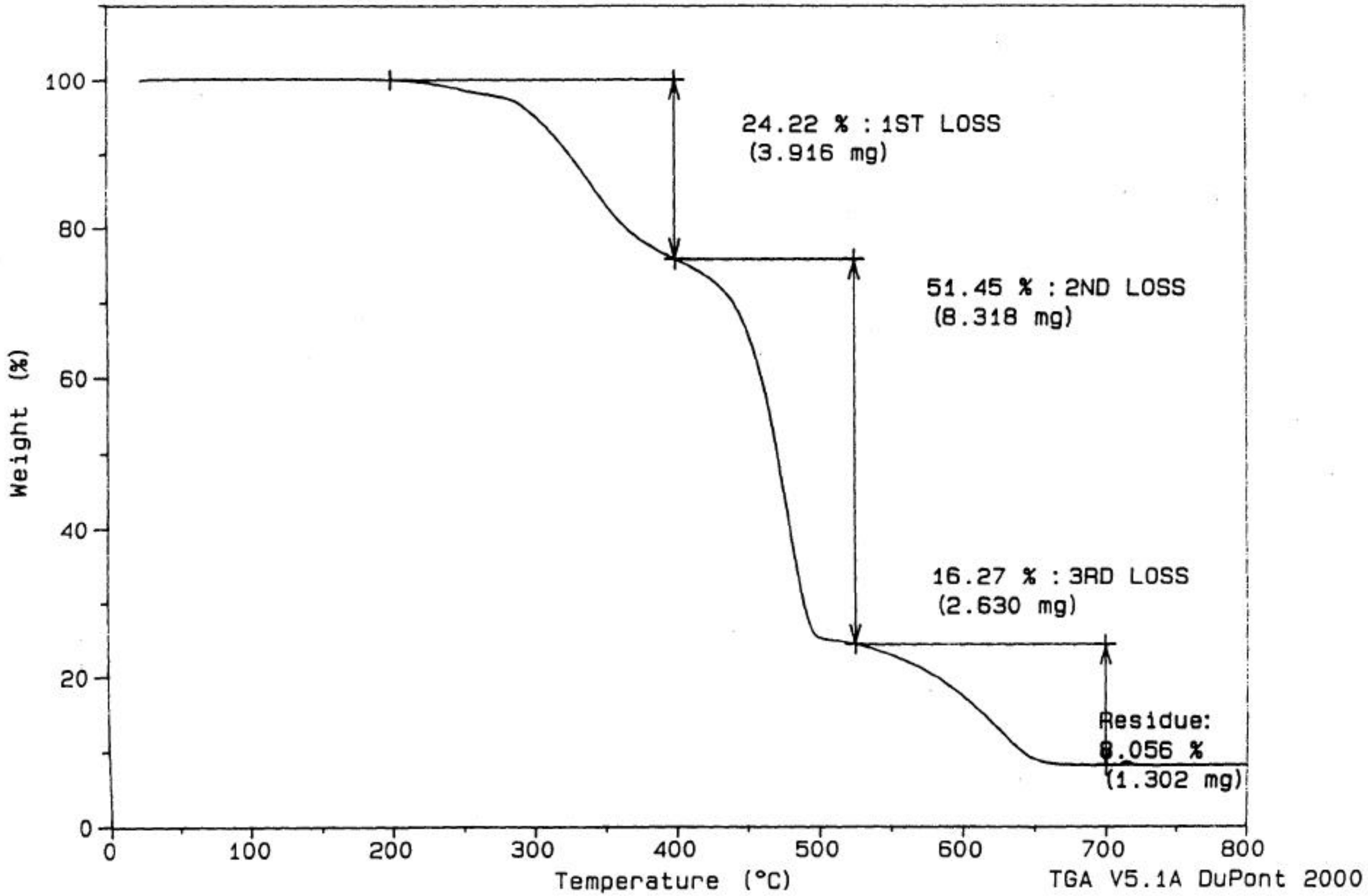
File: C:ARTI.066
Operator: GJM
Run Date: 17-Feb-93 16:22



Sample: #67 FILLED
Size: 16.1690 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

File: C:TGA.82
Operator: SKL
Run Date: 12-Jun-92 09:16

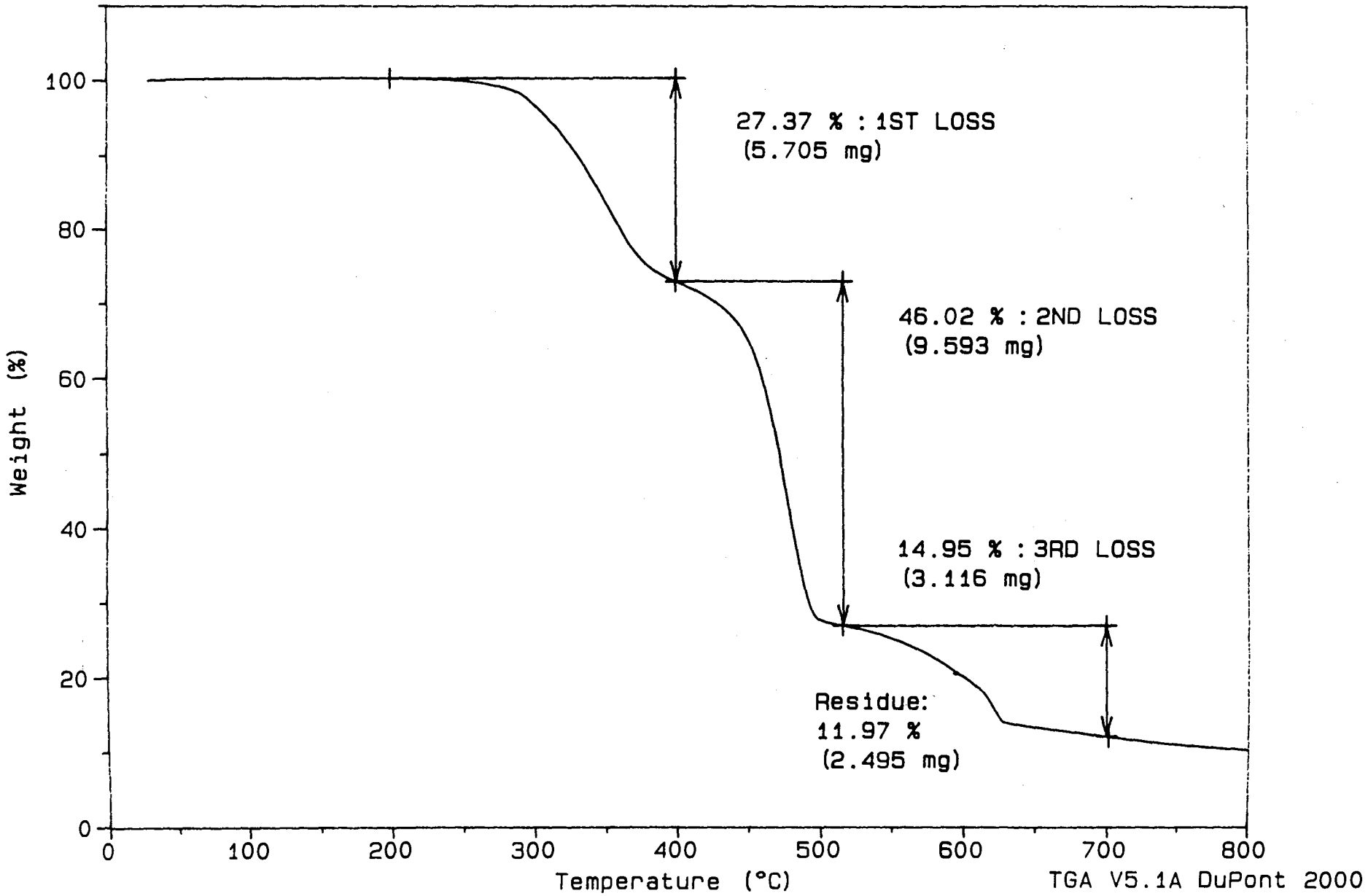


TGA V5.1A DuPont 2000

Sample: #68 FILLED
Size: 20.8470 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

File: C:TGA.83
Operator: SKL
Run Date: 12-Jun-92 10:27

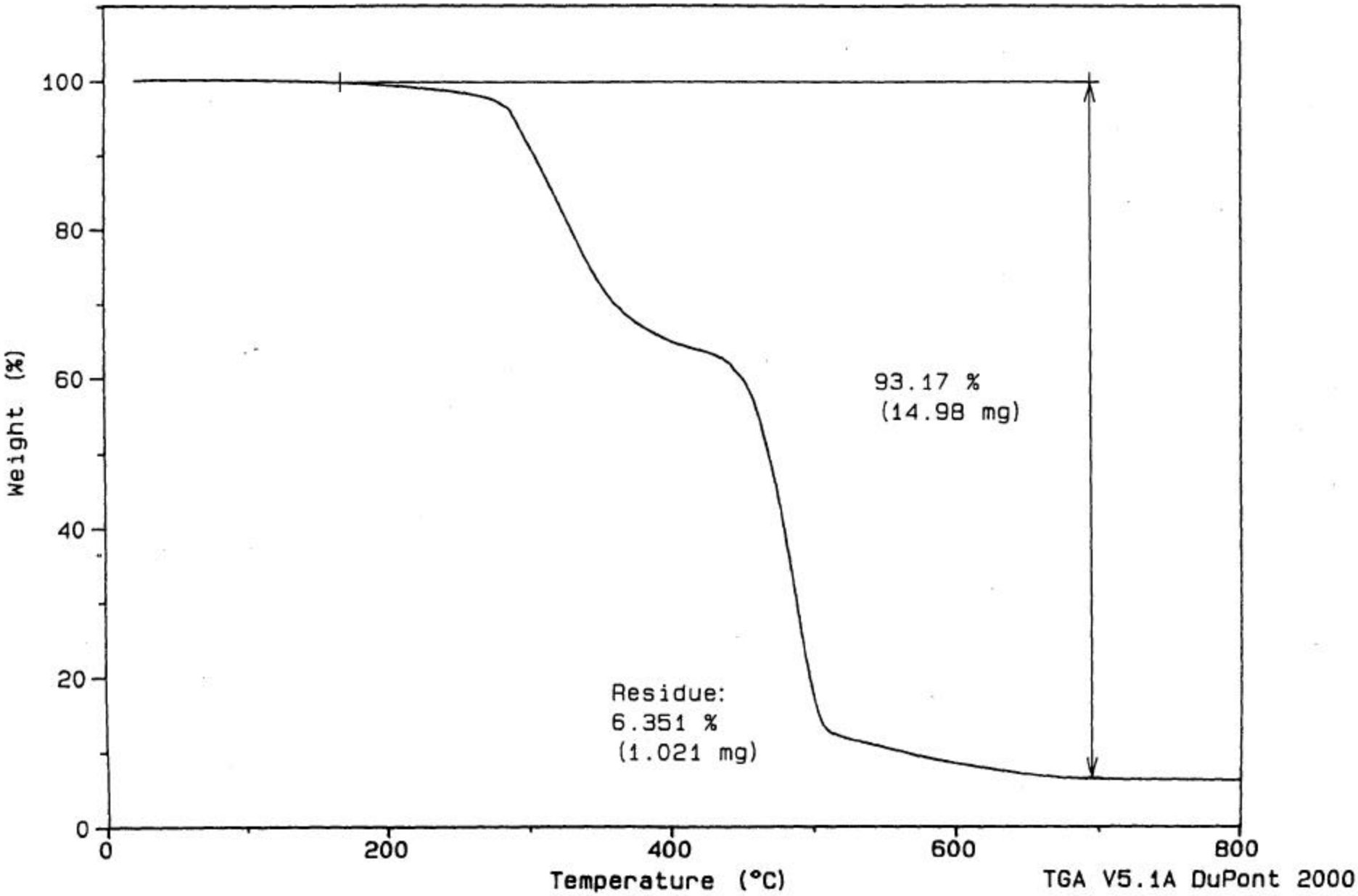


TGA V5.1A DuPont 2000

Sample: #69
Size: 16.0785 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

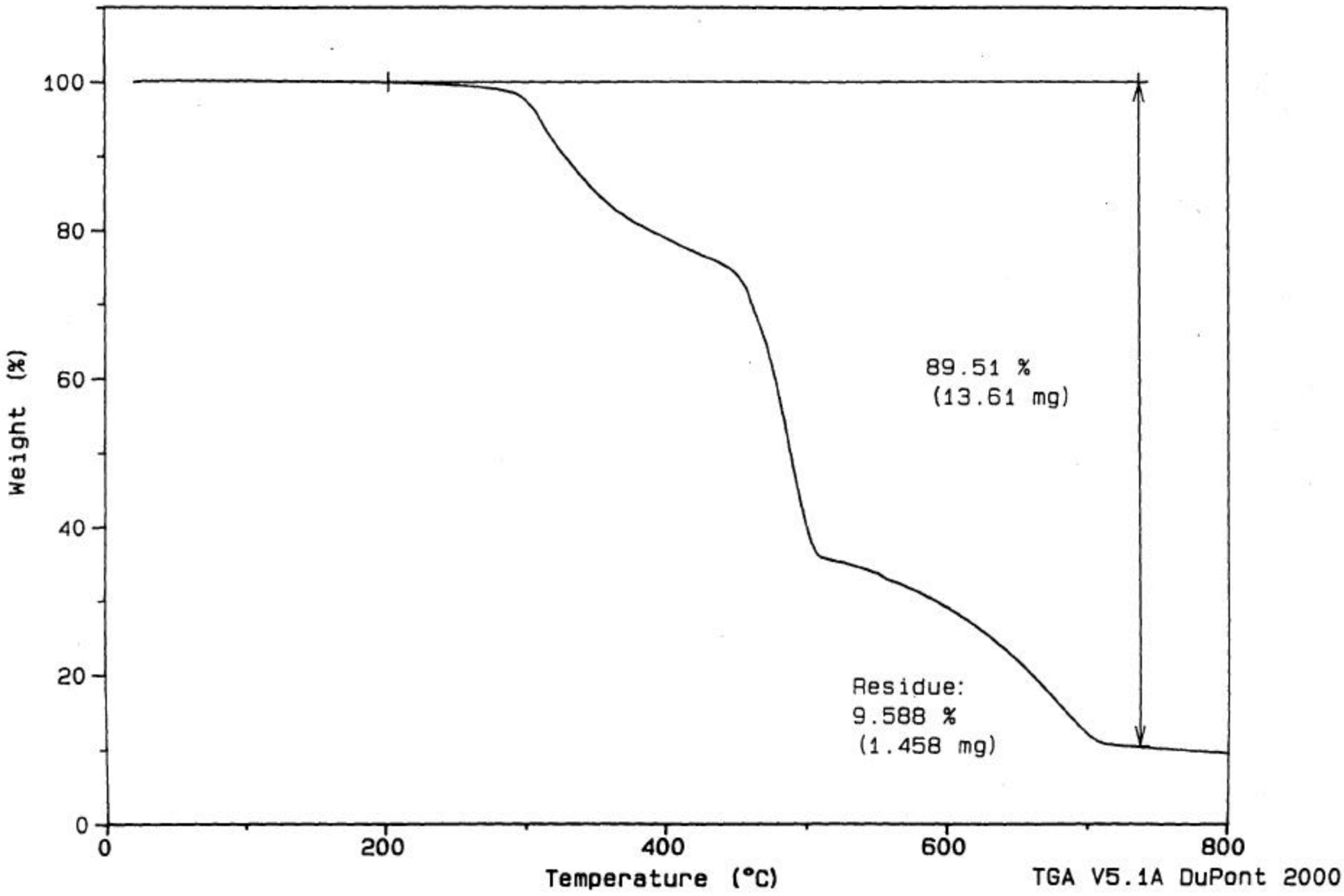
File: C:ARTI.069
Operator: GJM
Run Date: 18-Feb-93 09:22



Sample: #70
Size: 15.2070 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

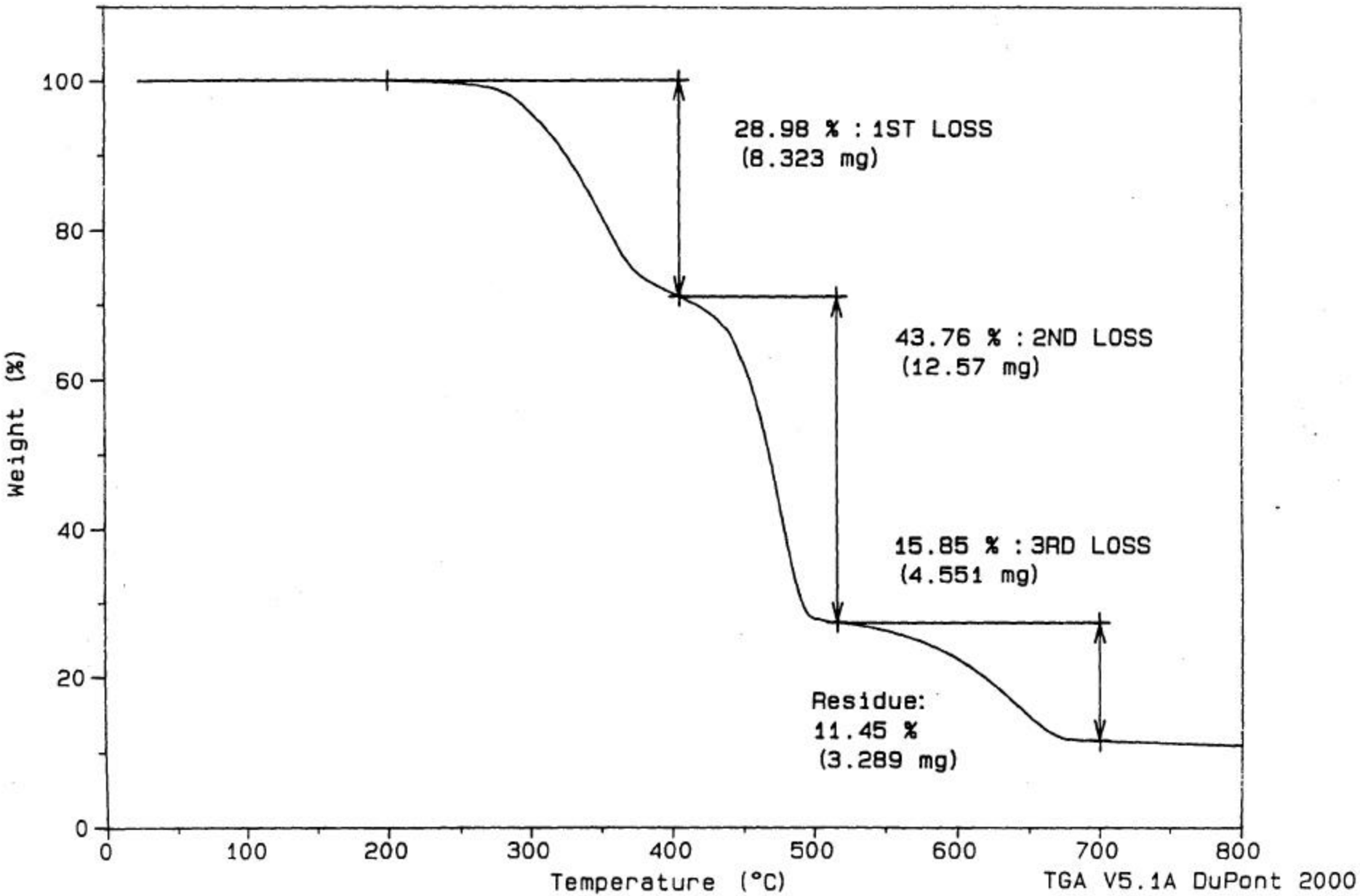
File: C:\ARTI70.070
Operator: GJM
Run Date: 18-Feb-93 11:18



Sample: #71 FILLED
Size: 28.7220 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2 THEN SWITCH TO AIR

TGA

File: C:TGA.84
Operator: SKL
Run Date: 12-Jun-92 13:20

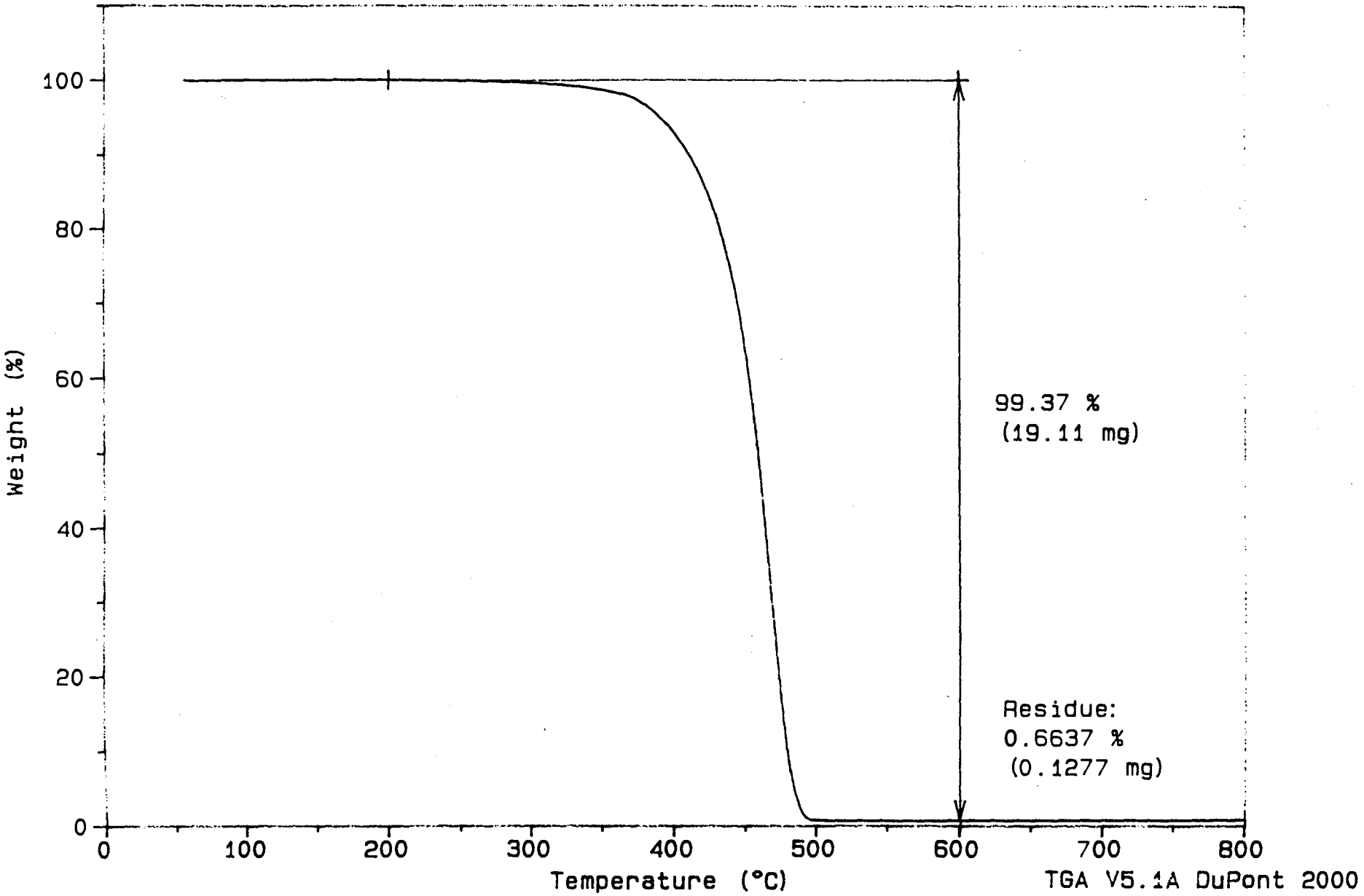


TGA V5.1A DuPont 2000

Sample: #72 UNFILLED
Size: 19.2330 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

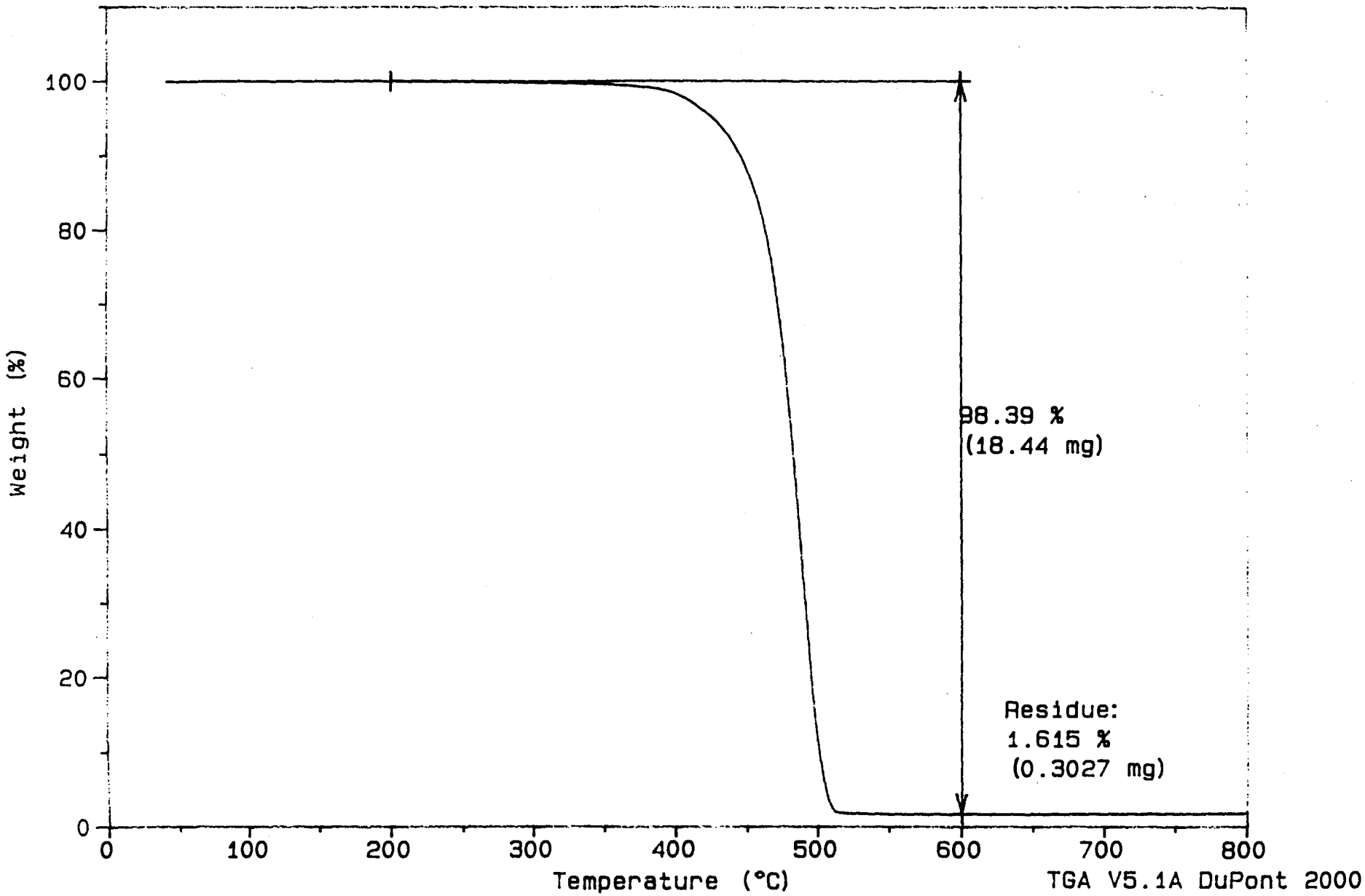
File: C:TGA.47
Operator: SKL
Run Date: 27-May-92 09:04



Sample: #73 UNFILLED
Size: 18.7410 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

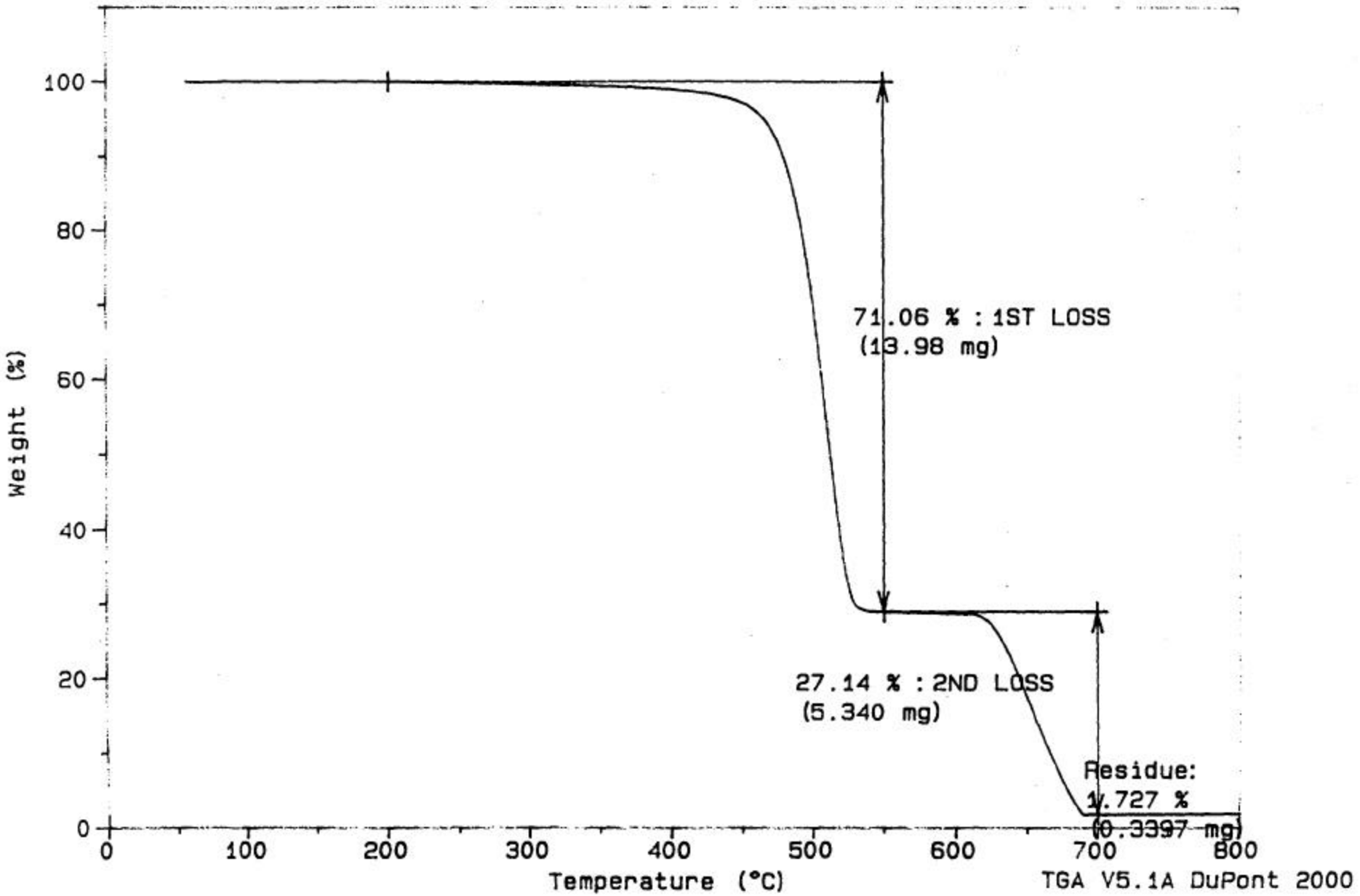
File: C:TGA.49
Operator: SKL
Run Date: 27-May-92 12:06



Sample: #74 FILLED
Size: 19.6710 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

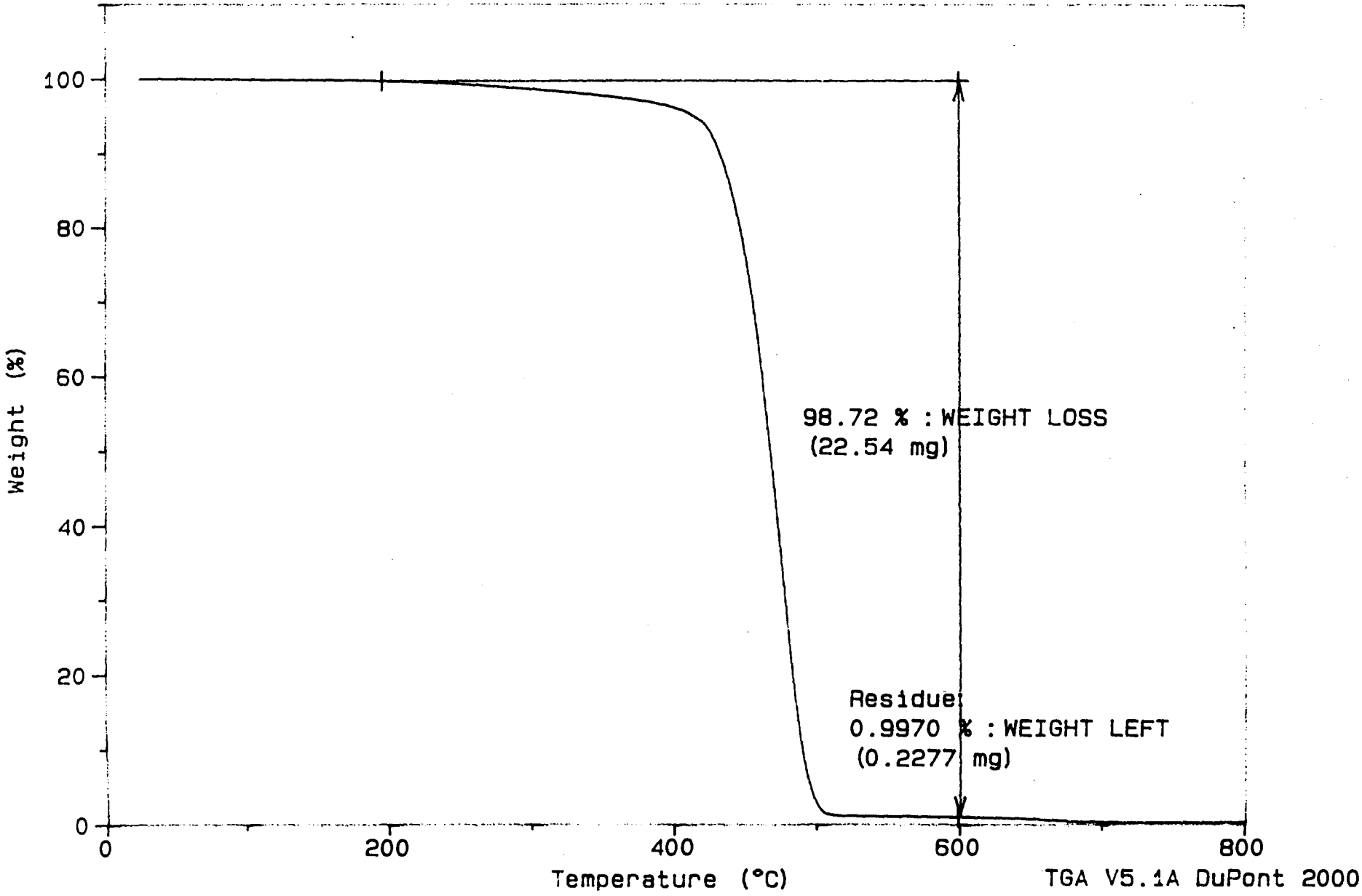
File: C:TGA.59
Operator: SKL
Run Date: 29-May-92 11:02



Sample: #75 UNFILLED
Size: 22.8370 mg
Method: TGA
Comment: HEAT UPTO 800°C BY 20°C/MIN IN N2

TGA

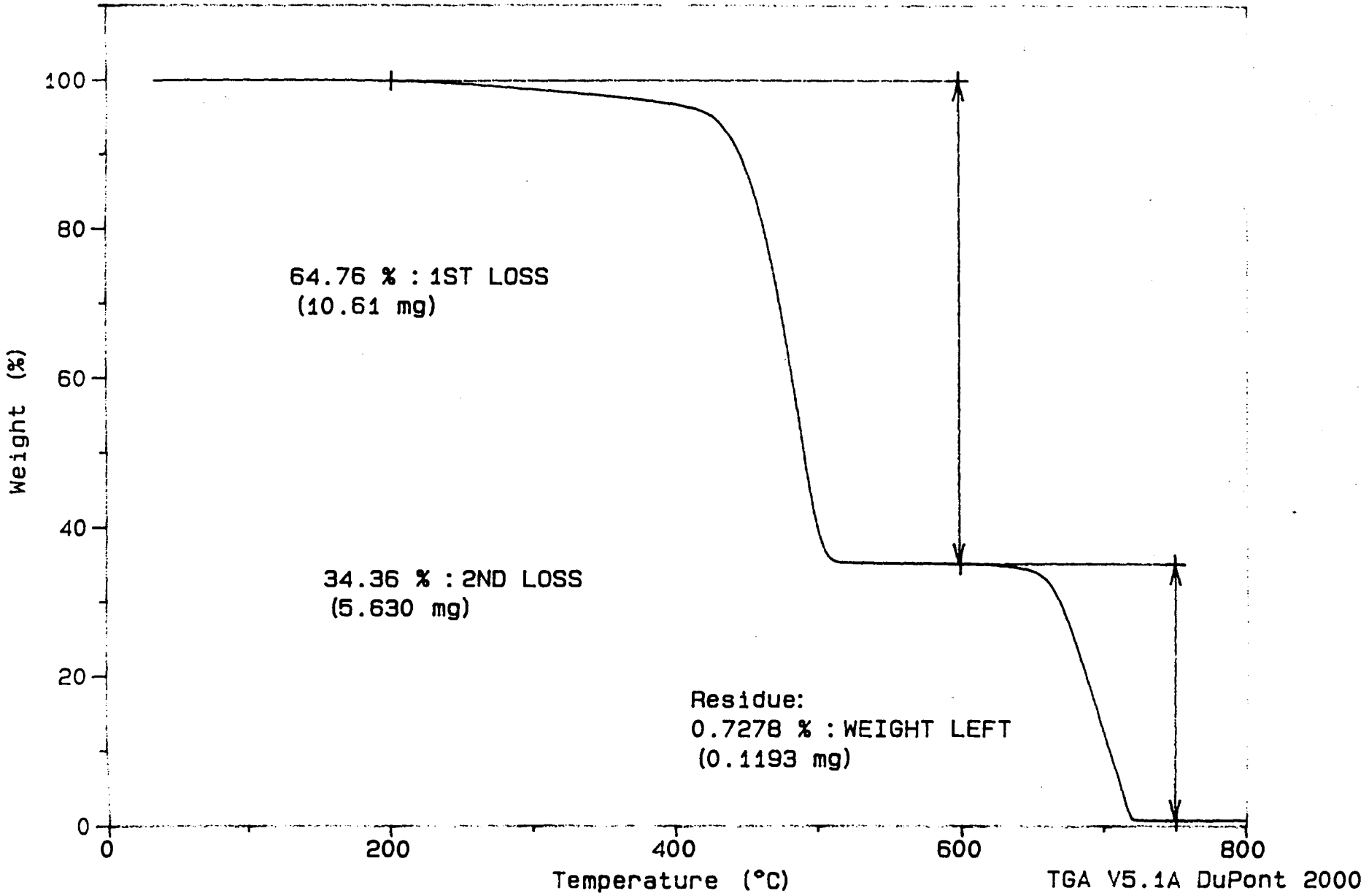
File: C:TGA.97
Operator: SKL
Run Date: 23-Jun-92 13:14



Sample: #76 FILLED
Size: 16.3870 mg
Method: TGA
Comment: HEAT UPTO 600°C BY 20°C/MIN IN N2 AND SWITCH TO AIR

TGA

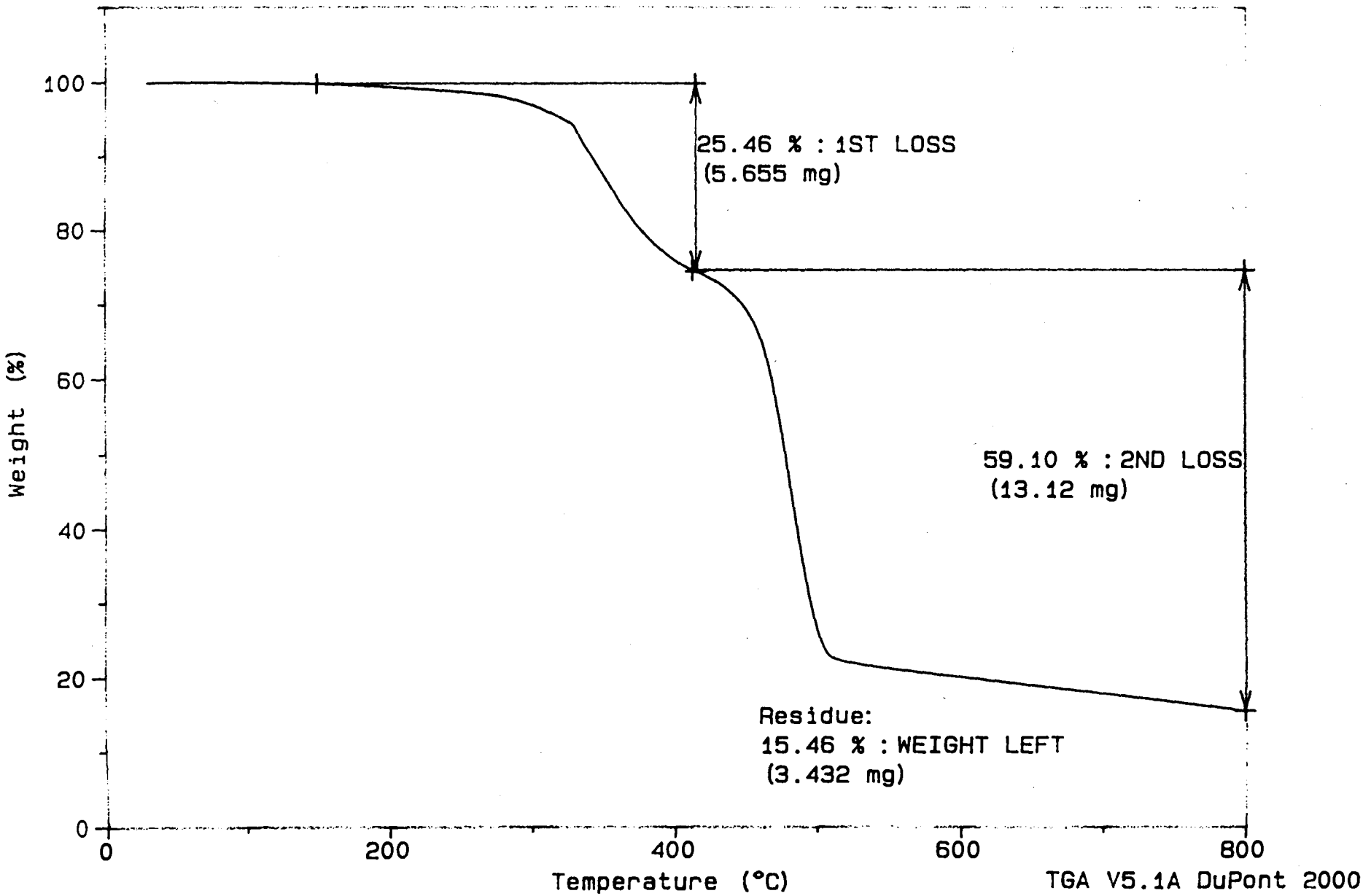
File: C:TGA.96
Operator: SKL
Run Date: 19-Jun-92 15:27



Sample: #77 UNFILLED
Size: 22.2080 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

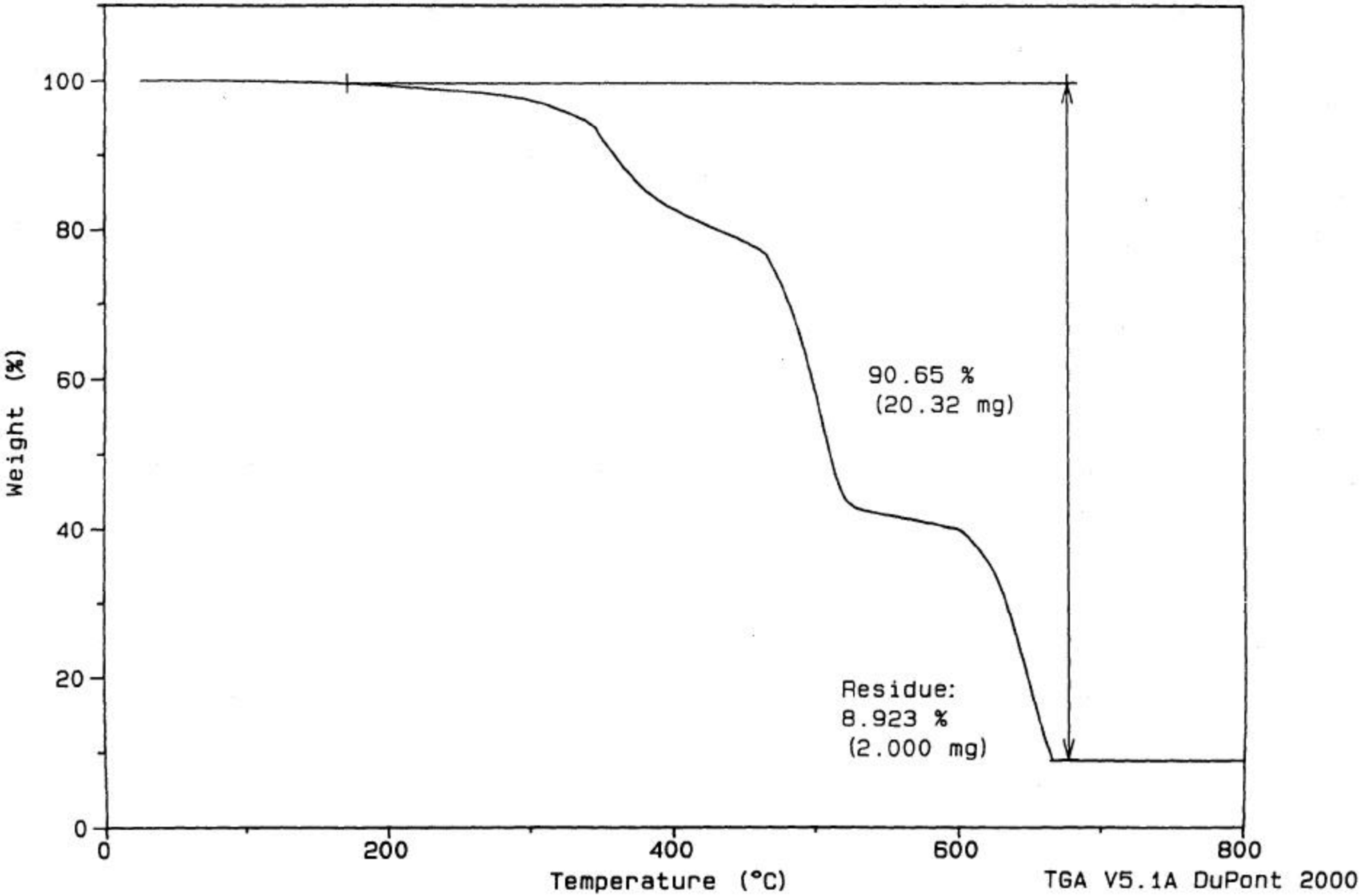
File: C:TGA.78
Operator: SKL
Run Date: 10-Jun-92 14:19



Sample: #78 FILLED
Size: 22.4120 mg
Method: TGA
Comment: RT TO 600°C BY 20°C/MIN IN N2 THEN SWITCHED TO AIR

TGA

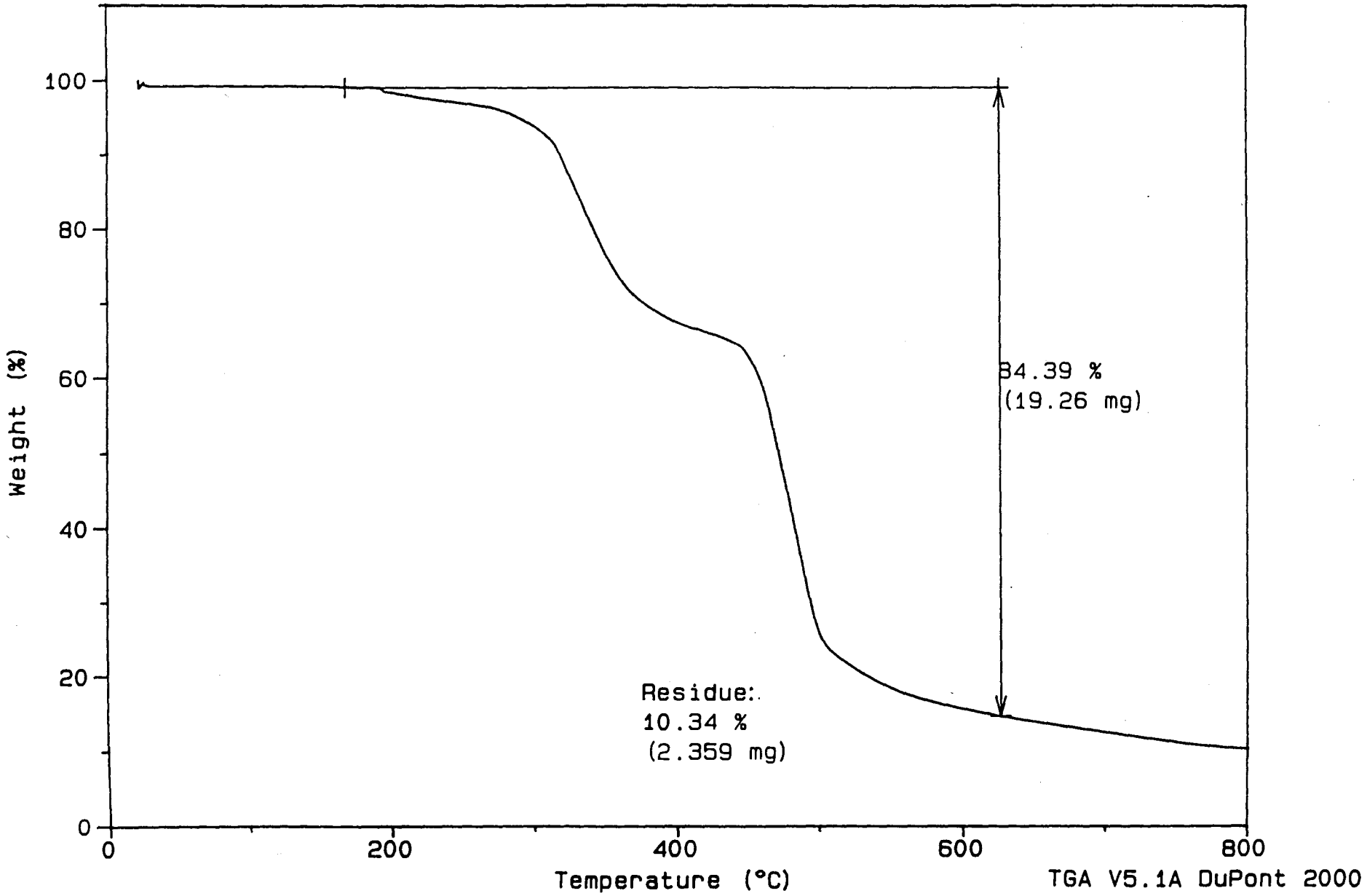
File: C:ARTI.078
Operator: SKL
Run Date: 17-Jul-92 09:33



Sample: #79
Size: 22.8170 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

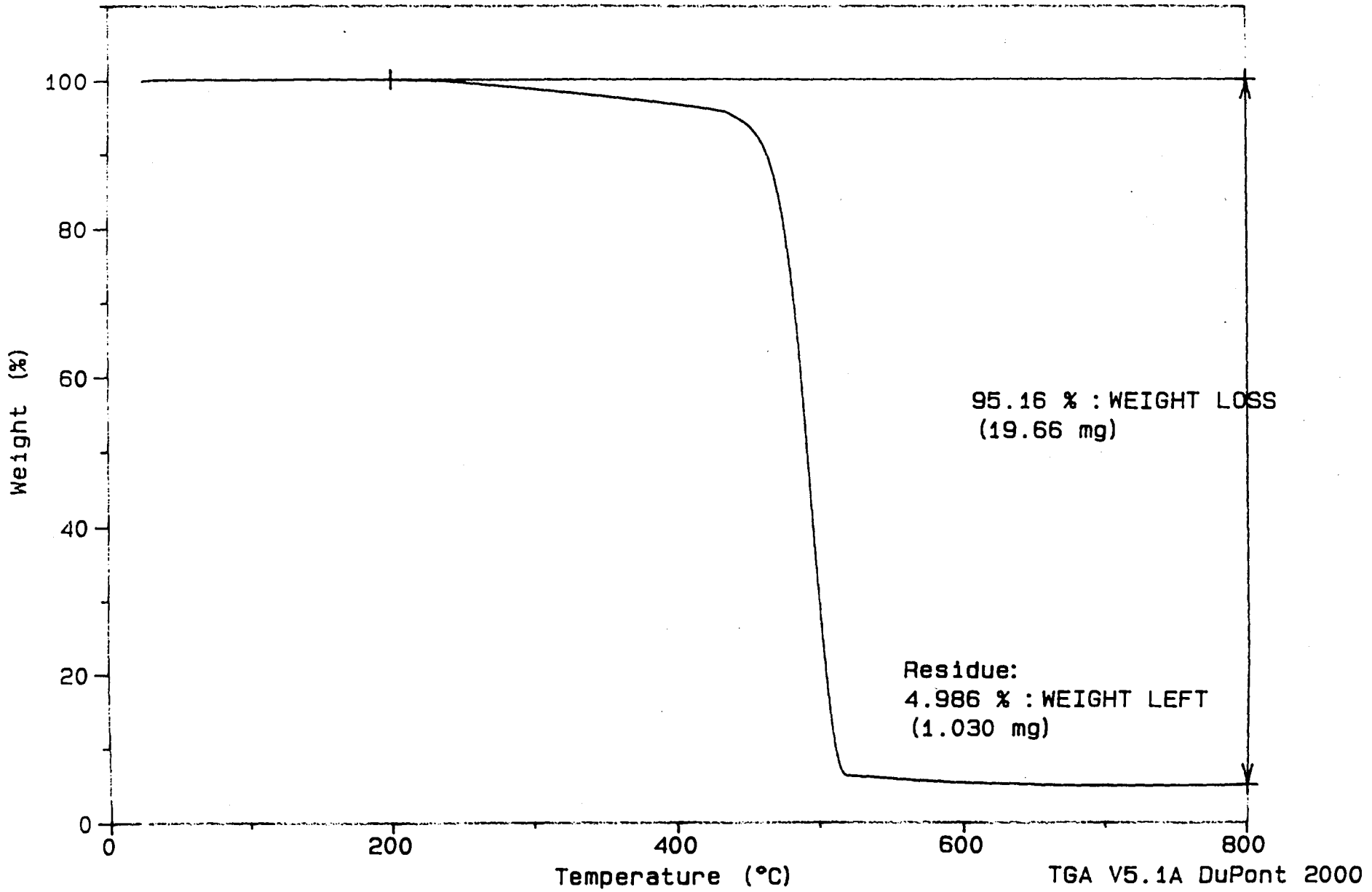
File: C:ARTI.079
Operator: GJM
Run Date: 1-Mar-93 10:36



Sample: #80 UNFILLED
Size: 20.6570 mg
Method: TGA
Comment: RM TO 600°C BY 20°C/MIN IN N2 THEN SWITCHED TO AIR

TGA

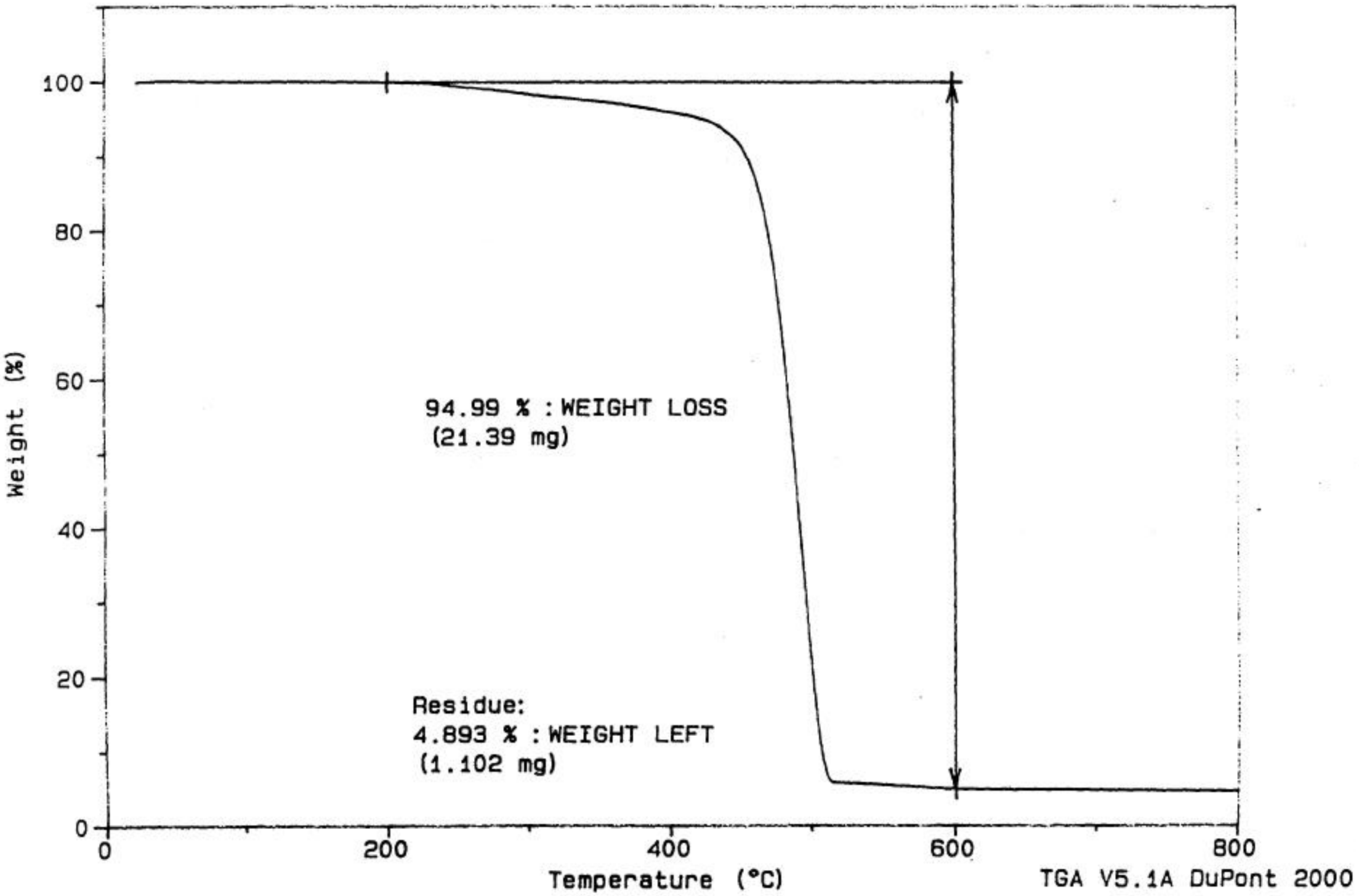
File: C:TGA.13
Operator: SKL
Run Date: 12-May-92 13:22



Sample: #81 UNFILLED
Size: 22.5130 mg
Method: TGA
Comment: RM TO 600°C BY 20°C/MIN IN N2 THEN SWITCHED TO AIR

TGA

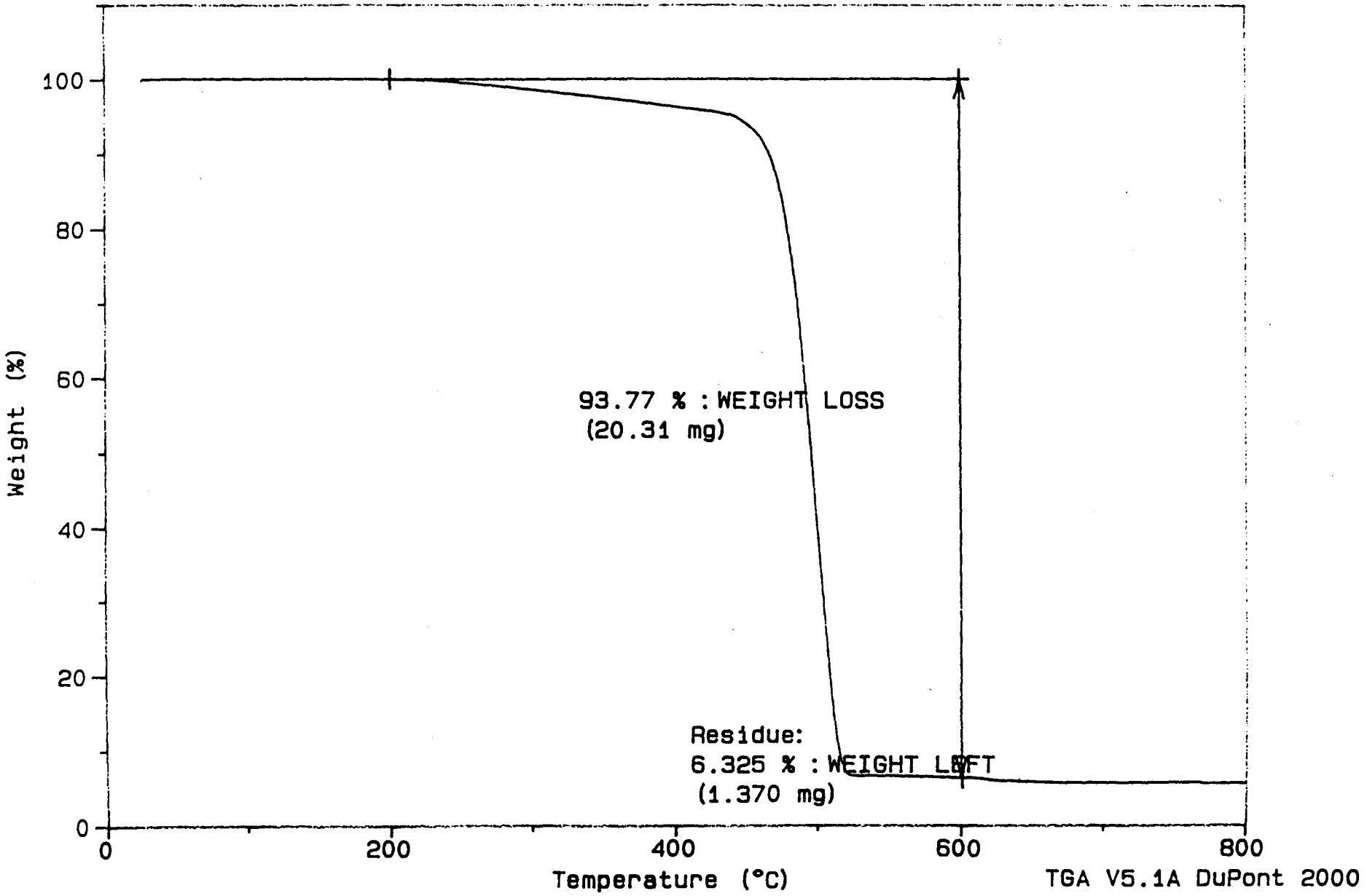
File: C:TGA.11
Operator: SKL
Run Date: 11-May-92 14:13



Sample: #82 UNFILLED
Size: 21.6550 mg
Method: TGA
Comment: RM TO 600°C BY 20°C/MIN IN N2 THEN SWITCHED TO AIR

TGA

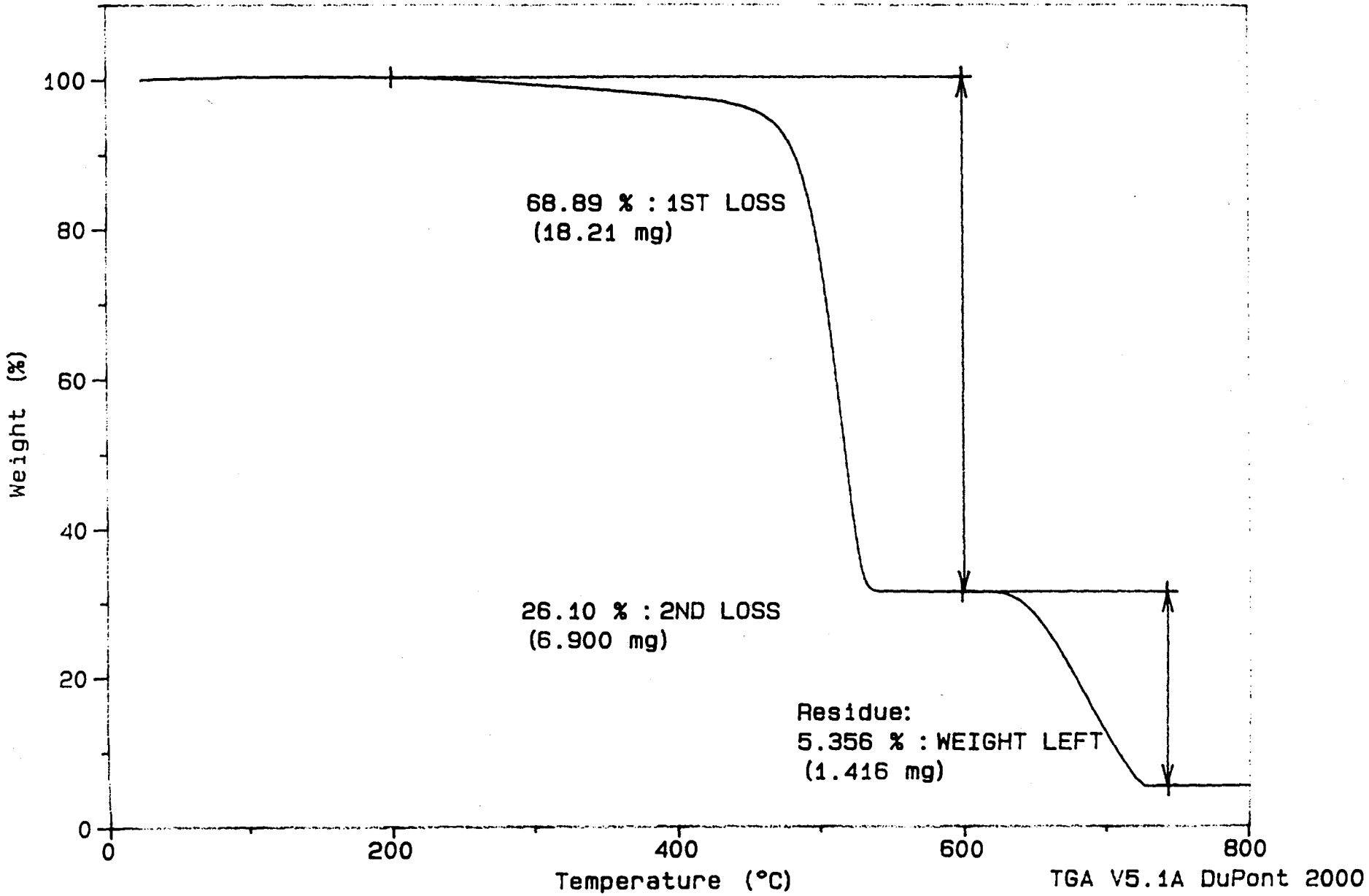
File: C:TGA.12
Operator: SKL
Run Date: 11-May-92 15:59



Sample: #83 FILLED
Size: 26.4400 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600 °C IN N2 THEN SWITCHED TO AIR

TGA

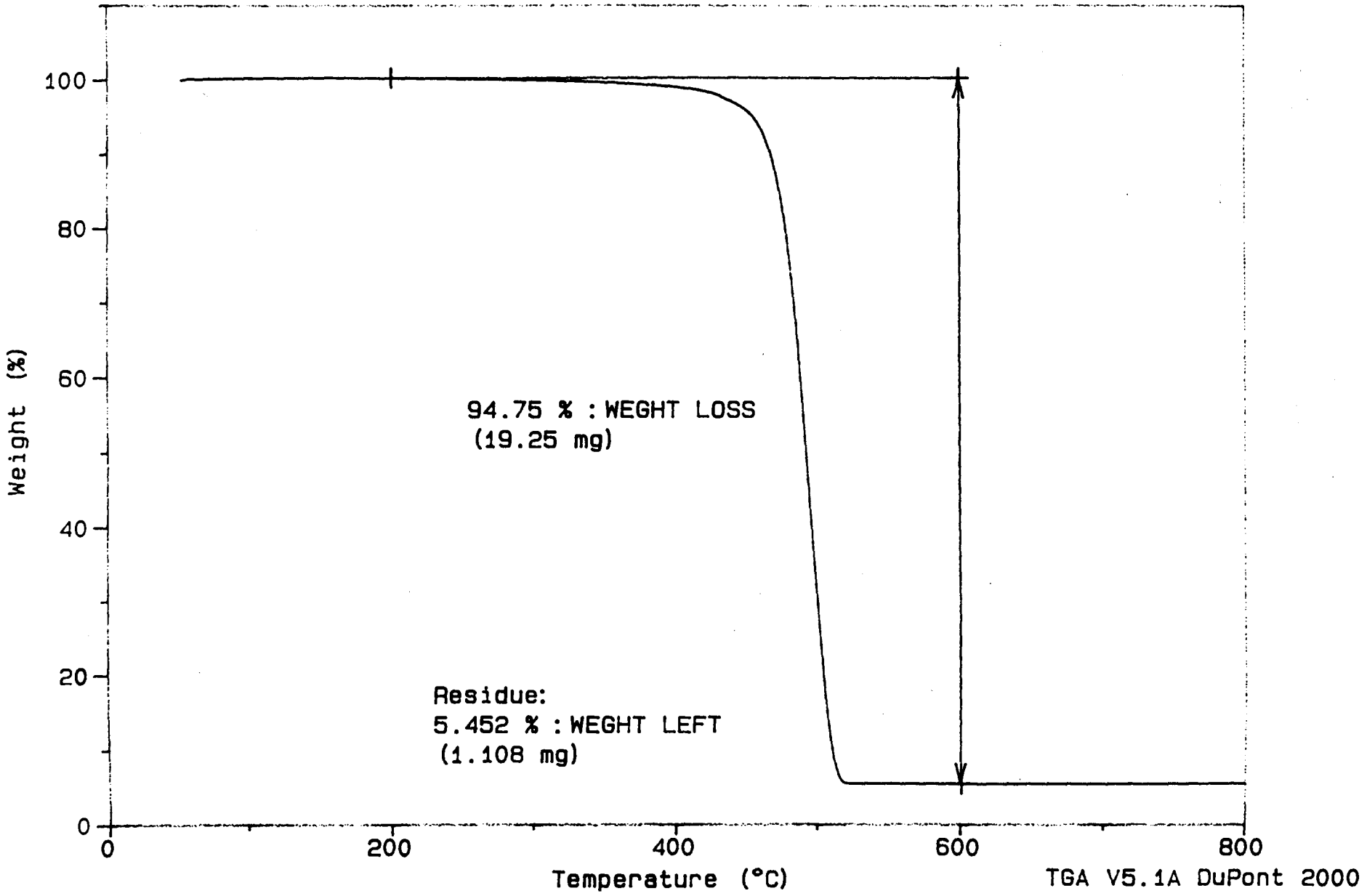
File: C:TGA.60
Operator: SKL
Run Date: 29-May-92 13:15



Sample: #84 UNFILLED
Size: 20.3160 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

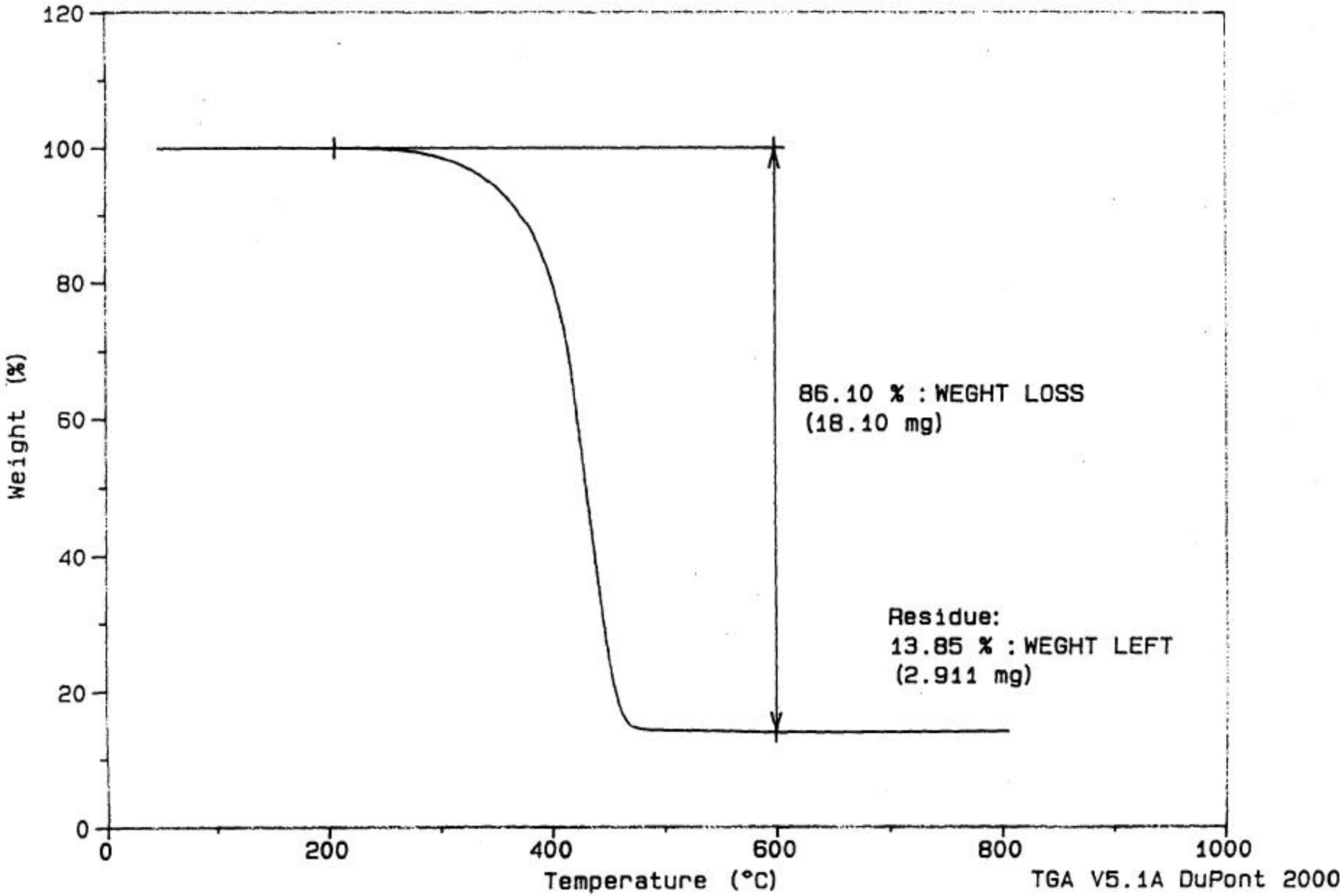
File: C:TGA.52
Operator: SKL
Run Date: 27-May-92 16:23



Sample: #85 UNFILLED
Size: 21.0240 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800 °C IN N2

TGA

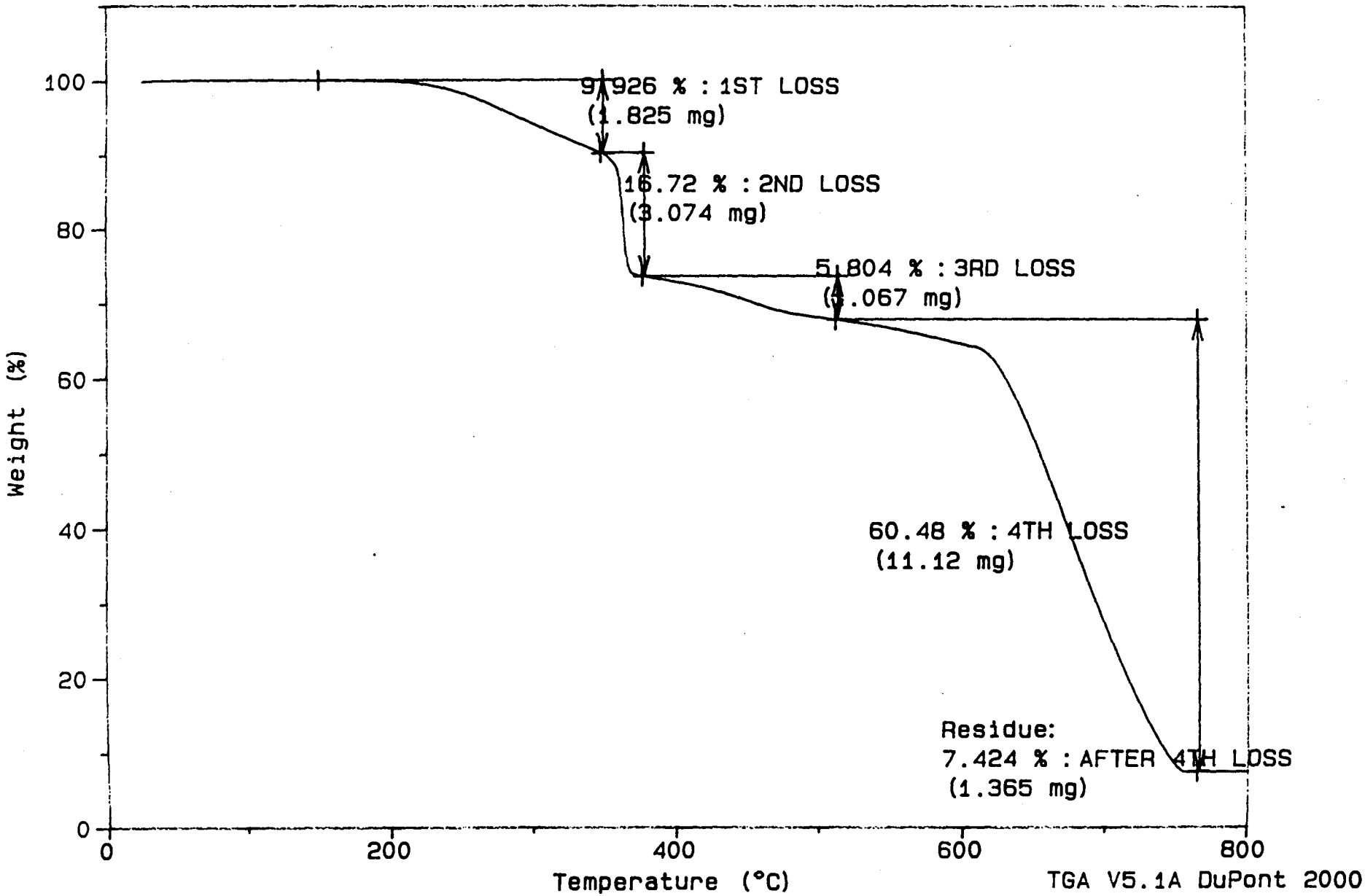
File: C:TGA.51
Operator: SKL
Run Date: 27-May-92 15:24



Sample: #86 FILLED
Size: 18.3850 mg
Method: TGA
Comment: HEAT UPTO 600°C BY 20°C/MIN IN N2 AND SWITCH TO AIR

TGA

File: C:TGA.93
Operator: SKL
Run Date: 19-Jun-92 09:46

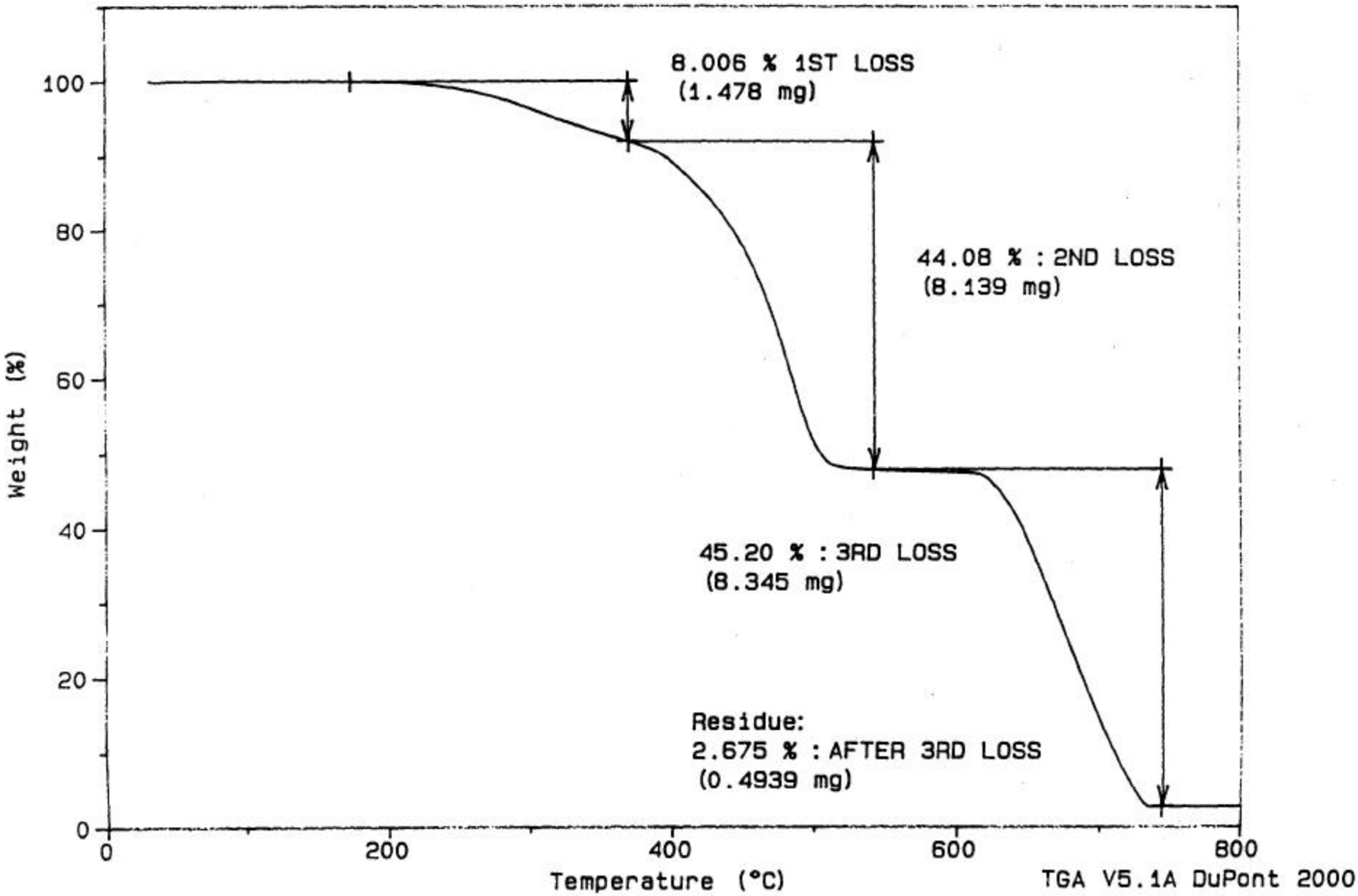


TGA V5.1A DuPont 2000

Sample: #87 FILLED
Size: 18.4640 mg
Method: TGA
Comment: HEAT UPTO 600°C BY 20°C/MIN IN N2 AND SWITCH TO AIR

TGA

File: C:TGA.94
Operator: SKL
Run Date: 19-Jun-92 10:51

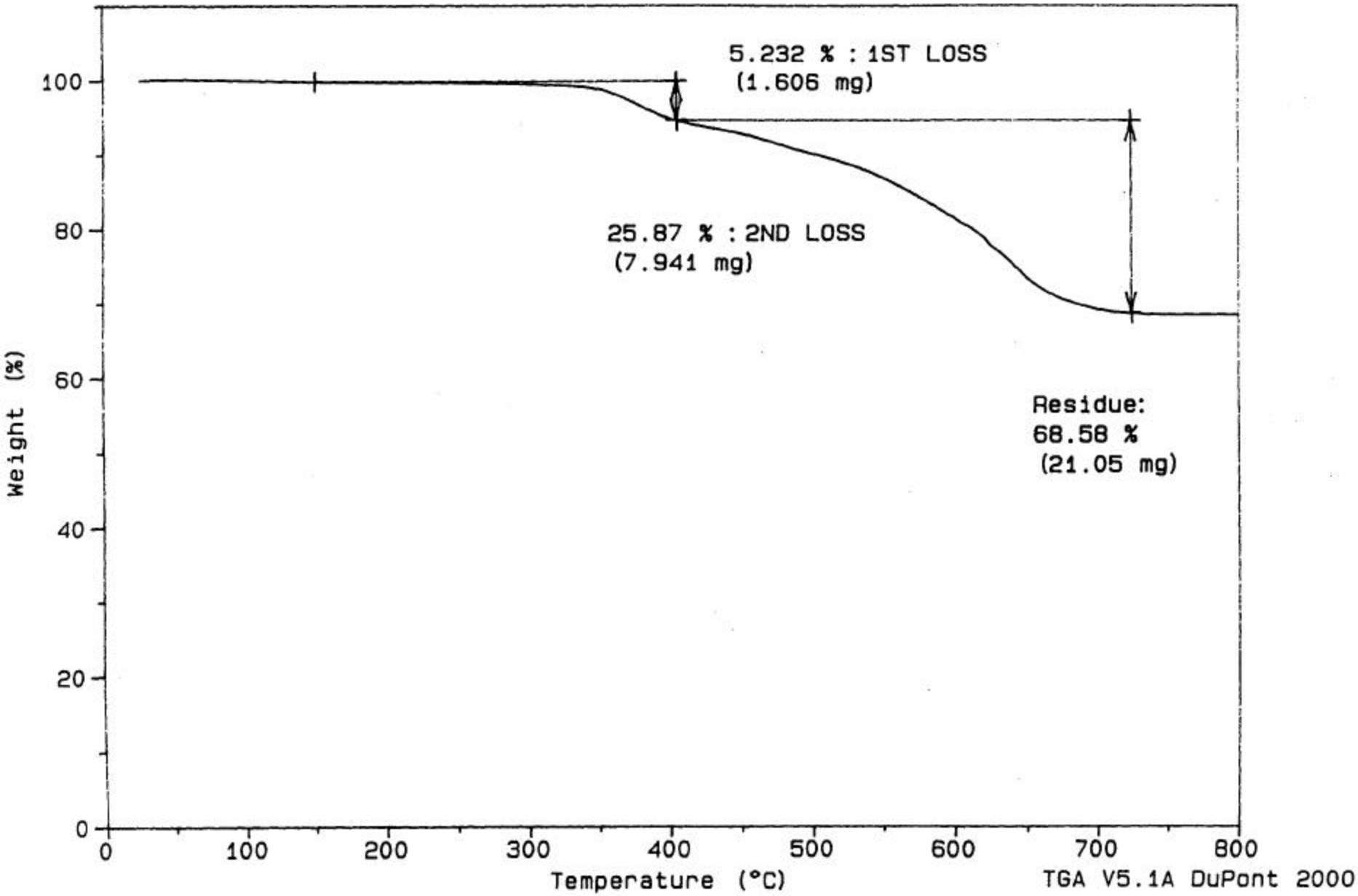


TGA V5.1A DuPont 2000

Sample: #88 FILLED
Size: 30.7000 mg
Method: TGA
Comment: HEAT UPTO 600°C BY 20°C/MIN IN N2 AND SWITCH TO AIR

TGA

File: C:TGA.95
Operator: SKL
Run Date: 19-Jun-92 14:10

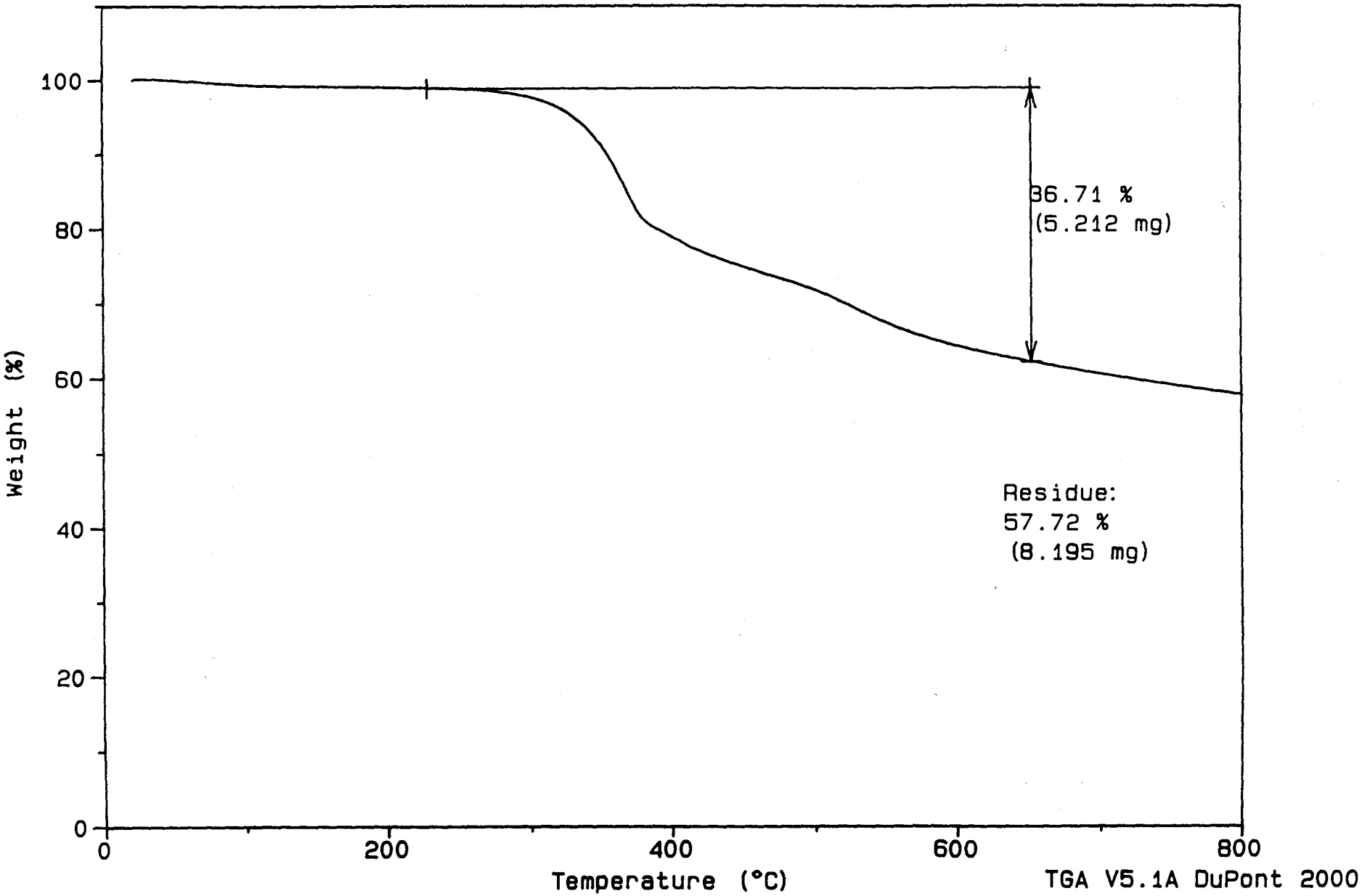


TGA V5.1A DuPont 2000

Sample: #89
Size: 14.1970 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

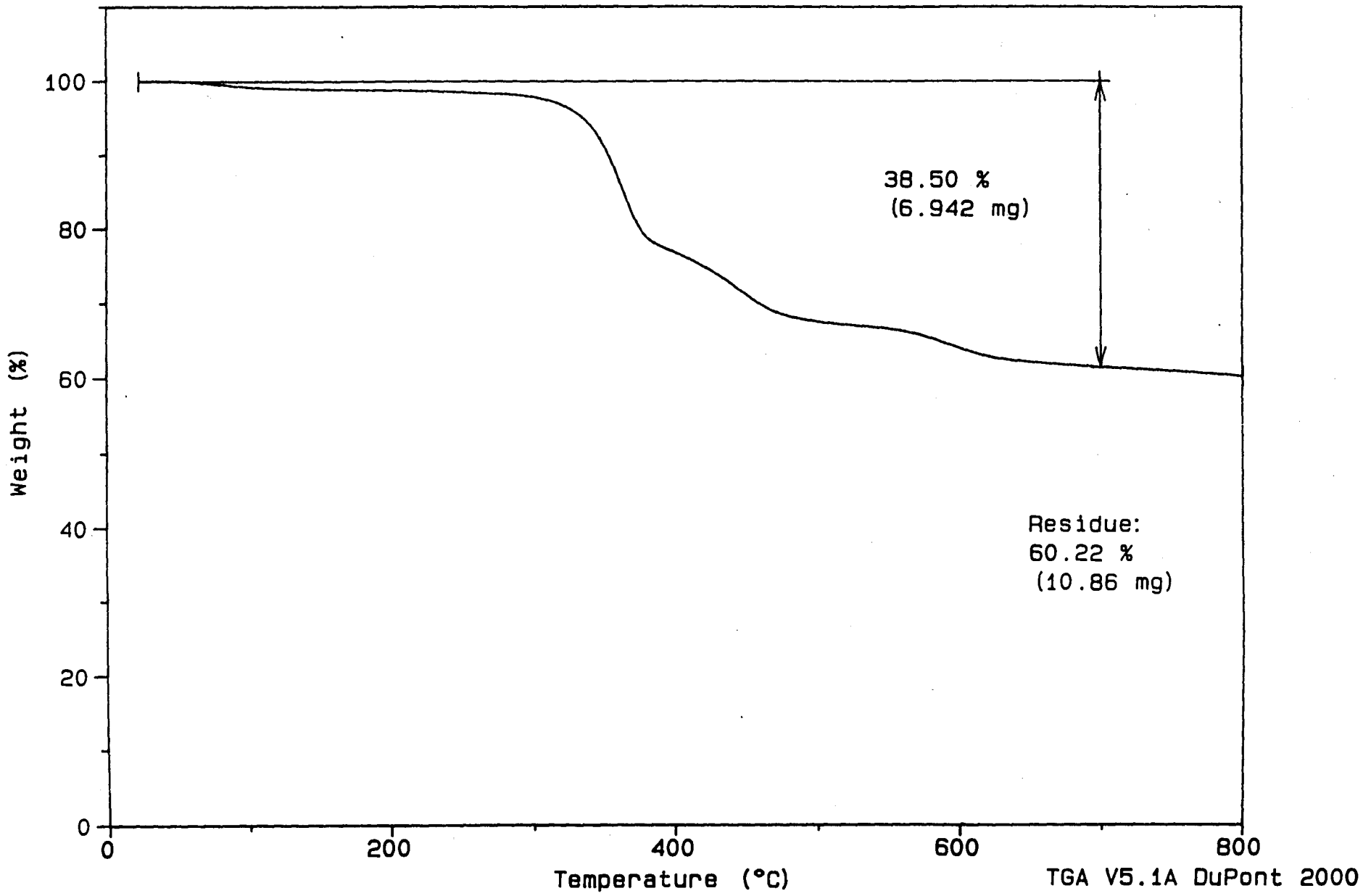
File: C:ARTI89.089
Operator: GJM
Run Date: 1-Mar-93 13:23



Sample: #90
Size: 18.0300 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

File: C:ARTI90.091
Operator: GJM
Run Date: 3-Mar-93 13:11

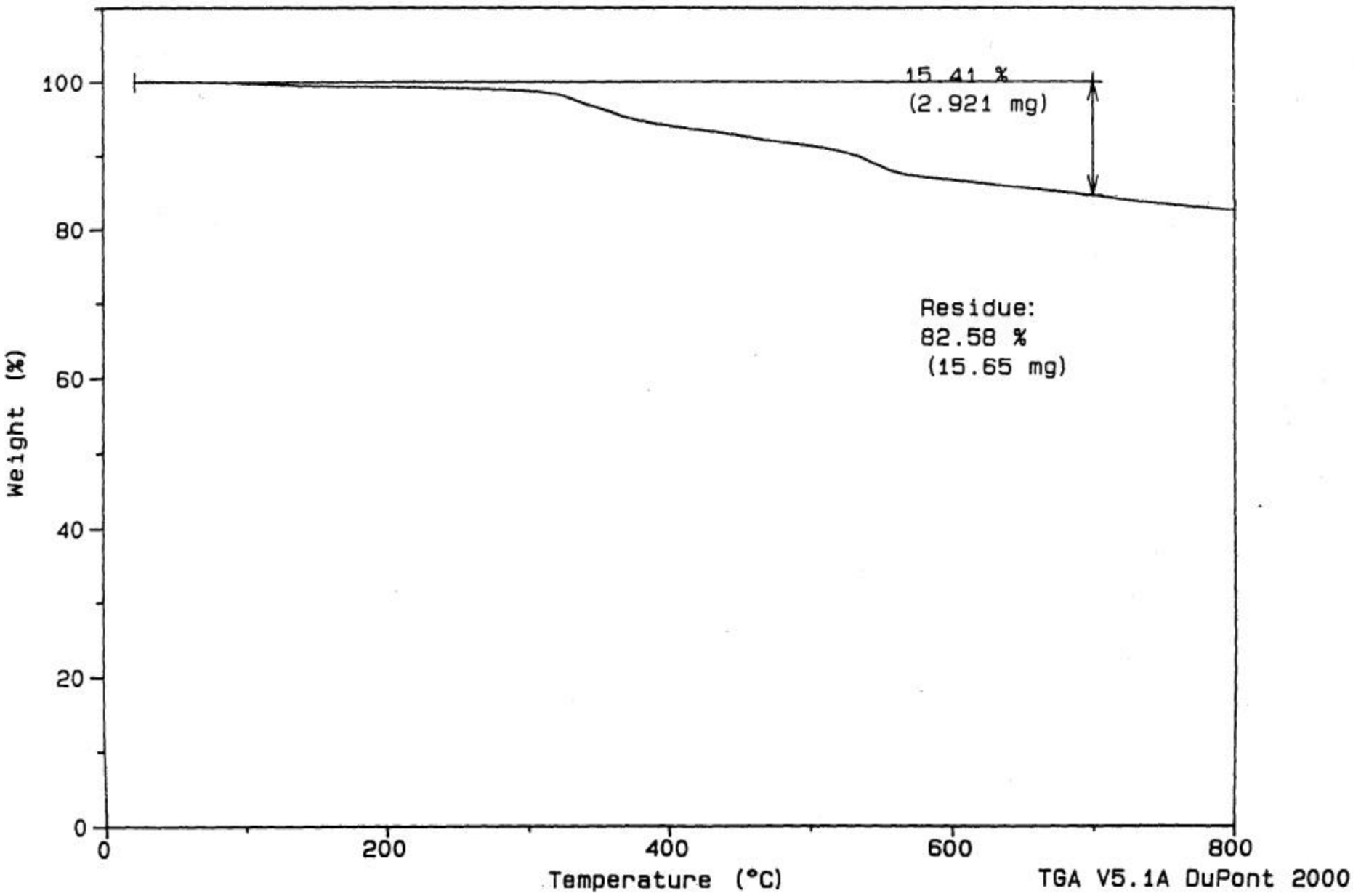


TGA V5.1A DuPont 2000

Sample: #91
Size: 18.9570 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

File: C:ARTI91.091
Operator: GJM
Run Date: 3-Mar-93 15:26

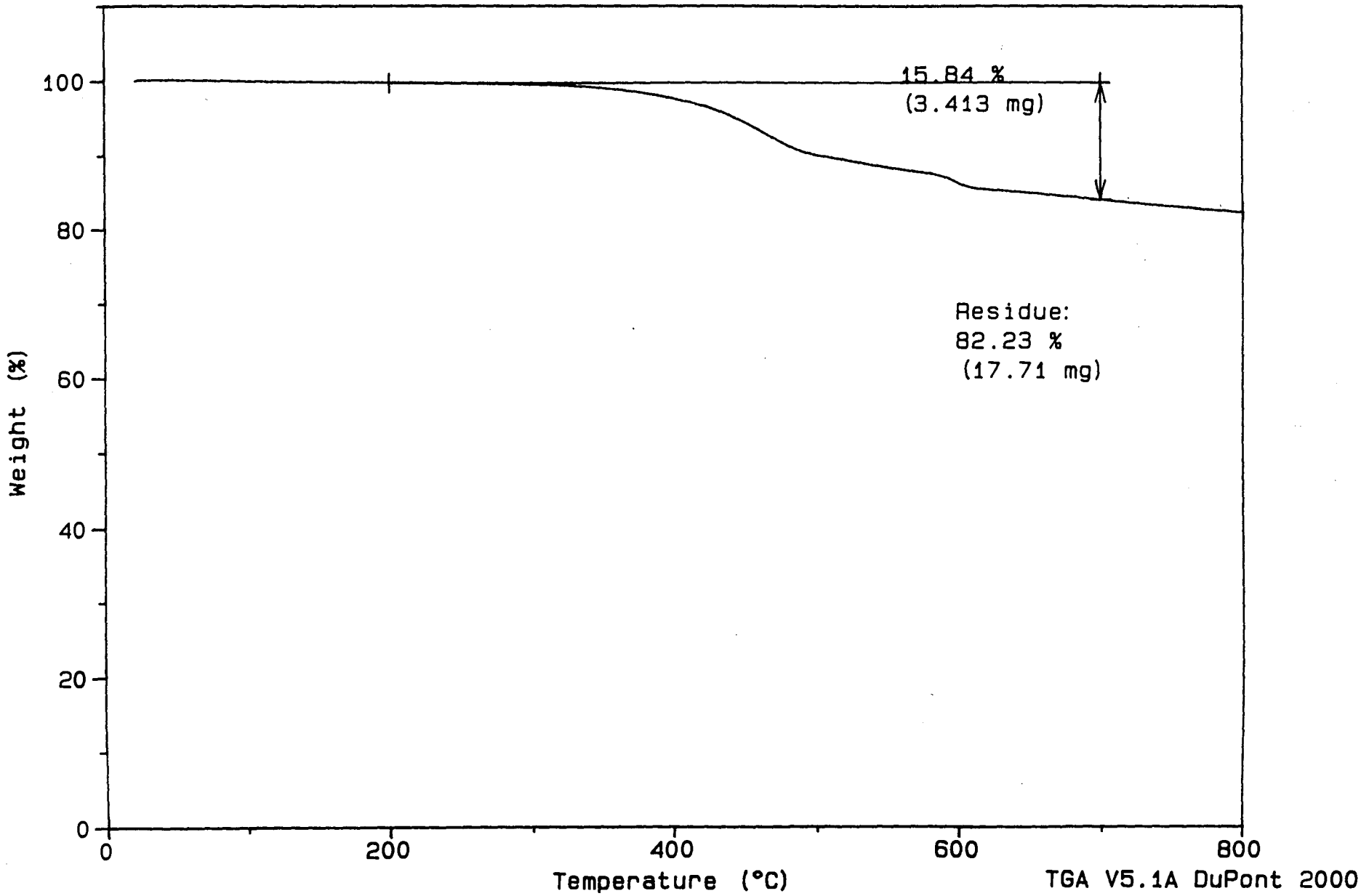


TGA V5.1A DuPont 2000

Sample: #92
Size: 21.5420 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

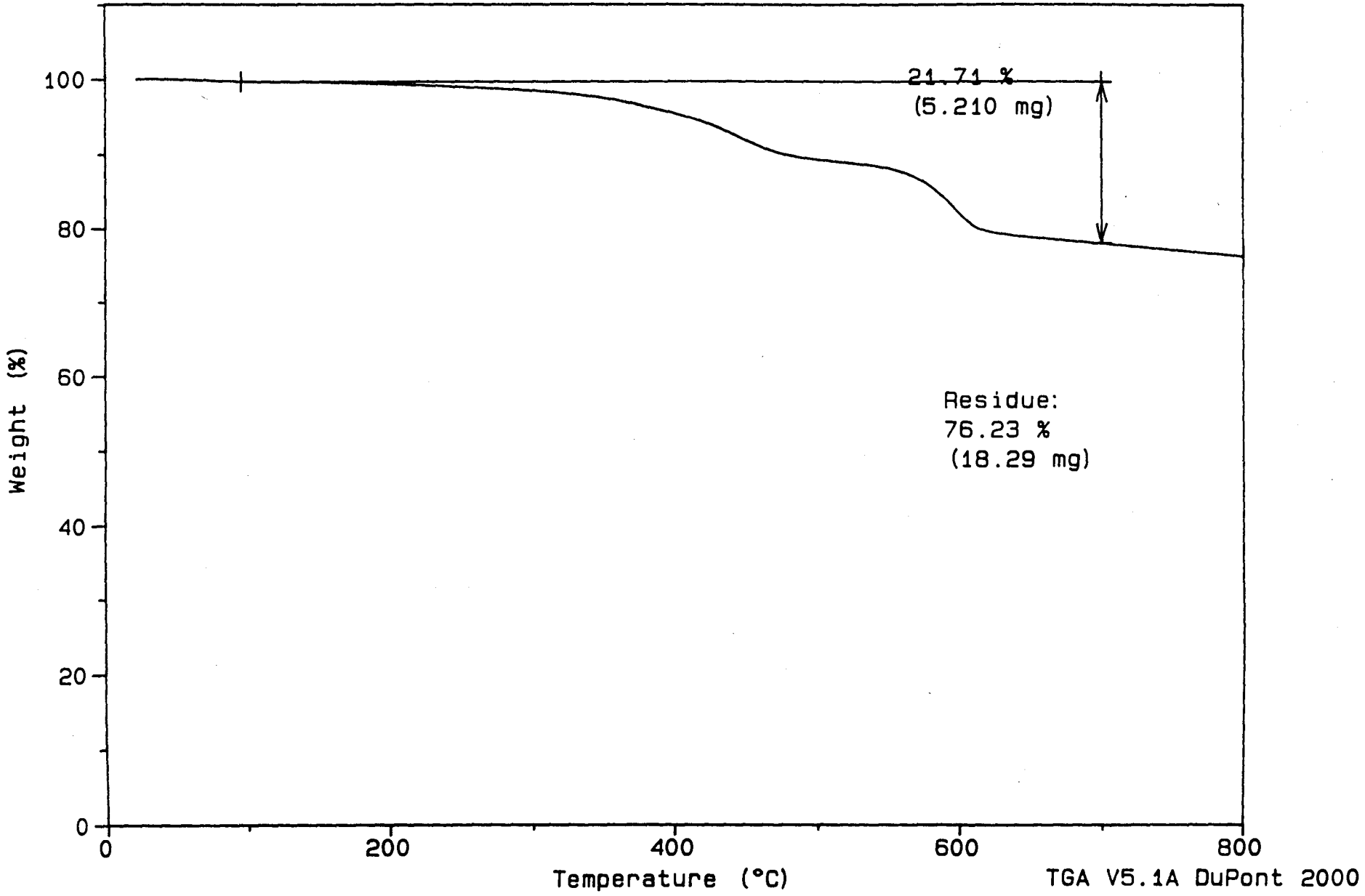
File: C:ARTI92.092
Operator: GJM
Run Date: 4-Mar-93 09:48



Sample: #93
Size: 23.9940 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

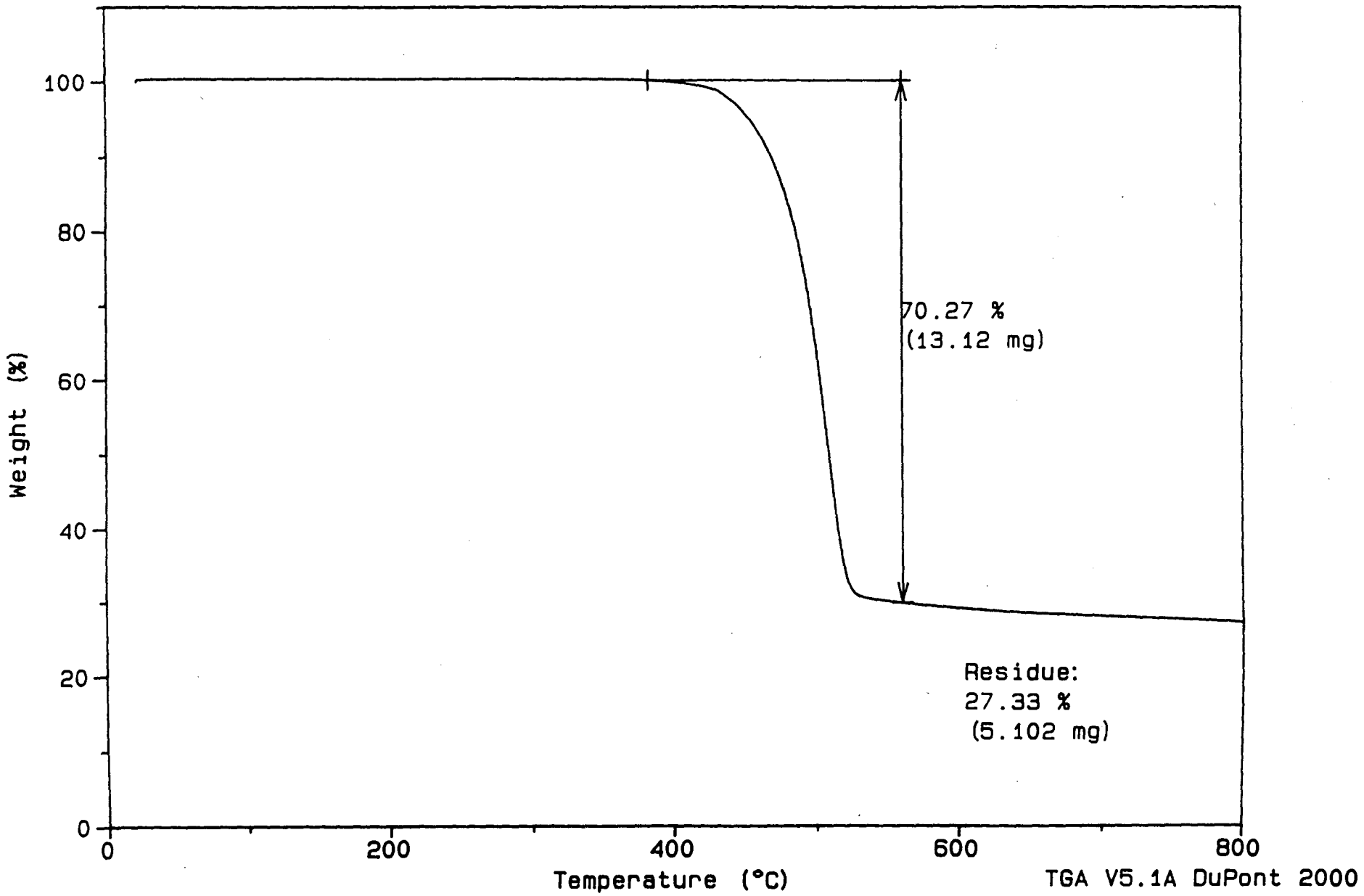
File: C:ARTI.093
Operator: GJM
Run Date: 4-Mar-93 11:56



Sample: #94
Size: 18.6690 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 800°C IN N2

TGA

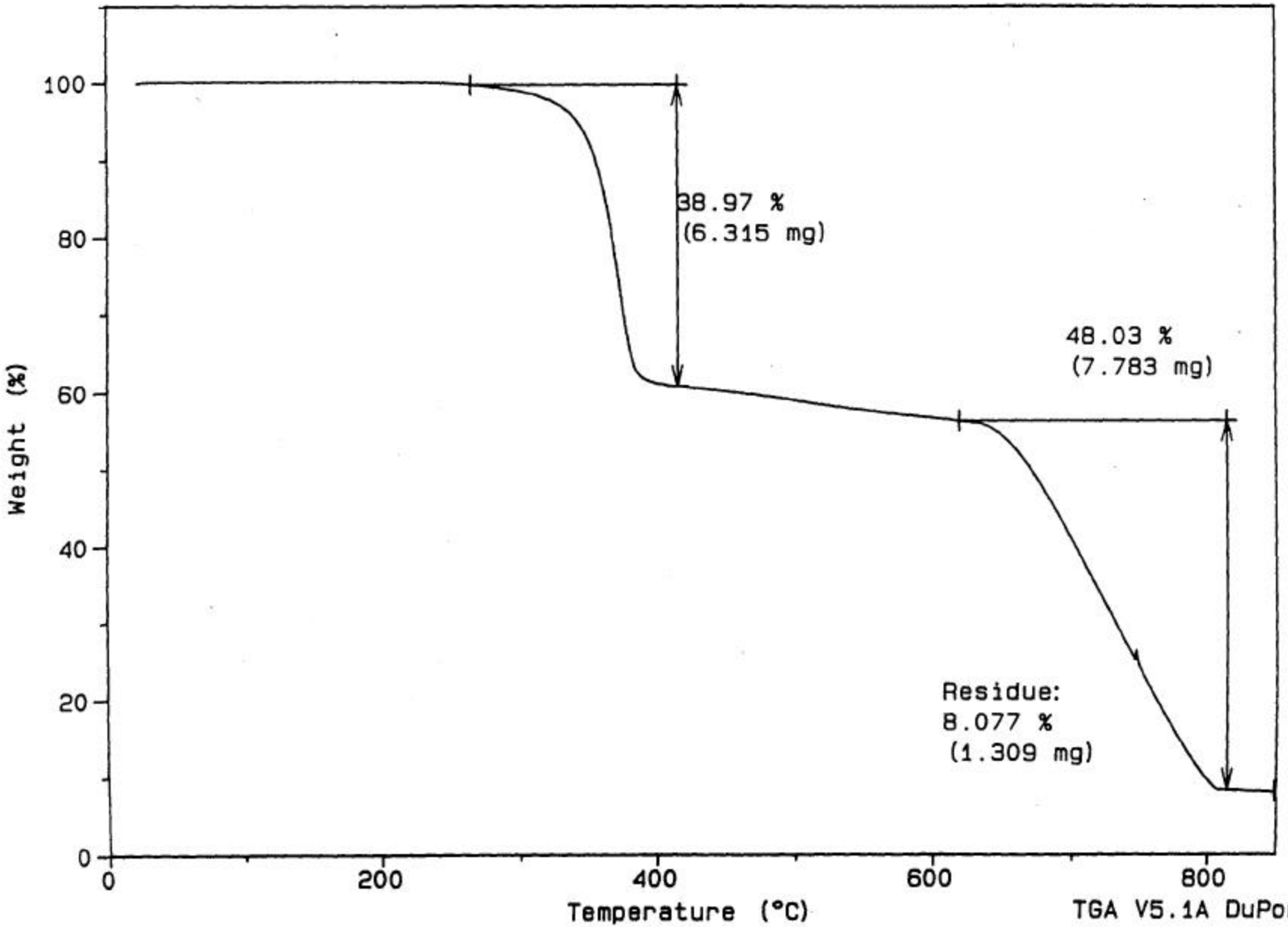
File: C:ARTI.094
Operator: GJM
Run Date: 4-Mar-93 13:55



Sample: #95
Size: 16.2050 mg
Method: TGA
Comment: HEAT BY 20°C/MIN UPTO 600°C IN N2, SWITCH TO AIR @ 600°C

TGA

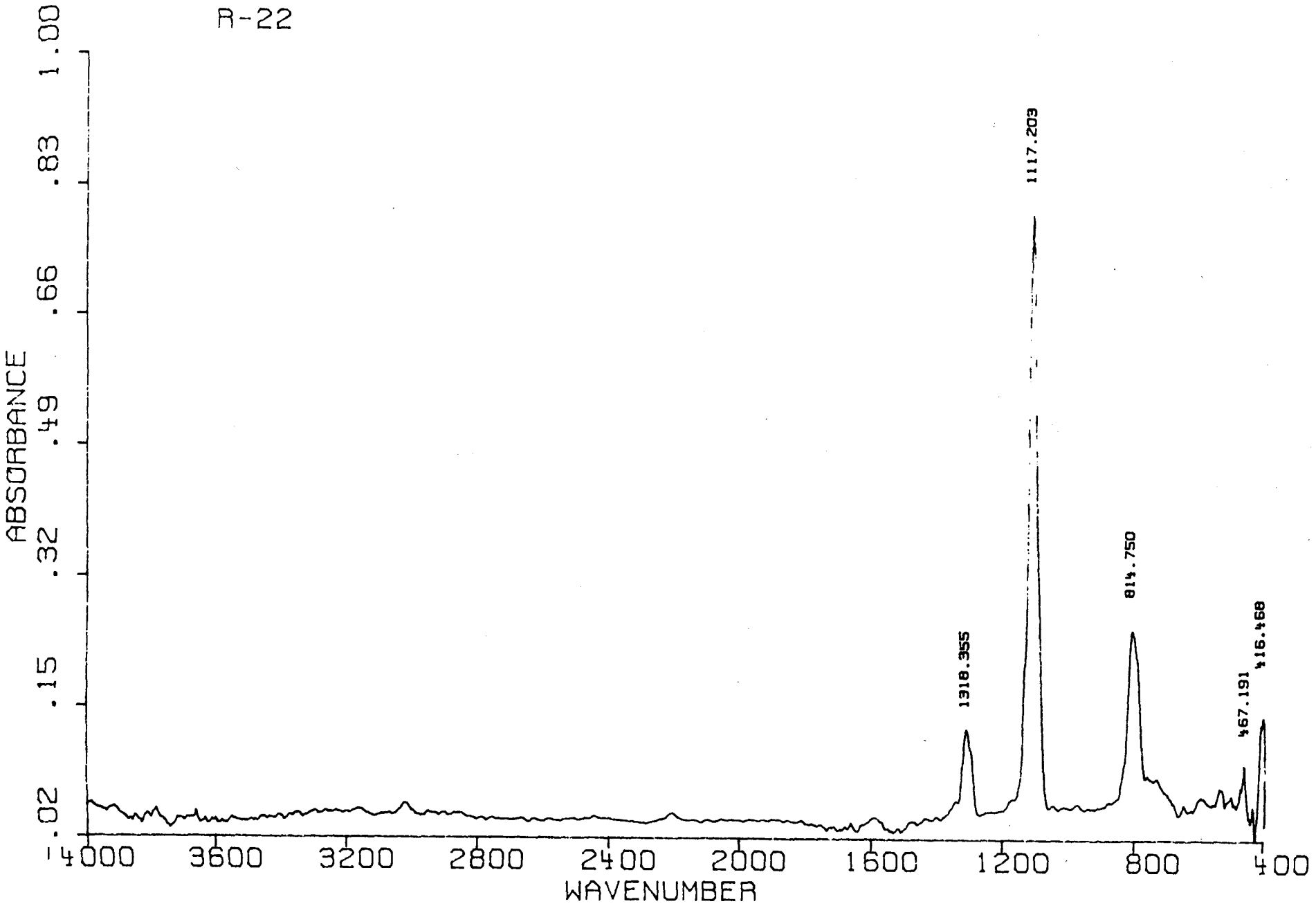
File: C:ARTI.095
Operator: GJM
Run Date: 5-Mar-93 10:12

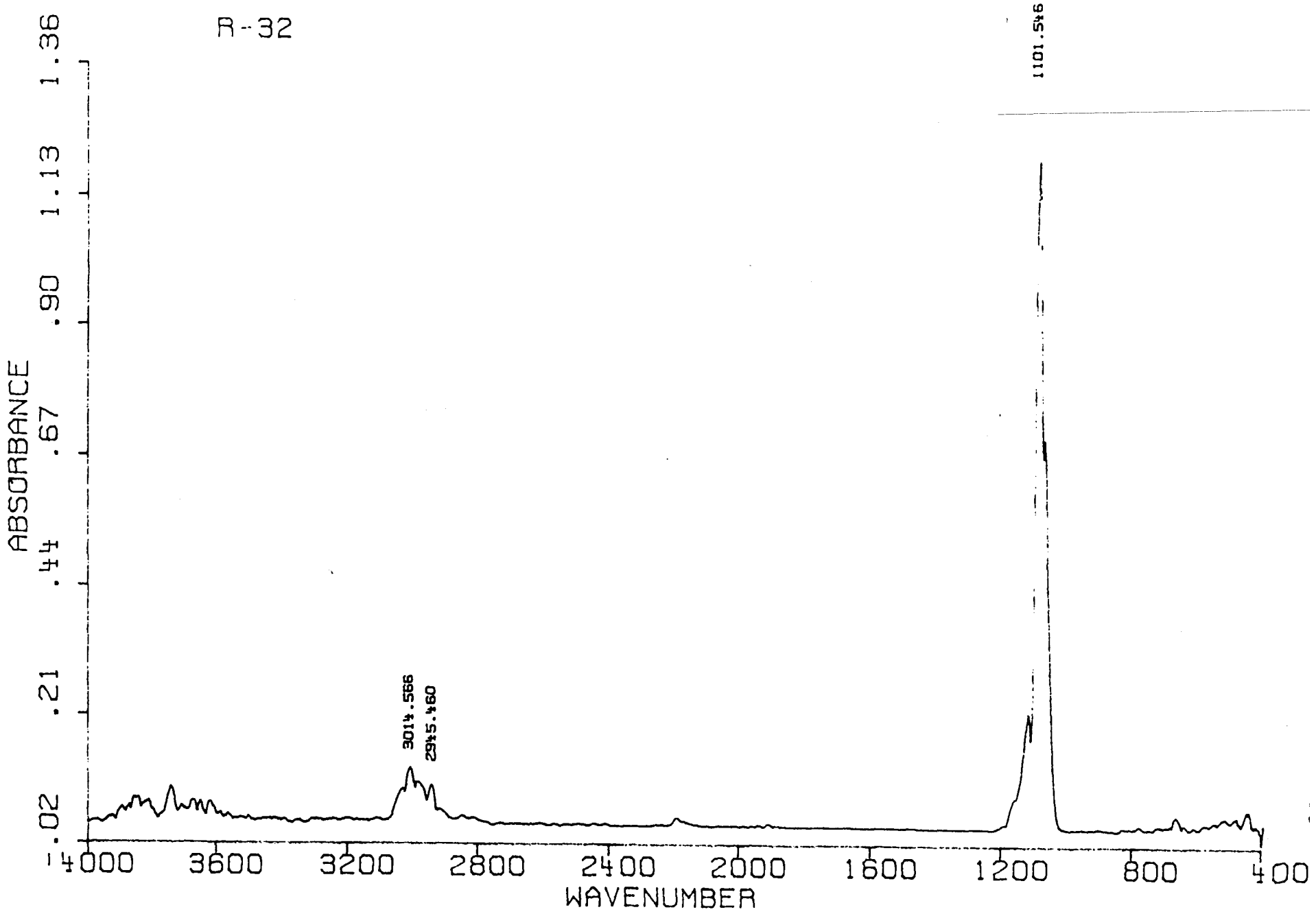


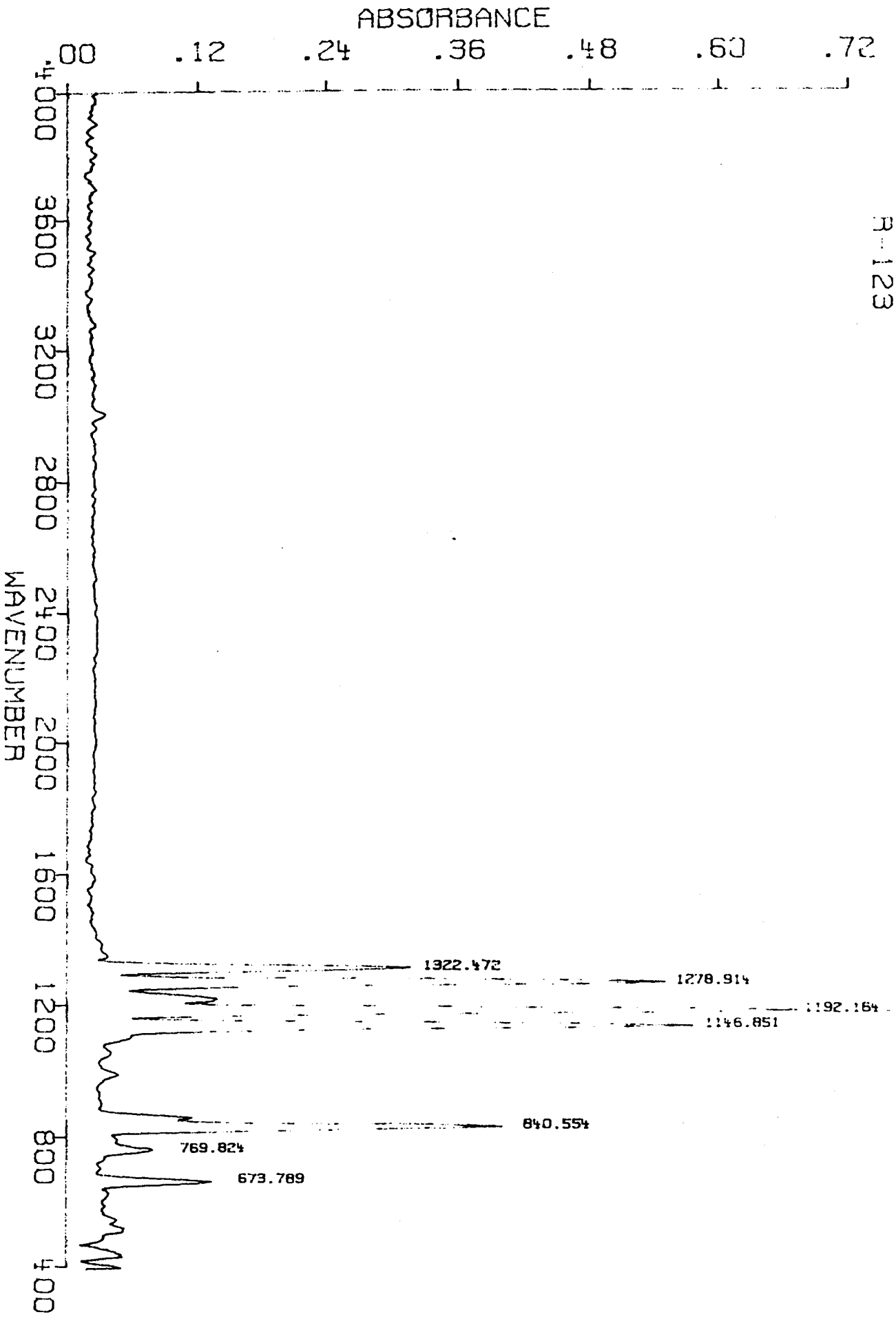
TGA V5.1A DuPont 2000

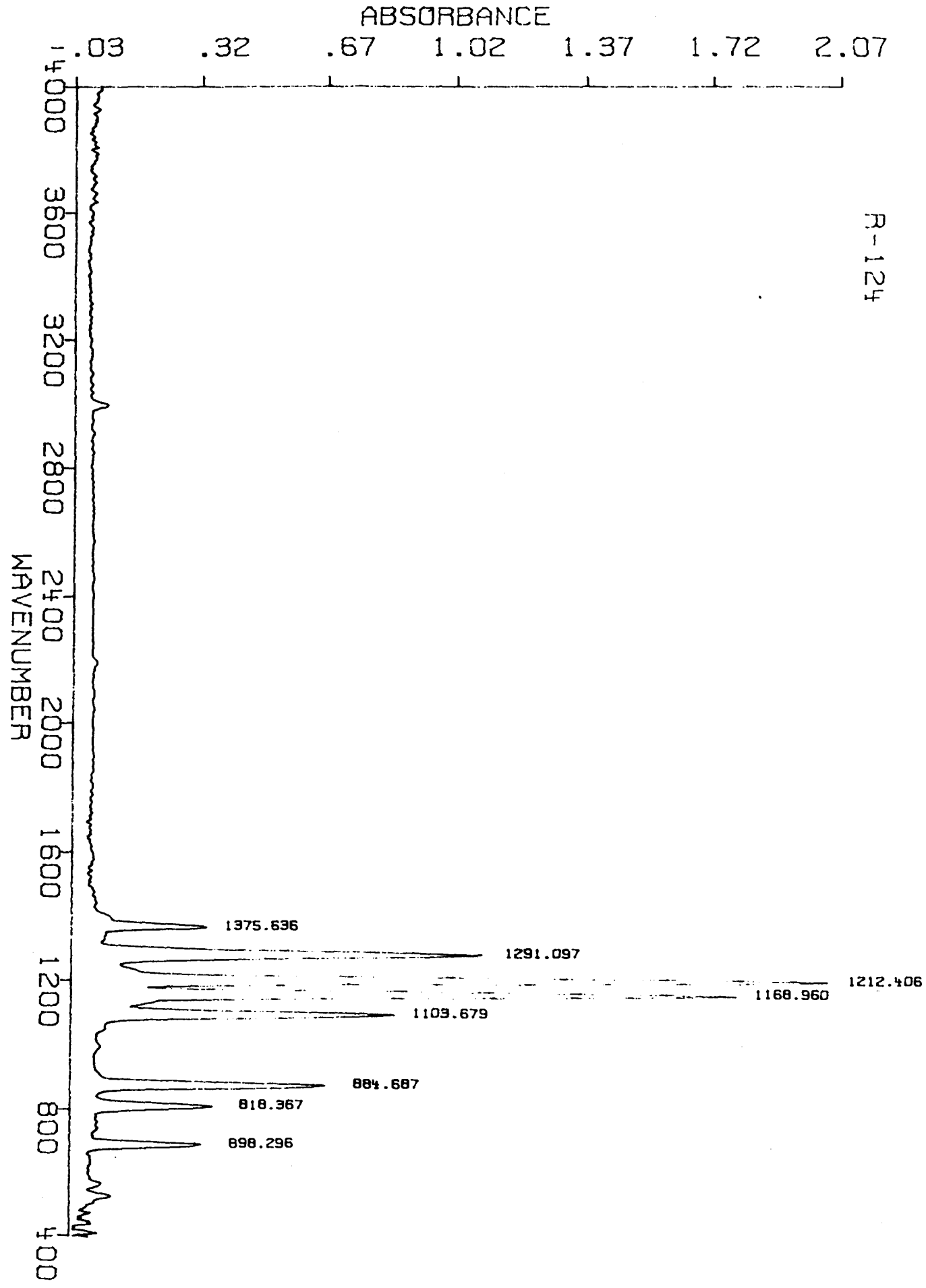
APPENDIX I

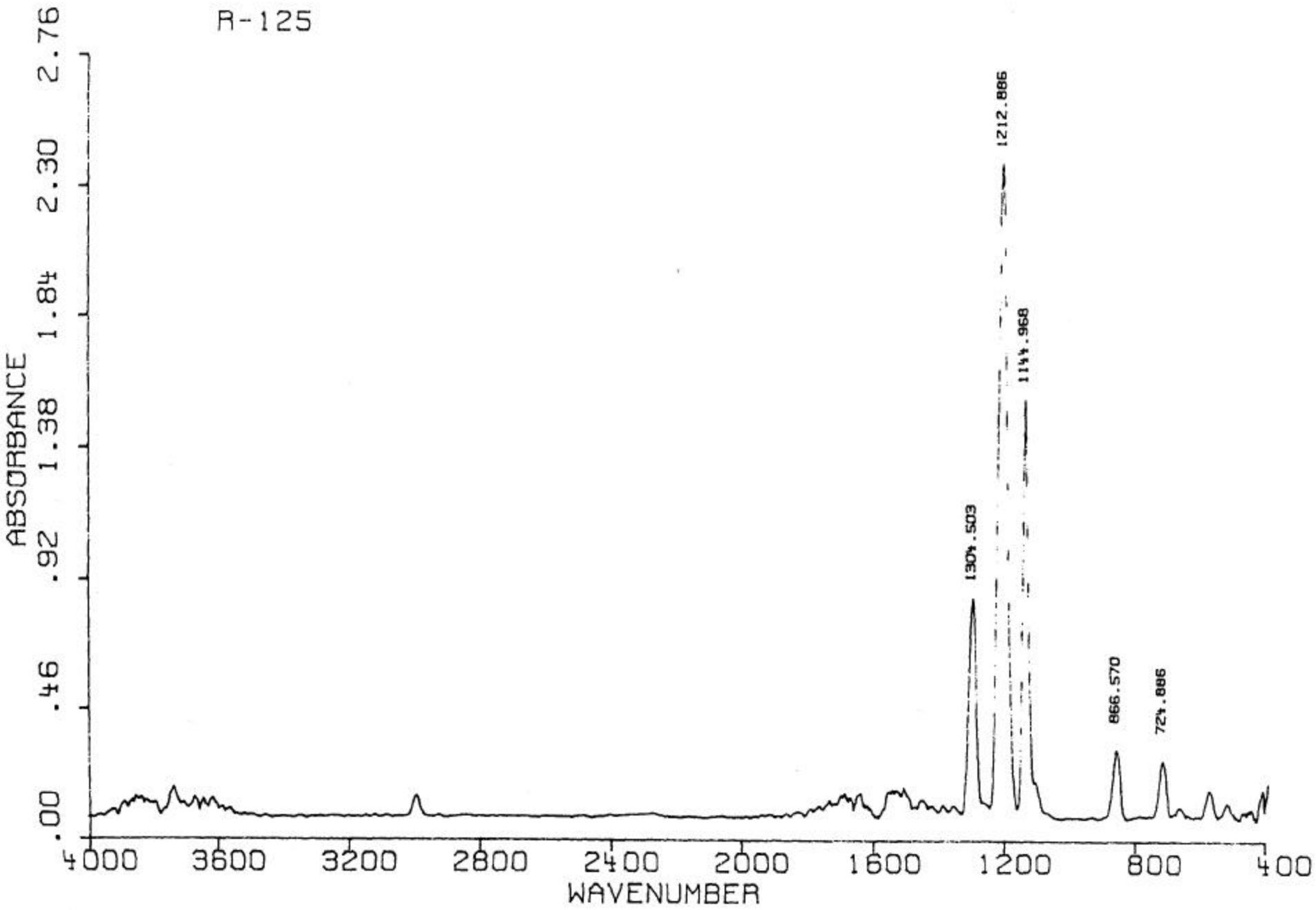
FOURIER TRANSFORM INFRARED ANALYSIS OF REFRIGERANTS AND LUBRICANTS

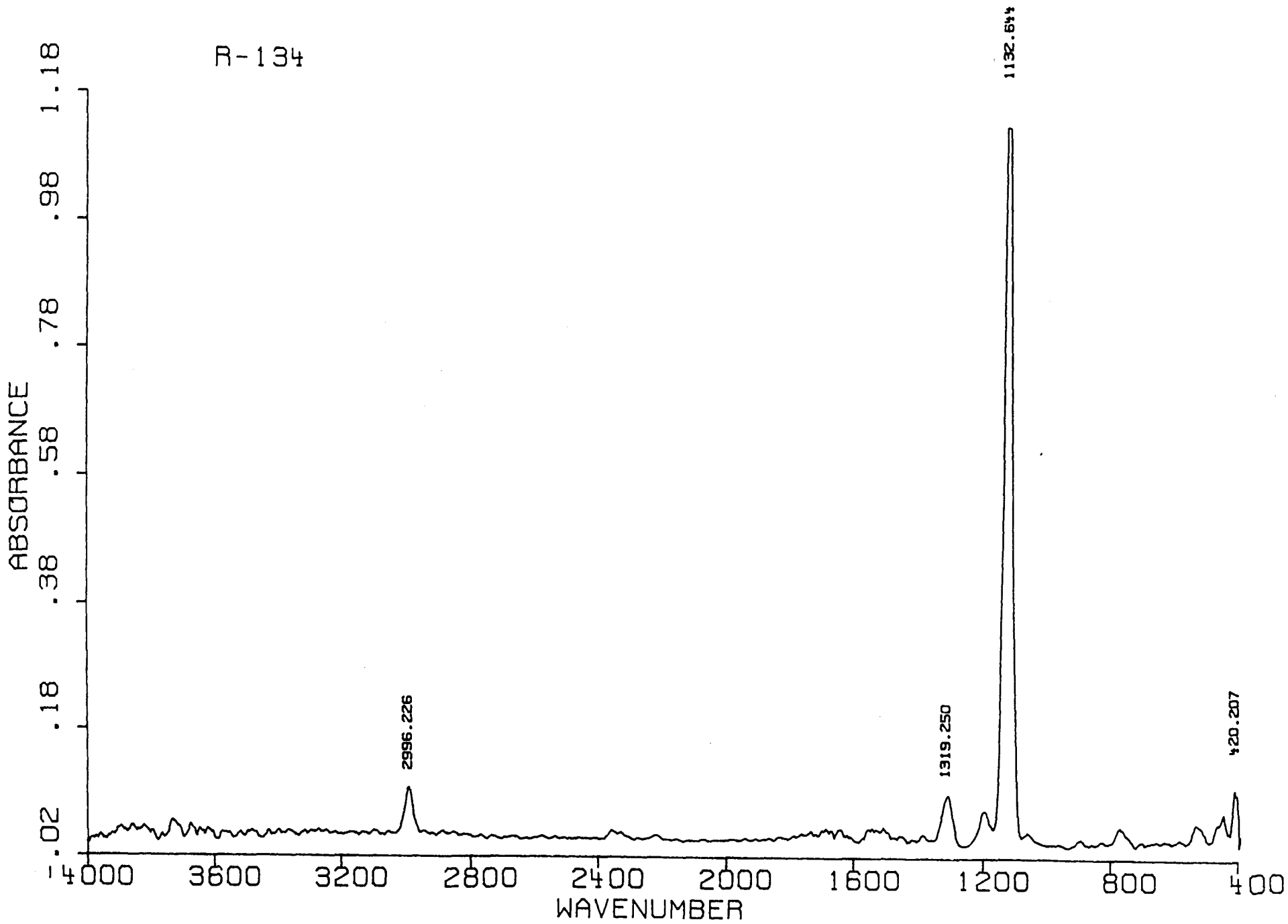

R-22
ABSORBANCE
1.00
.83
.66
.49
.32
.15
-.02
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1318.355
1117.209
814.750
467.191
416.468

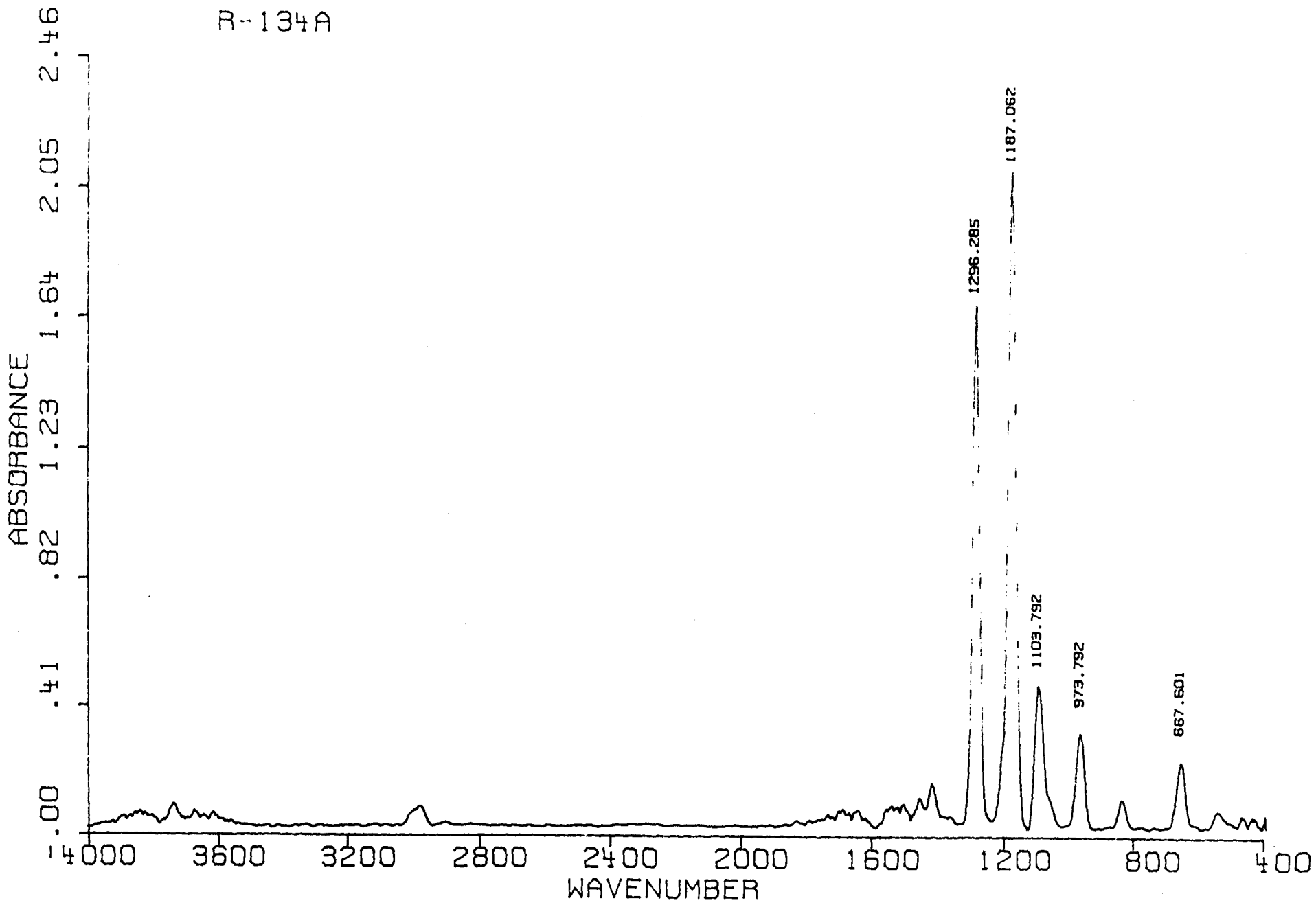

R-32
1101.546
3014.566
2945.460
ABSORBANCE
1.36
1.13
.90
.67
.44
.21
-.02
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER

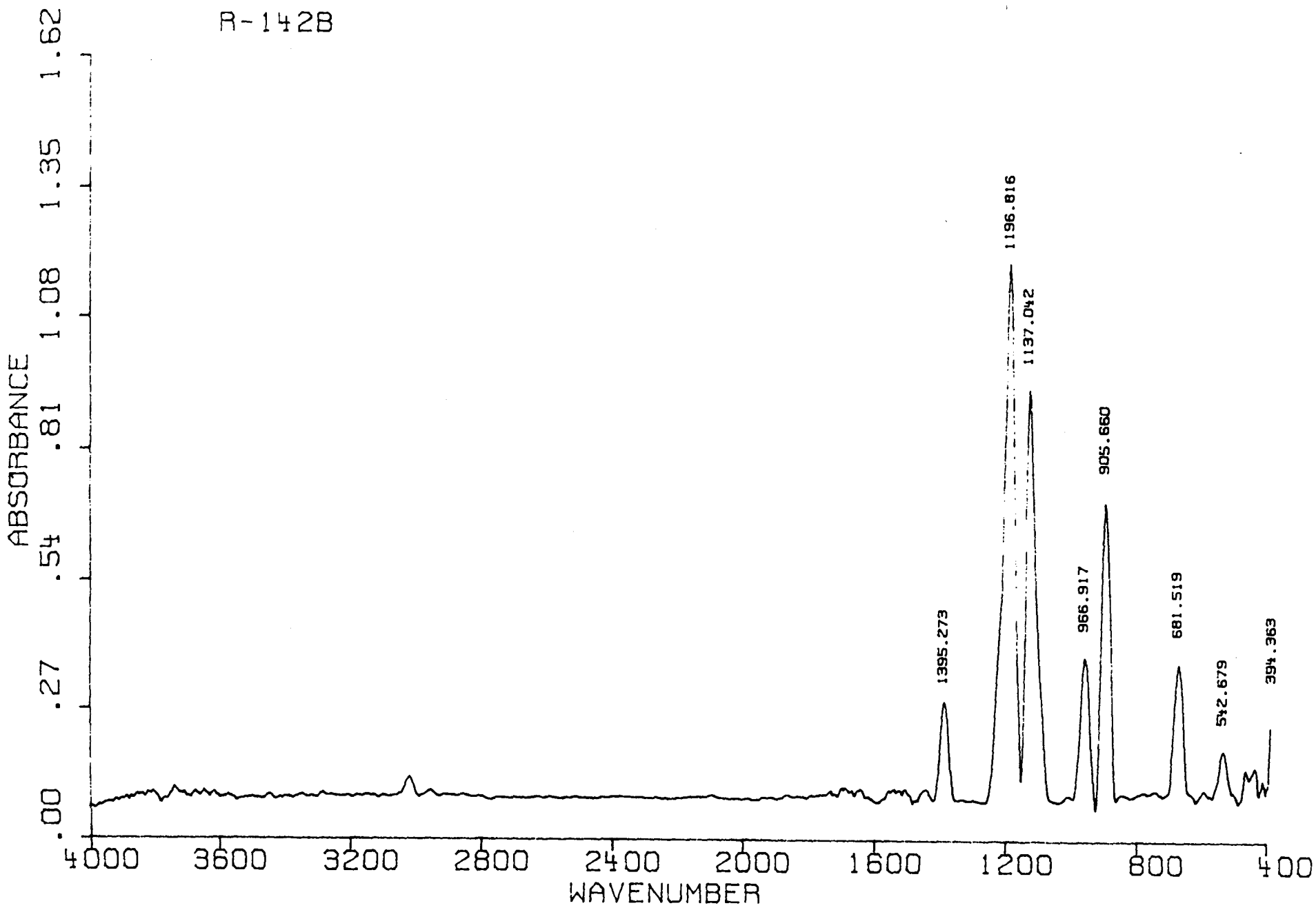

ABSORBANCE
.00
.12
.24
.36
.48
.60
.72
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1322.472
1278.914
1192.164
1146.851
840.554
769.824
673.789

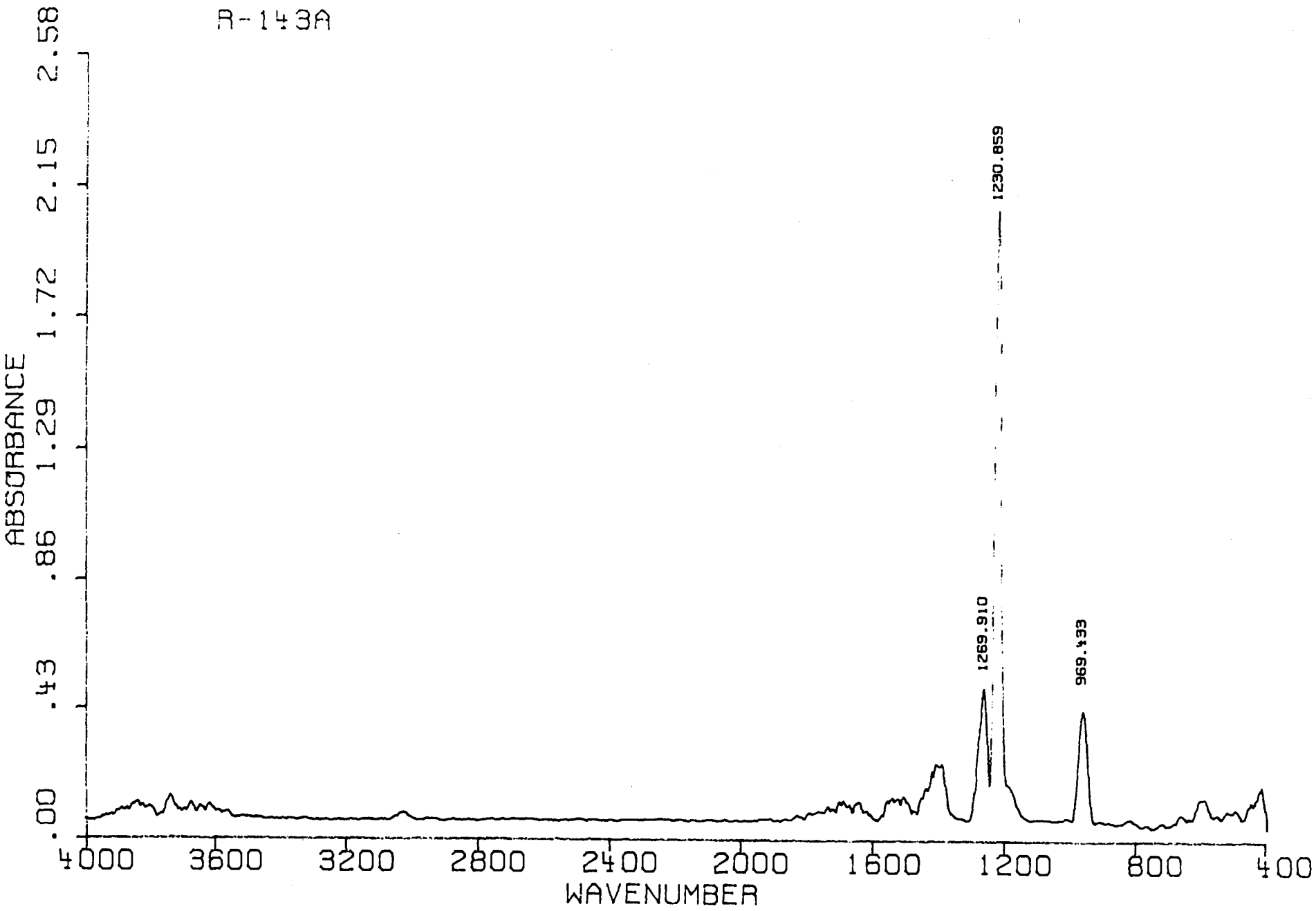

ABSORBANCE
-.03
.32
.67
1.02
1.37
1.72
2.07
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
R-124
1375.636
1291.097
1212.406
1168.960
1103.679
884.687
818.367
698.296

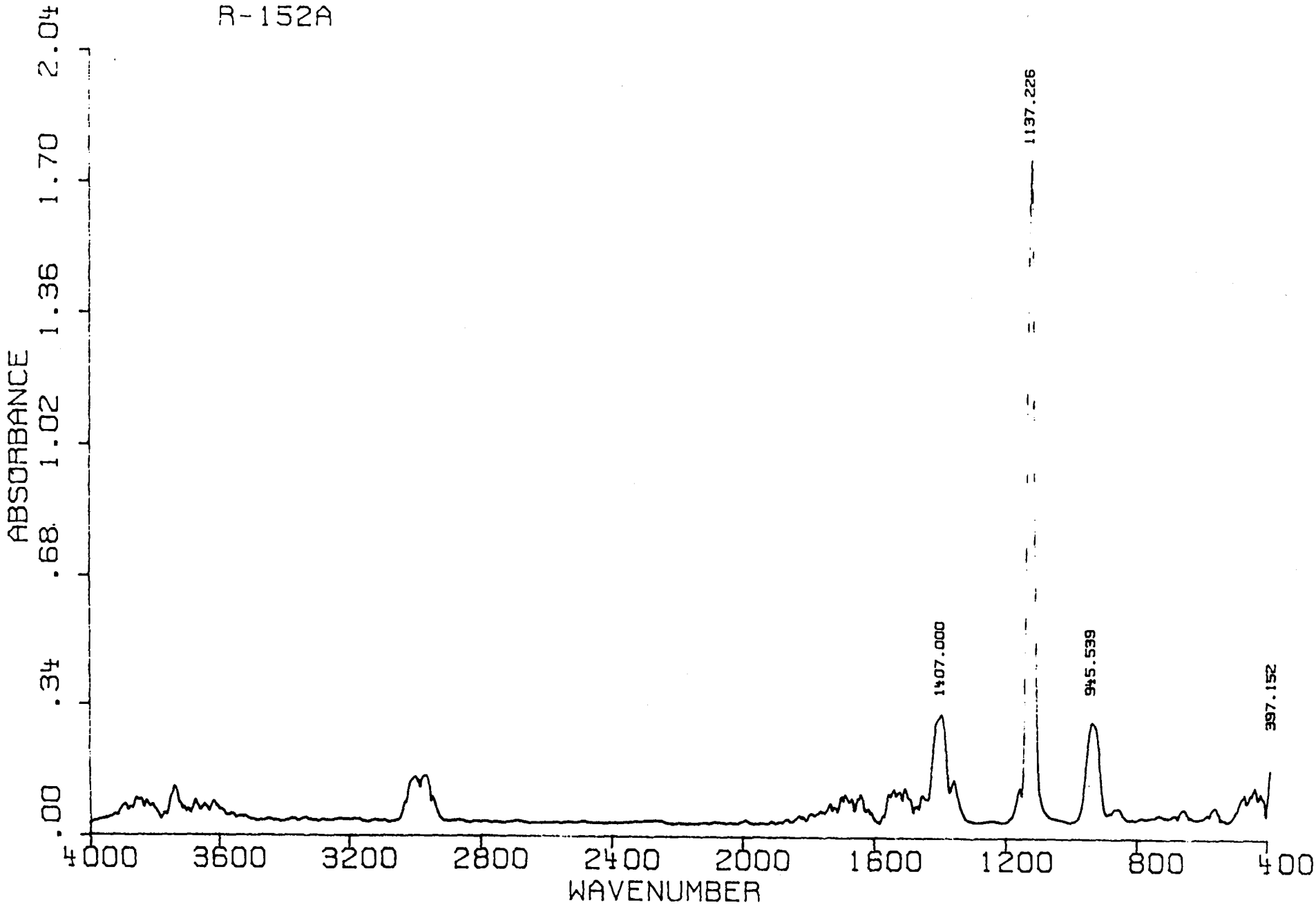

R-125
ABSORBANCE
.00
.46
.92
1.38
1.84
2.30
2.76
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1304.503
1212.886
1144.968
866.570
724.886

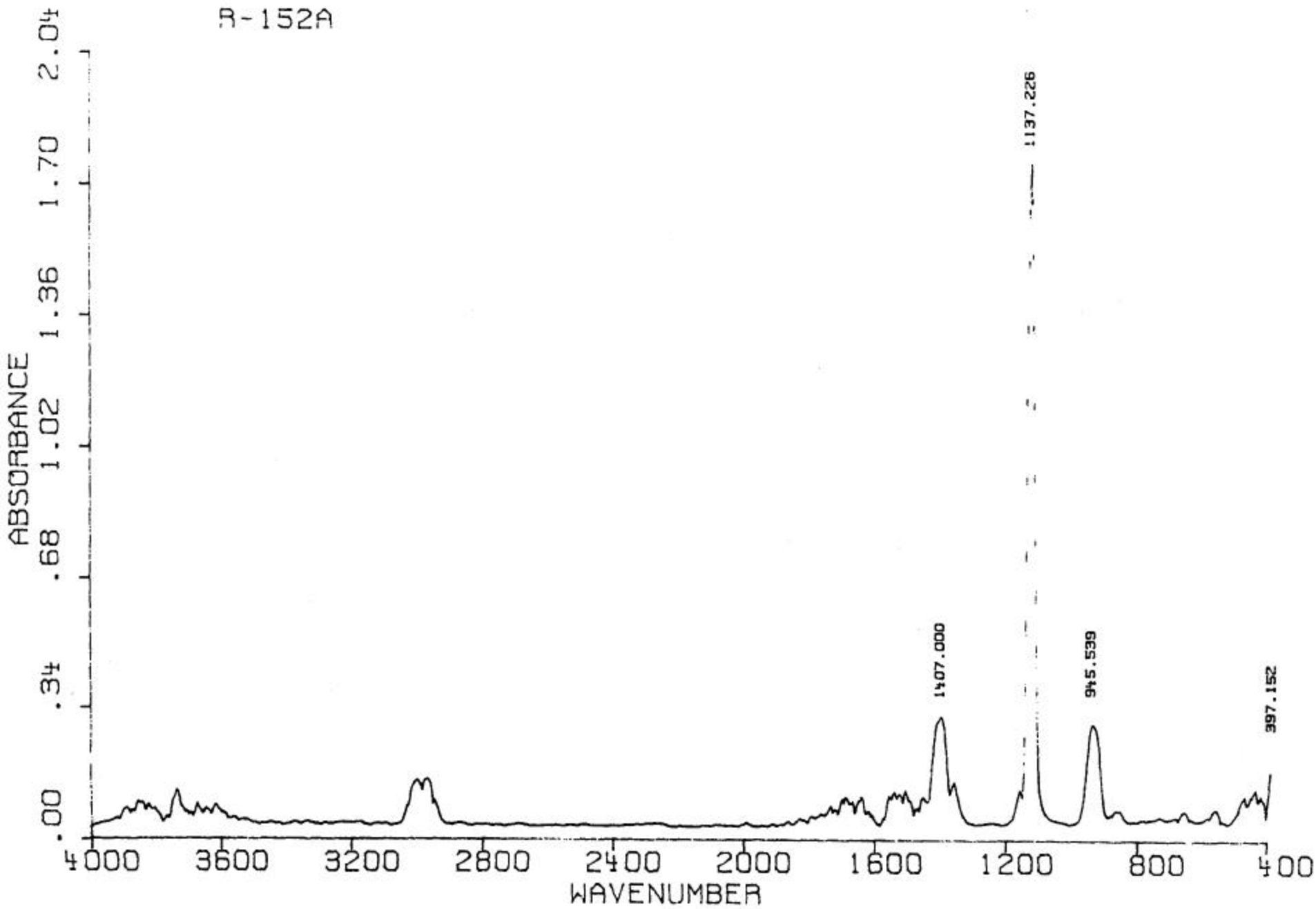

R-134
ABSORBANCE
1.18
.98
.78
.58
.38
.18
-.02
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
2996.226
1319.250
1132.644
420.207

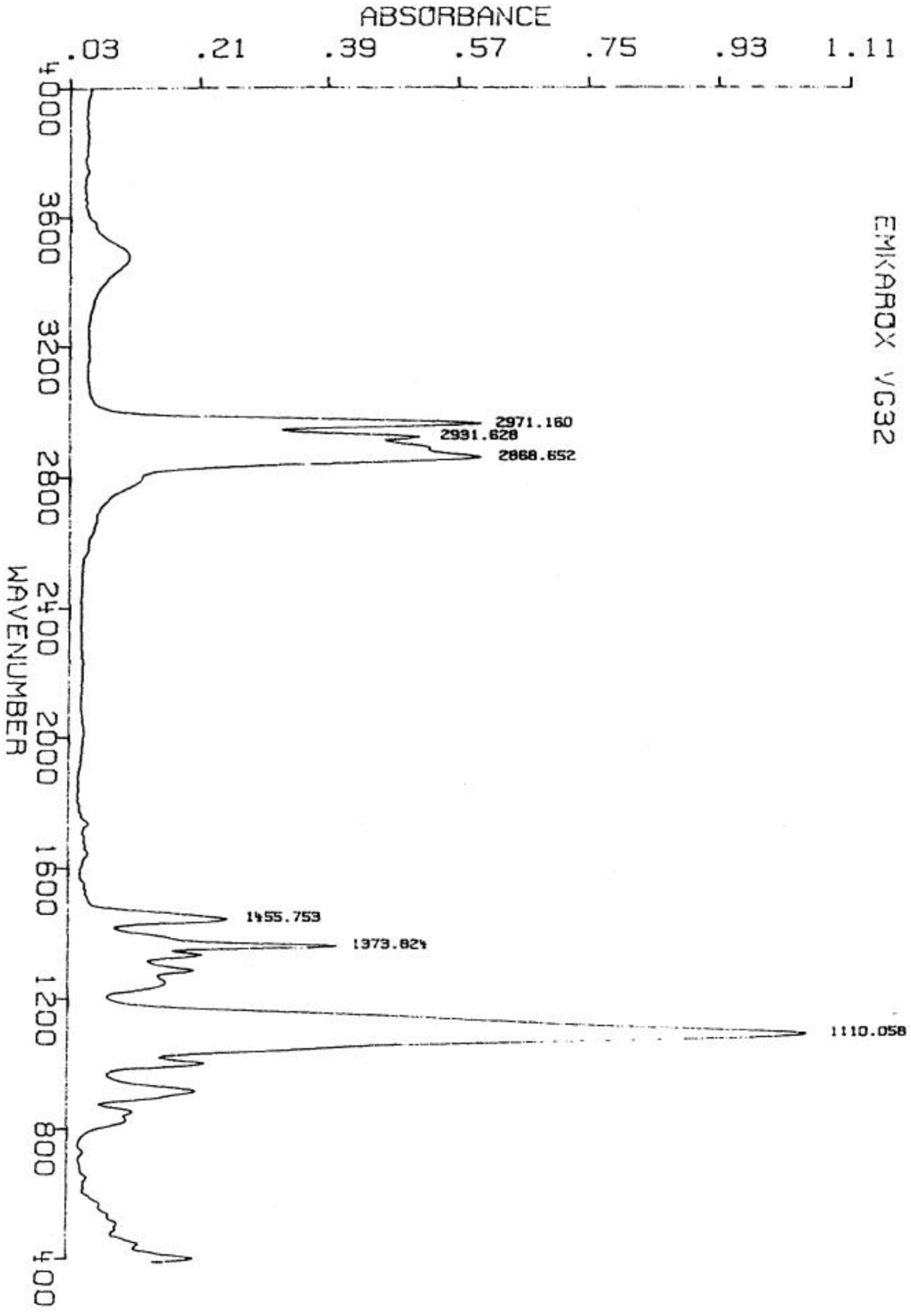

R-134A
ABSORBANCE
-.00
.41
.82
1.23
1.64
2.05
2.46
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1296.285
1187.062
1103.792
973.792
667.601

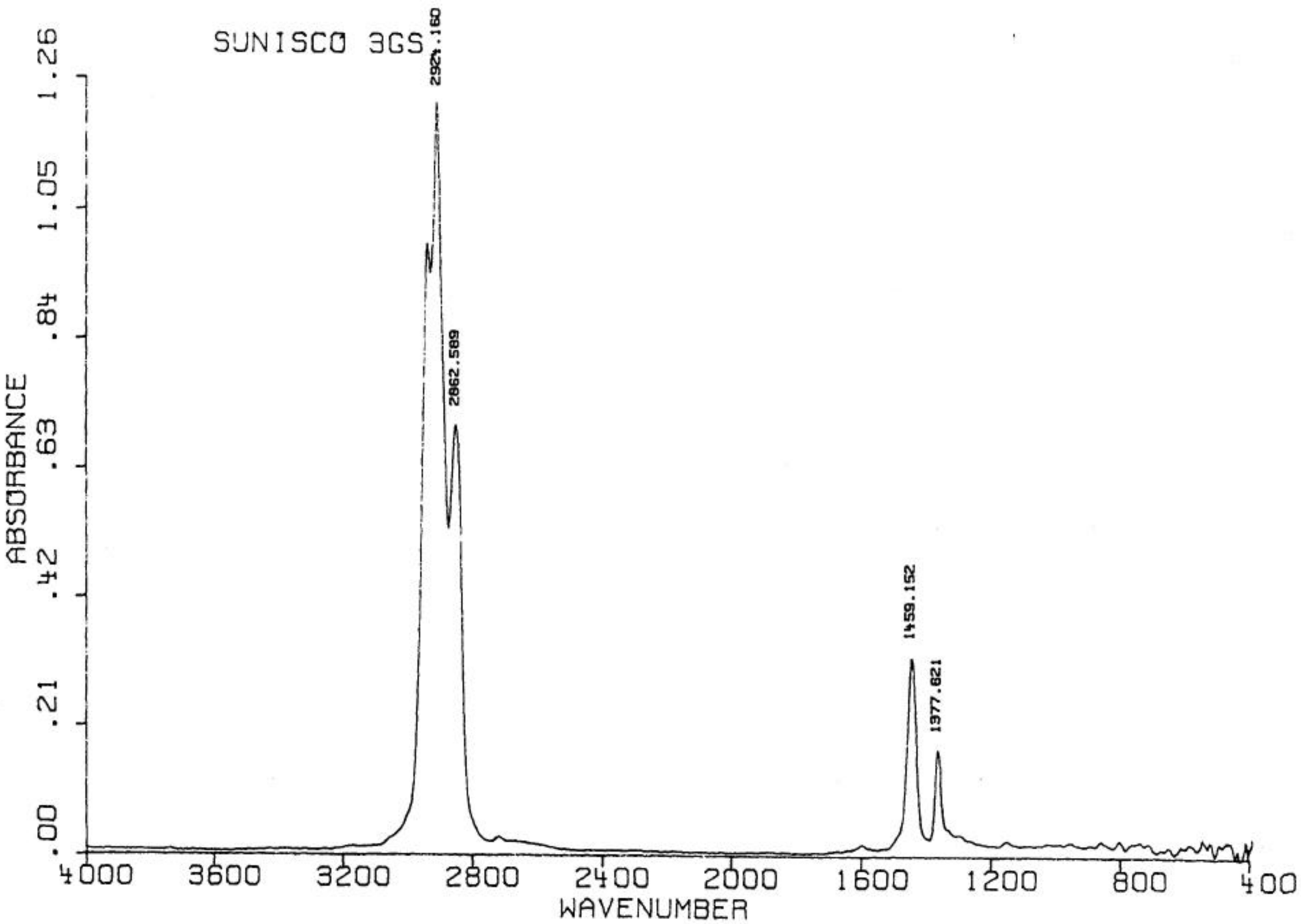

R-142B
ABSORBANCE
.00
.27
.54
.81
1.08
1.35
1.62
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1395.273
1196.816
1137.042
966.917
905.660
681.519
542.679
394.363

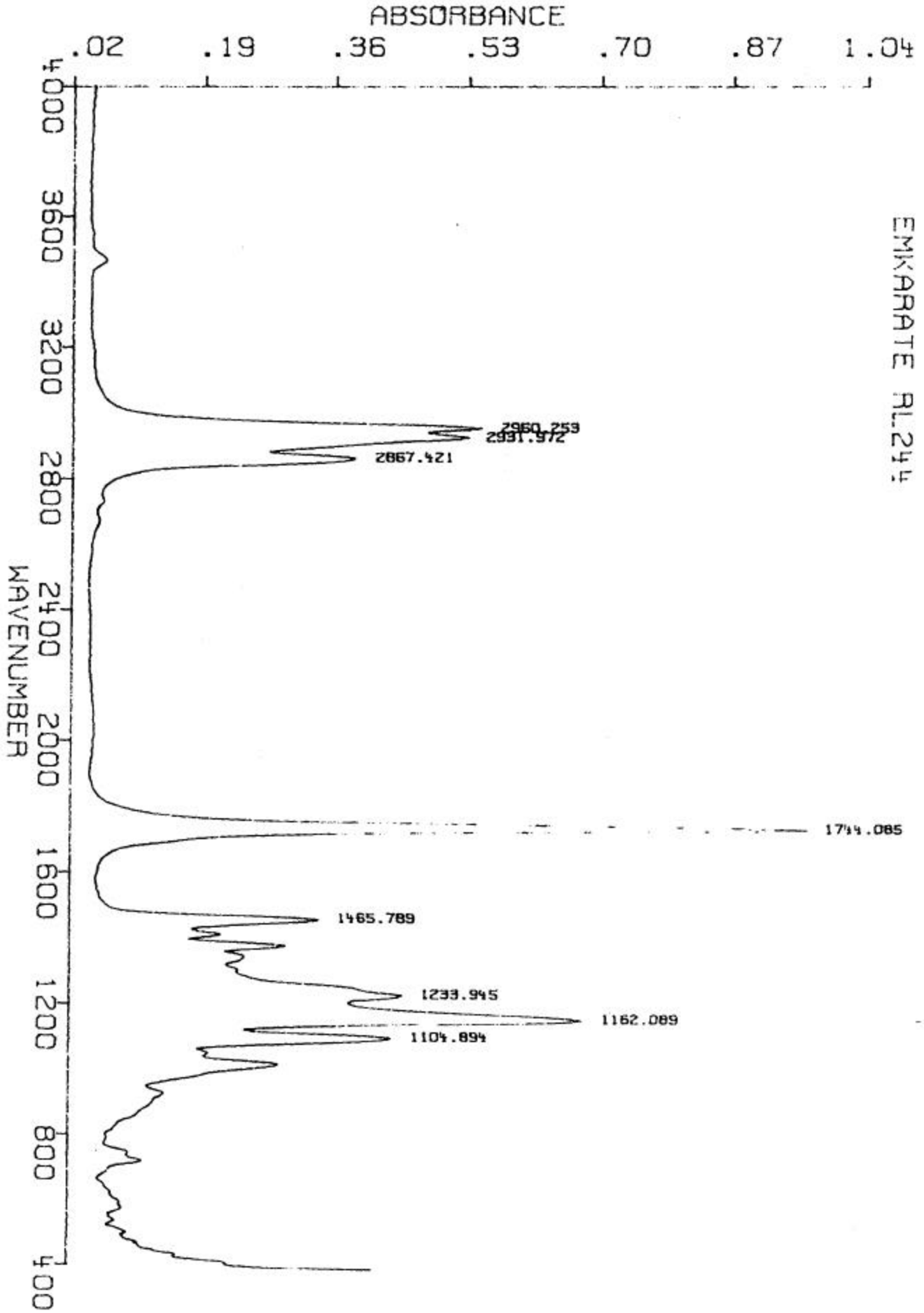

R-143A
ABSORBANCE
.00
.43
.86
1.29
1.72
2.15
2.58
1230.859
1269.910
969.433
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER

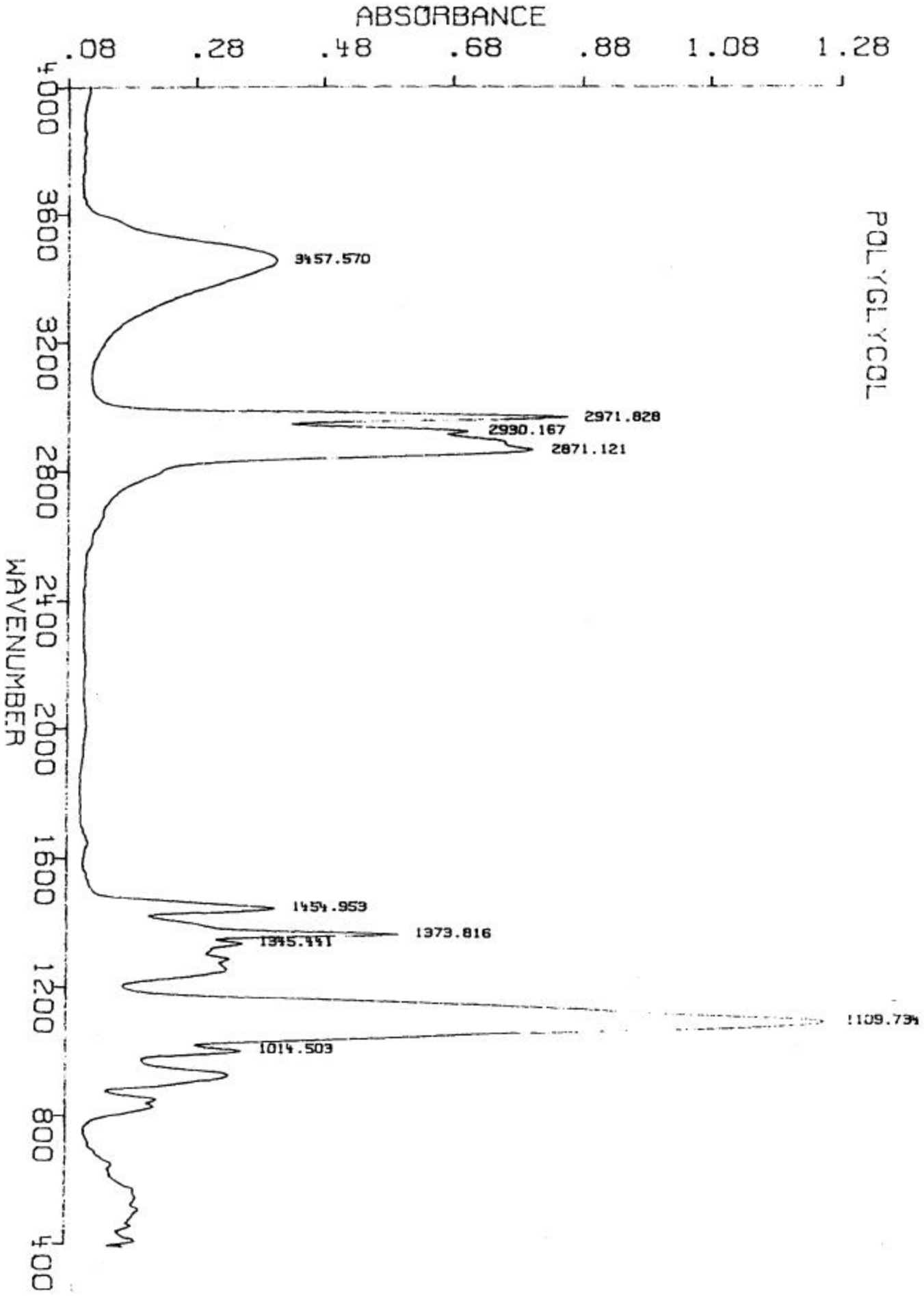

R-152A
ABSORBANCE
.00
.34
.68
1.02
1.36
1.70
2.04
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1407.000
1137.226
945.539
397.152

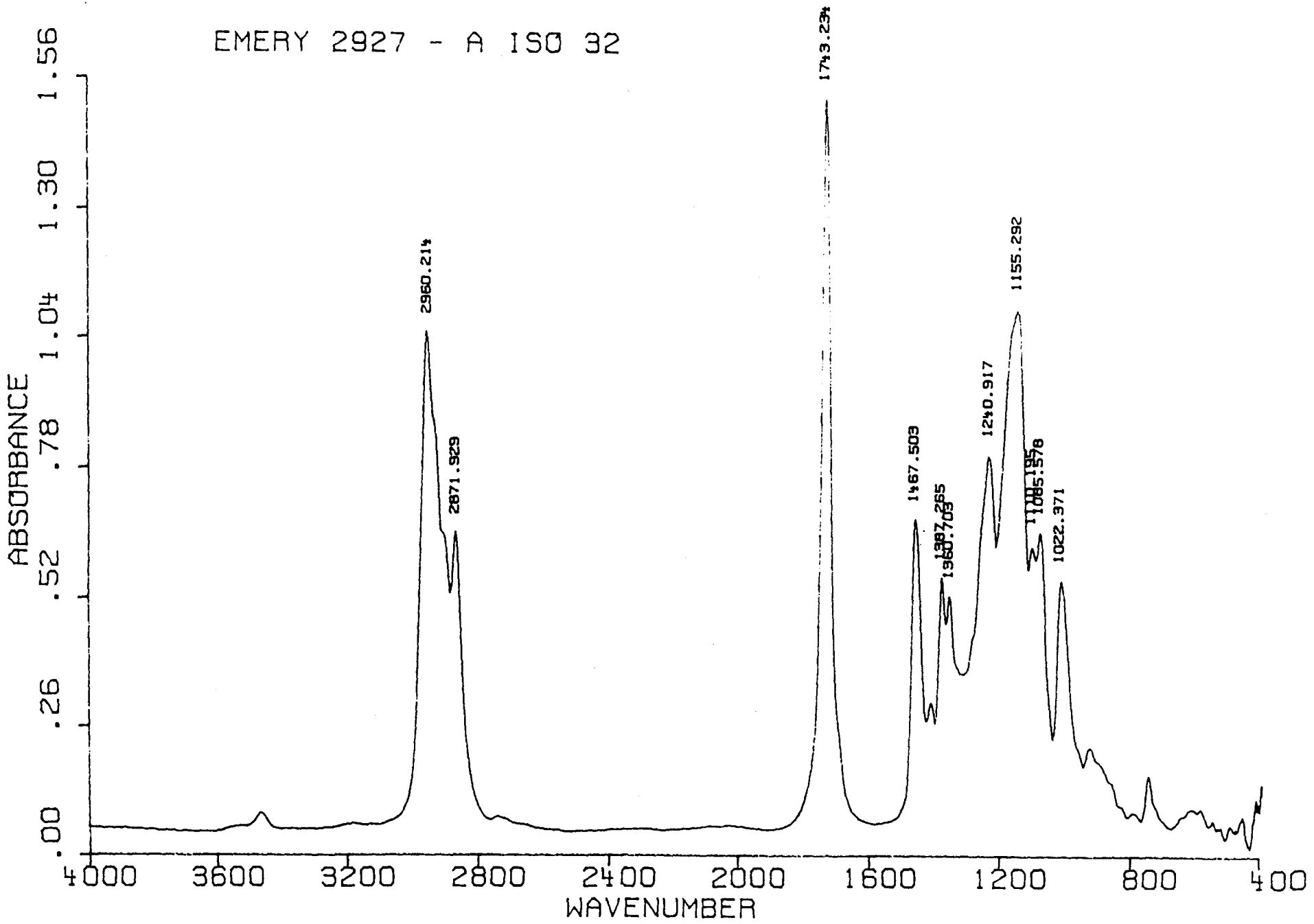

R-152A
ABSORBANCE
.00
.34
.68
1.02
1.36
1.70
2.04
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
1407.000
1137.226
945.539
397.152

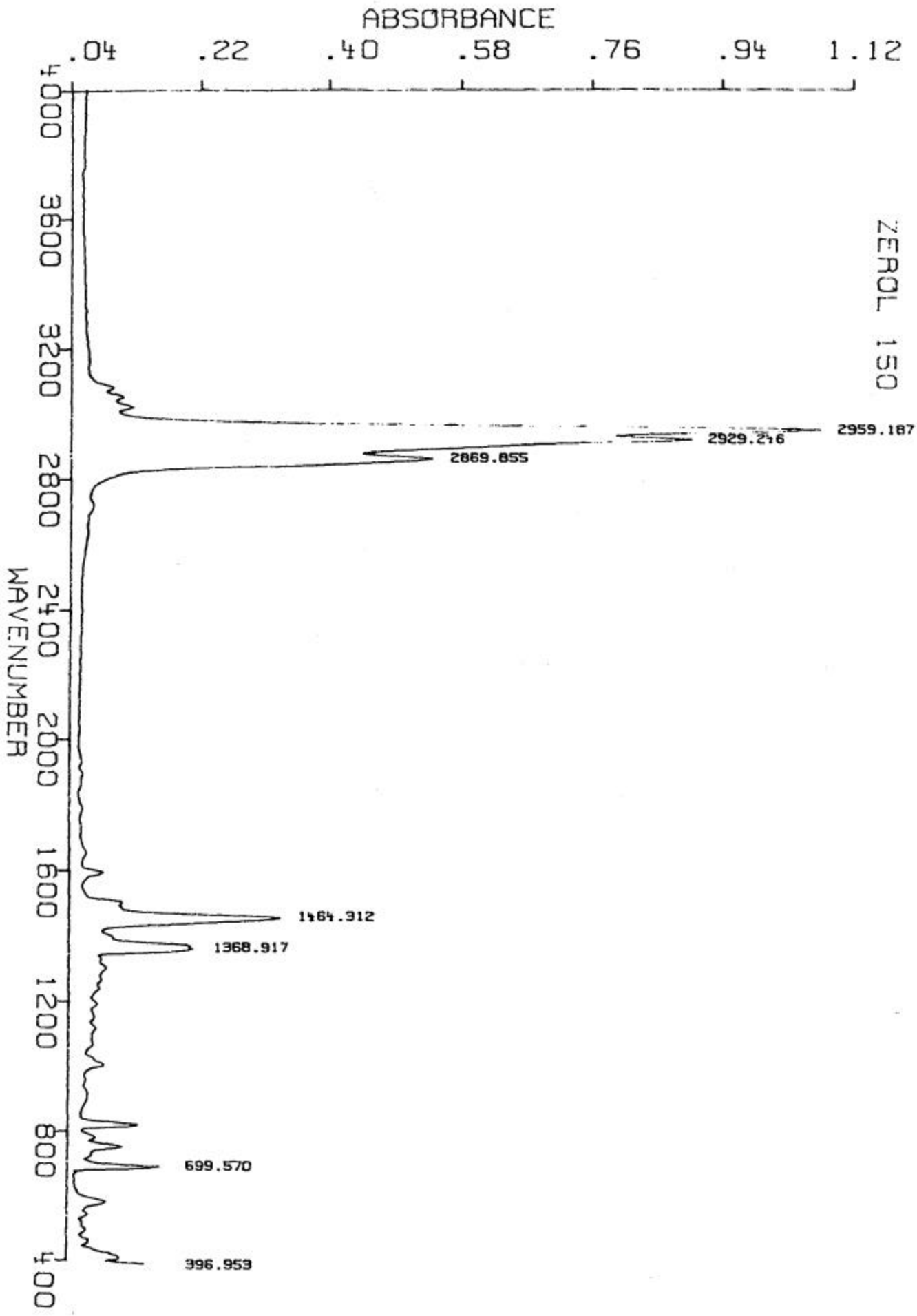

ABSORBANCE
.03
.21
.39
.57
.75
.93
1.11
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
EMKAROX VG32
2971.160
2931.628
2868.652
1455.753
1373.824
1110.058

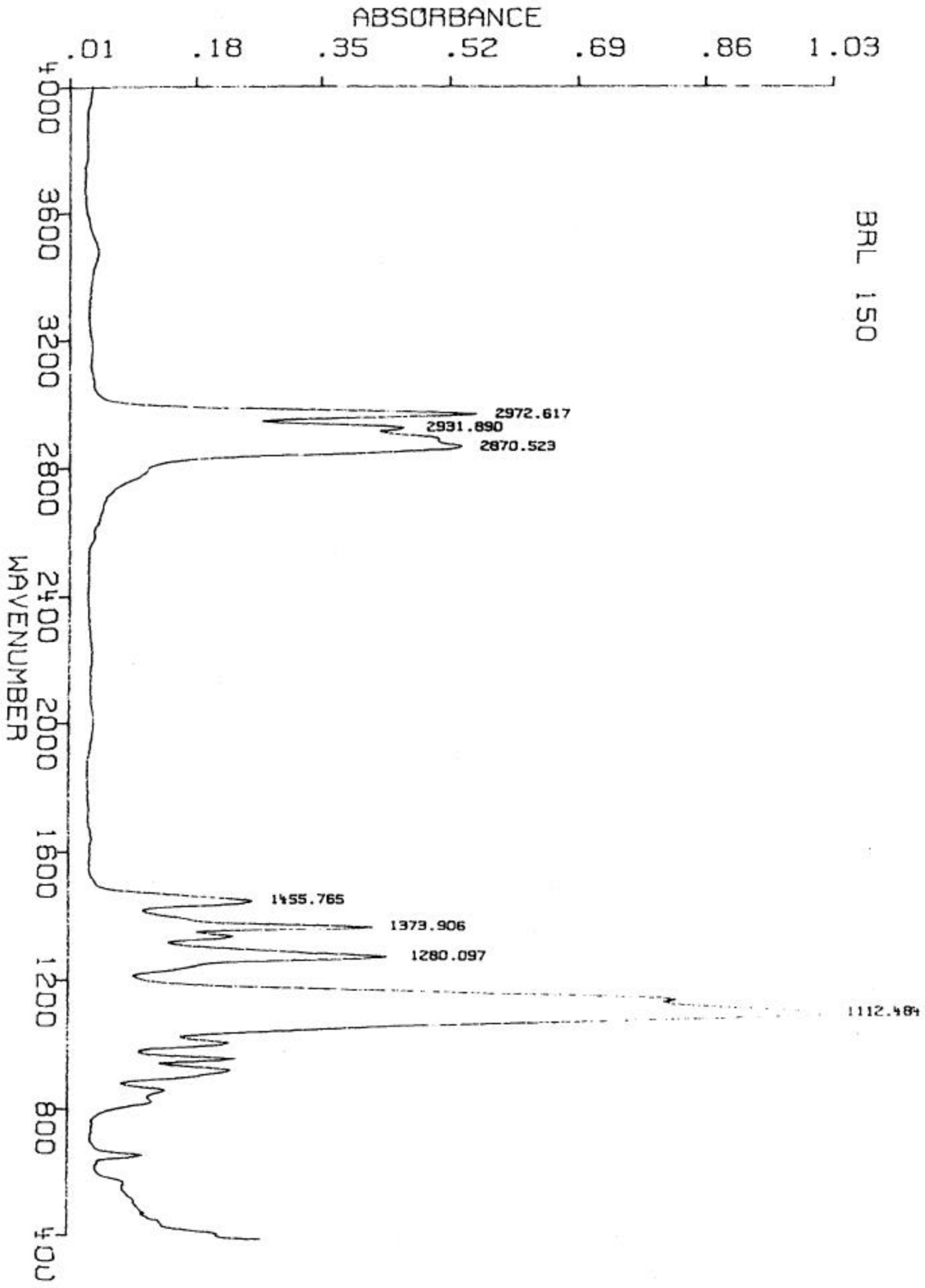

SUNISCO 3GS
2924.160
2862.589
1459.152
1377.821
ABSORBANCE
.00
.21
.42
.63
.84
1.05
1.26
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER


ABSORBANCE
.02
.19
.36
.53
.70
.87
1.04
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
EMKARATE RL244
2960.259
2931.972
2867.421
1744.085
1465.789
1233.945
1162.089
1104.894


ABSORBANCE
.08
.28
.48
.68
.88
1.08
1.28
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
POLYGLYCOL
3457.570
2971.828
2990.167
2871.121
1454.953
1373.816
1345.441
1109.734
1014.503


EMERY 2927 - A ISO 32
ABSORBANCE
.00
.26
.52
.78
1.04
1.30
1.56
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
2960.214
2871.929
1743.234
1467.503
1387.265
1240.917
1155.292
1085.578
1022.371


ABSORBANCE
.04
.22
.40
.58
.76
.94
1.12
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
ZEROL 150
2959.187
2929.246
2869.855
1464.312
1368.917
699.570
396.953


ABSORBANCE
.01
.18
.35
.52
.69
.86
1.03
4000
3600
3200
2800
2400
2000
1600
1200
800
400
WAVENUMBER
BRL 150
2972.617
2931.890
2870.523
1455.765
1373.906
1280.097
1112.484

APPENDIX J

ELASTOMER PHYSICAL PROPERTY DATA CHARTS

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
1	26		42		77		115		175		249		4435		801		
	26		41		75		114		173		245		3701		768		
	30	27	40	41	74	75	112	114	170	173	239	244	3498	3878	769	779	38/39
2	67		106		186		320		752		1414		4013		577		
	69		107		197		352		831		1505		4220		601		
	69	68	108	107	194	192	348	340	827	803	1500	1473	4330	4188	616	598	62/63
3	22		30		49		67		90		113		1442		757		
	24		34		53		69		94		118		1359		877		
	30	25	47	37	58	53	79	72	111	98	141	124	2159	1320	860	831	42/43
4	88		132		162		181		203		243		2707		983		
	62		90		122		144		169		203		2691		973		
	79	76	106	109	136	142	153	159	179	184	214	220	2781	2726	982	972	63/64
5	258		337		440		685		1467		2359		3564		529		
	225		300		396		600		1306		2176		3566		547		
	236	240	302	313	408	415	637	641	1396	1390	2293	2276	3541	3557	519	532	82/83
6	19		27		45		61		78		98		1506		861		
	21		29		47		60		79		101		1972		865		
	20	20	30	29	46	46	62	61	80	79	100	100	1962	1813	881	869	35/36
7	19		32		55		79		114		161		240		407		
	21		33		56		81		112		174		286		416		
	24	21	33	33	55	55	79	80	116	117	165	167	200	242	350	391	41/42
8	80		115		176		278		583		957		2262		603		
	83		115		175		280		590		966		2197		594		
	81	81	112	114	169	173	265	274	548	574	900	941	2242	2234	619	605	68/69

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
9	18		28		43		53		59		65		145		1012		
	19		29		45		54		62		70		174		1098		
		19		29		44		54		61		68		160		1055	35/36
10	50		78		122		178		410		810		1866		545		
	80		84		121		181		423		842		1973		561		
	64	65	87	83	128	124	183	181	409	414	788	813	1674	1838	516	541	59/60
11	17		27		46		66		96		126		175		433		
	17		27		46		65		91		118		227		560		
	17	17	27	27	46	46	63	65	87	91	114	119	330	244	680	558	37/38
12	47		74		127		219		605		1201		2499		564		
	46		70		122		210		581		1165		2410		553		
	13	35	37	60	99	116	215	215	627	604	1212	1193	2525	2478	581	566	58/59
13	28		48		81		108		140		170		274		520		
	29		48		83		111		145		176		222		417		
	29	29	48	48	83	82	112	110	146	144	178	175	276	257	497	478	49/50
14	100		158		251		426		1164		2224		3233		399		
	95		152		246		407		1138		2367		3362		389		
	95	97	148	153	233	243	365	399	991	1098	2034	2208	3314	3303	428	405	73/74
15	57		87		127		131		117		121		250		888		
	55		85		122		124		116		118		282		1011		
		56		86		125		128		117		120		266		950	71/72
16							458		540		718		1844		580		
							497		604		822		3607		691		
							528	494	659	601	918	819	3096	2849	630	634	88/89

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
17	55		89		149		198		271		348		2340		646		
	64		99		157		207		283		361		2254		625		
	60	60	95	94	155	154	206	204	281	278	359	356	2619	2404	631	634	63/64
18	43		71		122		163		212		258		2431		706		
	39		69		122		165		216		264		1350		749		
	43	42	73	71	122	122	165	164	214	214	260	261	2161	1981	783	679	60/61
19	38		61		105		140		180		216		653		688		
	38		61		105		140		177		211		512		654		
	36	37	60	61	104	105	141	140	181	179	216	214	326	497	515	619	58/59
20	33		55		99		142		214		292		437		445		
	40		63		113		173		189		411		477		350		
	37	37	61	60	110	107	169	161	286	263	411	371	520	478	380	392	56/57
21	99		163		332		611		1171		1794		2283		377		
	102		175		367		681		1303		1994		2292		342		
	102	101	178	172	388	362	756	683	1433	1302		1894	2057	2211	288	336	73/74
22	136		211		349		525		1076		1840		4343		607		
	128		211		350		527		1066		1830		3810		540		
	136	133	213	212	346	348	518	523	1065	1069	1837	1836	4118	4090	571	573	80/81
23	59		105		207		376		865				835		180		
	57		104		201		363						712		167		
	47	54	93	101	187	198	327	355					986	844	213	197	62/63
24	79		132		196		233		382		616		2320		870		
	80		130		192		228		370		603		2192		861		
	76	78	129	130	192	193	227	229	366	373	600	606	2310	2274	881	871	67/68

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
25	48		84		158		244		612				1501		276		
	49		85		157		240		574				1782		300		
	49	49	86	85	158	158	240	241	570	585			1360	1548	281	286	62/63
26	136		246		576		1477						3489		196		
	131		243		582		1503						3273		181		
	142	136	251	247	598	585	1533	1504					3045	3269	167	181	83/84
27	63		108		187		297		918				1281		232		
	62		107		182		286		841				1386		257		
	66	64	109	108	186	185	297	293	892	884			1402	1356	252	247	68/69
28	73		119		198		303		800				1653		294		
	70		117		192		287		706		1431		1503		309		
	67	70	113	116	194	195	289	293	725	744	1457	1444	1623	1593	323	309	68/69
29	55		89		155		244		739		1721		2056		323		
	56		88		151		249		776		1796		2129		321		
	54	55	88	88	152	153	240	244	738	751	1723	1747	2080	2088	324	323	66/67
30	326		538		1047		2153						2552		116		
	365		569		1078		2218						2627		116		
	345	345	545	551	1043	1056	2195	2189					2886	2688	127	120	93/94
31	50		84		162		497						1500		178		
	53		86		160		478						1800		199		
	49	51	81	84	152	158	400	458					1271	1524	175	184	62/63
32	239		365		604		896						1273		187		
	231		351		586		869						1252		190		
	228	233	357	358	590	593	892	886					1283	1269	185	187	73/74

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
33																	66/67 D
34	30		41		71		104		184		249		257		268		
	30		41		73		112		203		212		222		218		
	28	29	41	41	71	72	106	107	183	190		231	222	234	240	242	45/46
35	90		145		273		545		1378		2046		2431		382		
	89		144		267		534		1374		2046		2446		387		
	93	91	147	145	270	270	543	541	1366	1373	2020	2037	2609	2495	435	401	75/76
36	29		50		99		170		330		327		371		225		
	26		50		100		173		337				381		226		
	32	29	55	52	106	102	182	175	355	341			396	383	224	225	49/50
37	77		116		191		332		893		1609		2376		434		
	78		118		196		346		946		1699		2559		446		
	77	77	117	117	196	194	351	343	949	929	1699	1669	5435	2457	428	436	74/75
38	33		56		104		172		322				299		187		
	32		55		105		176		299				337		210		
	28	31	53	55	101	103	166	171		311			326	321	218	205	50/51
39	77		130		250		533		1652				1794		215		
	88		145		268		601		1794				1829		204		
	82	82	140	138	287	268	674	603		1723			1580	1734	172	197	73/74
40	21		27		41								53		86		
	18		26		38								42		55		
	22	20	30	28	44	41							44	46	48	63	27/28

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
41	27		42		81		122		168		214		1182		1092		
	28		45		85		126		177		224		1217		1084		
	27	27	43	43	82	83	120	123	169	171	214	217	1209	1203	1096	1091	43/44
42	49		73		104		132		229		384		1277		691		
	49		75		108		140		243		402		1177		645		
	49	49	74	74	106	106	140	137	239	237	392	393	1242	1232	681	672	56/57
43	170		265		466		804						1122		168		
	190		279		483		835						1145		164		
	173	178	271	272	481	477	833	824					1126	1131	160	164	80/81
44	65		96		171		349		784		1189		1261		320		
	62		90		159		321		720		1101		1149		313		
	58	62	87	91	157	162	322	331	721	742	1104	1131	1128	1179	306	313	65/66
45	656		821		950		1009		1103		1252		2095		530		
	639		809		943		1002		1101		1245		2188		546		
	654	650	812	814	943	945	1004	1005	1104	1103	1254	1250	2086	2123	523	533	93/94
46	208		290		405		510		661		822		1425		516		
	204		283		403		507		657		818		1291		488		
	206	206	285	286	399	402	505	507	657	658	822	821	1404	1373	513	506	78/79
47	1078		1295		1388		1399		1440		1560		2375		540		
	1078		1280		1377		1389		1444		1565		2376		528		41/42
	1083	1080	1277	1284	1361	1375	1372	1387	1422	1435	1550	1558	2347	2366	532	533	D
48	1743		1959		1979		1911		1881		1976		2584		498		
	1747		1920		1912		1848		1868		1917		2550		501		49/50
	1774	1755	1953	1944	1966	1952	1896	1885	1866	1872	1963	1952	2708	2614	521	507	D

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
49	946		1127		1258		1339		1520		1824		2357		413		
	919		1116		1251		1338		1530		1829		2457		428		
	902	922	1109	1117	1251	1253	1338	1338	1517	1522	1809	1821	2410	2408	420	420	93/94
50	304		427		581		718		955		1307		1423		325		
	311		418		565		695		932		1284		1303		305		
	311	309	420	422	562	569	692	702	932	940	1284	1292	1345	1357	313	314	82/83
51	1476		1682		1746		1775		1878		2146		2676		412		
	1482		1680		1733		1756		1842		2088		2777		439		45/46
	1444	1467	1654	1672	1718	1732	1743	1758	1832	1851	2080	2105	2676	2710	418	423	D
52							1586		1894		2368		3005		492		
							1380		1781		2359		2926		442		40/41
							1539	1502	1835	1837	2216	2314	2591	2841	489	474	D
53							2290		2525		2995		3643		462		
							2263		2470		2965		3602		413		52/53
							2319	2291	2579	2525	3087	3016	3870	3705	474	450	D
54	126		347		2128		2793		2971		3228		3503		422		
	86		219		1716		3044		3204		3536		3849		426		58/59
	103	105	278	281	1949	1931	3172	3003	3346	3174	3687	3484	4094	3815	451	433	D
55	87		351		3315		3592		3629		3882		3874		329		
	125		350		3590		3755		3741		3930		3893		329		59/60
	111	108	393	365	3695	3533	3930	3759	3899	3756	4075	3962	4215	3994	349	336	D
56	59		76		109		142		178				191		234		
	63		83		116		146		184				207		261		
	52	58	71	77	106	110	136	141	172	178			219	206	361	285	51/52

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
57	190		284		456		671		1067				1140		224		
	195		304		475		696		987				992		177		
	196	194	301	296	474	468	661	676		1027			1013	1048	210	204	81/82
58	17		24		39		53		72		92		96		322		
	15		23		36		49		66		84		95		350		
	16	16	23	23	38	38	52	51	70	69	90	89	98	96	335	336	44/45
59	126		201		331		523		1135				1464		248		
	125		198		323		512		1097				1209		217		
	129	127	207	202	336	330	533	523	1149	1127			1378	1350	236	234	80/81
60																	82/83
61	254		641		1098		1424		2085		2919		6692		625		
	300		693		1126		1441		2105		2936		6118		585		51/52
	314	289	697	677	1153	1126	1490	1452	2193	2128	3049	2968	6265	6358	588	599	D
62																	81/82
63	399		1128		1730		2112		2661		3257		7620		799		
	391		1070		1705		2084		2616		3184		6313		699		55/56
	422	404	1092	1097	1689	1708	2057	2084	2582	2620	3130	3190	8981	7638	950	816	D
64	27		46		76		101		127		151		2249		799		
	30		46		77		100		128		154		1705		705		
	29	29	46	46	76	76	99	100	127	127	152	152	2539	2164	671	725	49/50

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
65	31		50		86		115		141		166		1142		691		
	32		52		88		117		145		171		1136		677		
	33	32	53	52	88	87	116	116	143	143	168	168	1555	1278	711	693	66/67
66	129		189		295		473		1037		1764		3739		561		
	117		182		287		458		988		1680		3550		559		
	121	122	185	185	291	291	465	465	1003	1009	1699	1714	3490	3593	546	555	79/80
67	48		81		160		304		746				946		234		
	44		79		157		302		739				1274		282		
	42	45	77	79	167	161	336	314		743			663	961	170	229	60/61
68	45		78		134		202		422		785		1678		399		
	46		82		139		210		445		822		2228		423		
	47	46	79	80	137	137	198	203	403	423	749	785	2424	2110	435	419	60/61
69	41		72		117		151		227		382		3191		550		
	44		73		117		153		222		372		3242		559		
	44	43	70	72	119	118	152	152	223	224	371	375	3283	3239	555	555	61/62
70	43		74		140		248		639		1220		1525		352		
	52		84		152		283		750		1355		1382		308		
	49	48	83	80	146	146	252	261	644	678	1239	1271	1372	1426	321	327	58/59
71	49		87		170		311		844				1230		238		
	53		93		176		319		867				1186		232		
	53	52	93	91	179	175	321	321	904	872			1093	1170	221	230	65/66
72	25		42		71		96		115		128		207		547		
	29		47		74		95		115		128		210		626		
	31	28	44	44	71	72	94	95		115		128	242	220	693	622	45/46

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
73	98		168		243		281		311		351		581		555		
	101		163		243		291		328		370		610		518		
	95	98	153	161	230	239	268	280	299	313	341	354	544	578	488	520	71/72
74	218		317		448		550		770				899		268		
	229		329		461		558		786				928		264		
	219	222	318	321	449	453	549	552	772	776			894	907	259	264	84/85
75	31		44		67		83		110		145		326		476		
	27		39		64		80		107		143		170		344		
	19	26	33	39	54	62	73	79	98	105	134	141	261	252	455	425	45/46
76	99		146		240		431		951		1362		1810		499		
	83		127		222		409		939		1356		1805		498		
	102	95	139	137	230	231	420	420	947	946	1378	1365	1809	1808	483	493	72/73
77	58		97		171		250		526		979		776		261		
	61		103		174		252		527		969		1087		316		
	54	58	96	99	174	173	251	251	522	525		974	1466	1110	356	311	69/70
78	177		276		534		1391		4021				4061		199		
	178		273		519		1373		3993				4125		204		
	155	170	260	270	507	520	1349	1371		4007			4232	4139	210	204	87/88
79	115		167		251		334		522		741		1607		444		
	109		163		242		318		491		723		1662		441		
	105	110	156	162	236	243	316	323	509	507	768	744	1518	1596	413	433	78/79
80	128		200		267		294		369		533		722		344		
	121		194		259		283		357		510		579		322		
	121	123	194	196	263	263	288	288	367	364	525	523	628	643	333	333	78/79

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
81	44		73		133		188						223		139		
	43		72		135		188						205		117		
	38	42	67	71	126	131	182	186					227	218	153	136	61/62
82	83		136		201		236		314		450		561		340		
	85		133		197		231		300		421		583		357		
	86	85	139	136	201	200	242	236	333	316		436	372	505	332	343	72/73
83	227		321		425		620		1425				2451		282		
	285		375		477		670		1473				2574		286		
	313	275	393	363	495	466	710	667	1556	1485			2542	2522	278	282	89/90
84	86		148		219		253		301		365		990		337		
	84		136		203		237		279		336		899		620		
	76	82	133	139	204	209	236	242	274	285	328	343		945		479	73/74
85	92		128		183		253		385		540		656		369		
	86		122		180		250		381		537		610		344		
	86	88	122	124	177	180	247	250	381	382	537	538	635	634	356	356	64/65
86	68		124		238		417		805		1189		1554		403		
	28		96		220		393		757		1135		1496		404		
	60	52	117	112	232	163	387	399	714	759	1050	1125	1333	1461	394	400	74/75
87	125		198		362		758		1933		2606		2629		306		
	114		184		357		780		1925		2604		2705		331		
	109	116	183	188	342	354	727	755	1871	1910	2583	2598	2610	2648	308	315	74/75
88													4470		10		
													4757		9		70/71
													4649	4625	8	9	D

PHYSICAL PROPERTIES ON UNAGED ORIGINAL SAMPLE MATERIALS

Form #	10 % Modulus (Psi)		20 % Modulus (Psi)		50 % Modulus (Psi)		100 % Modulus (Psi)		200 % Modulus (Psi)		300 % Modulus (Psi)		Tensile Strength (Psi)		Elongation @ Break (%)		Shore
	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	values	mean	
89													2566		5		
													2292		3		64/65
													1949	2269	3	4	D
90													1439		21		
													2161		26		62/63
													2278	1959	17	21	D
91													3917		8		
													4585		7		67/68
													4264	4255	5	7	D
92													2454		6		
													2320		5		69/70
													2528	2434	6	6	D
93													1508		5		
													1580		5		65/66
													1675	1588	4	5	D
94	120		194		384		907						2322		196		
	124		202		401		954						2251		184		
	120	121	193	196	378	388	878	913					2556	2376	213	138	75/76
95	175		277		532		993						1583		203		
	178		279		542		1000						1376		166		
	170	174	260	272	508	527	960	984					1441	1467	184	184	86/87

APPENDIX K

GAS CHROMATOGRAPHY DATA ON REFRIGERANTS

Gas Chromatography Analysis

Method Parameters

Detector	FID
Detector Temp (°C)	275
Injector Mode	Splitless
Injector Temp (°C)	50
Column Type	Restek RXT-1
Length	100 m
ID	0.25 mm, 1 µm df
Initial Column Temp (°C)	30
Column Hold	70 min
Final Column Temp	150
Column Flow (linear cm/s)	4
Injection Volume (µl)	10 (vapor)

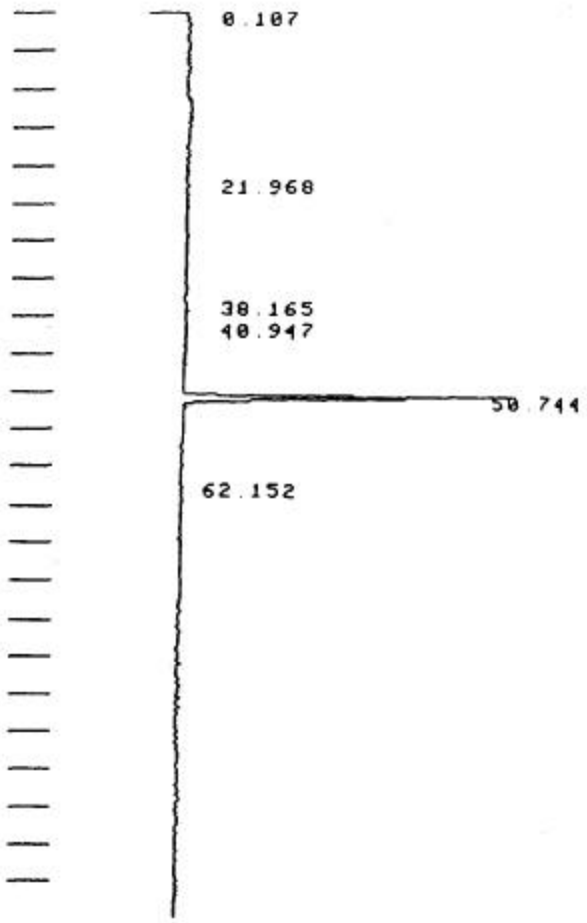
The following retention times were observed:

Sample	Retention Time (minutes)
HFC-125	50.74
HFC-32	51.04
HFC-143a	51.58
HFC-134a	52.41
HFC-152a	53.53
HCFC-22	54.95
HCFC-124	57.81
HCFC-142b	59.74
HCFC-123	57.66*
HFC-134	49.61

* Isothermal 120 °C.

The GC chromatograms are included for your reference.

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



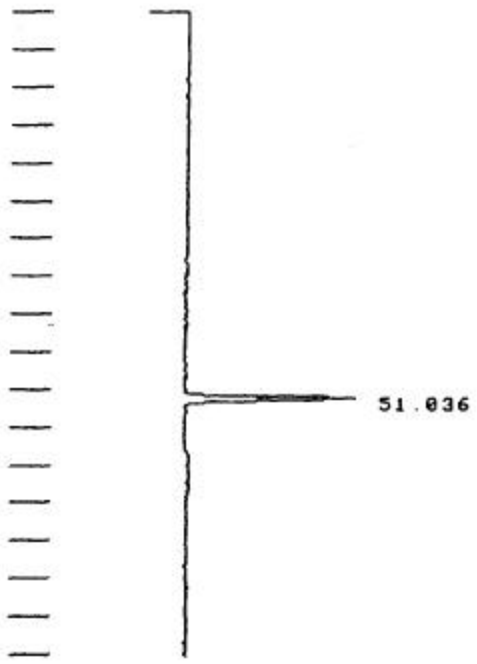
CHANNEL: 1A - 1 TITLE: R-125 12:17 10 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.2809	0.107	5003	BB
2		0.1407	21.968	2505	BV
3		0.0430	22.037	766	VB
4		0.1339	38.165	2385	BB
5		0.0399	40.947	710	BB
6		99.1081	50.744	1765097	BV
7		0.0148	51.385	263	T
8		0.2387	62.152	4252	BB
TOTALS:		100.0000		1780981	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



R-32

CHANNEL: 1A - 1 TITLE: 14:23 10 JUL 92

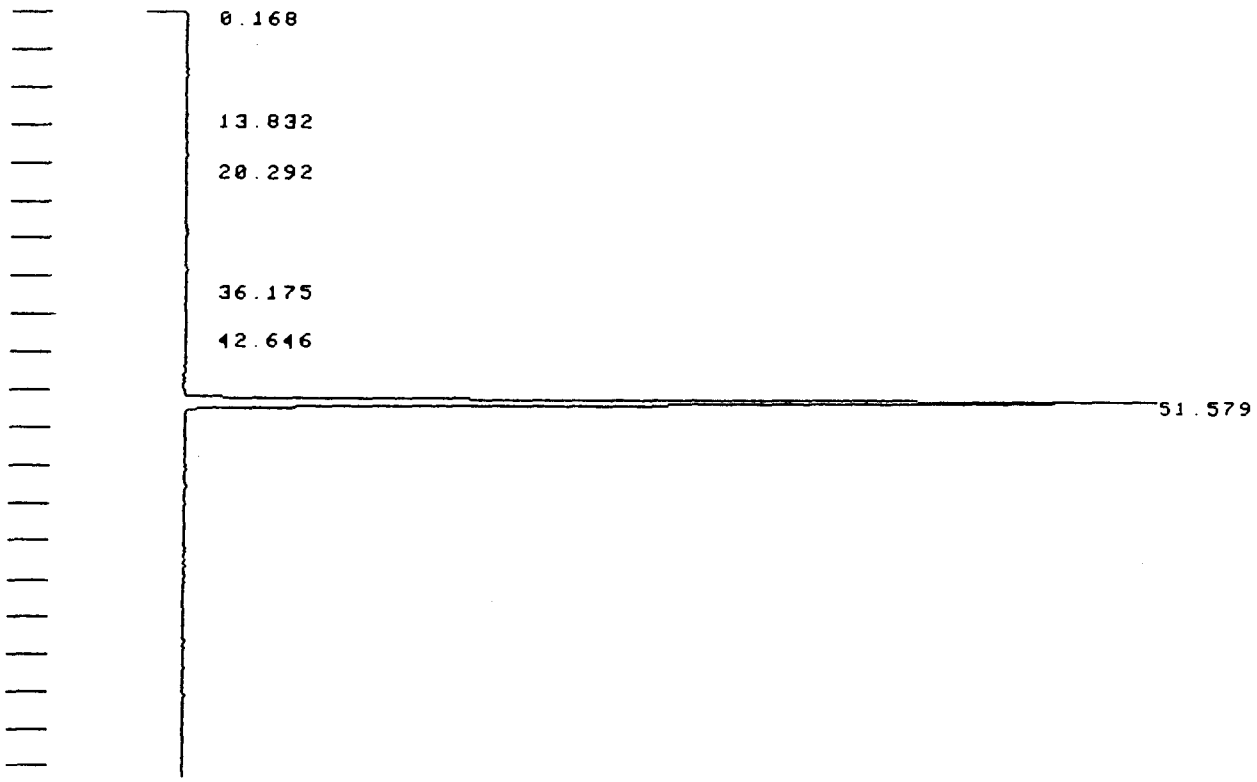
SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		99.9772	51.036	997582	BV
2		0.0227	51.712	227	T
TOTALS:		100.0000		997809	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

INSTRUMENT ERRORS:
COL TEMP

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



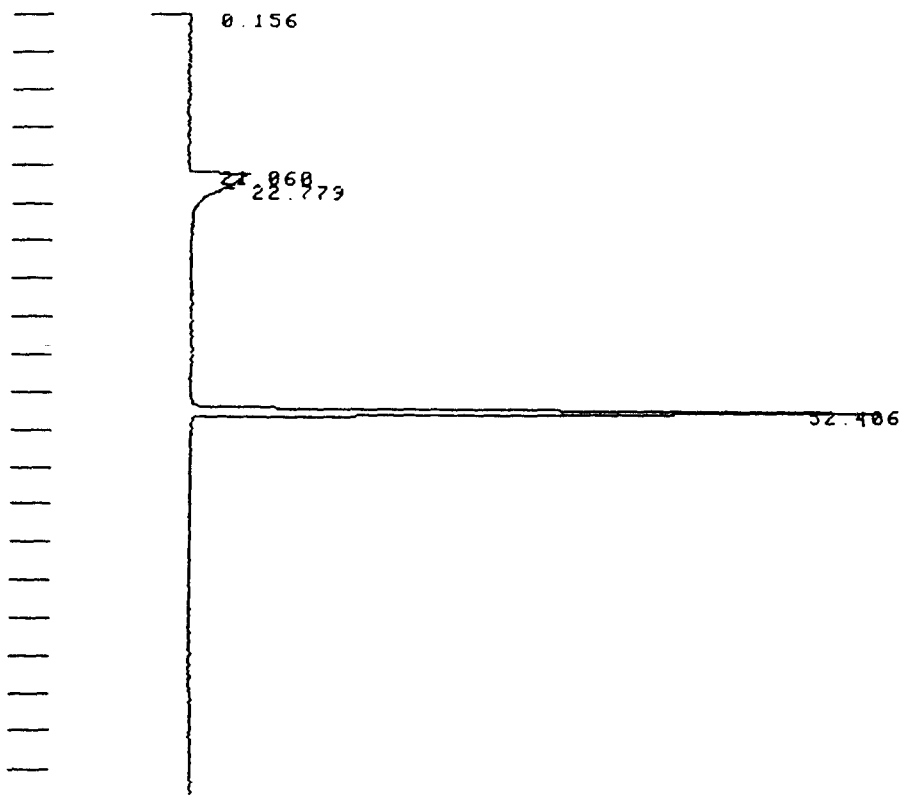
CHANNEL: 1A - 1 TITLE: **R-143a** 11:05 9 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.1367	0.168	8042	BB
2		0.0263	13.832	1545	BB
3		0.0186	20.292	1097	BB
4		0.0093	36.175	550	BB
5		0.0142	42.646	833	BB
6		99.7949	51.579	5872498	BB
TOTALS:		100.0000		5884565	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



R-134a

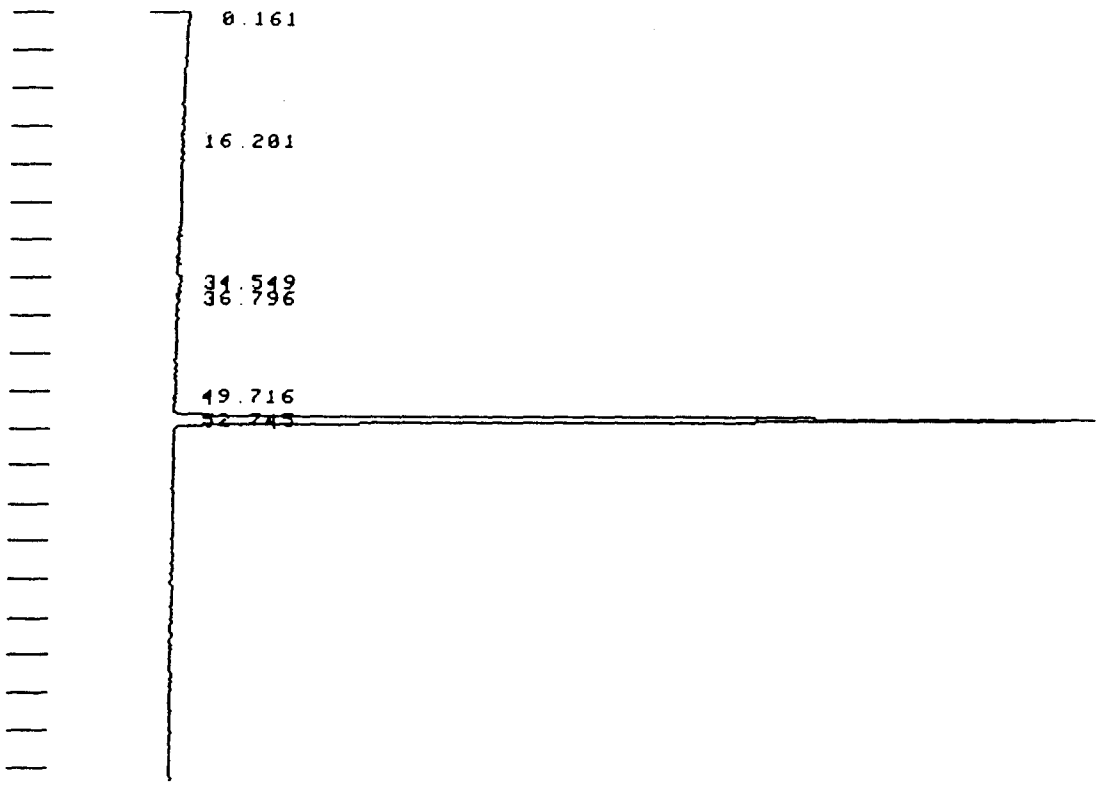
CHANNEL: 1A - 1 TITLE: 16:07 9 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.2049	0.156	8269	BB
2		1.0955	21.060	44214	BV
3		0.9334	21.119	37669	VB
4		0.0714	22.779	2881	BB
5		0.0597	23.505	2410	BB
6		97.6265	52.406	3940044	BV
7		0.0086	53.194	346	T
TOTALS:		100.0000		4035833	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



R-152a

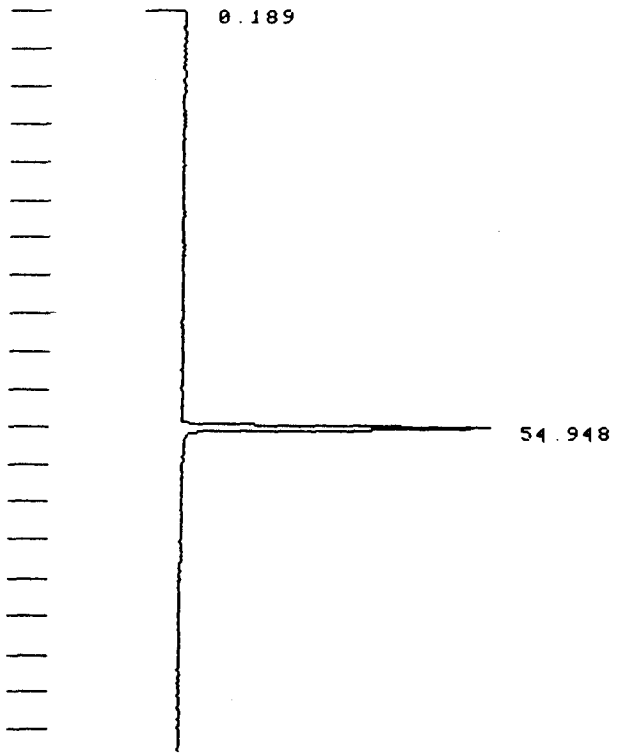
CHANNEL: 1A - 1 TITLE: 10:26 10 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.1097	0.161	6300	BB
2		0.0248	16.201	1423	BB
3		0.0775	17.655	4448	BB
4		0.0842	34.549	4833	BV
5		0.0765	34.802	4393	VV
6		0.0238	34.889	1364	VB
7		0.0442	36.796	2538	BB
8		0.0377	49.716	2164	BB
9		0.0406	52.745	2331	BV
10		99.4810	53.533	5711357	VB
TOTALS:		100.0000		5741151	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



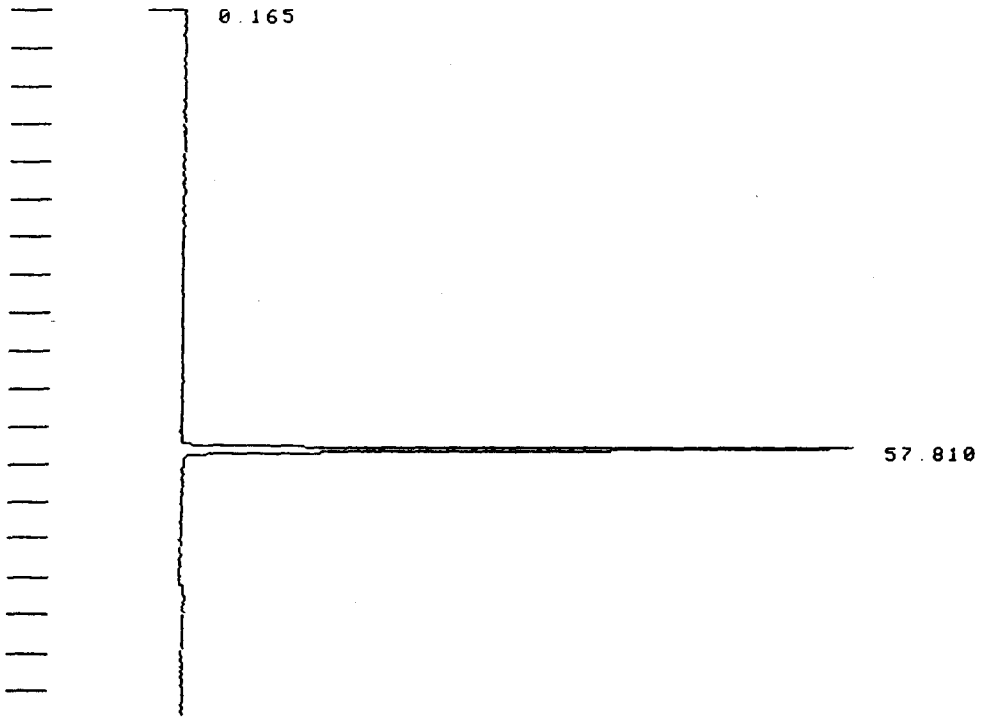
CHANNEL: 1A - 1 TITLE: R-22 12:50 9 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.4898	0.189	9187	BB
2		99.5102	54.948	1866558	BB
TOTALS:		100.0000		1875745	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



CHANNEL: 1A - 1 TITLE: R-124 14:31 9 JUL 92

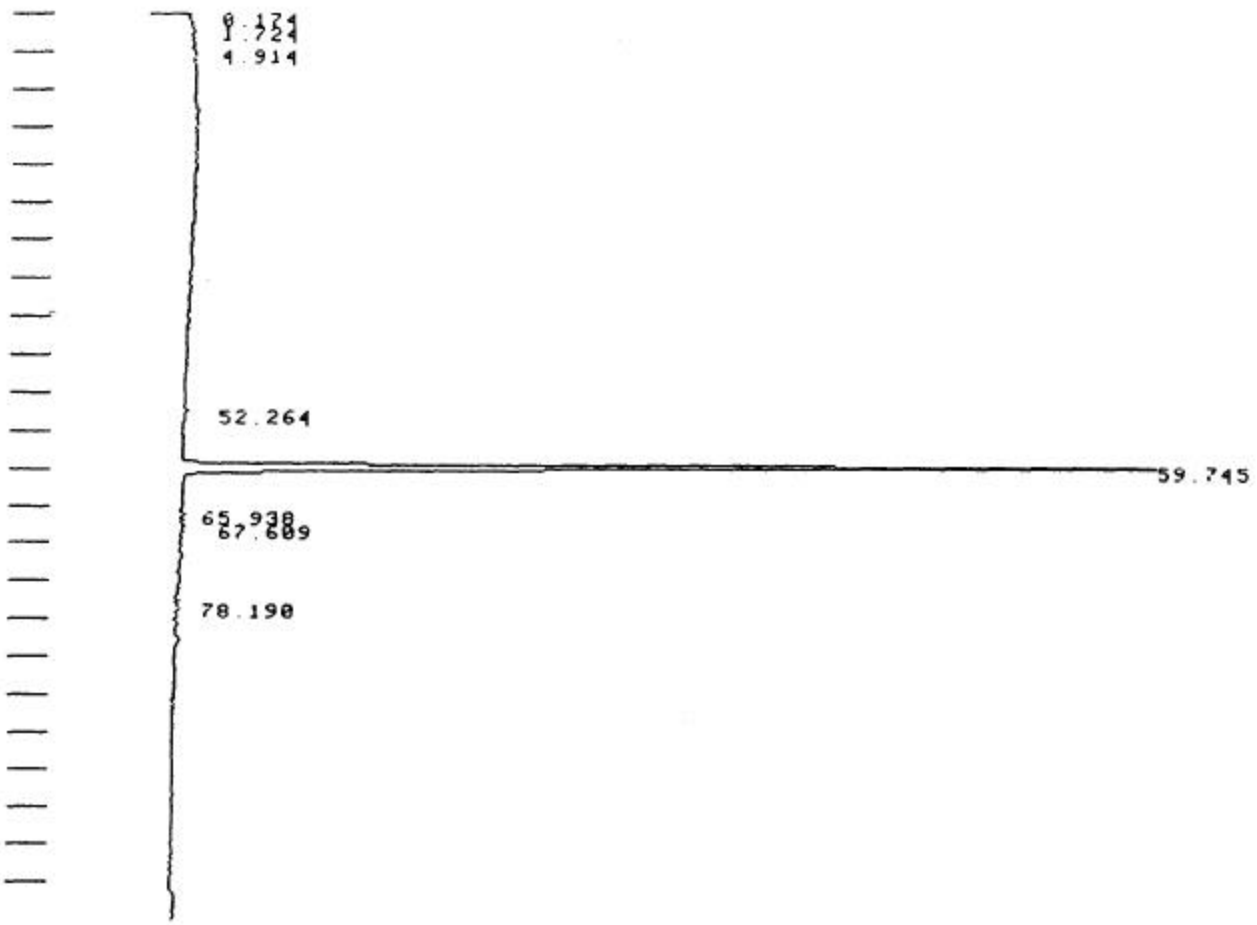
SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.1019	0.165	4110	BB
2		99.8981	57.810	4030831	BB
TOTALS:		100.0000		4034941	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

INSTRUMENT ERRORS:
COL TEMP

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



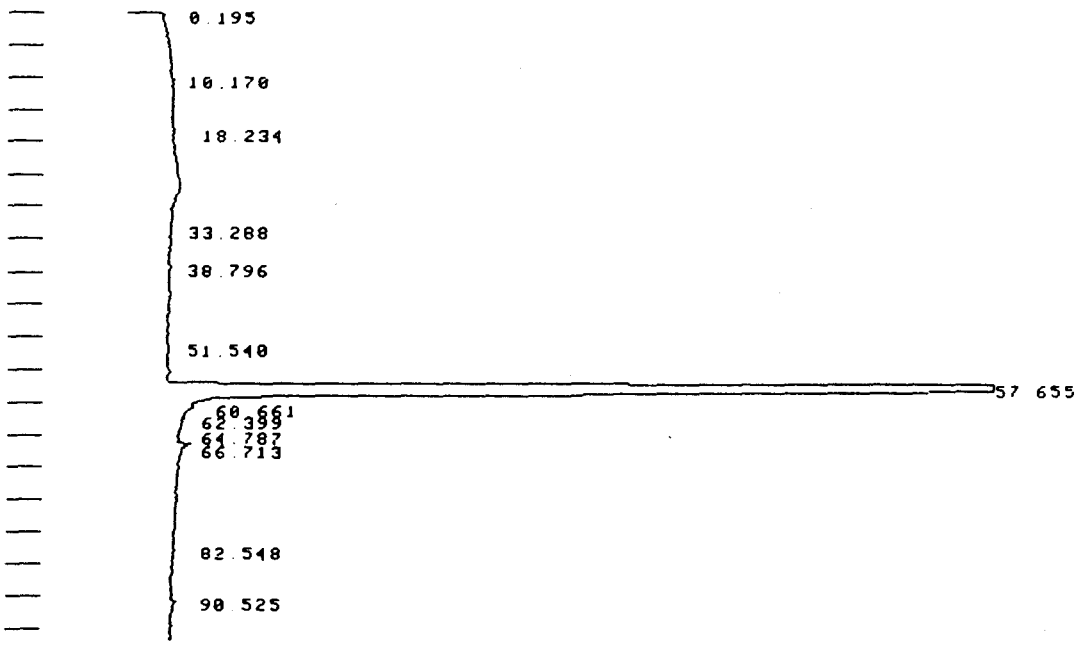
CHANNEL: 1A - 1 TITLE: R-142b 8:22 10 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.1052	0.174	8025	BB
2		0.0200	1.608	1526	BV
3		0.0507	1.724	3863	VB
4		0.0449	4.914	3424	BB
5		0.0842	52.264	6419	BB
6		98.9254	59.745	7543271	BB
7		0.0800	65.938	6097	BB
8		0.0532	66.547	4053	BV
9		0.1094	66.585	8343	VB
10		0.3688	67.609	28121	BB
11		0.1583	78.190	12073	BB
TOTALS:		100.0000		7625215	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

CHART SPEED 0.1 CM/MIN
ATTEN: 16 ZERO: 5% 5 MIN/TICK



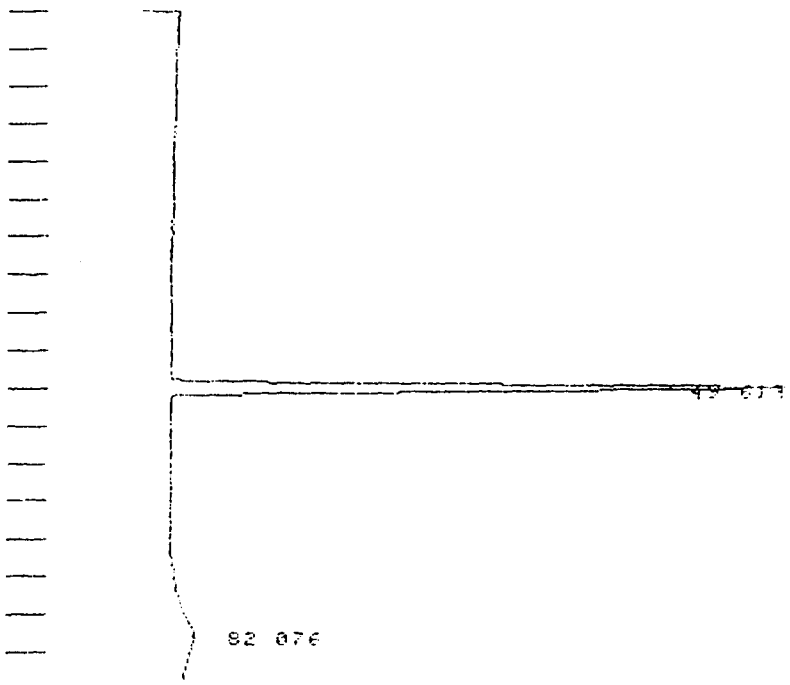
R-123

CHANNEL: 1A - 1 TITLE: 18:01 12 JUL 92

SAMPLE: METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		0.0034	0.195	2505	BV
2		0.0034	0.244	2507	VB
3		0.0075	10.170	5524	BB
4		0.0013	10.709	960	BV
5		0.0038	10.755	2810	VB
6		0.0042	18.234	3105	BB
7		0.0042	33.288	3063	BB
8		0.0089	38.796	6600	BB
9		0.0070	51.540	5189	BB
10		99.7328	57.655	73564064	BB
11		0.0290	60.661	21410	BB
12		0.0079	62.399	5840	BV
13		0.0049	62.465	3592	VB
14		0.0051	64.787	3777	BB
15		0.0439	66.301	32413	BV
16		0.0229	66.546	16896	VV
17		0.0146	66.713	10793	VV
18		0.0138	67.479	10200	VB
19		0.0128	82.548	9453	BB
20		0.0215	90.525	15851	BV
21		0.0174	90.832	12847	VV
22		0.0101	91.240	7426	VV
23		0.0107	91.501	7925	VV
24		0.0086	91.923	6366	VB
TOTALS:		100.0000		73761120	

CHART SPEED 0.1 CM/MIN
ATTEN: 8 ZERO: 5% 5 MIN/TICK



RECALCULATE ON FILE: FREON000

CHANNEL: 1A - 1 TITLE: 12:23 21 MAY 93

SAMPLE: HFC-134 METHOD: FREON CALCULATION: A% - ANALYS - OP

PEAK NO	PEAK NAME	RESULT AREA%	TIME (MIN)	AREA COUNTS	SEP CODE
1		99.8771	49.613	2563562	BB
2		0.0844	82.076	2166	BB
3		0.0163	82.778	419	BV
4		0.0222	82.829	570	VB
TOTALS:		100.0000		2566717	

DIVISOR: 1.00000 AMT STD: 1.00000 MULTIPLIER: 1.00000

APPENDIX L

REFRIGERANT-LUBRICANT TEST MIXTURES FOR PART II TESTING

TABLE L-1

Part II Refrigerant/Lubricant Test Mixtures

Refrigerant	Wt. % Refrigerant	Lubricant (Description)	ID	Lubricant (Trade Name)
HCFC-22	33	Naphthenic mineral oil	MO	Witco Suniso 3GS
HCFC-123	50	Naphthenic mineral oil	MO	Witco Suniso 3GS
HFC-134a	39	Polypropylene glycol diol	PPGD	DOW P425
HFC-134a	35	Modified polyglycol	MPG	Allied-Signal BRL-150
HFC-134a	41	Penta erythritol ester mixed-acid polyolester	PEMA	ICI Emkarate RL 244
HFC-134a	47	Penta erythritol ester branched-acid polyolester	PEBA	Emery 2927-A
HCFC-142b	50	Alkylbenzene	AB	Shrieve Zerol 150
HFC-152a	34	Alkylbenzene	AB	Shrieve Zerol 150
HFC-32	22	Penta erythritol ester branched-acid polyolester	PEBA	Emery 2927-A
HCFC-124	50	Alkylbenzene	AB	Shrieve Zerol 150
HFC-125	38	Penta erythritol ester branched-acid polyolester	PEBA	Emery 2927-A
HFC-143a	28	Penta erythritol ester branched-acid polyolester	PEBA	Emery 2927-A
HFC-134	67	Penta erythritol ester branched-acid polyolester	PEBA	Emery 2927-A
HFC-32	23	Penta erythritol ester mixed-acid polyolester	PEMA	ICI Emkarate RL 244
HFC-125	37	Polypropylene glycol diol	PPGD	Dow P425
HFC-125	36	Penta erythritol ester mixed-acid polyolester	PEMA	ICI Emkarate RL 244
HFC-152a	46	Penta erythritol ester branched-acid polyolester	PEBA	Emery 2927-A4

APPENDIX M

CHANGE IN PROPERTIES AFTER AGING DATA TABLES OF PART II COMPOUNDS

NOTE: All formulations contained in this appendix with an asterisk following the formulation number appeared to be significantly deteriorated or highly swollen such that tensile data could not be obtained or has little or no practical significance.

Refrigerant/Lubricant Type: HCFC-22 / SUNISCO (mineral oil)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	373/406	86.5/88.7	40.7/48.5	277	23.6/28.9	-90.5	44/45 A	5/6 A	-87.6
8*	258/226	44.1/49.4	33.3/31.3	2316	60.7/64.3	-97.3	61/62 A	22/23 A	-63.4
12*	169/164	31.1/27.5	53.9/49.5	2493	164/89.1	-94.9	55/56 A	48/49 A	-12.6
17	22.9/21.9	3.1/3.1	3.9/4.0	1727	785/744	-55.7	59/60 A	42/43 A	-28.6
35	11.2/11.0	0.6/-0.7	4.0/5.3	2891	2481/2228	-18.6	65/66 A	55/56 A	-15.3
45	41.1/40.4	9.5/9.4	11.7/12.5	2124	1565/1515	-27.5	93/94 A	79/80 A	-15.0
46	44.4/34.3	16.5/15.9	17.7/17.6	1269	935/877	-28.6	78/79 A	62/63 A	-20.4
47	30.7/31.2	11.5/8.2	11.5/11.5	2374	1900/1904	-19.9	42/43 D	27/28 D	-35.3
49	11.7/11.8	2.6/3.2	4.2/6.6	2561	2219/2012	-17.4	96/97 A	84/85 A	-12.4
50	12.9/12.7	1.9/-1.3	1.6/3.2	1393	988/1021	-27.9	84/85 A	74/75 A	-11.8
54	12.8/12.6	7.3/10.7	3.3/3.3	3815	3511/3649	-6.2	52/53 D	46/47 D	-11.4
55	9.3/9.3	3.3/5.8	2.5/3.3	3994	3639/3989	-4.5	61/62 D	52/53 D	-14.6
56*	-35.9/-34.0	-12.4/-16.2	-2.6/-14.6	205	105/122	-44.6	44/45 A	40/41 A	-8.9
57	-20.1/-20.7	-5.3/-6.6	-8.9/-8.9	1787	445/355	-77.6	76/77 A	87/88 A	14.4
58*	-11.1/-5.8	1.2/0.0	-4.7/-8.9	131	32/25	-78.2	32/33 A	21/22 A	-33.8
61	28.5/28.2	7.4/9.3	10.7/10.5	6358	3139/2501	-55.7	46/47 D	25/26 D	-45.2
63	13.6/13.8	2.6/1.3	4.7/3.7	7638	1183/1208	-84.4	53/54 D	30/31 D	-42.9
66	9.8/9.8	6.0/6.0	3.1/3.7	4347	3788/3664	-14.3	74/75 A	75/76 A	1.3
74*	187/180	40.4/46.1	48.4/46.1	1005	345/296	-68.1	82/83 A	31/32 A	-61.8
78	35.2/35.1	13.8/14.4	16.5/17.7	4359	2907/2805	-34.5	84/85 A	67/68 A	-20.1
83	106/96.2	31.0/28.6	33.3/35.5	3029	764/344	-81.7	82/83 A	44/45 A	-46.1
85*	136/133	28.5/19.4	32.7/34.7	725	158/146	-79.0	64/65 A	24/25 A	-62.0
86	21.0/21.0	7.8/11.1	8.6/8.8	1461	1146/1304	-16.2	74/75 A	55/56 A	-25.5
90	26.2/15.9	2.0/2.6	3.1/2.5	1959	1665/1359	-22.9	45/46 D	46/47 D	2.2
95	4.0/4.1	3.9/4.6	0.7/1.4	1467	1551/1440	2.0	83/84 A	76/77 A	-8.4

Refrigerant/Lubricant Type: HCFC-123 / SUNISCO (mineral oil)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7	499/530	66.7/71.6	53.8/50.6	277	38.9/44.6	-84.9	44/45 A	10/11 A	-76.4
8	325/336	49.4/53.6	52.5/47.6	2316	261/210	-89.9	61/62 A	21/22 A	-65.0
12	228/230	31.6/34.6	51.9/61.1	2493	494/464	-80.8	55/56 A	33/34 A	-39.6
17	76.1/75.8	15.3/13.1	14.5/9.6	1727	244/220	-79.9	59/60 A	45/46 A	-23.5
35	18.0/17.9	5.1/1.3	8.0/5.9	2891	2495/2118	-20.2	65/66 A	62/63 A	-4.6
45	47.9/47.2	12.1/12.9	12.2/11.5	2124	1676/1403	-27.5	93/94 A	79/80 A	-15.0
46	78.4/75.1	18.5/20.8	18.8/17.2	1269	856/925	-29.8	78/79 A	59/60 A	-24.2
47	40.7/41.2	8.9/8.9	11.9/10.9	2374	1925/1861	-20.3	42/43 D	24/25 D	-42.4
49	44.3/43.8	9.6/9.7	10.0/10.0	2561	1657/1780	-32.9	96/97 A	82/83 A	-14.5
50	49.7/49.4	10.4/9.7	11.3/11.3	1393	963/922	-32.3	84/85 A	71/72 A	-15.4
54	27.33/27.42	8.1/11.3	6.8/6.7	3815	3780/3830	-0.3	52/53 D	41/42 D	-21.0
55	18.7/18.5	7.4/4.1	4.1/4.6	3994	3862	-3.3	61/62 D		
56	-34.4/-38.1	-18.1/-18.8	-12.5/-11.7	205	127/94.7	-45.9	44/45 A	54/55 A	22.5
57	-21.4/-21.8	-5.2/-7.1	-7.4/-7.4	1787	232	-87.0	76/77 A	91/92 A	19.6
58*	-32.8/-31.3	-14.3/-13.8	-17.8/-17.1	131	0	-99.0	32/33 A	33/34 A	3.1
61	61.0/63.6	17.0/16.3	17.2/16.7	6358	1985/2270	-66.5	46/47 D	25/26 D	-45.2
63	26.9/26.9	10.7/9.2	8.5/8.5	7638	6405/6585	-14.9	53/54 D	38/39 D	-28.0
66	41.4/41.7	9.6/8.9	8.6/11.8	4347	1761/1967	-57.1	74/75 A	58/59 A	-21.5
74	258/256	25.3/27.0	51.9/53.9	1005	352/450	-60.1	82/83 A	36/37 A	-55.8
78	51.1/50.4	12.2/14.1	18.8/18.1	4359	2476/2599	-41.8	84/85 A	59/60 A	-29.6
83	176/173	29.8/32.9	38.8/38.8	3029	434/688	-81.5	82/83 A	49/50 A	-40.0
85	165/159	25.0/28.3	37.5/37.5	725	172/296	-67.8	64/65 A	31/32 A	-51.2
86	30.9/30.9	15.9/16.9	11.4/10.7	1461	1169/1192	-19.2	74/75 A	55/56 A	-25.5
90	28.6/27.8	2.0/4.0	10.7/12.6	1959	1557/1083	-32.6	45/46 D	44/45 D	-2.2
95	9.4/9.5	1.9/1.9	2.7/1.4	1467	1409/1548	0.8	83/84 A	78/79 A	-6.0

Refrigerant/Lubricant Type: HFC- 134a / Dow P425 (Polyproylene glycol diol)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7	5.6/5.3	-3.7/1.9	1.2/1.3	277	210/210	-24.2	44/45 A	40/41 A	-9.0
8	4.2/4.6	0.0/0.0	0.0/1.8	2316	1722/1934	-21.1	61/62 A	-	-
12	20.0/20.3	2.5/3.7	7.0/5.8	2493	1822/1757	-28.2	55/56 A	42/43 A	-23.4
17	21.6/22.5	4.5/3.1	4.0/4.0	1727	844/749	-53.9	59/60 A	45/46 A	-23.5
35	15.4/15.6	5.1/3.8	5.9/7.1	2891	2261/2381	-19.7	65/66 A	60/61 A	-7.6
45	-11.9/-11.5	-6.3/-4.4	-7.9/-7.6	2124	2219/2254	5.3	93/94 A	76/77 A	-18.2
46	-22.5/-23.6	-13.6/-9.1	-7.7/-13.6	1269	987	-22.2	78/79 A	28/29 D	
47	-3.2/-3.7	-1.9/-3.1	-3.6/-3.3	2374	2176/2110	-9.7	42/43 D	34/35 D	-18.8
49	6.2/6.4	1.9/3.3	0.8/2.5	2561	2168/2185	-15.0	96/97 A	93/94 A	-3.1
50	5.2/6.0	-1.3/0.6	1.6/2.4	1393	1020/1048	-25.8	84/85 A	76/77 A	-9.5
54	8.2/8.4	4.1/6.5	1.7/1.7	3815	3403/3738	-6.4	52/53 D	33/34 D	-36.2
55	7.4/7.3	1.7/1.7	1.7/1.7	3994	4228/4329	7.1	61/62 D	57/58 D	-6.5
56*	-51.6/-52.3	-36.0/-42.1	-7.7/-1.3	205	0	-99.0	44/45 A	40/41 A	-9.0
57	-18.6/-18.7	-5.9/-3.9	-3.7/-5.0	1787	573/589	-67.5	76/77 A	84/85 A	10.5
58	-62.2/-62.1	-26.3/-35.0	-31.1/-36.4	131	70.6/61.6	-49.5	32/33 A	59/60 A	83.1
61	38.6/41.3	13.9/11.8	13.1/13.9	6358	637/538	-90.8	46/47 D	14/15 D	-68.8
63	13.4/13.4	7.2/8.7	5.5/6.0	7638	2003/1966	-74.0	53/54 D	35/36 D	-33.6
66	15.1/14.6	2.6/1.3	2.4/0.7	4347	430/417	-90.3	74/75 A	47/48 A	-36.2
74	4.8/5.4	0.0/0.6	1.7/2.2	1005	1105/1083	8.8	82/83 A	80/81 A	-2.4
78	6.9/6.1	0.7/0.0	3.7/5.1	4359	3927/3788	-11.5	84/85 A	75/76 A	-10.7
83	5.3/5.3	-1.9/-1.3	2.1/1.1	3029	2640/2470	-15.6	82/83 A	75/76 A	-8.5
85	-14.8/-15.0	-2.0/-5.8	-8.0/-8.2	725	792/917	17.8	64/65 A	67/68 A	4.7
86	-2.4/-2.7	-1.3/-0.7	0.0/0.0	1461	1500/1532	3.8	74/75 A	75/76 A	1.3
90	20.9/24.4	0.0/1.3	6.8/6.7	1959	870/709	-59.7	45/46 D	45/46 D	0.0
95	9.0/9.1	2.6/4.6	2.7/2.7	1467	1651/1470	6.4	83/84 A	73/74 A	-12.0

Refrigerant/Lubricant Type : HFC- 134a / BRL-150 (modified polyglycol)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7	3.8/3.9	3.3/7.4	1.3/2.5	277	218/212	-22.4	44/45 A	42/43 A	-4.5
8	3.2/3.0	6.9/6.8	1.3/2.5	2316	1933/1914	-16.9	61/62 A	52/53 A	-14.6
12	4.6/4.9	6.8/5.3	2.9/3.0	2493	2139/1996	-17.1	55/56 A	51/52 A	-7.2
17	8.7/8.8	1.4/4.6	2.5/2.4	1727	620	-64.1	59/60 A	44/45 A	-25.2
35	3.3/3.3	2.6/2.6	1.3/1.3	2891	1871/2426	-25.7	65/66 A	52/53 A	-19.8
45	-8.0/-8.2	-3.9/-3.2	-6.6/-5.7	2124	2243/2193	4.5	93/94 A	81/82 A	-12.8
46	-23.7/-23.7	-4.5/-8.4	-13.4/-13.6	1269	1699/1750	35.9	78/79 A	77/78 A	-1.3
47	-3.3/-3.7	0.0/0.0	-5.3/-4.4	2374	2319/2196	-4.9	42/43 D	22/23 D	-47.1
49	-0.3/0.4	1.3/2.0	-0.8/0.0	2561	2022/2328	-15.1	96/97 A	95/96 A	-1.0
50	-4.8/-5.0	2.6/-0.7	-3.2/-3.2	1393	1471/1314	-0.1	84/85 A	84/85 A	0.0
54	4.5/4.8	4.8/12.0	0.8/1.6	3815	3830/4053	3.3	52/53 D	40/41 D	-22.9
55	3.5/2.2	7.7/1.6	0.8/1.7	3994	4002/3983	-0.1	61/62 D	95/96 A	55.3
56*	-52.3/-52.9	-32.9/-34.8	-30.0/-29.1	205	0	-99.0	44/45 A	45/46 A	2.2
57	-15.0/-15.3	-5.9/-4.6	-5.5/-5.0	1787	746/798	-56.8	76/77 A	85/86 A	11.8
58*	-27.1/-27.5	-10.0/-13.1	-11.1/-10.9	131	103/91	-26.0	32/33 A	45/46 A	40.0
61	7.5/7.9	6.1/6.8	1.2/2.4	6358	5541/6042	-8.9	46/47 D	49/50 D	6.5
63	7.0/7.1	4.0/3.3	2.4/1.8	7638	8791/8107	10.6	53/54 D	44/45 D	-16.8
66	2.6/2.5	2.6/4.6	0.0/1.3	4347	3622/3777	-14.9	74/75 A	67/68 A	-9.4
74	2.0/2.2	-0.6/-1.3	1.1/1.1	1005	957/977	-3.8	82/83 A	54/55 A	-33.9
78	3.8/3.7	-0.6/0.6	1.4/1.4	4359	3379/3852	-17.1	84/85 A	74/75 A	-11.8
83	2.1/1.9	-3.7/-5.6	0.0/0.0	3029	2326/2305	-23.6	82/83 A	80/81 A	-2.4
85	-17.6/-17.7	-7.1/-7.1	-11.4/-10.3	725	921/925	27.3	64/65 A	72/73 A	12.4
86	-5.8/-5.8	-0.7/-0.7	-5.3/-2.7	1461	1258/1288	-12.9	74/75 A	80/81 A	8.1
90	27.8/28.9	-0.7/0.0	3.1/1.5	1959	793/868	-57.6	45/46 D	44/45 D	-2.2
95	1.3/1.5	4.0/0.0	0.0/0.0	1467	1444/1489	-0.01	83/84 A	84/85 A	1.2

Refrigerant/Lubricant Type: HFC- 134a / Emkarate RL-244 (Pentaerythritol ester mixed acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	17.8/16.5	5.1/3.1	4.9/3.9	277	163/207	-33.3	44/45 A	34/35 A	-22.5
8	11.2/11.4	4.5/4.5	2.5/3.7	2316	2089/2080	-10.0	61/62 A	54/55 A	-11.4
12	16.3/16.5	2.5/3.8	5.7/3.9	2493	1864/1549	-31.5	55/56 A	50/51 A	-9.0
17	19.1/20.4	-2.4/1.9	4.5/4.2	1727	438/378	-76.4	59/60 A	48/49 A	-18.5
35	19.5/19.5	9.0/9.0	9.0/7.5	2891	2510/2517	-13.0	65/66 A	54/55 A	-16.8
45	-5.2/-5.2	-2.6/-3.7	-4.8/-4.9	2124	1478/2025	-17.5	93/94 A	93/94 A	0.
46	-16.4/-16.5	-6.9/-7.0	-10.5/-10.8	1269	1346/1414	8.7	78/79 A	82/83 A	5.1
47	-0.7/-0.9	-1.9/-1.9	-2.7/-1.8	2374	2092/2157	-10.5	42/43 D	33/34 D	-21.2
49	7.1/7.1	2.0/3.2	1.7/1.7	2561	2136/1989	-19.5	96/97 A	90/91 A	-6.2
50	8.3/8.2	1.3/1.3	19.4/18.6	1393	1240/1210	-12.1	84/85 A	82/83 A	-2.4
54	7.7/7.5	3.2/3.2	1.7/1.7	3815	3568/3817	-3.3	52/53 D		
55	4.9/5.0	1.64/6.1	1.7/1.6	3994	3780/3867	-4.3	61/62 D	50/51 D	-17.9
56*	-40.1/-47.6	-17.2/-10.3	-25.0/-21.6	205	95.2/122	-47.2	44/45 A	30/31 A	-31.5
57	-22.4/-22.3	-7.1/-6.5	-8.5/-10.4	1787	315/362	-81.1	76/77 A	91/92 A	19.6
58	-23.2/-25.5	-12.1/-12.9	-8.9/-9.1	131	125/125	-4.6	32/33 A	40/41 A	24.6
61	14.8/14.7	7.2/5.9	4.6/4.8	6358	4335/3938	-34.9	46/47 D	25/26 D	-45.2
63	4.0/4.1	0.7/2.6	2.5/1.2	7638	2115/3193	-65.3	53/54 D	37/38 D	-29.9
66	7.7/7.8	3.2/6.6	2.6/1.3	4347	3218/2951	-29.0	74/75 A	74/75 A	0.0
74	9.2/9.5	0.0/-0.7	18.1/16.9	1005	995/997	-0.9	82/83 A	74/75 A	-9.7
78	20.2/20.2	7.8/7.1	8.1/9.5	4359	3532/3296	-21.7	84/85 A	64/65 A	-23.7
83	7.7/7.5	-1.9/-1.9	2.1/2.1	3029	2287/2647	-18.6	82/83 A	75/76 A	-8.5
85	-7.0/-7.2	-3.1/-4.4	-7.8/-6.3	725	651/627	-12.0	64/65 A	58/59 A	-9.3
86	2.6/2.6	0.0/2.0	1.2/1.3	1461	1316/1316	-9.9	74/75 A	73/74 A	-1.3
90	32.8/33.0	2.0/1.3	6.3/4.6	1959	893/1010	-51.4	45/46 D	41/42 D	-8.8
95	11.7/11.7	6.5/6.5	4.1/2.7	1467	1430/1434	-2.4	83/84 A	73/74 A	-12.0

Refrigerant/Lubricant Type: HFC- 134a / Emery 2927-A (Pentaerythritol ester branched-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7	15.3/15.0	1.3/1.3	0.0/1.3	277	179/181	-35.0	44/45 A	36/37 A	-18.0
8	9.9/9.9	3.9/5.1	2.5/3.7	2316	1908/2100	-13.5	61/62 A	56/57 A	-8.1
12	13.2/13.2	7.1/6.5	4.8/4.7	2493	2061/1877	-21.0	55/56 A	54/55 A	-1.8
17	18.4/18.2	7.1/5.1	5.0/4.7	1727	328/412	-78.6	59/60 A	52/53 A	-11.8
35	12.8/12.9	5.8/4.5	6.7/5.3	2891	2077/2566	-19.7	65/66 A	64/65 A	-1.5
45	-4.6/-6.3	-0.7/-3.1	-4.8/-5.4	2124	2093/2057	-2.3	93/94 A	94/95 A	1.1
46	-16.7/-16.9	-5.7/-3.9	-10.4/-9.1	1269	1471/1538	18.6	78/79 A	79/80 A	1.3
47	-1.3/-1.2	-1.9/-1.3	-3.5/-1.8	2374	2099/2092	-11.7	42/43 D	38/39 D	-9.4
49	4.1/4.2	0.7/1.3	1.7/0.8	2561	2174/1841	-21.6	96/97 A	40/41 D	
50	4.4/4.8	1.9/-0.6	0.0/0.8	1393	1271/1264	-9.0	84/85 A	81/82 A	-3.6
54	8.2/7.7	6.4/1.6	1.6/1.7	3815	3481/4085	-0.9	52/53 D	49/50 D	-5.7
55	5.3/5.3	1.3/0.8	1.7/1.7	3994	4172/4379	7.0	61/62 D	54/55 D	-11.4
56*	-45.9/-49.4	-28.9/-26.4	-22.5/-20.5	205	86.9/106	-53.0	44/45 A	40/41 A	-9.0
57	-22.1/-21.7	-6.5/-5.9	-10.0/-9.0	1787	592/617	-66.2	76/77 A	95/96 A	24.8
58*	-30.2/-31.8	-11.3/-12.5	-9.3/-11.6	131	114/114	-12.9	32/33 A	50/51 A	55.4
61	14.2/13.7	5.2/5.2	5.2/4.8	6358	3919/4427	-34.4	46/47 D	33/34 D	-28.0
63	7.9/8.1	3.3/2.7	3.7/2.4	7638	5705/5932	-23.8	53/54 D	45/46 D	-14.9
66	6.7/7.0	2.6/4.6	2.6/2.5	4347	3284/3041	-27.2	74/75 A	74/75 A	0.0
74	7.7/7.9	0.7/1.3	4.5/4.6	1005	956/918	-6.8	82/83 A	72/73 A	-12.1
78	13.5/14.0	3.2/3.2	5.4/6.4	4359	3598/3484	-18.8	84/85 A	64/65 A	-23.7
83	5.7/5.9	-0.6/-1.3	2.2/1.6	3029	2678/3029	-5.8	82/83 A	78/79 A	-4.8
85	-12.3/-12.1	-6.3/-5.7	-8.9/-9.1	725	713/779	2.8	64/65 A	62/63 A	-3.1
86	-2.5/-2.6	-0.7/-3.2	-2.6/-2.5	1461	1352/1516	-1.8	74/75 A	80/81 A	8.1
90	30.6/21.0	0.7/0.0	6.2/4.9	1959	1191/699	-51.8	45/46 D	50/51 D	11.0
95	5.4/5.6	2.6/5.4	2.3/2.3	1467	1428/1463	-1.5	83/84 A	74/75 A	-10.8

Refrigerant/Lubricant Type: HCFC-142b / Zerol 150 (Alkylbenzene)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	205/200	40.6/35.6	35.0/25.0	277	49.6/39.8	-83.9	44/45 A	15/16 A	-65.2
8*	136/139	31.0/32.7	33.7/33.3	2316	384	-83.4	61/62 A	28/29 A	-53.7
12	146/144	28.5/29.4	34.9/36.5	2493	717	-71.2	55/56 A	34/35 A	-37.8
17	21.7/21.9	4.4/5.8	5.8/7.7	1727	503/375	-74.6	59/60 A	53/54 A	-10.1
35	9.5/9.4	9.3/7.7	5.3/4.0	2891	2052/2479	-21.6	65/66 A	66/67 A	1.5
45	21.5/21.6	1.3/2.5	6.2/6.4	2124	1641/1791	-19.2	93/94 A	85/86 A	-8.6
46	30.4/29.6	7.6/6.3	9.1/7.7	1269	985/906	-25.5	78/79 A	62/63 A	-20.4
47	16.1/16.1	2.5/3.1	5.4/5.3	2374	2143/2066	-11.4	42/43 D	23/24 D	-44.7
49	13.2/12.8	5.8/3.9	3.3/5.0	2561	1490/1387	-43.8	96/97 A	91/92 A	-5.2
50	9.6/9.6	2.6/1.9	1.6/3.2	1393	1069/1134	-20.9	84/85 A	77/78 A	-8.3
54	11.0/11.1	3.3/4.9	3.3/4.2	3815	4130/4036	7.0	52/53 D	45/46 D	-13.3
55	7.0/7.2	4.9/4.0	3.4/1.7	3994	3859/4383	3.2	61/62 D	50/51 D	-17.9
56	-29.5/-33.1	-11.9/-18.8	-9.8/-7.9	205	108/93.5	-50.9	44/45 A	49/50 A	11.2
57	-18.7/-16.0	-5.8/-6.5	-7.8/-7.3	1787	602/796	-60.9	76/77 A	90/91 A	18.3
58*	-30.5/-33.1	-11.3/-13.8	-16.3/-13.6	131	67.4/59.5	-51.6	32/33 A	38/39 A	18.5
61	21.4/20.9	6.5/6.5	7.1/8.2	6358	4257/3869	-36.1	46/47 D	26/27 D	-43.0
63	8.2/8.3	3.3/2.6	4.9/3.7	7638	5397/4967	-32.2	53/54 D	41/42 D	-23.0
66	8.1/8.2	1.9/1.9	2.6/2.6	4347	3554/3700	-16.56	74/75 A	66/67 A	-10.7
74*	132/132	19.8/19.6	36.2/35.8	1005	532/478	-49.8	82/83 A	44/45 A	-46.1
78	24.8/25.0	7.1/9.1	10.9/10.6	4359	3217/2567	-33.7	84/85 A	70/71 A	-16.6
83	86.2/84.7	19.8/16.8	26.1/23.9	3029	1113/971	-65.6	82/83 A	55/56 A	-32.7
85	77.8/76.8	12.4/12.5	17.7/15.7	725	219/154	-74.3	64/65 A	34/35 A	-46.5
86	7.7/7.7	0.7/3.2	2.6/2.5	1461	1456/1417	-1.7	74/75 A	70/71 A	-5.4
90	24.2/24.6	0.7/-0.7	1.5/1.5	1959	1012/956	-49.8	45/46 D	48/49 D	6.6
95	3.7/3.7	0.7/0.0	-37.7/-37.7	1467	1354/1268	-10.6	83/84 A	78/79 A	-6.0

Refrigerant/Lubricant Type: HFC-152a / Zerol 150 (Alkylbenzene)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	182/162	49.0/39.9	34.2/32.5	277	14.7/11.4	-95.3	44/45 A	14/15 A	-67.4
8*	124/131	34.0/32.3	32.5/31.7	2316	74.9/97.0	-96.3	61/62 A	59/60 A	-3.3
12	121/125	25.2/26.4	39.2/34.0	2493	574/642	-75.6	55/56 A	41/42 A	-25.2
17	20.5/20.2	1.8/1.8	7.0/6.0	1727	305/298	-82.5	59/60 A	56/57 A	-5.0
35	9.4/9.3	1.9/3.1	5.3/4.0	2891	1514/2084	-37.8	65/66 A	68/69 A	4.6
45	17.8/17.7	3.8/3.1	7.9/9.1	2124	1713	-19.3	93/94 A	81/82 A	-12.8
46	37.7/38.3	8.8/8.1	14.1/13.6	1269	967/978	-23.3	78/79 A	61/62 A	-21.7
47	13.9/13.7	3.1/1.2	5.2/7.0	2374	2010/1955	-16.5	42/43 D	28/29 D	-32.9
49	8.6/8.0	3.2/3.9	4.2/3.3	2561	1881/1922	-25.8	96/97 A	91/92 A	-5.2
50	8.4/8.2	1.3/1.3	3.2/3.2	1393	1038/1087	-23.7	84/85 A	77/78 A	-8.3
54	8.4/8.4	378/389	3.4/3.3	3815	3179/3223	-16.1	52/53 D	45/46 D	-13.3
55	4.9/4.9	2.4/7.3	1.7/3.3	3994	4090/3977	1.0	61/62 D	57/58 D	-6.5
56*	-18.3/-15.9	-5.0/-7.5	2.6/13.5	205	62.3/109	-58.4	44/45 A	52/53 A	17.9
57	-15.6/-15.0	-3.3/-5.2	-6.3/-6.0	1787	851/789	-54.1	76/77 A	88/89 A	15.7
58	-36.5/-39.4	-12.3/-13.8	-15.6/-13.0	131	104/83.2	-28.6	32/33 A	42/43 A	30.8
61	16.8/16.4	7.2/2.6	7.0/9.2	6358	2670/3200	-53.8	46/47 D	27/28 D	-40.9
63	7.3/7.4	4.6/3.9	2.5/2.9	7638	4722/4536	-39.4	53/54 D	40/41 D	-24.3
66*	-	-	-	4347	0	-99.0	74/75 A	10/11 A	-85.9
74	120/123	13.7/20.1	37.8/35.6	1005	423/564	-50.9	82/83 A	42/43 A	-48.5
78	24.6/24.5	9.7/9.7	13.2/13.2	4359	3130/3034	-29.3	84/85 A	69/70 A	-17.8
83	87.4/87.8	20.8/21.9	26.8/27.3	3029	892/977	-69.2	82/83 A	55/56 A	-32.7
85	74.3/75.0	28.0/19.4	22.9/22.6	725	239/229	-67.8	64/65 A	36/37 A	-43.4
86	9.9/9.8	3.3/4.6	5.3/3.8	1461	1204/1185	-18.2	74/75 A	65/66 A	-12.1
90	15.5/15.8	-0.7/0.0	0.0/1.7	1959	1786/1696	-11.2	45/46 D	51/52 D	13.2
95	1.5/1.5	-1.9/-1..3	0.7/0.0	1467	1401/1490	-1.5	83/84 A	81/82 A	-2.4

Refrigerant/Lubricant Type: HFC-32 / Emery 2927-A (Pentaerythritol ester branched-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	20.7/19.5	40.1/29.9	59.8/17.1	277	128/101	-58.8	44/45 A	18/19 A	-58.4
8	12.0/12.1	3.1/3.1	1.8/1.7	2316	1967/1779	-19.1	61/62 A	50/51 A	-17.9
12	15.6/15.7	3.8/1.9	4.6/4.6	2493	1835/1613	-30.8	55/56 A	43/44 A	-21.6
17	14.8/14.8	3.9/3.9	5.6/6.2	1727	398/414	-76.5	59/60 A	64/65 A	8.4
35	29.1/29.2	15.7/11.5	13.5/13.8	2891	2371/2090	-22.8	65/66 A	60/61 A	-7.6
45	-5.9/-5.9	-3.8/-2.6	-4.6/-3.2	2124	2078/2066	-2.4	93/94 A	95/96 A	2.1
46	-15.3/-15.5	-5.1/-5.2	-9.4/-7.7	1269	1453/1443	14.1	78/79 A	80/81 A	2.5
47	-0.5/-0.4	-1.9/-1.3	-1.8/-1.8	2374	2104/1385	-26.5	42/43 D	41/42 D	-2.4
49	4.9/4.6	2.6/1.9	1.7/3.3	2561	2306/2156	-12.9	96/97 A	94/95 A	-2.1
50	4.0/4.3	0.6/0.0	1.6/0.0	1393	1236/1135	-14.9	84/85 A	84/85 A	0.0
54	5.5/5.6	1.7/4.1	1.7/3.1	3815	3672/3606	-4.6	52/53 D	51/52 D	-1.9
55	3.4/3.4	0.8/0.8	1.6/1.6	3994	4010/4134	2.0	61/62 D	59/60 D	-3.3
56	-60.1/-60.5	-32.1/-31.7	-17.5/-22.5	205	0	-99.0	44/45 A	60/61 A	36.0
57	-23.4/-24.6	-8.4/-9.1	-3.9/-4.9	1787	644/794	-59.8	76/77 A	48/49 D	
58	-68.9/-69.3	-33.7/-35.5	-34.0/-31.9	131	60.4/42.2	-60.9	32/33 A	65/66 A	101.5
61	12.8/12.7	7.4/7.3	5.8/4.7	6358	3420/3390	-46.5	46/47 D	39/40 D	-15.1
63	1.5/1.6	0.7/0.7	0.0/0.0	7638	1303/1313	-82.9	53/54 D	44/45 D	-16.8
66	4.9/5.2	1.3/1.3	2.5/2.5	4347	2802/2885	-34.6	74/75 A	74/75 A	0.0
74	8.2/8.4	0.7/2.0	3.3/4.4	1005	1179/1119	14.3	82/83 A	76/77 A	-7.3
78	25.3/26.1	7.7/7.1	11.7/12.9	4359	3094/2800	-32.4	84/85 A	72/73 A	-14.2
83	8.8/9.0	0.0/0.0	3.3/3.0	3029	2893/3167	0.1	82/83 A	80/81 A	-2.4
85	-6.5/-6.5	-4.4/-4.4	-5.9/-5.9	725	671/632	-10.2	64/65 A	64/65 A	0.0
86	9.6/9.5	2.6/4.2	3.9/3.8	1461	1639/1599	10.8	74/75 A	69/70 A	-6.7
90	22.4/24.0	0.0/2.0	8.3/8.3	1959	1303/1410	-30.8	45/46 D	49/50 D	8.8
95	17.3/17.2	7.8/9.1	6.8/8.1	1467	1381/1640	3.0	83/84 A	75/76 A	-9.6

Refrigerant/Lubricant Type: HCFC-124 / Zerol 150 (alkylbenzene)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	161/162	33.8/24.2	30.5/26.3	277	51.3/46.4	-82.4	44/45 A	21/22 A	-51.7
8	131/136	26.9/19.4	29.4/29.4	2316	451/392	-81.8	61/62 A	37/38 A	-39.0
12	132/134	17.1/25.8	36.5/38.3	2493	624/763	-72.2	55/56 A	47/48 A	-14.4
17	40.2/39.8	3.1/2.5	8.9/9.0	1727	423/390	-76.5	59/60 A	53/54 A	-10.1
35	7.4/7.2	4.6/5.2	2.6/2.7	2891	2686/2498	-10.3	65/66 A	62/63 A	-4.6
45	17.9/17.7	3.1/3.1	7.6/6.6	2124	1692/1757	-18.8	93/94 A	80/81 A	-13.9
46	35.5/35.4	4.4/5.7	10.8/10.8	1269	768/1031	-29.1	78/79 A	56/57 A	-28.0
47	15.3/14.4	5.1/3.8	6.6/5.4	2374	2154/2156	-9.2	42/43 D	82/83 A	94.1
49	3.5/3.5	4.0/6.0	1.7/0.8	2561	2058/2128	-18.3	96/97 A	83/84 A	-13.5
50	13.6/13.6	1.3/3.3	3.2/3.2	1393	1137/1102	-19.6	84/85 A	65/66 A	-22.5
54	14.2/14.1	3.3/3.7	4.7/4.8	3815	3521/3620	-6.4	52/53 D	40/41 D	-22.9
55	10.5/10.4	3.3/3.3	1.7/3.4	3994	3753/3446	-9.9	61/62 D	54/55 D	-11.4
56	-27.4/-34.4	-11.1/-8.6	-13.2/-14.3	205	158/132	-29.4	44/45 A	54/55 A	22.5
57	-7.7/-7.2	2.7/2.7	-5.1/-3.7	1787	869/752	-54.6	76/77 A	76/77 A	0.0
58	-34.9/-34.7	-13.1/-13.0	-15.6/-13.9	131	89/86	-33.2	32/33 A	39/40 A	21.5
61	32.9/32.8	12.8/11.3	10.9/9.9	6358	2526/2924	-57.1	46/47 D	27/28 D	-40.9
63	15.1/15.2	6.0/7.3	5.9/4.8	7638	3675/3777	-51.2	53/54 D	42/43 D	-20.6
66	62.6/63.1	24.3/23.6	16.9/17.4	4347	2744/2692	-37.5	74/75 A	60/61 A	-18.8
74	114/122	28.7/24.2	36.7/36.4	1005	648/638	-36.1	82/83 A	40/41 A	-50.9
78	22.7/22.7	6.5/9.7	10.0/10.3	4359	3178	-27.1	84/85 A	70/71 A	-16.6
83	77.1/75.9	23.3/23.8	21.9/22.2	3029	1261/1069	-61.5	82/83 A	55/56 A	-32.7
85	75.6/75.2	26.7/24.0	22.5/22.9	725	341/280	-57.2	64/65 A	32/33 A	-49.6
86	7.2/7.1	10.7/8.4	2.6/4.5	1461	1568/1548	6.6	74/75 A	53/54 A	-28.2
90	21.7/29.8	3.4/4.1	7.6/9.4	1959	1201/947	-45.2	45/46 D	45/46 D	0.0
95	2.4/2.5	-1.3/-0.6	0.8/0.7	1467	1614/1561	8.2	83/84 A	69/70 A	-16.8

Refrigerant/Lubricant Type : HFC-125 / Emery 2927-A (Pentaerythritol ester branched-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	19.9/19.4	21.3/20.9	15.6/17.1	277	195	-29.8	44/45 A	23/24 A	-47.2
8	13.2/13.6	3.9/2.5	3.6/3.5	2316	2254/2047	-7.2	61/62 A	50/51 A	-17.9
12	15.6/15.7	6.5/7.1	4.9/5.5	2493	1837/1883	-25.4	55/56 A	55/56 A	0.0
17	9.6/9.5	2.6/-2.5	2.5/3.7	1727	455/359	-76.4	59/60 A	74/75 A	25.2
35	14.2/14.2	2.6/5.8	7.8/8.0	2891	2111/2639	-17.8	65/66 A	65/66 A	0.0
45	-1.6/-5.5	-4.4/-3.1	-4.8/-3.0	2124	2229/2194	4.2	93/94 A	95/96 A	2.1
46	-14.3/-14.7	-4.5/-2.0	-9.0/-10.6	1269	1430	-43.6	78/79 A	78/79 A	0.0
47	-1.7/-1.5	-4.4/-0.6	-1.7/-1.8	2374	2073/1966	-15.0	42/43 D	41/42 D	-2.4
49	3.0/2.8	1.3/1.3	0.0/1.7	2561	2753/2411	0.8	96/97 A	95/96 A	-1.0
50	2.3/2.6	0.7/-1.3	0.0/0.0	1393	1525/1348	3.1	84/85 A	82/83 A	-2.4
54	5.1/5.2	0.8/0.0	3.2/1.7	3815	4126/3798	3.8	52/53 D	45/46 D	-13.3
55	2.7/2.8	-0.8/-0.8	1.7/0.0	3994	4807	20.3	61/62 D	55/56 D	-9.8
56*	-34.5/-37.3	-15.9/-17.3	-20.5/-16.2	205	89.3/67.3	-61.9	44/45 A	51/52 A	15.7
57	-18.9/-19.1	-7.2/-5.8	-9.2/-9.8	1787	601/876	-58.7	76/77 A	81/82 A	6.5
58*	-21.2/-22.1	-10.6/-9.9	-8.7/-10.6	131	106/92.9	-24.2	32/33 A	42/43 A	30.8
61	10.6/10.7	3.3/1.9	3.9/4.1	6358	4385/4945	-26.6	46/47 D	40/41 D	-12.9
63	1.9/1.9	2.0/0.7	1.2/0.0	7638	4028/3717	-49.3	53/54 D	50/51 D	-5.6
66	3.0/2.8	2.0/4.6	-1.2/0.0	4347	3543/3654	-17.2	74/75 A	80/81 A	8.1
74	11.2/11.0	0.0/-0.6	5.8/5.4	1005	936/930	-7.2	82/83 A	77/78 A	-6.1
78	18.8/18.7	6.5/3.1	7.4/9.1	4359	3394/2503	-32.4	84/85 A	72/73 A	-14.2
83	7.9/7.9	0.0/0.0	2.2/2.5	3029	2651/2784	-10.3	82/83 A	78/79 A	-4.8
85	-5.6/-5.4	-8.0/-8.0	-5.5/-3.8	725	826/860	16.2	64/65 A	65/66 A	1.6
86	1.5/1.9	0.0/1.3	0.0/-10.1	1461	1526/1210	-6.4	74/75 A	76/77 A	2.7
90	29.7/30.4	0.7/1.3	3.1/3.1	1959	1210/1432	-32.6	45/46 D	45/46 D	0.0
95	9.6/9.7	5.8/6.5	2.7/2.7	1467	1646/1706	14.3	83/84 A	75/76 A	-9.6

Refrigerant/Lubricant Type: HFC-143a/ Emery 2927-A (Pentaerythritol ester branched-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	22.4/22.8	6.3/3.8	2.4/2.3	277	210/215	-23.3	44/45 A	38/39 A	-13.5
8	15.6/15.4	5.8/3.2	3.7/3.8	2316	2057/2026	-11.9	61/62 A	51/52 A	-16.3
12	20.2/20.4	3.8/3.8	6.6/6.3	2493	1817/1868	-26.1	55/56 A	49/50 A	-10.8
17	19.1/19.5	1.3/2.5	4.1/5.1	1727	804/789	-54.0	59/60 A	45/46 A	-23.5
35	24.0/24.7	8.2/10.8	11.1/11.1	2891	2237/2346	-20.7	65/66 A	54/55 A	-16.8
45	-3.3/-2.7	-3.1/-1.9	-3.3/-3.3	2124	2057/1835	-8.4	93/94 A	93/94 A	0.0
46	-13.9/-14..3	-5.7/-6.3	-9.1/-9.1	1269	1299	2.3	78/79 A	80/81 A	2.5
47	-3.3/-3.3	-1.3/-1.3	-3.3/-3.6	2374	2172/2148	-9.0	42/43 D	39/40 D	-7.1
49	3.5/3.2	2.6/2.6	1.7/1.7	2561	2500/2087	-10.4	96/97 A	95/96 A	-1.0
50	3.2/3.4	3.3/0.6	0.0/0.0	1393	1229/1145	-14.8	84/85 A	84/85 A	0.0
54	5.3/5.4	0.8/0.8	0.0/1.6	3815	3747	-1.8	52/53 D	50/51 D	-3.8
55	3.1/2.9	-0.8/0.0	0.0/1.7	3994	3914/4372	3.7	61/62 D	58/59 D	-4.9
56*	-41.9/-49.3	-27.5/-24.4	-25.0/-27.8	205	107	-47.7	44/45 A	52/53 A	17.9
57	-20.2/-20.6	-5.8/-7.1	-10.1/-11.1	1787	684/732	-60.4	76/77 A		
58	-57.2/-57.1	-28.1/-28.1	-27.8/-29.2	131	104/88	-27.0	32/33 A	53/54 A	64.6
61	12.4/12.2	3.3/3.3	5.3/4.6	6358	4358/4888	-27.3	46/47 D	37/38 D	-19.4
63	1.1/0.8	0.0/0.7	0.0/0.0	7638	2537/2723	-65.6	53/54 D	52/53 D	-1.9
66	2.6/2.6	0.0/0.0	1.3/1.2	4347	3389/3044	-26.0	74/75 A	79/80 A	6.7
74	11.7/11.8	0.7/1.4	5.6/6.0	1005	856/880	-13.7	82/83 A	75/76 A	-8.5
78	20.5/18.4	7.1/7.1	10.0/10.7	4359	3046/3566	-24.2	84/85 A	75/76 A	-10.7
83	9.3/8.5	-0.6/1.3	2.2/3.3	3029	2571/3016	-7.8	82/83 A	64/65 A	-21.8
85	-5.1/-5.0	-6.1/-4.3	94.0/100	725	710/690	-3.5	64/65 A	65/66 A	1.6
86	6.0/6.1	0.0/2.6	2.5/2.5	1461	1288/1408	-7.7	74/75 A	71/72 A	-4.0
90	20.8/29.3	0.0/0.7	3.3/4.6	1959	1559/825	-39.2	45/46 D	48/49 D	6.6
95	13.6/13.7	3.9/5.8	4.1/4.1	1467	1460/1323	-5.1	83/84 A		

Refrigerant/Lubricant Type: HFC-134 / Emery 2927-A (Pentaerythritol ester branched-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7	8.0/8.2	0/0	0/0	277	193/211	-26.9	44/45 A	30/31 A	-31.5
8	5.5/5.4	0.6/1.3	1.2/0.0	2316	1517/1627	-32.1	61/62 A	60/61 A	-1.6
12	12.1/11.6	0.0/0.0	3.1/4.7	2493	1817/1842	-26.6	55/56 A	54/55 A	-1.8
17	50.4/50.4	8.7/8.7	10.0/10.4	1727	236/252	-85.9	59/60 A	45/46 A	-23.5
35	11.0/10.9	6.5/4.5	4.0/4.5	2891	2526/2608	-11.2	65/66 A	65/66 A	0.0
45	-9.6/-8.0	-2.6/-0.7	-1.9/-6.5	2124	2242/2231	5.3	93/94 A	93/94 A	0.0
46	-20.6/-20.8	-8.3/-10.6	-13.6/-11.9	1269	1663	31.1	78/79 A	82/83 A	5.1
47	-3.9/-4.1	-1.9/-2.5	-5.4/-3.5	2374	2058/2059	-13.3	42/43 D	44/45 D	4.7
49	6.0/8.9	0.7/1.9	0.0/1.7	2561	2106/1961	-20.6	96/97 A	37/38 D	
50	9.5/9.7	2.6/1.3	1.6/1.6	1393	1271/1251	-9.4	84/85 A	82/83 A	-2.4
54	9.1/8.9	0.0/1.2	4.8/3.3	3815	4022/4072	6.1	52/53 D	49/50 D	-5.7
55	8.9/9.3	0.8/0.8	1.7/3.3	3994	2945/3580	-5.8	61/62 D	56/57 D	-8.1
56*	-27.6/-23.0	-8.3/-9.6	5.6/-17.1	205	89.9/97.5	-54.4	44/45 A	58/59 A	31.5
57	-11.6/-11.9	-0.7/-5.9	-3.8/-2.3	1787	1141/912	-42.6	76/77 A	82/83 A	0.1
58	-45.6/-45.8	-19.9/-19.9	-20.8/-21.3	131	101/105	-21.6	32/33 A	45/46 A	40
61	19.0/19.1	6.6/6.5	7.1/6.0	6358	3530/3735	-42.9	46/47 D	31/32 D	-32.3
63	17.8/17.8	4.5/5.2	7.4/6.1	7638	2382/2085	-70.8	53/54 D	44/45 D	-16.8
66	24.1/24.0	6.5/5.2	6.1/6.3	4347	3158/3201	-26.9	74/75 A	69/70 A	-6.7
74	5.0/5.4	0.0/0.0	2.3/14.6	1005	901/1034	-3.8	82/83 A	77/78 A	-6.1
78	11.3/11.3	2.6/1.3	5.1/3.8	4359	3941/3457	-15.2	84/85 A	70/71 A	-16.6
83	5.1/5.1	0.7/1.3	1.7/1.1	3029	2518/2449	-18.0	82/83 A	80/81 A	-2.4
85	-15.2/-14.9	-8.6/-9.7	-11.8/-10.4	725	749/768	4.6	64/65 A	69/70 A	7.8
86	-4.5/-4.4	-3.9/-3.3	-3.2/-3.8	1461	1552/1414	1.5	74/75 A	84/85 A	13.4
90	31.4/22.4	0.0/0.0	4.7/4.9	1959	1057/1371	-38.0	45/46 D	49/50 D	8.8
95	4.6/4.6	0.7/1.9	1.4/1.4	1467	1384/1361	-6.4	83/84 A	80/81 A	-3.6

Refrigerant/Lubricant Type: HFC-32 / Emkarate RL 244 (Pentaerythritol ester mixed-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	26.7/20.2	0.6/4.3	3.7/3.9	277	231/156	-30.2	44/45 A	21/22 A	-51.7
8	12.9/13.3	4.4/3.8	5.3/5.1	2316	2146/1770	-15.5	61/62 A	50/51 A	-17.9
12	32.2/43.3	1.9/1.2	10.7/5.9	2493	1854/1646	-29.8	55/56 A	45/46 A	-18.0
17*	15.4/15.6	5.0/5.1	4.1/5.8	1727	223/445	-80.7	59/60 A	49/50 A	-16.8
35	37.8/37.5	12.9/12.2	15.2/15.7	2891	1843/1166	-49.9	65/66 A	52/53 A	-19.8
45	-5.0/-4.8	-5.1/-3.2	-4.7/-3.2	2124	2138/2109	0.1	93/94 A	34/35 D	
46	-15.2/-13.9	-5.8/-7.1	-9.1/-4.7	1269	1242/1340	1.8	78/79 A	77/78 A	-1.3
47	-0.7/-1.1	-1.3/-0.6	-1.8/-2.6	2374	2166/2165	-8.8	42/43 D	38/39 D	-9.4
49	5.4/5.4	5.2/6.0	3.3/1.7	2561	2138/2168	-15.9	96/97 A	89/90 A	-7.3
50	8.8/8.1	2.6/1.9	3.2/3.2	1393	1198/1092	-17.8	84/85 A	80/81 A	-4.7
54	6.3/5.8	1.7/1.7	3.1/1.6	3815	3984	4.4	52/53 D	50/51 D	-3.8
55	4.5/4.5	1.7/1.7	1.6/1.7	3994	4223/4209	5.6	61/62 D	59/60 D	-3.3
56	-71.2/-64.2	-	-	205	0	-99.0	44/45 A	-	-
57	-23.6/-24.1	-9.9/-8.4	-4.9/-7.1	1787	495/431	-74.1	76/77 A	39/40 D	
58	-72.1/-70.8	-37.5/-32.5	-28.2/-29.6	131	69.5/25.0	-63.9	32/33 A	-	-
61	14.1/14.3	6.8/6.7	5.8/5.2	6358	3977/3823	-38.7	46/47 D	30/31 D	-34.4
63	1.3/1.3	0/-0.7	0/0	7638	1680/1558	-78.8	53/54 D	45/46 D	-14.9
66	7.8/8.4	5.2/2.0	1.7/2.6	4347	2536/3600	-29.4	74/75 A	67/68 A	-9.4
74	8.7/8.5	2.6/3.3	4.4/3.3	1005	1133/1126	12.3	82/83 A	71/72 A	-13.3
78	32.3/31.1	11.8/11.5	14.9/15.2	4359	2965/2869	-33.1	84/85 A	70/71 A	-16.6
83	8.6/8.5	1.3/0.6	3.3/2.2	3029	3155/2740	-2.7	82/83 A	79/80 A	-3.6
85	-6.2/-6.4	-7.4/-6.3	-5.4/-5.3	725	730/746	1.7	64/65 A	60/61 A	-6.2
86	16.4/16.9	9.3/10.0	6.4/2.5	1461	1415/1434	-2.5	74/75 A	59/60 A	-20.1
90	25.0/20.9	0.0/0.0	6.7/6.7	1959	1197/1355	-34.9	45/46 D	44/45 D	-2.2
95	23.6/31.1	11.6/11.6	10.2/10.2	1467	1296/1215	-14.4	83/84 A	64/65 A	-22.8

Refrigerant/Lubricant Type: HFC-125 / Dow P425 (Polypropylene glycol diol)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	3.5/3.4	0.6/2.6	0.0/0.0	277	188/217	-26.8	44/45 A	33/34 A	-24.7
8	2.6/2.8	0.7/0.0	0.0/1.2	2316	2002/1954	-14.6	61/62 A	60/61 A	-1.6
12	17.8/16.6	5.2/2.6	5.4/6.6	2493	1932/1761	-25.9	55/56 A	45/46 A	-18.0
17	13.8/13.5	1.3/3.2	2.4/2.5	1727	571/600	-66.1	59/60 A	55/56 A	-6.7
35	17.8/17.9	7.1/6.5	7.8/7.9	2891	2496/2743	-9.4	65/66 A	63/64 A	-3.1
45	-12.5/-10.4	-5.1/-3.8	-9.4/-6.6	2124	2262/1904	-1.9	93/94 A	97/98 A	4.3
46	-24.0/-23.5	-10.3/-10.3	-15.2/-14.1	1269	1779/1584	32.5	78/79 A	87/88 A	11.5
47	-4.9/-3.8	-1.9/-1.9	-3.3/-3.5	2374	2121/2092	-11.3	42/43 D	47/48 D	11.8
49	2.8/3.2	1.3/2.0	0.8/0.0	2561	2248/2225	-12.7	96/97 A	96/97 A	0.0
50	5.4/5.6	0.0/0.0	1.6/1.6	1393	1194/1232	-12.9	84/85 A	83/84 A	-1.2
54	7.1/6.6	0.8/1.7	1.6/1.7	3815	4316/3510	2.6	52/53 D	52/53 D	0.0
55	4.4/4.8	1.7/0.8	3.2/0.0	3994	4438/4408	10.7	61/62 D	61/62 D	0.0
56	-57.5/-57.2	-24.7/-23.9	-5.4/-15.8	205	0	-99.0	44/45 A	59/60 A	33.7
57	-16.2/-15.5	-5.8/-5.2	-2.5/-3.3	1787	782/1067	-48.3	76/77 A	84/85 A	10.5
58*	-36.9/-36.3	-8.1/-9.6	-4.6/-6.4	131	44.3/50.7	-63.7	32/33 A	42/43 A	30.8
61*	-	-	-	6358	-	-	46/47 D	-	-
63	10.7/10.0	3.9/4.6	4.9/3.7	7638	1177/1162	-84.7	53/54 D	38/39 D	-28.0
66	18.3/18.0	7.1/5.2	5.2/4.8	4347	1598/1486	-64.5	74/75 A	50/51 A	-32.2
74	2.8/2.7	0.7/0.0	1.2/1.1	1005	909/864	-11.8	82/83 A	80/81 A	-2.4
78	7.3/7.4	1.9/1.9	3.8/3.8	4359	4253/3435	-11.8	84/85 A	59/60 A	-29.6
83	3.3/2.7	-3.1/-5.6	0.0/1.1	3029	2028/2380	-27.2	82/83 A	84/85 A	2.4
85	-14.7/-15.2	-6.9/-8.1	-9.4/-10.0	725	782/862	13.3	64/65 A	72/73 A	12.4
86	-1.6/-1.5	-1.3/-1.3	-1.3/-1.3	1461	1160/1307	-15.6	74/75 A	80/81 A	8.1
90	30.3/21.5	0.7/0.0	4.6/6.7	1959	594/591	-69.8	45/46 D	49/50 D	8.8
95	8.0/8.0	1.9/3.3	2.7/1.4	1467	1402/1513	-0.6	83/84 A	75/76 A	-9.6

Refrigerant/Lubricant Type: HFC-125 / Emkarate RL 244 (Pentaerythritol ester mixed-acid)

Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	16.2/17.7	22.4/16.4	18.3/13.4	277	175/158	-39.9	44/45 A	21/22 A	-51.7
8	13.8/14.0	4.5/5.2	3.5/3.5	2316	1904/2045	-14.7	61/62 A	51/52 A	-16.3
12	18.7/19.4	5.2/4.5	7.5/6.6	2493	1649/1795	-30.9	55/56 A	45/46 A	-18.0
17	10.4/10.1	3.2/1.9	3.6/3.5	1727	519/493	-70.7	59/60 A	70/71 A	18.5
35	20.3/21.0	5.8/6.5	10.5/10.5	2891	1821/2405	-26.9	65/66 A	63/64 A	-3.1
45	-2.6/-3.3	-1.3/-1.3	-3.3/-3.0	2124	1950/1905	-9.2	93/94 A	94/95 A	1.1
46	-13.9/-13.7	-5.7/-7.1	-8.2/-9.2	1269	1446/1522	17.0	78/79 A	82/83 A	5.1
47	0.7/0.4	0.0/0.6	-1.8/-1.6	2374	2124/2145	-10.1	42/43 D	42/43 D	0.0
49	4.6/4.7	1.9/1.3	0.0/0.8	2561	2259/2156	-13.8	96/97 A	96/97 A	0.0
50	6.9/7.1	0.0/1.3	1.6/1.6	1393	1262/1383	-5.0	84/85 A	84/85 A	0.0
54	5.9/5.9	2.5/0.8	1.7/1.7	3815	3497/3872	-3.4	52/53 D	53/54 D	1.9
55	3.6/3.6	0.0/0.0	0.0/0.0	3994	4056/4034	1.3	61/62 D	61/62 D	0.0
56*	-46.8/-53.7	-20.8/-15.0	-27.5/-24.3	205	0	-99.0	44/45 A	69/70 A	56.2
57	-11.8/-12.2	-4.5/-4.6	-3.1/-2.5	1787	1046/817	-47.9	76/77 A	87/88 A	14.4
58	-63.0/-63.1	-33.3/-26.6	-31.3/-28.6	131	76.4/92.4	-35.6	32/33 A	70/71 A	117
61	12.7/12.7	2.6/3.3	6.0/4.7	6358	4519/4929	-25.7	46/47 D	41/42 D	-10.8
63	2.1/2.1	0.7/0.7	0.0/1.2	7638	4363/4302	-43.3	53/54 D	54/55 D	1.9
66	3.0/3.2	2.6/2.0	2.5/1.3	4347	3061/3296	-26.9	74/75 A	79/80 A	6.7
74	10.0/10.5	0.0/2.7	5.6/5.2	1005	883/876	-12.5	82/83 A	75/76 A	-8.5
78	22.9/23.1	7.1/7.2	10.4/12.7	4359	2648/3434	-30.3	84/85 A	76/77 A	-9.5
83	20.0/9.5	0.0/0.6	3.5/2.1	3029	2514/2850	-11.4	82/83 A	79/80 A	-3.6
85	-5.5/-5.3	-3.8/-5.0	-4.2/-4.2	725	617/604	-15.9	64/65 A	63/64 A	-1.6
86	7.1/7.1	2.6/2.0	3.9/3.8	1461	1550/1396	0.8	74/75 A	70/71 A	-5.4
90	22.2/22.7	-1.3/-1.3	3.2/5.0	1959	1114/979	-46.6	45/46 D	42/43 D	-6.6
95	12.1/11.9	4.5/5.8	5.5/4.1	1467	1483/1470	0.7	83/84 A	74/75 A	-10.8

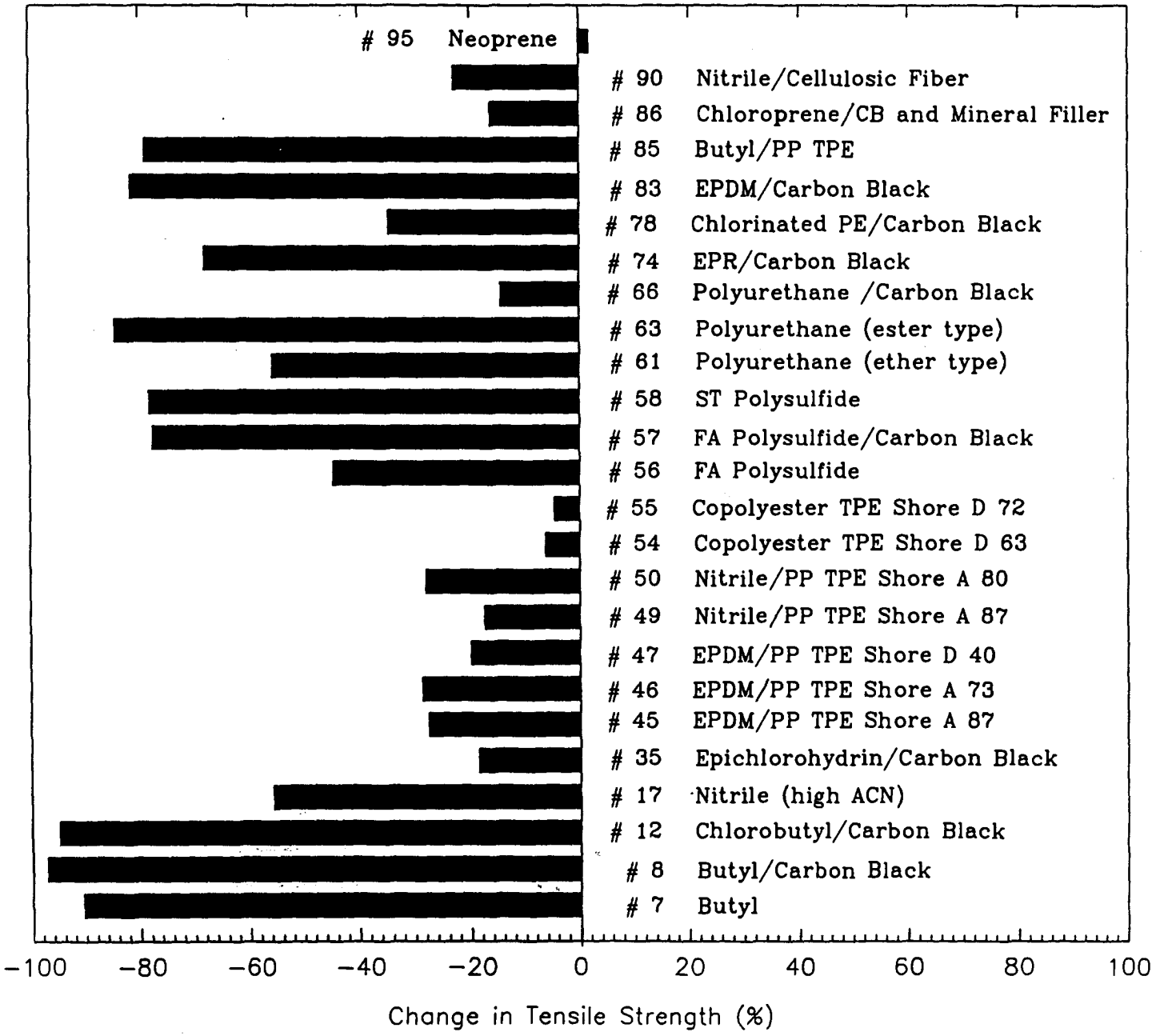
Refrigerant/Lubricant Type: HFC- 152a / Emery 2927-A (Pentaerythritol ester branched-acid)

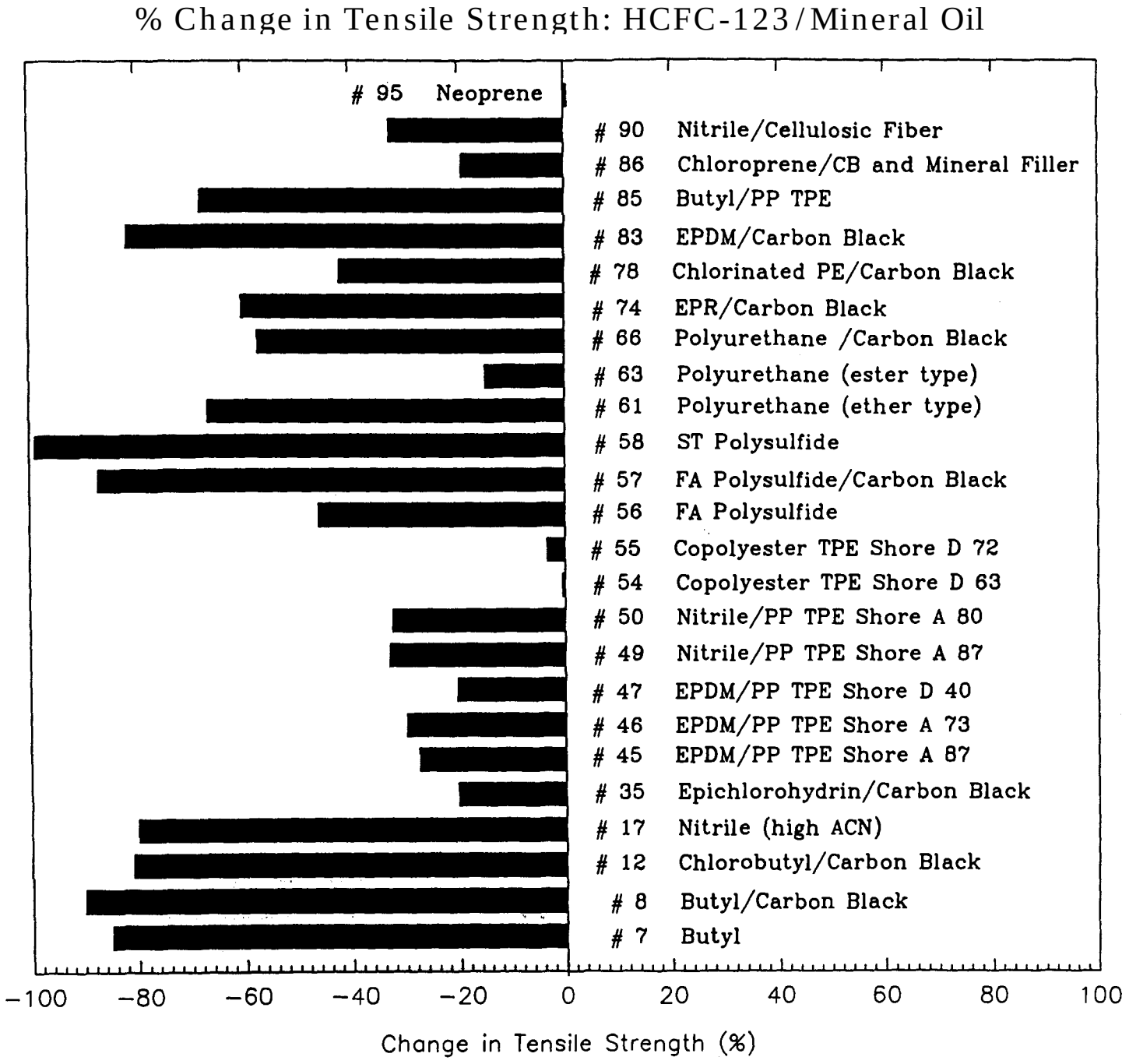
Formula #	% Change In Weight After Aging	% Change In Width After Aging	% Change In Thickness After Aging	Tensile Strength			Shore A Hardness		
				Original (PSI)	Aged (PSI)	% Change	Original	Aged	% Change
7*	15.4/15.4	3.8/2.5	1.3/1.3	277	131/168	-46.1	44/45 A	34/35 A	-22.5
8	10.5/10.8	5.2/4.5	2.4/2.4	2316	1791/1827	-21.9	61/62 A	52/53 A	-14.6
12	14.5/14.5	5.9/4.5	3.8/3.8	2493	1699/1722	-31.4	55/56 A	51/52 A	-7.2
17	24.4/24.4	6.9/7.6	6.6/5.8	1727	319/305	-81.9	59/60 A	54/55 A	-8.4
35	22.4/22.5	7.1/6.5	10.4/10.4	2891	1783/1992	-34.7	65/66 A	60/61 A	-7.6
45	-8.5/-6.8	-4.4/-5.0	-6.3/-4.8	2124	2090/1959	-4.7	93/94 A	92/93 A	-1.1
46	-17.9/-17.7	-8.2/-7.6	-11.1/-10.9	1269	1434/1397	11.6	78/79 A	80/81 A	2.5
47	-2.5/-2.6	-0.6/-0.6	-3.5/-3.6	2374	1991/2039	-15.1	42/43 D	38/39 D	-9.4
49	4.9/5.2	2.6/3.2	0.0/1.7	2561	1877/2086	-22.6	96/97 A	94/95 A	-2.1
50	3.3/3.8	0.6/0.0	1.6/0.0	1393	1134/1127	-18.9	84/85 A	81/82 A	-3.6
54	7.5/7.9	2.5/2.5	1.6/3.1	3815	3298/3896	-5.7	52/53 D	50/51 D	-3.8
55	5.4/5.3	0.0/-0.8	1.7/0.0	3994	3913/3667	-5.1	61/62 D	55/56 D	-9.8
56*	-37.9/-54.2	-17.7/-13.9	-17.9/-25.0	205	73.4	-64.3	44/45 A	64/65 A	44.9
57	-18.5/-18.8	-5.8/-5.2	-10.3/-9.0	1787	815/703	-57.5	76/77 A	91/92 A	19.6
58	-21.7/-23.9	-5.7/-7.5	-4.8/-6.9	131	132/103	-10.3	32/33 A	40/41 A	24.6
61	15.0/14.4	3.9/2.0	5.7/5.9	6358	4030/3215	-43.0	46/47 D	30/31 D	-34.4
63	7.4/7.4	2.6/1.9	3.6/2.5	7638	3737/3617	-51.9	53/54 D	41/42 D	-22.4
66	9.3/9.2	3.3/4.6	2.5/2.6	4347	3341/3503	-21.3	74/75 A	70/71 A	-5.4
74	8.7/8.8	-0.7/0.0	5.9/4.6	1005	806/850	-17.7	82/83 A	75/76 A	-8.5
78	18.2/18.8	3.2/5.8	9.5/10.3	4359	2851/3339	-29.0	84/85 A	64/65 A	-23.7
83	7.9/7.6	0.0/-0.6	-2.0/3.2	3029	2124/2167	-29.2	82/83 A	78/79 A	-4.8
85	-10.0/-10.4	-6.3/-5.7	-7.4/-7.6	725	710/784	2.9	64/65 A	64/65 A	0.0
86	0.4/0.6	0.7/-0.7	-1.3/1.3	1461.	1482/1530	3.1	74/75 A	75/76 A	1.3
90	30.4/29.9	1.3/1.3	5.5/5.5	1959	1326/803	-45.7	45/46 D	45/46 D	0.0
95	14.0/13.9	1.3/0.0	5.3/5.4	1467	1289/1189	-15.5	83/84 A	70/71 A	-15.6

APPENDIX N

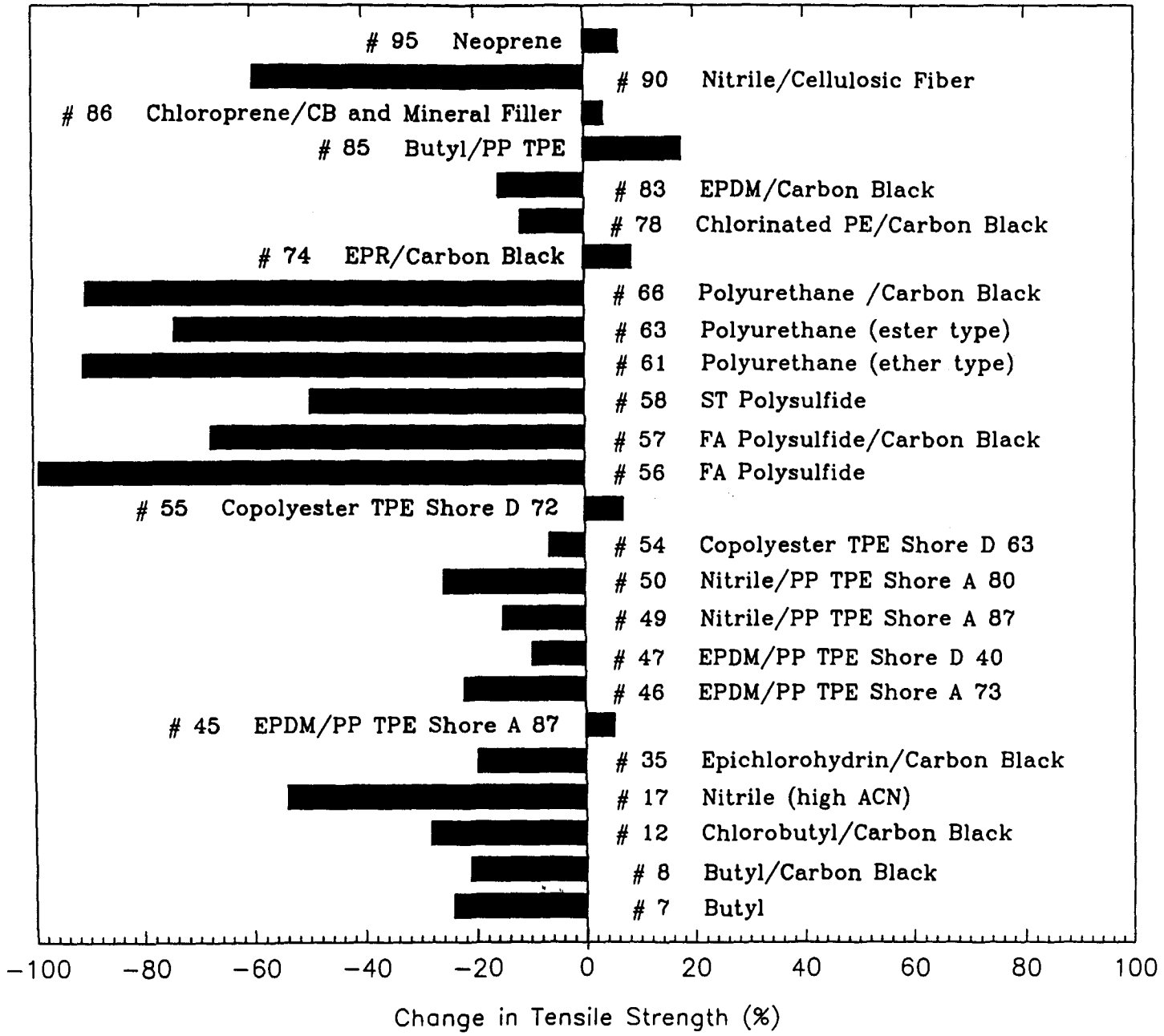
PERCENT CHANGE IN TENSILE STRENGTH AFTER AGING OF PART II COMPOUNDS

% Change in Tensile Strength: HCFC-22/Mineral Oil

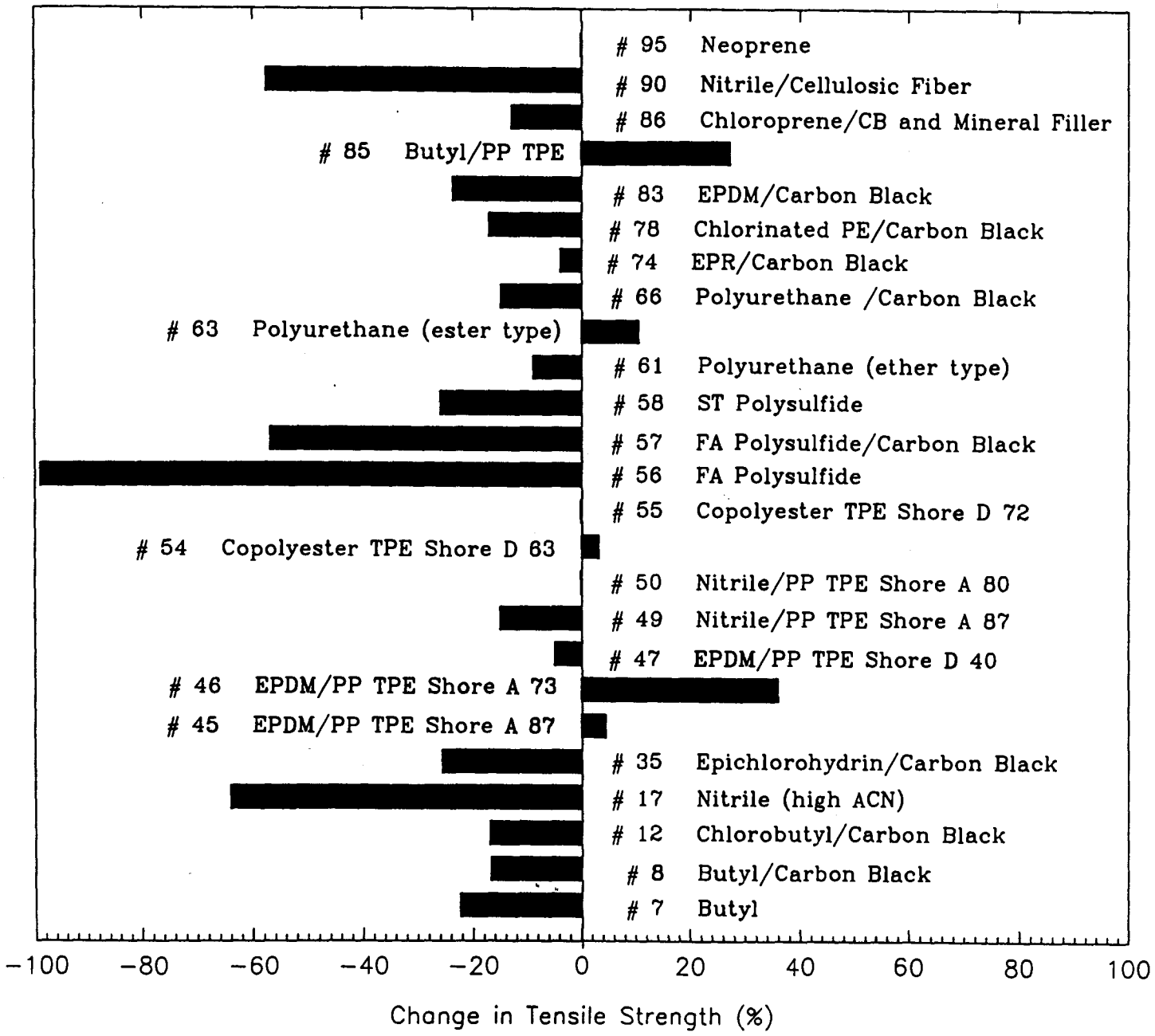



% Change in Tensile Strength: HCFC-123/Mineral Oil
# 95 Neoprene
# 90 Nitrile/Cellulosic Fiber
# 86 Chloroprene/CB and Mineral Filler
# 85 Butyl/PP TPE
# 83 EPDM/Carbon Black
# 78 Chlorinated PE/Carbon Black
# 74 EPR/Carbon Black
# 66 Polyurethane /Carbon Black
# 63 Polyurethane (ester type)
# 61 Polyurethane (ether type)
# 58 ST Polysulfide
# 57 FA Polysulfide/Carbon Black
# 56 FA Polysulfide
# 55 Copolyester TPE Shore D 72
# 54 Copolyester TPE Shore D 63
# 50 Nitrile/PP TPE Shore A 80
# 49 Nitrile/PP TPE Shore A 87
# 47 EPDM/PP TPE Shore D 40
# 46 EPDM/PP TPE Shore A 73
# 45 EPDM/PP TPE Shore A 87
# 35 Epichlorohydrin/Carbon Black
# 17 Nitrile (high ACN)
# 12 Chlorobutyl/Carbon Black
# 8 Butyl/Carbon Black
# 7 Butyl
−100 −80 −60 −40 −20 0 20 40 60 80 100
Change in Tensile Strength (%)

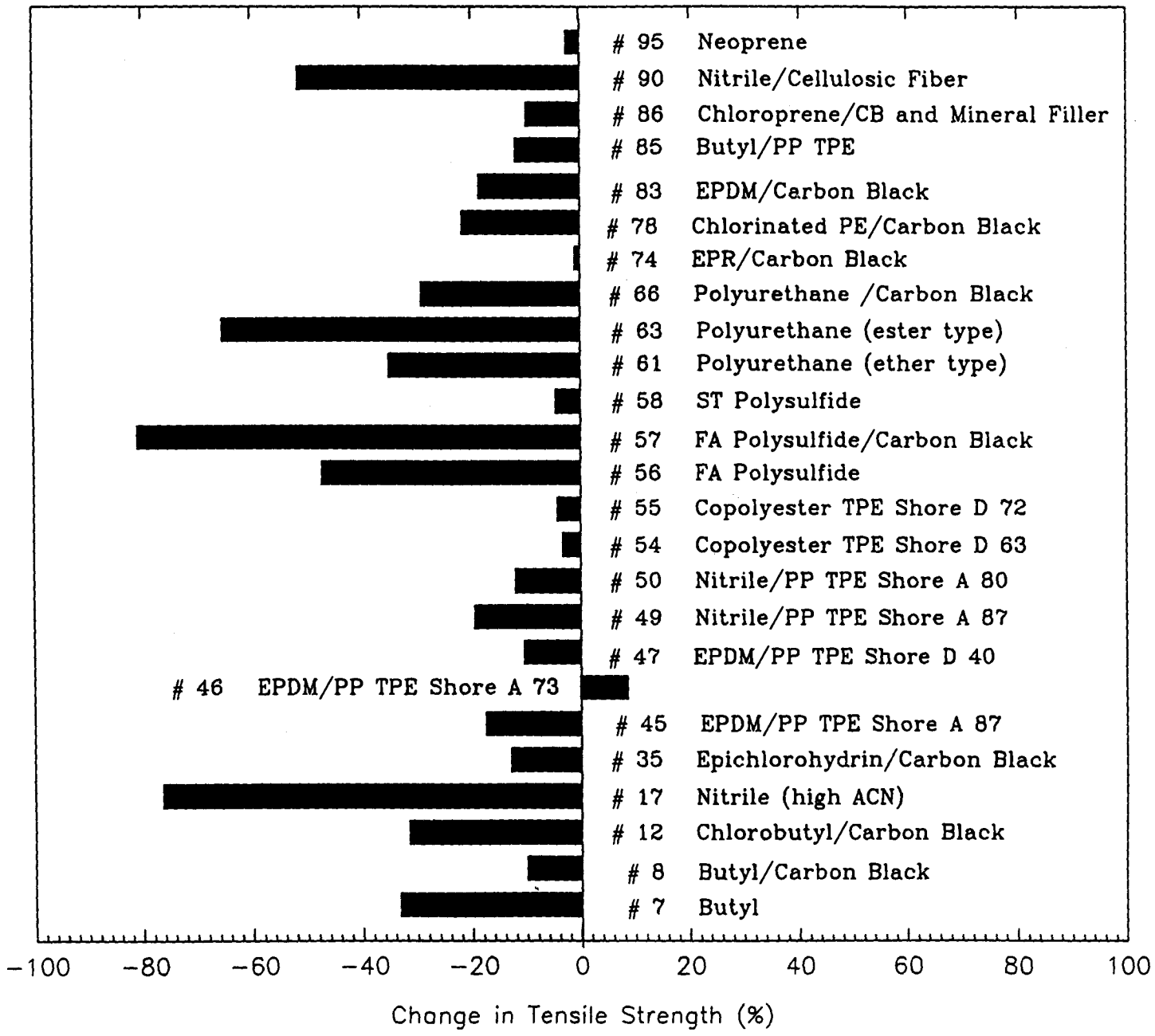
% Change in Tensile Strength: HFC- 134a / Dow P425



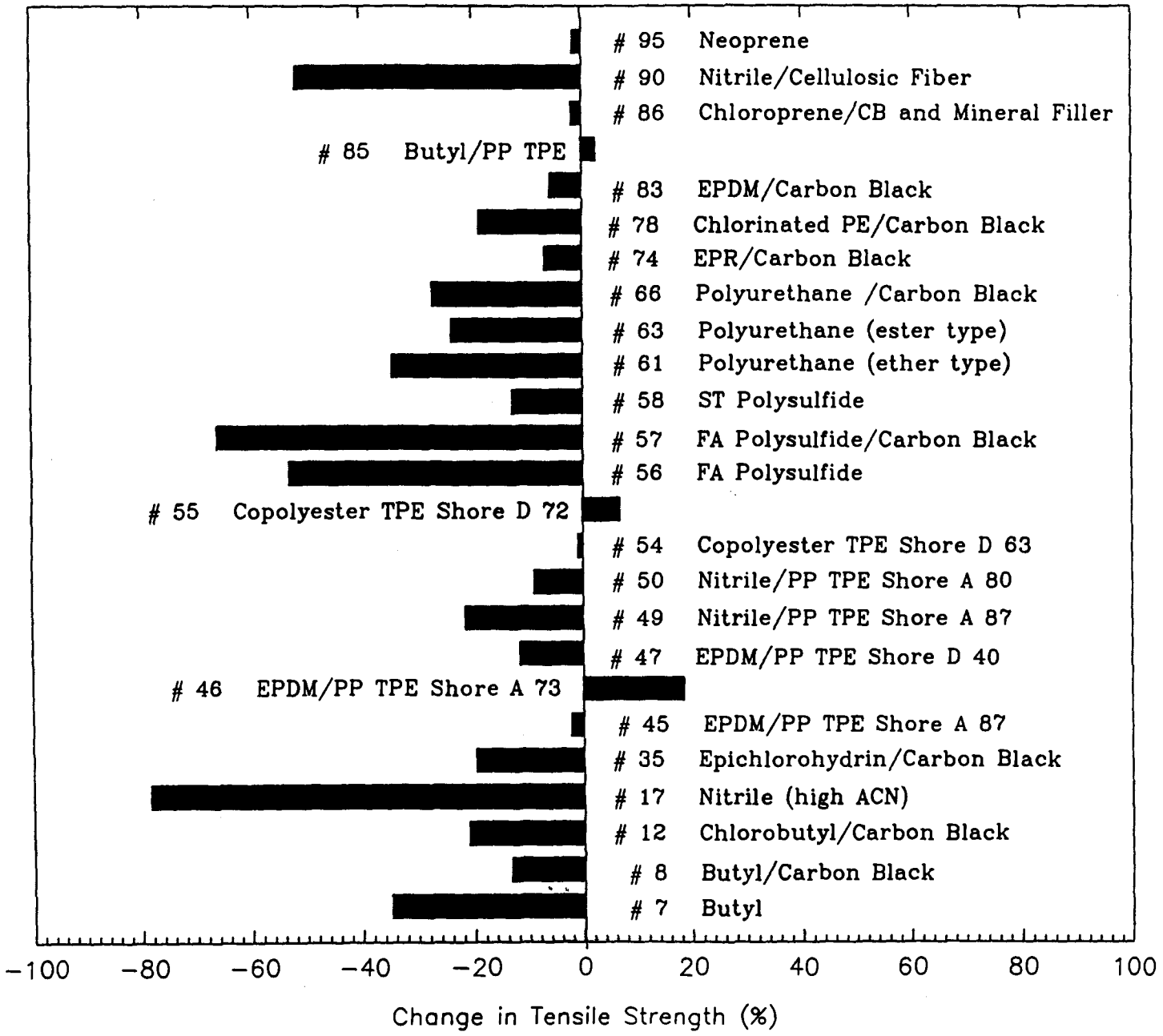
% Change in Tensile Strength: HFC-134a/BRL-150



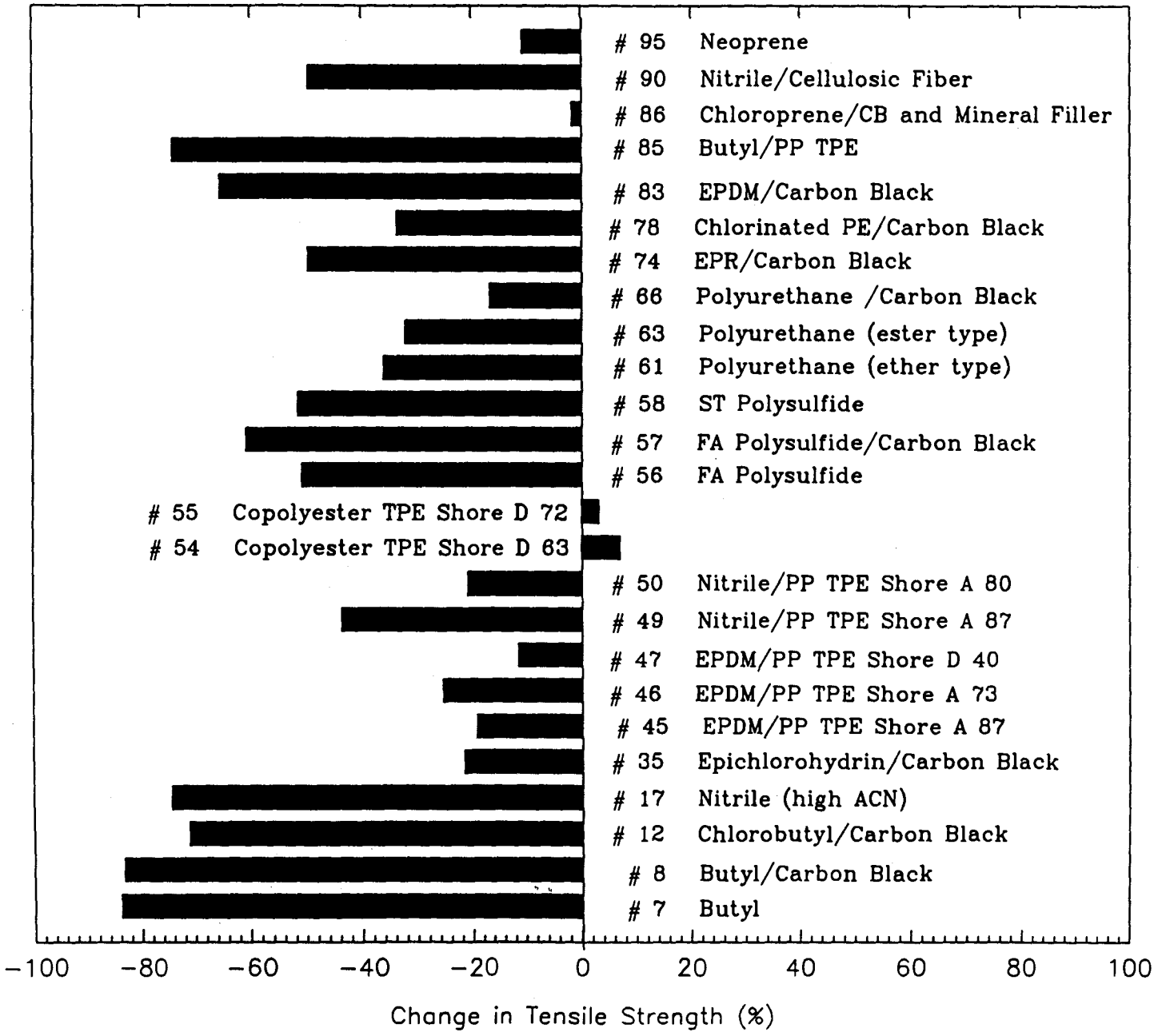
% Change in Tensile Strength: HFC-134a/Emkarate RL-244



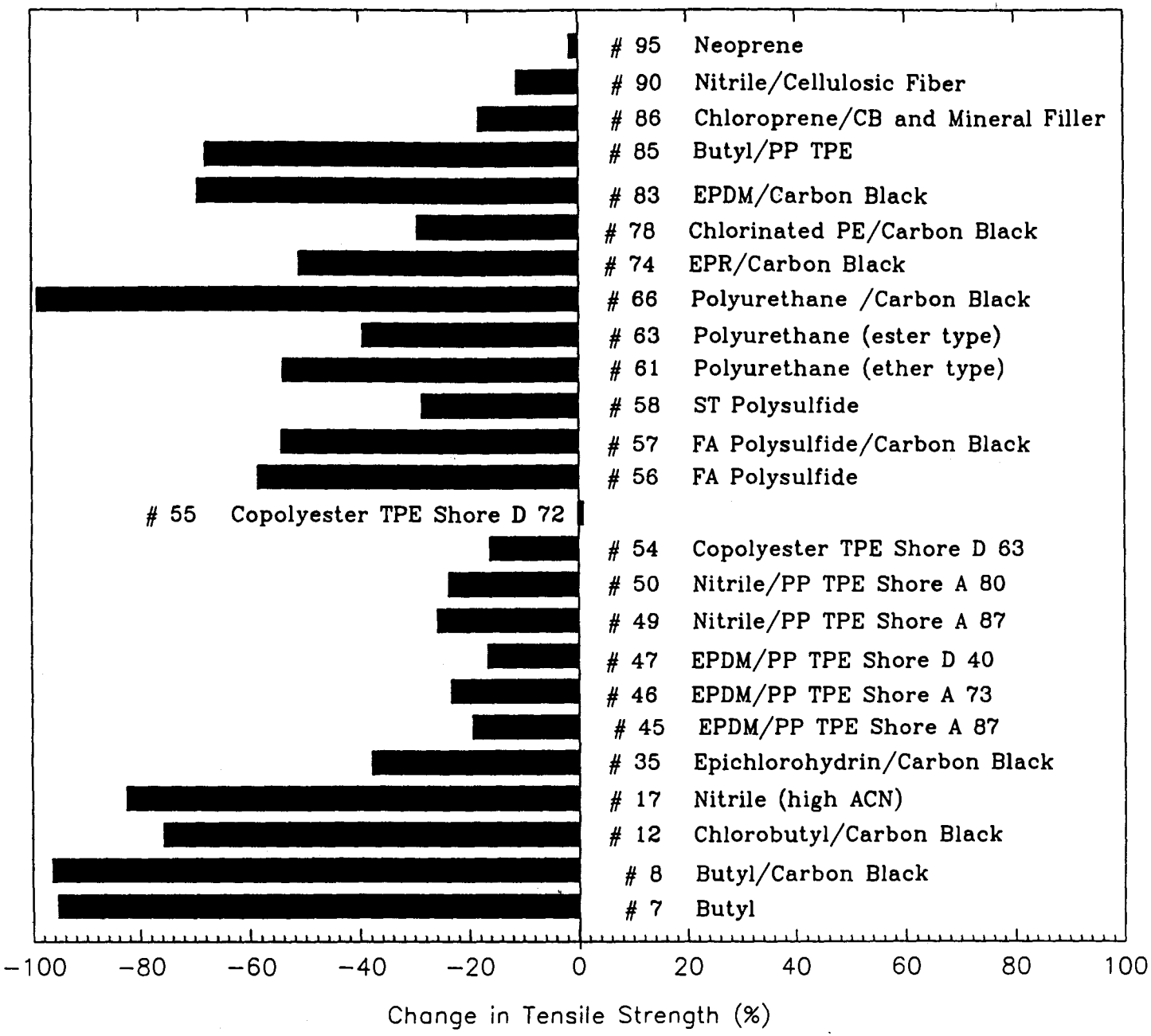
% Change in Tensile Strength: HFC-134a/Emery 2927-A



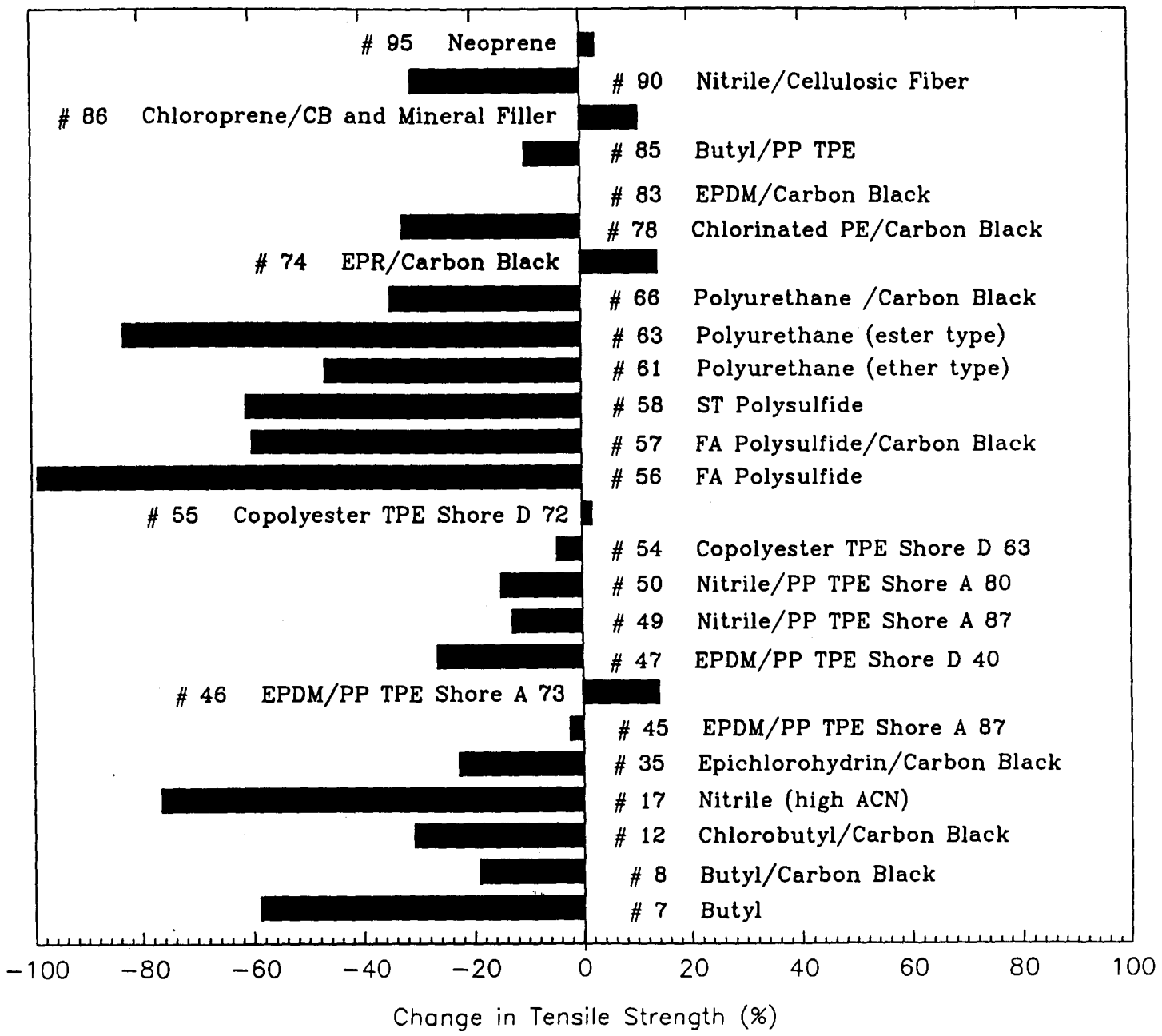
% Change in Tensile Strength: HCFC-142b/Zerol 150



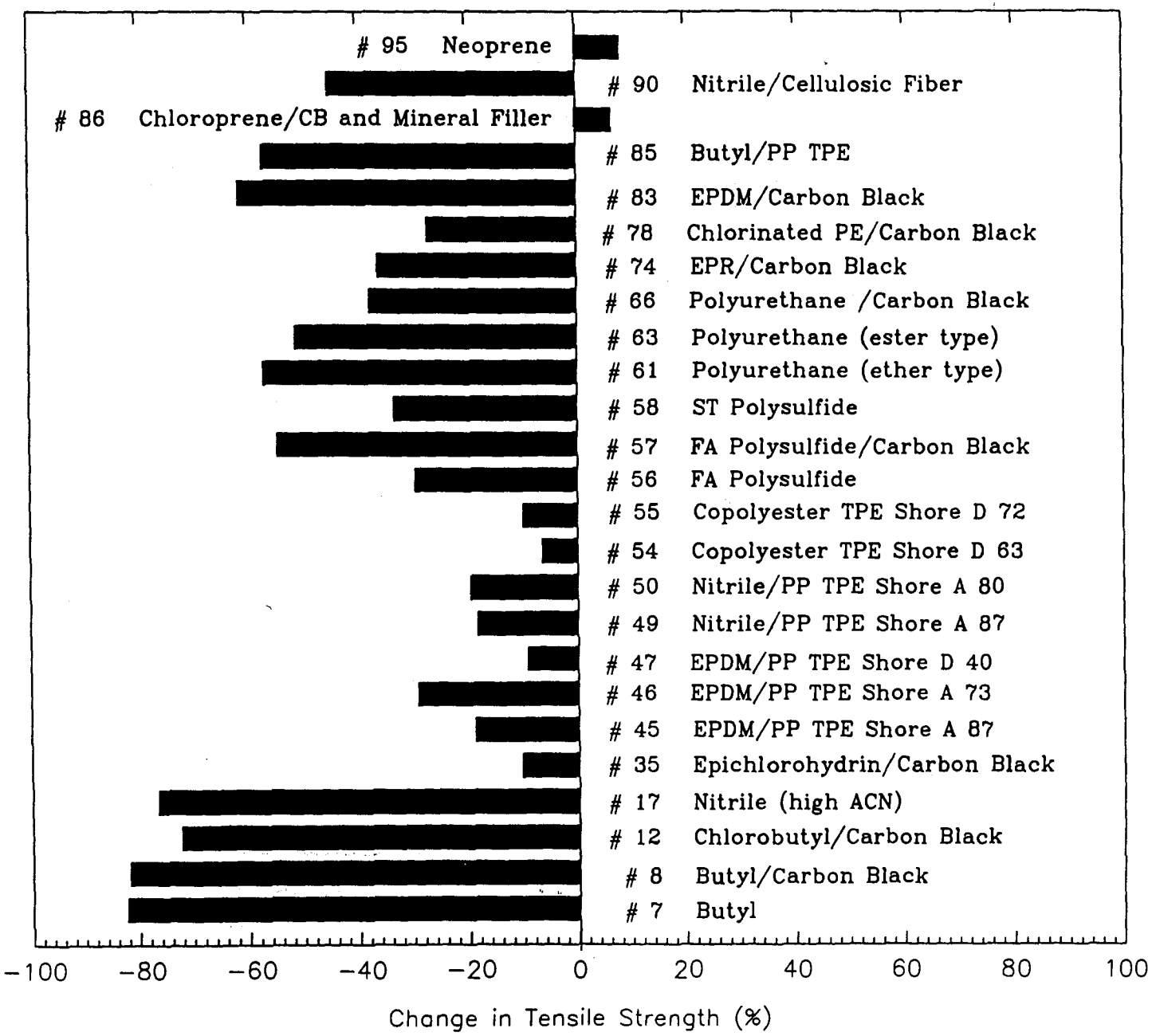
% Change in Tensile Strength: HFC-152a/Zerol 150

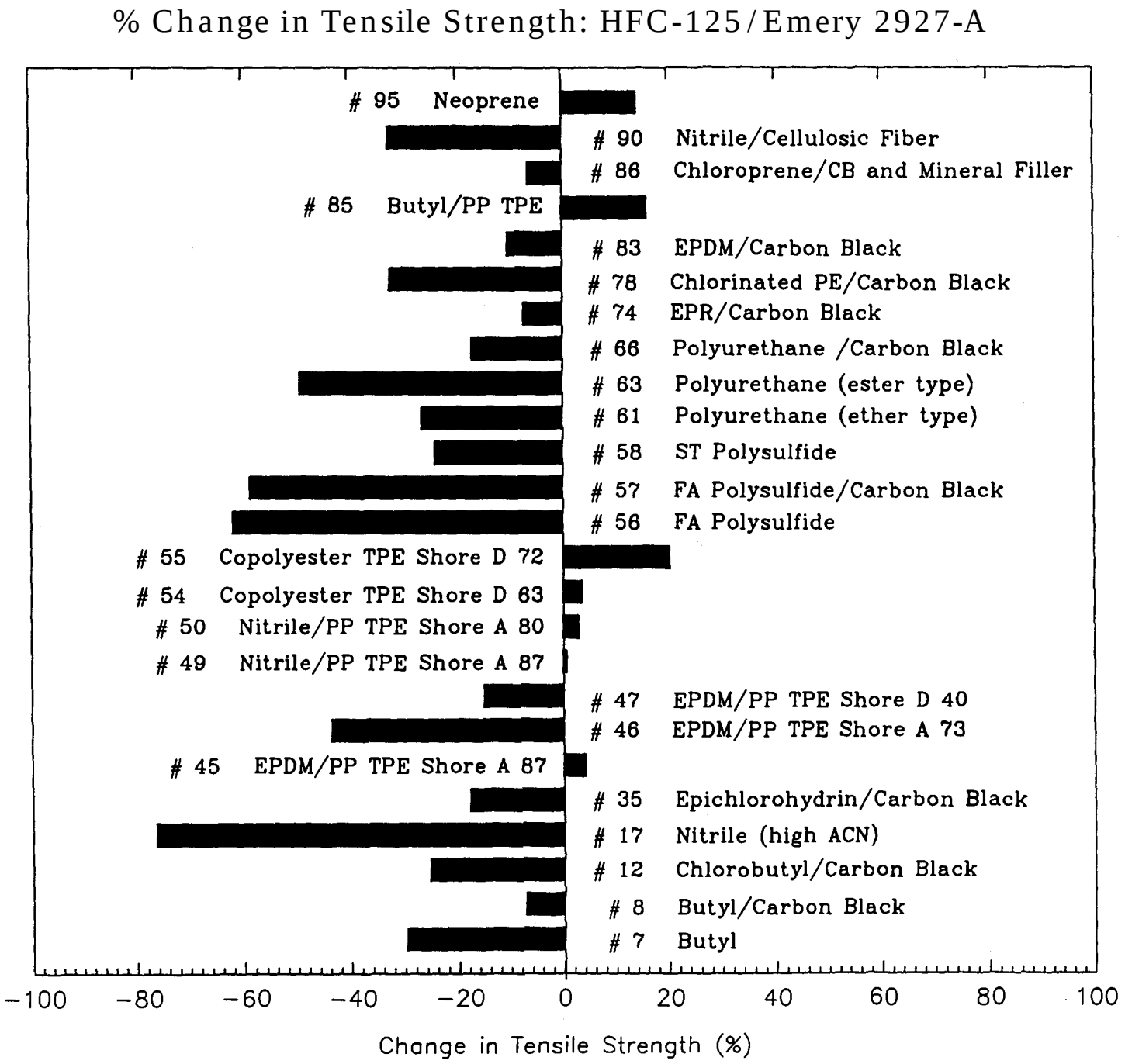


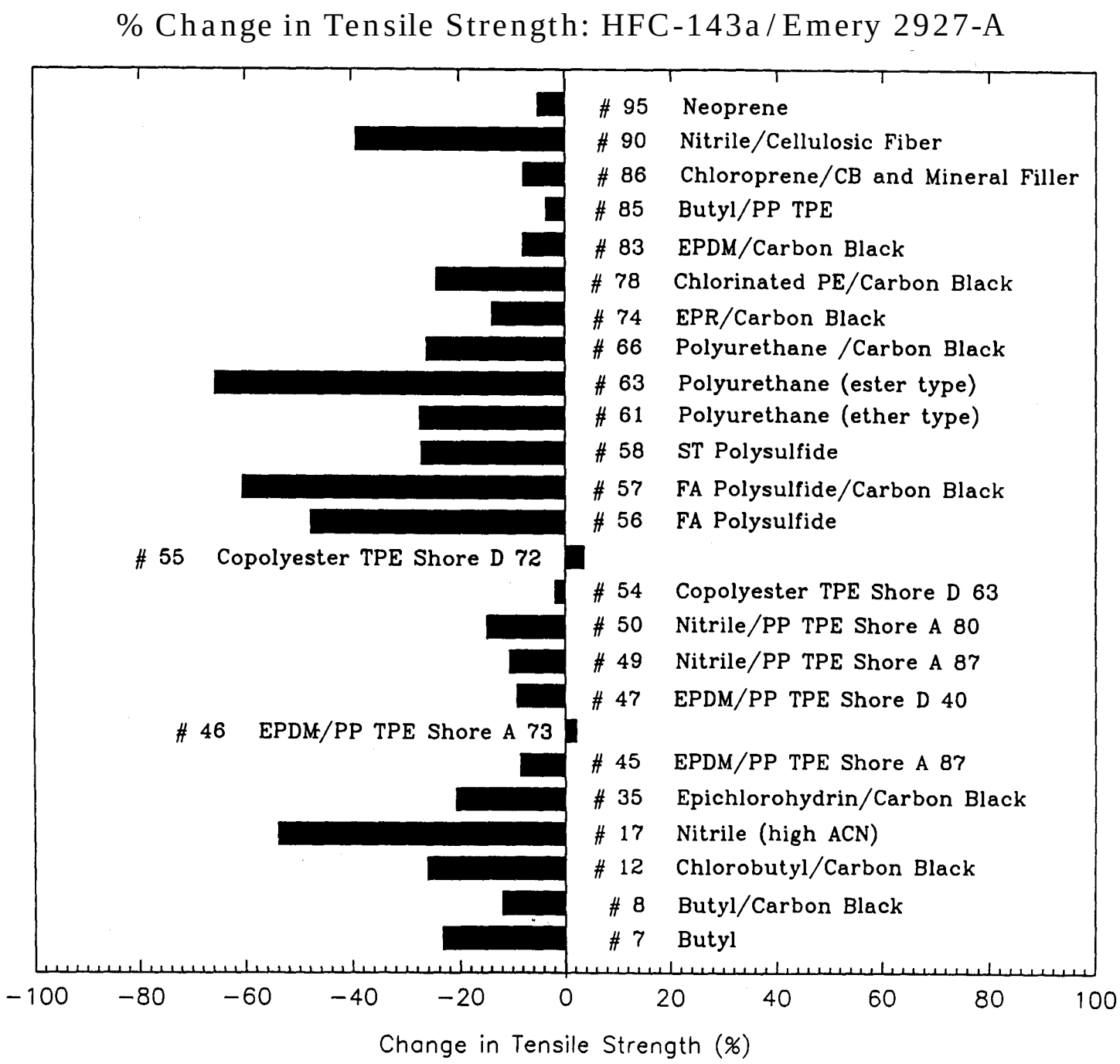
% Change in Tensile Strength: HFC-32/Emery 2927-A



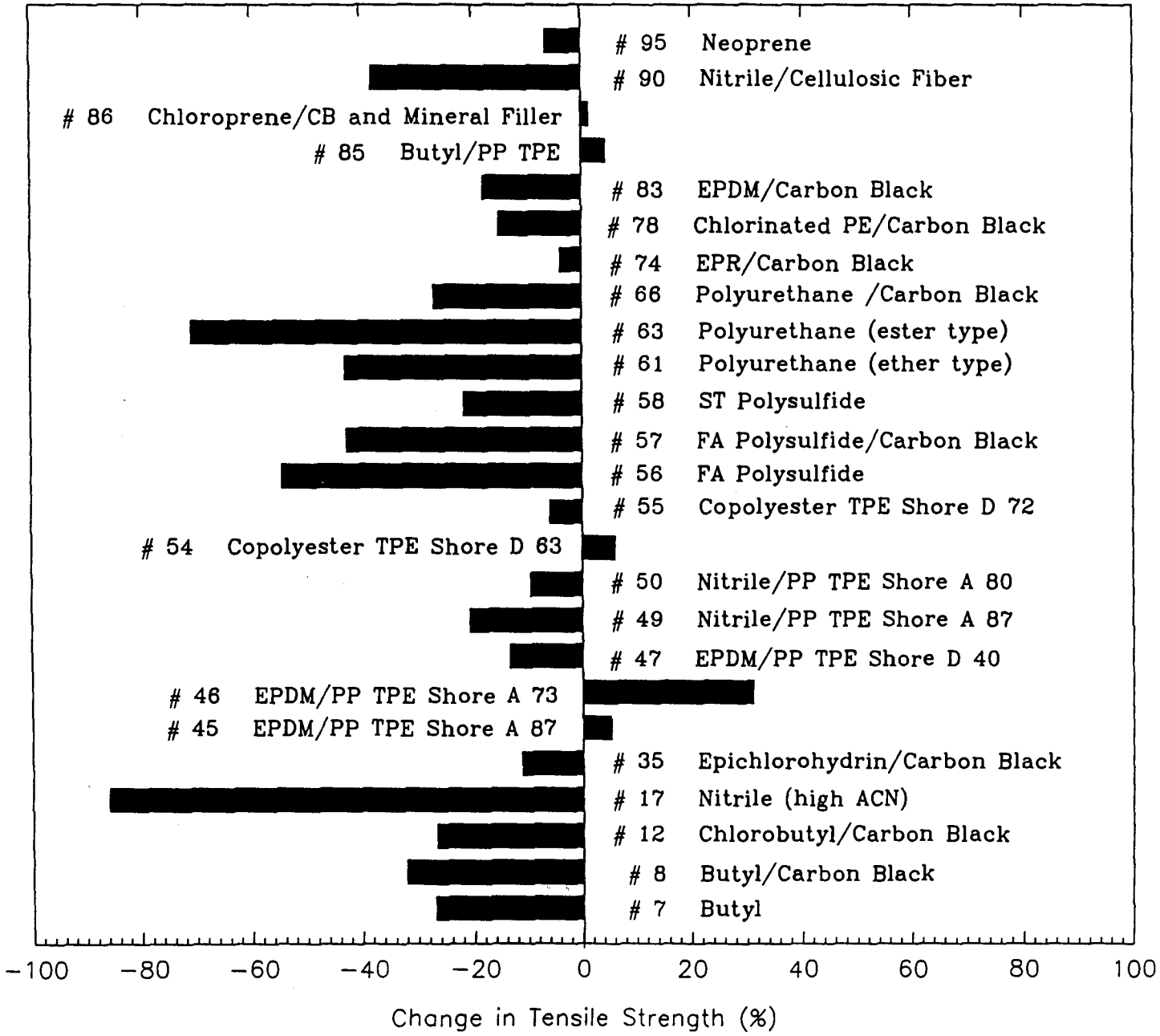
% Change in Tensile Strength: HCFC-124/Zerol 150



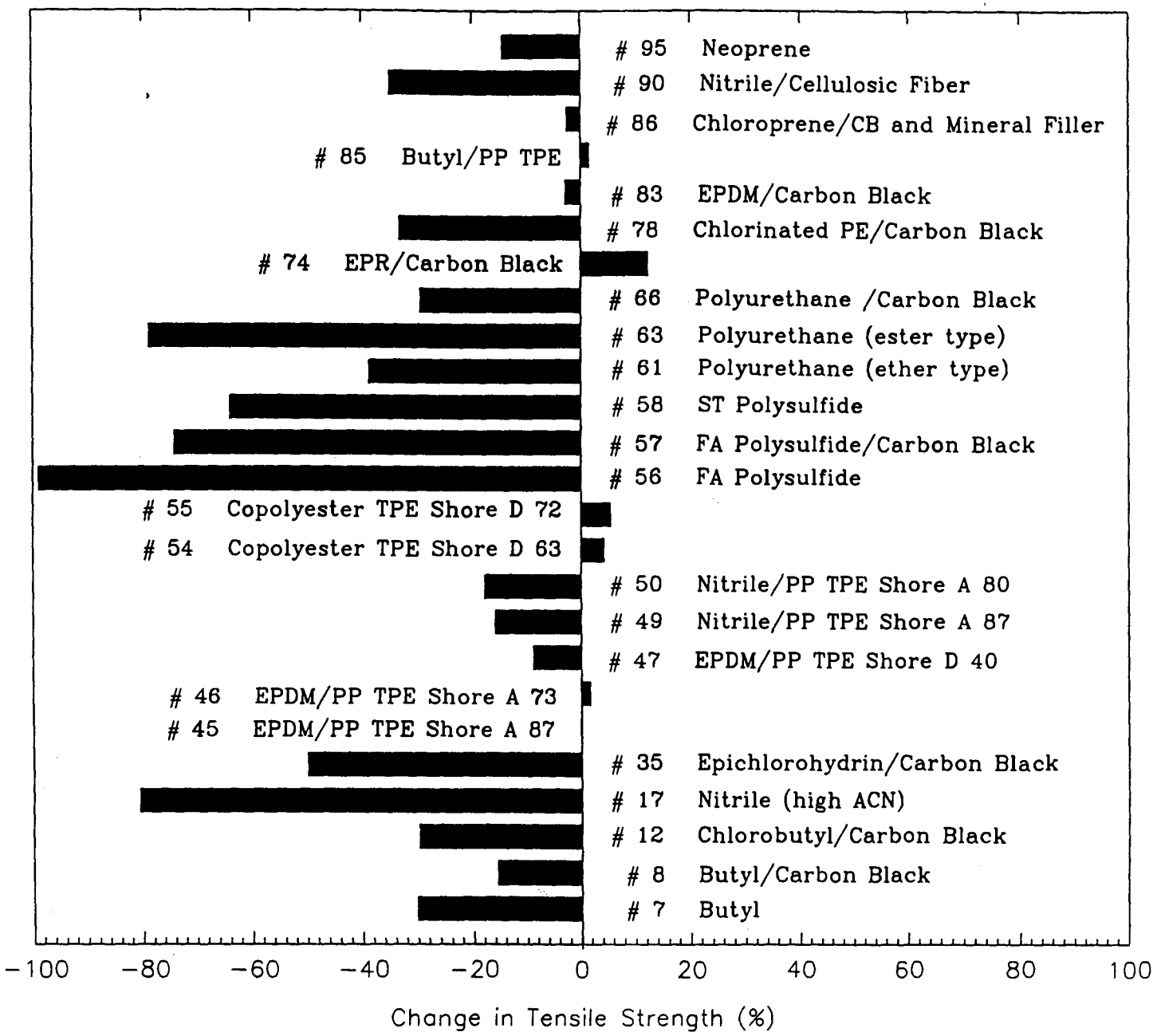

% Change in Tensile Strength: HFC-125/Emery 2927-A
# 95 Neoprene
# 90 Nitrile/Cellulosic Fiber
# 86 Chloroprene/CB and Mineral Filler
# 85 Butyl/PP TPE
# 83 EPDM/Carbon Black
# 78 Chlorinated PE/Carbon Black
# 74 EPR/Carbon Black
# 66 Polyurethane /Carbon Black
# 63 Polyurethane (ester type)
# 61 Polyurethane (ether type)
# 58 ST Polysulfide
# 57 FA Polysulfide/Carbon Black
# 56 FA Polysulfide
# 55 Copolyester TPE Shore D 72
# 54 Copolyester TPE Shore D 63
# 50 Nitrile/PP TPE Shore A 80
# 49 Nitrile/PP TPE Shore A 87
# 47 EPDM/PP TPE Shore D 40
# 46 EPDM/PP TPE Shore A 73
# 45 EPDM/PP TPE Shore A 87
# 35 Epichlorohydrin/Carbon Black
# 17 Nitrile (high ACN)
# 12 Chlorobutyl/Carbon Black
# 8 Butyl/Carbon Black
# 7 Butyl
−100 −80 −60 −40 −20 0 20 40 60 80 100
Change in Tensile Strength (%)


% Change in Tensile Strength: HFC-143a/Emery 2927-A
# 95 Neoprene
# 90 Nitrile/Cellulosic Fiber
# 86 Chloroprene/CB and Mineral Filler
# 85 Butyl/PP TPE
# 83 EPDM/Carbon Black
# 78 Chlorinated PE/Carbon Black
# 74 EPR/Carbon Black
# 66 Polyurethane /Carbon Black
# 63 Polyurethane (ester type)
# 61 Polyurethane (ether type)
# 58 ST Polysulfide
# 57 FA Polysulfide/Carbon Black
# 56 FA Polysulfide
# 55 Copolyester TPE Shore D 72
# 54 Copolyester TPE Shore D 63
# 50 Nitrile/PP TPE Shore A 80
# 49 Nitrile/PP TPE Shore A 87
# 47 EPDM/PP TPE Shore D 40
# 46 EPDM/PP TPE Shore A 73
# 45 EPDM/PP TPE Shore A 87
# 35 Epichlorohydrin/Carbon Black
# 17 Nitrile (high ACN)
# 12 Chlorobutyl/Carbon Black
# 8 Butyl/Carbon Black
# 7 Butyl
−100 −80 −60 −40 −20 0 20 40 60 80 100
Change in Tensile Strength (%)

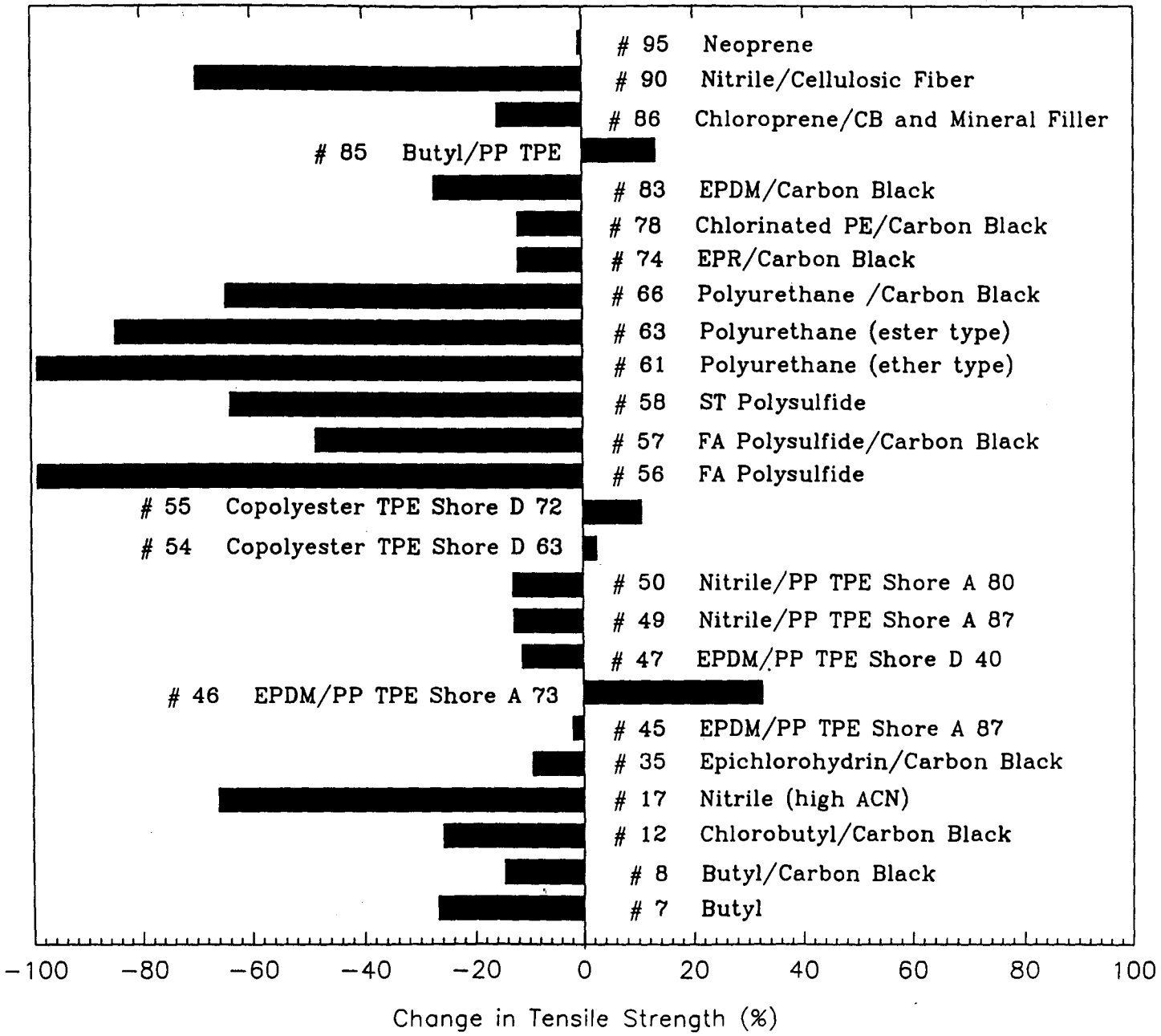
% Change in Tensile Strength: HFC-134/Emery 2927-A



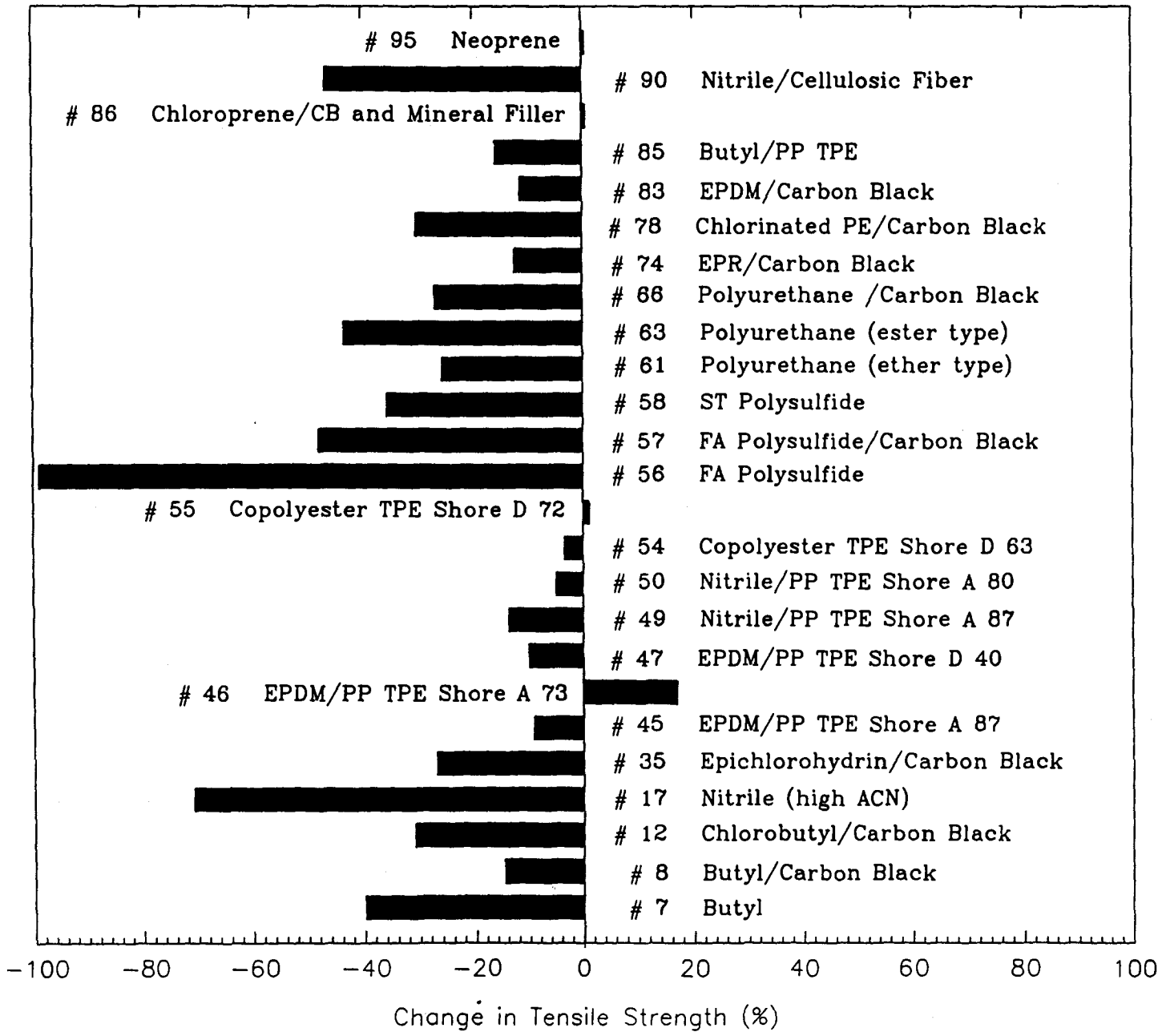
% Change in Tensile Strength: HFC-32/Emkarate RL 244



% Change in Tensile Strength: HFC-125/Dow P425



% Change in Tensile Strength: HFC-125/Emkarate RL 244



% Change in Tensile Strength: HFC-152a/Emery 2927-A