# FINAL REPORT FOR PREPARATION OF NON-METALS PROPERTIES FOR DATA BASE 

SUBMITTED TO NASA

MARSHALL SPACE FLIGHT CENTER

CONTRACT \# NAS8-36198

## SUBMITTED BY ER SYSTEMS

2904 WESTCORP BLVD.
HUNTSVILLE, AL 35805
JUNE 8, 1988

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# FINAL REPORT FOR PREPARATIONOF NON-METALS PROPERTIES FOR DATA BASE 

## INTRODUCTION

Contract NAS8-36198 entitled "Preparation of Non-Metals Properties for Data Base" awarded to EER Systems began September 3, 1985 and was concluded May 31, 1988. The scope of this contract stated that the contractor would conduct a literature search to locate, and obtain from manufacturers $A$ through $H$ and distributors, ilterature describing the physical, electrical, and chemical properties or atributes of non-metallic materials. This literature search would include but not be limited to the following Classes:

| 1. Adhesives | 14. Laminates |
| :--- | :--- |
| 2. Plastics | 15. Films |
| 3. Elastomers | 16. Insulation Thermal |
| 4. Foams (Insulations) | 17. Gasket Material |
| 5. Potting Compounds | 18. Hose and Duct |
|  | Materials |
| 6. Tapes | 19. Paints |
| 7. Electrical Cable | 20. Inks |
| 8. HeatShrink Tubing | 21. Molding Compounds |
| 9. Fabrics | 22. Webbings |
| 10. Wire Tie Materials | 23. Ablatives |
| 11. Cords | 24. Sealants |
| 12."VELCRO" Type | 25. Extruding \& Molding |
| Fasteners | compounds |
| 13. Corks | 26. Plastics for |
|  | Electronics |

It was later agreed by NASAMSFC and EER that in order to build a highly functional Non-Metallic Materlals Properties Data Base each class of materlals should be developed to Include manufacturers A through Z and distributors. This meant that each class of non-metallic materials would be developed completely before beginning other classes. This modification became effective December 4, 1986 by which the scope was narrowed to include as a minimum the non-metallic material classes of Adhesives and Plastics. July 24, 1987 a second modification became effective to include two addhional material classes.

EER Systems, under this contract with the modifications, developed non-metallic materials properties data bases for the Materials and Processes Laboratory NASAMSFC. The data bases developed consisted of the non-metallic materla classes of Adhesives, Adhesive/Sealants, Plastics, and Elastomers. Included with these properties data bases, EER developed a Specifications Data Base to incorporate material specifications data to supplement the Elastomers Data Base, however this data base can supplement the other properties data bases.

## ADHESIVES DATA BASE

## LITERATURE SEARCH \& DATA CLASSIFICA: TION

The goal of this contract was to design and Implement a Properties Data Base consisting of Non-Metallic material properties. The scope of this particular effort required the acquistion of properties data for non-metallle materials found in the MSFC-HDBK-527/JSC. In order to correctly. identify and categorize the materials therein by non-metallic material class, a Materials Engineer, John T. Schell (Retired Chief of Polymers and Composites Branch MSFC/NASA), was employed for this purpose. Mr. Schell immediately reviewed the handbook and classified each material by material class. This Initial effort required almost 3 to 4 weeks.

Upon the completion of this classification process, a decision was made to determine which material class would be researched and developed for propertles data base initially. NASAMSFC made the decision to have EER Systems begin their Initial efforts towards designing and developing the Adhesives Properties Data Base. This decision resulted in a complete effort to locate all Adhesive manufacturers/manufacturer products listed in MSFC-HDBK-527/JSC.


Once all Adhesive manufacturers/manufacturer products listed in MSFC-HDBK-527/JSC were identified and grouped, then EER began to research the manutacturers phone numbers. It was at thls polnt that the scope of non-metallic materials broadened to all U.S. Aerospace Adhesive manufacturers. This decision to pursue these additlonal manufacturers complimented NASAMSFC needs by providing them with an extended range of Aerospace Adhesive materials with their respective properies.

## RESEARCH_SOURCES

In order to locate phone numbers for the adhesive manufacturers located in MSFC-HDBK-527/JSC. the VSMF Information Handling Services books were used. The VSMF books contained addresses and phone numbers for almost all existing manulacturers in the U.S. The VSMF proved to be a valuable tool in the research of each non-metalIIC material class. One of the most useful VSMF Volumes to EER contains a listing of all manufacturers by product such as Adhesives. This particular volume with its listing proved to be beneficial in the expanding of the scope of work to include all U.S. manufacturers of Adhesives. The Thomas Register, which also lists manufacturers according to product, was utilized. An additional reference book, Adhesive Age Directory, a publication of U.S. Adhesive manufacturers and current information about new adhesives products was also helpful. These reference materials aided in identifying Adhesive manufacturers and obtaining phone numbers and addresses.

## DATASOUCITATIONPROCESS

Having obtained an exaustive listing of Adhesive manufacturers addresses and phone numbers, procedures were developed to begin contacting manufacturers and soliciting information. In order to feasibly contact by phone a large number of manulacturers without incurring an unreasonable expense, EER used the FTS telephone network at the Materials and Processes Laboratory, EHO2 NASAMSFC. Therefore, the costly task of contacting manufacturers by phone proved to be inexpensive to the government. Atter a manufacturer was contacted, the person to whom we needed to speak most often was a sales representative. EER requested technical data consisting of general, physical, thermal, electrical, and chemical resistance properties. Many times thls came in the form of brochures containing product informatlon. These product brochures sometimes were ax-
tremely limited and requests were made to provide specific information containing various properties such as specific gravity, hardness, service temperature range, etc. This provided the manufacturers with a clearer understanding of the information requested and therefore the quality of the information recelved was improved. EER discovered that the most productive point of contact for solicting technical information was the sales representative. Occaslonally, certain manufacturers requested that a letter be sent describing the need for the necessary technical data. EER anticlpated that such a letter would be needed and previously prepared a letter to be sent to those manufacturers explaining the need for technical data. A sample copy of this letter was enclosed in this report. Within 3 to 4 weeks, the contacting of these manufacturers by phone and/or letter with follow-up was completed. After all Adhesive manufacturers had been successfully contacted, the forwarded technical information usually arrived within the following two to three weeks.

When the solicited technical data arrived at EER, Data Analysts began to sort the Information by material class and manufacturer. The Materials Englneer reviewed the data upon receipt to determine whether a material was an applicable Adhesive to be assigned to the NASA/MSFC Materials and Processes Laboratory.

## DATA ENTRY FORM DEVELOPMENT

Data accepted was later reviewed by Data Analysts to determine the frequencles of materlal properties usage that appeared unique to Adhesives. Once these frequencles were determined, a listing of properties ordered by frequency of use was sent for review to NASAMSFC In order to determine which properties should be incorporated in the Adhesive data base. A final decision was made by NASAMSFC to incorporate certaln material properties and to eliminate others as irrelevant. The remalning properties were then used to develop the Adhesives data entry form to be used in conjunction with transcription and data entry. The data entry form development process was revised three times for the Adhesive data entry form. Each form was approved by NASAMSFC, but each form remained a candidate for update. Subsequent updates were made to facilitate data base use. The revisions
resulted from basic dissatisfactions observed later by NASA and EER with initial data base design. Each revised data entry form possessed substantial improvements for data base design. Eventually, a decislon was made by NASANMSFC to finalize the data entry form and proceed with the other tasks. The form was reviewed by NASAMSFC for acceptance. The approved Adhesives data entry form was then prepared and coples made for transcription purposes.

## IRANSCRIPTION PROCESS

Once sufficient Adhesive data entry forms were copled, the transcription process began. This involved Data Analysts transcribing the Adhesive product information on the Adheslve data entry forms. At times the manufacturer's literature would vary from the norm and additional technical information would have to be sought out from the manufacturer when the data was not clearly understood. This particular problem usually stemmed from unfamiliar units, test methods, and or properties. For this reason the Materials Engineer was employed to help alleviate some of the confusion involved in transcrlbing manufacturer's product information.

NASA Generic Identification Codes and H4ID(s) were assigned during transcription to each material. It was noted that some H4ID(s) were unable to be obtained for certain manulacturers.

## DATABASEDESIGN

While the product Information was being transcribed by EER, the NASAMSFC Computer Support Contractor, assisted by EER, was designing the Non-Metallic Materials Properties Data Base to contain the Adhestives propertes data. This system was being developed on the VAX 8650 located at EH02, MSFC. ORACLE was the selected Data Base Management System. The NASAMSFC Computer Support Contractor designed the data entry and valldation screens for data entry and validation purposes on the VAX.

## IBM/PC DATA ENTPY PROCESS

When 500 to 600 Adhesives were initially transcribed, EER proceeded with the data entry and validation on site at MSFC. It became evident. that the loss of time in travel and the loss of communication with competent help gave rise to the possibility of performing these procedures inhouse at the EER Huntsville facility. The idea was
to develop a procedure whereby data entry and validation procedures could be performed on microprocessors in-house, then download the data from the microprocessors and upload to the VAX 8650. EER recognized the fact that the process could move along much faster if more of the effort was performed on the IBM AT's inhouse.

## EOUIPMENT NEEDS

Upon recolving approval from NASAMSFC. EER purchased the ORACLE Data Base Management PC Version, three IBM Computers(AT), two Proprinters XL, and one Sony Video Projector with 8 foot screen. A DEC VT240 whth corresponding DEC LA-210 AA printer was purchased and placed on site at NASA to faciltate the data transferral process. We used the Kermit Communication package and downloaded the IAG source codeto the IBM AT. All the screens had to be changed because of version compatibilities. Other changes had to be made because of AT restrictions.

Once all programs had been customized to run on the AT's we found that changes were made much more rapidly, competent help available, and data entry/validation procedures flowed much more smoothly than previous on-site procedures. This particular effort proved beneficial for NASAMSFC. NASAMSFC no longer had to reserve space for an additional contractor inside limited faciilites. Often the VAX 8650 was shut down due to maintenance which under normal circumstances would have caused EER to cease productivity. This no longer became a problem. When the VAX became inoperable, EER continued to function. EER performed the remaining data entry and validation processes for Adhesives in-house using the IBM AT(s).

The data entry process for Adhesives involved entering the transcribed materials from the data entry forms onto the microprocessors via the Data Entry screens. Data entry processes continued untl the number of Adhestve materlals usually reached 1000. Having entered 1000 materials, the valldation process began.

## YALIDATION PROCEDURE

This validation procedure conslsted of 100 percent validation. This meant that the data entered would be compared with the manufacturer's product information sheet, not the data entry
form. Verification from the source assured accuracy. Once the materlals were initially validated, then a final check of the validated information is then periformed. This includes a check of several fields in the data base. This process began with a complete check of 1) materials that have not been valldated, 2) propertles that have not been validated, 3) a determination to establish every manufacturer's designation was the same as the part designation, 4) a determination to verify that the trade name is pan of the manufacturer's designation, 5) check the validity of scientific notation and exponentiation, 6) check the validity of the units, and 7) finally, to approve the generic identification which is based on chemical make-up of the material. When this process was completed, the data was ready to be transferred to the VAX 8650 on-site at MSFC.

## MICRO-TO-YAX DATATRANSEER

The transfer process developed by EER Systems allowed the data resident on IBM microprocessors to be transferred to a VAX 8650 main frame computer. After some research EER decided to use a communication package published by ORACLE Corporation called ORALNKK. ORALNNK allows a microprocessor to "talk" to a mainframe, thus enabling an easy transfer of data. ORALUNK allowed each table to be transferred individually. This process took about one day per 1000 materials. Initially a backup of each AT was carried to an AT compatible on-site which was on-line to the VAX 8650. The backup sets were loaded on the AT and transferred using ORALNNK. EER then developed a system that does a series of exports on each AT. All of the data files were Imported onto one microprocessor by a series of imports. When a backup set was made, only one ORALNK process was performed.

## DATA BASE CONTENTS \& TIME OF PEREOBMANCE

The transcription, data entry, validation, and transfer of Adhesives properties data to the VAX 8650 continued until all avallable MSFC-HDBK-527/JSC Adhesive manufacturers/manufacturer products and U.S. Aerospace Adhesive manufacturers/manufacturer products were entered. The total number of Adhesive products entered In the Adhesive Properties Data Base was 3014.

The development of the Adhesive Properties Data Base was the most time consuming of the entire contractual effort. This was a result of a series of
updates to data base design. These updates inItially were needed to facilltate data base use. Once all these updates were made and data base satisfaction was acheived, data base design was finalized. These updates established the initial data base design for the remainIng non-metallic material data bases, which resulted in a shorter performance time for each data base. The total time of performance for the Adhesive effort was 13 months which began in September 1985 and was completed in October 1986.

## NASA MATERIALS CODES

Under the direction of NASAMSFC, EER subcontracted the assigning of all NASA Materlal Codes to each material entered into the NonMetallic Materlals Properties Data Base to BAMSI Inc. BAMSI Inc. performed all the necessary research to assign the Material Codes. Codes were provided to EER for each material and then EER would enter these into the data base. Upon the completion of the effort it was understood that there were stlll a number of materials without NASA Material Codes. These materials needing Material Codes are listed in EXHIBIT 1.

## PLASTICS DATA BASE

The next class of non-metallic materlal for data base design was Plastics. EER, having previously developed a highly productive means of locating manufacturers iferature and a useful system for data entry form development, followed procedures developed for the Adhesive effort exactly to design and develop the Plastics Data Base. EER continued to use the IBM AT(s) for the data entry and validation processes. The data was transferred in the same manner as the Adhesives data was to the VAX 8650.

The procedures used for the development of the Plastics Properties Data Base were all previously used for the Adhesive effort. This resulted in less development time and gave additional time to transcription, data entry, and validation of the Plastics Data Base.

DATA BASE CONTENTS \& TIME OF PEREOBMANCE

The transcription, data entry, validation, and transfer of Plastics properties data to the VAX 8650 continued until all available MSFC-HDBK-

527/JSC Plastlc manufacturers/manufacturer products and U.S. Plastic manufacturers/manufacturer products were entered. The total number of Plastic products entered in the Plastic Properties Data Base was 6462 . The total time of performance for the Plastics effiort was 8 months which began in November 1986 and was completed in June 1987.

## SURYEY OF MISSING DATA

EER conducted a survey of the data transcribed to check the frequency of properties used in order to identify the amount of missing data. This survey would be used to determine a cost/schedule for fillIng in the gaps. The survey results were given to NASA to review. NASAMSFC made a decision on which properties were most important to the effort. This list led to a listing of properties classified by NASAMSFC and EER as the "Ten Most Wanted Propertles" although there were approximately 13 necessary properties. The properties selected as most needed by NASA were compressive strength, continuous service temperature, denstry, dielectric constant, dissipation factor, tlexural strength, hardness, intermittent service temperature, specific heat, tenslle strength, thermal conductivity coefficlent, and thermal expansion coefficient.

EER devaloped procedures in order to follow-up on the missing data. Having previously established a point of contact whth the manufacturers for these particular materials, EER again solicited information from the manufacturers of Adhesives, Adheswe/Sealants, and. Plastics requesting the unique missing properties data out of which none or part of the "Ten Most Wanted Properties" were not supplied. Upon receipt of this particular missing information, it was noted that not all data for these properties could be obtained simply because the manufacturers did not periorm these panticular tests. Occasionally, missing data resulted from the failure of the manufacturer or distributor to supply the requested data for the entire product line.

The data recelved was entered into the data base then a now frequency of of the usage of "Ten Most Wanted Properties" was generated. The results of this new frequency of usage changed very little. This led NASAMMSFC and EER to the conclusion that in order to obtaln the missing technical data testing would have to be performed. This new listing of frequencles of missing propenties were submitted to NASA EH02 to decide which missing properties should be reviewed in regard to testing
of Non-Metallic materlals. The results of EER's analysis was provided in a chart that permits the Government to make a rational decision regardIng the cost/benefit value of obtaining the missIng data (See CHART 1).

## ADHESIVES/SEALANTS DATA BASE.

The next class of non-metallic material for data base design was Adhesive/Sealants. EER. having previously developed a highly productive means of locating manufacturers literature and a useful system for data entry form development, followed procedures developed for the Adhesive effort exactuy to design and develop the Adhesive/Sealants Data Base. EER continued to use the IBM AT(s) for the data entry and valdation processes. This data was transferred in the same manner as the Adhesives data was to the VAX 8650.

The procedures used for the development of the Adhesive/Sealants Properties Data Base were all previously used for the Adhesive effort Thls resulted In less development time and gave additional time to transcription, data entry, and validation of the Adhesive/Sealants Data Base.

## DATA BASE CONTENTS \& TIME OF PERFORMANCE

The transcription, data entry, valldation, and transfer of Adhesive/Sealants properties data to the VAX 8650 continued until all avallable MSFC-HDBK-527/JSC Adhesive/Sealants manufacturers/manufacturer products and U.S. Aerospace Adhesive/Sealants manufacturers/manufacturer products were entered. The total number of Adhesive/Sealants products entered in the Adhesive/Sealants Properties Data Base was 563. The total time of performance for the Adhesive/Sealants effort was four months which began in July 1987 and was completed in October 1987.

## ELASTOMERS DATA BASE

The next class of non-metallic material for data base design was the Elastomers. EER, having previously developed a hlghly productive means of locating manufacturers Iterature and a useful system for data entry form development, followed procedures developed for the Adhesive effort exactly to design and develop the Elastomers Data Base. EER continued to
use the IBM AT(s) for the data entry and validation processes. Thls data was transferred in the same manner as the Adhestives data was to the VAX 8650.

The procedures used for the development of the Elastomers Properties Data Base were all previously used for the Adhesive effort. This resulted in less development time and gave additional time to transcription, data entry, and validation of the Elastomers Data Base.

DATA BASE CONTENTS \& TIME OF PERFORMANCE

The transcription, data entry, validation, and transfer of Elastomers properties data to the VAX 8650 continued until all available MSFC-HDBK-527/JSC Elastomers manufacturers/manufacturer products and U.S. Elastomers manufacturers/manufacturer products were entered. The total number of Elastomers products entered in the Elastomers Propertles Data Base was 3320. The total time of performance for the Elastomers effort was 7 months which began in November 1987 and was completed in May 1987.

## SPECIEICATIONS DATA BASE

## UNDERSTANDING THE NEED

An additional data base, Specifications Data Base; was deslgned to compliment the Elastomer Data Base. EER developed the Specifications Data Base to incorporate material specfications data to supplement the Elastomers Data Base. However, thls data base can supplement the other propenies data bases. The reason for the supplement was because of a lack of sufficient product information made avallable by the manufacturer. As was pointed out by EER's Materials Enginoer, John Schell, (noted expert with rubber materials) product information was not generally made available for elastomeric materials. The reason this information was not made available was that each manufacturer sees their products and corresponding technical data as proprietary. The only allowable data that generally was obtained from Elastomer manufacturers was in the form of specifications.

EER came to the realization that much of the Elastomer data would only be in the form of specifications, therefore follow-up phone calls were made to all Elastomer manufacturers who had not supplled specifications for thelr materlals. The
specifications that Elastomer manufacturers materials met had to be obtained and reviewed in order to devise a method for transcription, data entry, and data base design.

RESOURCES FOR OBTAINING SPECIEICAIIONS

A list was complled of all specifications mentioned in the solicited manufacturer's information. This listing was used to locate the required specifications. Several sources were located and contacted. The Redstone Sclentific Iniormation Center was the first source investigated. This was reliable but was very time consuming since all the specifications were located on film. EER also ordered specifications from the NASA repository. Later is was discovered that specificatlons could be ordered from the Naval Publications and Forms Center for no cost. This was very reliable and the specifications arrived quickly.

As the specifications were recelved they were reviewed by EER's Materials Engineer, John Schell, who determined which specifications were related to the project. The specifications were analyzed and the properties that occurred most frequently were used in the design of the data entry form and the data base. All chemical resistance data was used.

Once these needed specifications were obtained EER began to design and develop the proper data base structure to incorporate the data. Specification data came in the form of a property range such as Tensile Strength with a range of $1400-1500 \mathrm{psl}$. Of the data input into this Specifications Data Base, 75 percent was in the form of chemical resistance data.

## IRANSCRIPTION DATA ENTRY \& YALIDAIION

A Specifications data entry form was developed in order to transcribe the data. After this form was designed then the transcription process began. Screens for data entry were designed to complement the data entry forms. All Information was then entered into the data base via menus and property screens. A sequence number and a data source number were generated in order to reference the specification to the source. Each specification was validated $100 \%$ by comparing the data on-line to the original material specification.

## DATA BASE CONTENTS \& TIME OF PERFORMANCE

The transcription, data entry, valdation, and transfer of Elastomer Specification data to the VAX 8650 continued until all avallable MSFC-HDBK-527/JSC Elastomers manufacturers/manufacturer products specifications and U.S. Elastomers manufacturers/manufacturer products specifications were entered. The total number of Specifications entered In the Specifications Data Base was 506. The total time of periformance for the Specifications Data Base effort was 5 months which began in January 1988 and was completed in May 1988.

## DIBECTIONS FOR LOCATING DATA ON THE VAX

The product that EER Systems developed for NonMetallic propertles and Spectications resides on the VAX 8650 . User querles, command files and executables for the Non-Metallic Properties Data Base are located on disk DUA10 in the [EER] subdirectories. Each Non-Metallic class (Adhesives, Plastics, Elastomers,and Specifications) Is located in it's own subdirectory. To enter SQL commands for the Non-Metallic Properties tables use the username NMPROP and password NMPROP.

User querles, command files and executables related to the Specifications Data Base are also located in their own [EER] subdirectory. The username for this Data Base is MILSPEC and password MILSPEC. INP files for both Data Bases are located in [EER.INP].

## CONTENTS OE REMAINDER OF REPORT

This final report contains a series of Task Flowcharts describing the processes Involved in each task. Included in this report are the Data entry forms developed for Adhesives, Adhesive/Sealants, Plastics, Elastomers, Specifications, Ponting Compounds, Adhestive Tapes, and Foams. A Units table is also Included which describes field names, stored units, valid units, and input converslon. The Data Base Tables are given which list the table names, the field names, column type, width, and scale nulls. The Specification Data Base tables Includes the table names, fields, column type, width and scale nulls. An Individual listing of the manufacturers for Adhesives, Adhesive/Sealants, Plastics, and Elastomers is included along with a combined listing of all the manufacturers. All product designations listed by manulacturer are enclosed in list form. These are listed by Adhestves, Adhesive/Sealants, Plastics, and Elastomers categories. Enclosed is a list of all specifications that were entered Into the Specifications Data Base. A sample of each manufacturer's data for Adheslves, Plastics, Adhesive/Sealants, and Elastomers has been included with two sample coples of the specifications. A list of chemicals used as mediums for chemical resistance properties is enclosed. These mediums are currently resident in the Resistance Characteristics Table which increases data entry speeds. Coples have been enclosed of the letters used in solicitIng product information, follow-up data, and the request for the "Ten Most Wanted Properties".


The numbers represented are based upon the actual number of data points represented in the Non-Metaliic Materials Properties Data Base.

The testing estimates are based upon three sample runs per test and include sample preparation time. Solicitation Process


Large quantities of manufacturer non－metallic property literature were analyzed efficiently．

## Evaluation Methodology for Selection Criteria

Tosk 2


EER's process determined properties of individual non-metallic material classes.

## Data Entry Form Development.



The development of the data entry form was an iterative process leading to unique forms for each class of materials.

## Transcription Process



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Physical Propertios
Mectronicol Psoparies Cleclrical Properties Inermal Pioperties

Depicted above is the Transcription Process, which involved the following tables: Data Source, General Table, Composition Table, and Properties Table.

## Data Entry Process

## Tosk 4



EER utilized the IBM AT Computer for data ontry processing.

## Validation Process

## Task 4



EER did'a $100 \%$ visual validation of the manufacturer's data.

## Data Survey and Cost/Schedule Approoch

## Task 5



A Cost vs Benefit approach was used regarding acquisition of missing properties.

Initial Data Entry Form; Adhesives



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## MATERIAL CODE

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MEGR. DESIGNATION MANUFACTURER
H4ID
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SPECIFICATION

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TEST CONDITIONS

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BRITTLE POINT
FLASH POINT
FLOW POINT
GEL POINT
MELT POINT
FALLING DART
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SPECIFICATION

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 SPECIFICATION



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TEST CONDITION


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TEST CONDITION

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IMPACT RESILIENCE
HEAT DIST. TEMP.
HARDNESS

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CONTROL NO.

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MECHANICAL BASICS
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INMT. SERVICE TEMP.
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CONDITIONS

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TEST CONDITION

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DATA ENTRY
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WATER ABSORPTION
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IMPACT STRENGTH
MECHANICAL STRENGTH

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## SURFACE RES

## VOLUME RES


CLERK
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## Initial Data Entry Form; Foams

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Units Tables; Field Name, Stored Units, Valid Units, Input Conversion

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| FIELD NAME | STORED UNITS | VALID UNITS | INPUT CONVERSION |
| :---: | :---: | :---: | :---: |
| DE_NM_ARC_TE | DEG F | $\begin{array}{ll} \text { C } & \\ \text { DEG } & \mathbf{C} \\ \text { DEG } & \boldsymbol{F} \\ \text { DEG } & \mathbf{K} \\ \mathbf{F} & \\ \mathbf{K} & \end{array}$ | $\begin{aligned} & : 9 / 5+32 \\ & : 9 / 5+32 \\ & 1 \\ & -273) \cdot 9: 5+32 \\ & (1 \\ & -273) \cdot 0 / 5+32 \end{aligned}$ |
| DE_NM_ARC_THICK | 18 | CEMTIMETER CENTIMETERS CM <br> FEET <br> FOOT <br> ET <br> IF <br> 1NCH <br> INCHS <br> M <br> METER <br> METERS <br> MIL <br> MILIIMETER <br> MILLIMETERS <br> MIIS <br> MM <br> YARD <br> YARDS <br> YD |  |
| DE_NM_ARC_VALUE | SEC | SEC <br> SECONDS | $\because 1$ |
| DE_NM_AR_TE | DEG F | $\begin{array}{ll} \text { C } & \\ \text { DEG } & C \\ \text { DEG } & \mathbf{F} \\ \text { DEG } & \mathbf{R} \\ \mathbf{F} & \\ \mathbf{X} & \end{array}$ | $\begin{aligned} & =9 / 5+32 \\ & =9 / 5+32 \\ & =1 \\ & =173)=0 / 5+32 \\ & =1 \\ & =273) \cdot 0 / 5+32 \end{aligned}$ |
| DE_NM_AR_VALUE | CU CM | CC <br> CU CM <br> CU IH <br> G <br> GRAMS <br> LBS <br> MG <br> MILOGRAMS <br> POUNDS |  |
| DE_NH_CDFI_LOAD | PS I | ATMOSPHERE BAR | $\begin{aligned} & =14.698 \\ & =14.50 \end{aligned}$ |





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## CENTIMETER CENTIMETERS CM FEET FOOT FT IN INCH INCHS M METER METERS MII MIILIMETER MIILIMETERS MIIS MM YARD

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| MEGAHERTZ | - 1000 |
| MHZ | - 1000 |
| C | - $9 / 5+32$ |
| DEG C | - $9 / 5+32$ |
| DEG $F$ | - 1 |
| DEG K | $-273) * 0 / 5+38$ |
| F | - 1 |
| K | $-273) \cdot 9 / 5+32$ |
| ATMOS PHERE | - 14.698 |
| BAR | - 14.50 |
| G/ SQ CM | 170.3 |
| G/ SQ. CM. | 170.3 |
| G/SQ CM | 170.3 |
| G/SQ. CM | / 70.3 |
| GPA | - 14503 |
| GRAMS PER SQUARE CENTIMETER | 170.3 |
| KGISQ CM | - 14.2258 |
| KG/SQ MM | - 1422.58 |
| KILOGRAMS PER SQUARE CENTIMETER | 10.0703 |
| LBS PER SQ IM | - 1 |
| LES./SQ. FT. | 1244 |
| LBS./SQ. IF. | - 1 |
| LBS/SQ FT | 1144 |
| LBS/SQ In | - 1 |
| MM | - 0.0193368 |
| MPA | . 145.03 |
| M/CM SQ | /.0001/8894.75 |
| M/SQ CH | / . $0001 / 8894.75$ |
| M/SQ MM | . 145.0378 |
| N/SQUARE METER | / 6804.757 |
| PA | / 6894.757 |
| POUNDS / SQUARE INCH | - 2 |
| POUNDS PER SQUARE FOOT | 1244 |
| POUNDS PER SQUARE INCH | - 1 |
| POUNDS/SQUARE INCH | - 1 |
| PSF | 1 144 |
| PS I | - 1 |
| C | - $9 / 3+38$ |
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DE_NM_DFL_TE


| F1ELD NAME | STORED <br> UNITS | VALID UNITS | INPUT CONVERSION |
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| DE_NM_DS_VALUE | VOLTS MIL | RVOLT / MIL <br> KVOLTS/MIL <br> MILLIVOLT/HIL <br> MILIIVOLTSMIL <br> V/MII <br> VOLT/MIL <br> VOLTS/MIL | $=1000$ $=1000$ 11000 $=1000$ $=1$ $=1$ |
| DE_NM_D_TE | DEG F | $\begin{aligned} & \text { C } \\ & \text { DEG } \\ & \text { DEG } \\ & \text { DE } \\ & \text { DEG } \\ & \mathbf{F} \\ & \mathbf{K} \end{aligned}$ | $\begin{aligned} & =9 / 5+32 \\ & =0 / 5+32 \\ & =1 \\ & -173)=0 / 5+32 \\ & -273)=0 / 5+32 \end{aligned}$ |
| DE_NM_D_VALUE | LB/CU IN | ```G./CU. CM. G/CU CM G/L GMS / IITER GRAMS PER CUBIC CENTIMETER GS./CU. CH. GSiCU CM kG. ICU. M Kg./GAL. KG/CU M KG/GAL RGS./CU. M RGS./GAL. KGS/CU M RGS/GAL KILOGRAMS PER CUPIC METER LB-CU IK LB./CU. FT. LB./CU. IN. LB./GAL. LB/CU FT LB/CU IN LB/GAL LBS./CU. FT. LBS./CU. IN. LBS./GAL. LBS/CU FT LBS/CU IM LBS/GAL MG;CU M POUNDS PER CUBIC FEET POUNDS PER CUBIC FOOT POUNDS PER CUBIC INCH``` | / 27.68 <br> / 27.68 <br> / 27680 <br> / 27578.80 <br> / 27.68 <br> / 27.68 <br> / 27.68 <br> / 27880 <br> / 104.8 <br> / 27880 <br> / 104.8 <br> / 27880 <br> / 104.8 <br> / 27880 <br> / 104.8 <br> / 27880 <br> - 1 <br> / 1728 <br> - 1 <br> / 231 <br> 11728 <br> $-1$ <br> / 231 <br> / 1728 <br> - 1 <br> / 831 <br> 11728 <br> - 1 <br> / 231 <br> - 1000/87880 <br> , 1728 <br> ! 1728 <br> - 1 |
| DE_NH_EL_TE | DEG F | DEG C DEG $F$ | $\begin{aligned} & =9 / 5+32 \\ & =0 / 5+32 \\ & =1 \end{aligned}$ |


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|  | DEG F | $\begin{array}{ll} \mathbf{C} & \\ \text { DEG } & \text { C } \\ \text { DEG } & \mathbf{F} \\ \text { DEG } & \mathbf{X} \\ \mathbf{F} & \\ \mathbf{K} & \end{array}$ |
| DE_NH_ET_FLOW_PT | DEG $\boldsymbol{F}$ | $\begin{array}{ll} \text { C } & \\ \text { DEG } & \text { C } \\ \text { DEG } & \mathbf{F} \\ \text { DEG } & \mathbf{K} \\ \mathbf{F} & \\ \mathbf{R} & \end{array}$ |
| DE_NH_ET_GEL_PT | deg $\boldsymbol{F}$ | $\begin{array}{ll} \mathrm{C} & \\ \text { DEG } & \mathrm{C} \\ \text { DEG } & \mathbf{F} \\ \mathrm{DEG} & \mathbf{K} \\ \mathbf{F} & \\ \mathbf{K} & \end{array}$ |
| DE_NH_ET_MELT_PT | DEG F | $\begin{array}{ll} \mathrm{C} & \\ \text { DEG } & \mathrm{C} \\ \mathrm{DEG} & \mathrm{~F} \\ \mathrm{DEG} & \mathrm{~K} \\ \mathbf{F} & \\ \mathbf{R} & \end{array}$ |
| DE_NM_ET_SOFT_PT | DEG F | $\begin{array}{ll} \mathbf{C} & \\ \text { DEGG } \\ \text { DEG } & \mathbf{F} \\ \text { DEG } & \mathbf{X} \\ \mathbf{F} & \\ \mathbf{R} \end{array}$ |
| DE_NH_FC_RATE | fi/min | $\begin{aligned} & \text { FPM } \\ & \text { FI/MIN } \end{aligned}$ |

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VALID
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KILOGRAMS PER SQUARE CENTIMETER


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Data Base Tables; Table Names, Column (Field) Names, Column Type (Numerical, Character, Date, etc.), Width, Scale Nulls (Fields that require a value)

| tname | cname | COLTYP | wIdTH | SCale | nulls |
| :---: | :---: | :---: | :---: | :---: | :---: |
| class | SEQUENCE | number | 8 | 0 | Not null |
|  | UPDT DIE | Date | 7 |  | null |
|  | data_source | nUMber | 6 | 0 | NUIL |
|  | class | char | 10 |  | NULE |
|  | UPDT_OID | char | 15 |  | NULL |
| cNv | SEQ | NUMBER | 8 | 0 | NULL |
|  | flag | NUMBER | 1 | 0 | nuld |
| composition | SEQUENCE | NUMBER | 8 | 0 | not null |
|  | FILLER_PCT | number | 0 |  | null |
|  | THICKNESS_U | Char | 10 |  | NULL |
|  | DATA SOURCE | NUMBER | 6 | 0 | nUlL |
|  | THICXESSS | NUMBER | 0 |  | NULL |
|  | PARIS BY VOL | NUMBER | 0 |  | nUsL |
|  | PART_DESİG | char | 240 |  | NOT NULL |
|  | GENEXIC_TYPE | char | 40 |  | nuld |
|  | FORM | char | 40 |  | null |
|  | PARTS BY WGHT | NUMBER | 0 |  | mule |
|  | PART_DESC | Char | 40 |  | NULL |
|  | UPDT_DTE | date | 7 |  | null |
|  | UPDT_OID | Char | 15 |  | NULL |
| CURE | SEquence | NUMBER | 8 | 0 | not null |
|  | CURE_PRESS_U | Char | 10 |  | NULL |
|  | CURE-QTY | char | 25 |  | NULL |
|  | CURE TE | NUMBER | 0 |  | NULL |
|  | CURE-maX_DEPTH | NUMBER | 0 |  | nuel |
|  | CURE-MAX DEPTH_U | Char | 10 |  | nuld |
|  | CURECOND - | Char | 240 |  | nULI |
|  | data source | NUMBER | 6 | 0 | nULL |
|  | CURE NO | NUMBER | 4 | 0 | NOT NULL |
|  | CURE Phase | number | 4 | 0 | not null |
|  | SPECİfication | Char | 53 | 0 | null |
|  | CURE_TEU | Char | 10 |  | NULI |
|  | CURE-PRESS | number | 0 |  | nULI |
|  | CURE-TI_U | Char | 10 |  | nULI |
|  | CURE-II_2 | number | 0 |  | NULL |
|  | CURETIT_ ${ }^{-}$ | Char | 10 |  | nUld |
|  | CURE ${ }^{-} \mathrm{TI}^{-}$ | number | 0 |  | nULL |
|  | UPDT-DTE | date | 7 |  | nUle |
|  | UPDT_OID | char | 15 |  | nule |
| DATA_SOURCE | DS_ID | NUMBER | 6 | 0 | not null |
|  | DS_DATE | date | 7 |  | nule |
|  | DS_REM | Char | 240 |  | nUll |
|  | DS_DOC_IDENT | CHAR | 30 |  | nULI |
|  | DS_DOC_TYPE | char | 50 |  | null |
| general | SEquence <br> DESC_TYPE_DS | NUMBER RUMBER | $\begin{aligned} & 8 \\ & 8 \end{aligned}$ | 0 | not null NULL |


| trame | CNAME | COLTYP | WIDTH | SCALE | NULLS |
| :---: | :---: | :---: | :---: | :---: | :---: |
| general | COLOR_CURED | CHAR | 20 |  | NULL |
|  | COLOR_CURED_DS | NUMBER | 6 | 0 | NULL |
|  | PROCES̄S_METHOD_DS | NUMBER | 6 | 0 | null |
|  | COMPOUND | CHAR | 30 |  | nule |
|  | COMPOUND_DS | NUMBER | 6 | 0 | NULL |
|  | CATEGORY | CHAR | 100 |  | NULL |
|  | PROCESS METHOD | CHAR | 240 |  | NULL |
|  | DESC TYPE | CHAR | 240 |  | NULL |
|  | TRADE_NAME_DS | NUMBER | 6 | 0 | NuLL |
|  | MANUF_H4ID | CHAR | 6 |  | NULL |
|  | MANUF_DESIG | CHAR | 100 |  | KULL |
|  | MANUFDESIG DS | MUMEER | 6 | 0 | HULL |
|  | GENERIC_COMP1 | CHAR | 2 |  | MULL |
|  | GENERIC_COMP2 | CHAR | 2 |  | MULL |
|  | GENERIC_COMP3 | CHAR | 2 |  | NULL |
|  | GENERIC-USE | CHAR | 2 |  | MULL |
|  | COMPANY | CHAR | 50 |  | MULL |
|  | MANUF | CHAR | 50 |  | MULL |
|  | TRADE_NAME | CHAR | 50 |  | NULL |
|  | MATCD ${ }^{-}$ | CHAR | 8 |  | NULL |
|  | UPDT_DTE | DATE | 7 |  | HULL |
|  | UPDT_OID | CHAR | 15 |  | MULL |
| MATERIAI_SPEC |  |  |  | 0 | NOT NULL |
|  | UPDT_DTE | DATE |  |  | null |
|  | DATA SOURCE | MUMBER |  | 0 | NULL |
|  | MATERIAL_SPEC | CHAR | 53 |  | HULL |
|  | UPDI_OID ${ }^{\text {- }}$ | CHAR | 15 |  | NULI |
| NM_STORED_UNITS | COLNAME | CHAR | 30 |  | NULI |
|  | STRD_UNIT | CHAR | 50 |  | NULL |
| NH_VALID_UNITS |  | CHAR | 50 |  | null |
|  | STRD_UNITS | Char | 50 |  | nUll |
|  | CATEGORY | NUMBER | 2 | 0 | NULL |
|  | INPUT_CONV | CHAR |  |  | NULL |
| PROPERTY | SEQUENCE | MUMBER | 8 | 0 |  |
|  | TEMP | NUMBER | 0 |  | NULE |
|  | SUPPLEMENT | CHAR | 240 |  | MULL |
|  | DATA SOURCE SPECIFICATION | NUMBER CHAR | 6 53 | 0 | NULI |
|  | SEMP_U | CHAR CHAR | 53 10 |  | NULL |
|  | TIME | NUMBER | 0 |  | FULL |
|  | TMEEU | CHAR | 10 |  | NULL |
|  | PRESS LOAD | RUMBER | 0 |  | NULL |
|  | FREQ_- ${ }^{\text {PATE }}$ | NUMBER | 0 |  | NULL |
|  | FREQ RATESU | CHAR | 10 |  | NULI |
|  | THICKNESS | MUHBER | 0 |  | NULL |
|  | THICKNESS_U | CHAR | 10 |  | MULL |
|  | SUBSTRATE | CHAR | 50 |  | HULL |
|  | PERCENT_OXYGEN | NUMBER | 0 |  | HULL |


| trame | cname | COLTYP | WIDTH | Scale mulls |
| :---: | :---: | :---: | :---: | :---: |
| Property | OTHER_NAME | char | 20 | musi |
|  | OTHER_VALUE_U | char | 10 | nuli |
|  | OTHER_VALUE | nukber | 0 | NuLL |
|  | press_load_u | Char | 10 | NULL |
|  | Properit | CHar | 30 | nuld |
|  | Ratimg | CHAR | 20 | null |
|  | value | NUMBER | 0 | null |
|  | value_u | Char | 25 | nult |
|  | CODE | CHAR | 15 | null |
|  | UPDT_DTE | date | 7 | nule |
|  | PROPCLASS | Char | 15 | nule |
|  | basiçflag | Char | 1 | nule |
|  | UPDT_ŌID | char | 15 | nuli |
| RES ISTANCE_CHARACTERISTICS | SEQUENCE | NUMBER | 8 | 0 mot muld |
|  | UPDT_DTE | date | 7 | nuil |
|  | TIME ${ }^{-1}$ | char | 3 | null |
|  | HARD_Change | char | 25 | NUIL |
|  | TENS ${ }^{-} \mathbf{P C T}$ CHG | nUMber | 0 | nuld |
|  | PCT_WT_CHG | NUMBER | 0 | nule |
|  | YLD-STR CHG | number | 0 | NULI |
|  | OTHER_RĒSULT NAME | char | 20 | NUIL |
|  | OTHER-RESULT Value | number | 22 | 5 NuLL |
|  | OTHER RESULT-VALUE_U | Char | 10 | NULL |
|  | SPECIFICATION - | char | 53 | nule |
|  | data source | MUMBER | 0 | nuil |
|  | VOL_ ${ }^{\text {chem }}$ | number | 0 | null |
|  | SUP戸¢LEMENT | Char | 50 | nuld |
|  | ELONG_PCT_CHG | number | 0 | NuLI |
|  | pressure - | number | 0 | nuld |
|  | PRESSURE U | Char | 10 | NULI |
|  | OTHER_PARAMETER_MAME | CHAR | 20 | nuld |
|  | OTHER_PARAMETER_VALUE | number | 0 | nuid |
|  | OTHER ${ }^{\text {PARAMEETER_VALUE_U }}$ | Char | 10 | nuti |
|  | OBSERV̄ation - - | Char | 200 | nuld |
|  | MEDIUM | Char | 60 | NULI |
|  | TIME | number | 0 | nuli |
|  | TEMP_U | Char | 5 | NULI |
|  | TEMP | number | 0 | nuld |
|  | UPDT_OID | Char | 15 | nule |
| Short_matcd | hatcd | Char | 8 | nuls |
|  | NEW_matcd | char | 8 | NULI |
| VALId_DS | DS ID | NUMBER | 6 | 0 not mull |
|  | DS_DATE | date | 7 | nule |
|  | DS_-rem | Char | 240 | nule |
|  | DS_DOC_IDENT | Char | 30 | null |
|  | DS_DOC_IYPE | Char | 50 | nuld |
| VALId_MS_TYPE | VMS TYPE <br> ACEEPTT TYPE | CHAR CHAR | 15 15 | nULL NULL |

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& \text { ORMCNAL PAGE IS }
\end{aligned}
$$




## Adhesive Manufacturers

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HANUFACTURER


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## MANUFACTURER

RUBBER ASBESTOS CORP
SHELDAHL INC
SHELL OIL CO/SHELL CHEMICAL CO
SIRA CHEMICAL CORP
SOLUOL CHEMICAL CO INC
STABOND
STAUEFER CHEMICAL COISWS SILICONES CORP
SWS CORP
TECHNIT EMI SHIELDING PRODUCTS
TECKIT
TESIWORIH LAB. INC
THERMALIOY INC
THERMOSET PLASTICS INC
THREE M CO (SM) ADHESIVES, COATINGS \& SEALERS DIV
TRA-CON INC, RESIN SYSTEMS DIV
TRANSENE CO INC
UNIONOIL COMPANY OF CALIFORNIA, UNION $7 B$ DIV
UNIROYAL INC, UNIROYAL PLASTICS PRODUCTS
WESTINGHOUSE ELECTRIC CORP

Plastic Manufacturers



## ORIGINAL PAGE IS OF POCR QUALITY

DYNAMIT NOBEL CHEMICALS
EAGLE-PICHER INDUSTRIES INC. PLASTICS DIV EASIMAN CHEMICAL PRODUCTS INC
EL PASO PRODUCTS CO
EXXON CORPIEXXON
FIBERITE CORP
FILLITE USA. INC
FLUOROCARBON CO, ANAHEIM DIV
FURANE PRODUCTS CO
FURANE PRODUCTS CO
GENERAL ELECTRIC CO
GENERAL ELECTRIC CO, SIIICONE PRODUCTS DIV
GENERAL ELE
GOODRICH (B F) CO, CHEMICAL GROUP
GOODYEAR TIRE RUBBER CO. CHEMICA
GOODYEAR TIRE RUBBER CO. CHEMICAL DIV
GREENE, TWEED CO
GULF-WANDES CORP
HAMMOND PLASTICS,
HEXCEI CORPORATION
HIMONT U.S.A.. IN
HIMONT USA, INC
HOECHST
HUNTSMAN CHEMICAL CORP
INDUSTRIAL DIELECTRICS
INTERNATIONAL POLYMER CORF
INTERNAT IONAL POLYMER CORFORATION
JOHN CRANE-HOUDAILLE INC
KIDDE INC, FENWAL ELECTRONICS DIV
KIDDE INC
L $P$ COR
MITSUBISHI CHEMICAL IMDUSTRIES AMERICA INC
MITSUBISHI PETROCHEMICAL CO.. ITD.
HITSUBISHI PETROCHEMICAL CO.. LTD.
HOBAY CHEMICAL CORP
HOBIL CHEMICAL CORP, PETROCHEMICAL DIV
MONMOUTH PLASTICS INC
MONSANTO INDUSTRIAL CHEMICALS CO
GORPISON MOLDED FIBER GLASS CO
NAT'I DISTILLERS CHEMICAL CORP/ USI CHEMICAL DIV
NAT I DON CHEMPLAST INC
NUODEX INC, HULS COMPANY
NUODEX INC, PLASTICS GROUP
MYTEF PLASTICS. LTD.
P PG INDUSTRIES INC, COATINGS RESINS DIV
PETRARCH SYSTEM INC
PHILLIPS CHEMICAL CO. PIASTICS DIV
PIASKON ELECTRONICS MATERIALS INC
PIASKON ELECTRONICS MATERIALS INC
PIASTICS ENGINEERING CO POIIFII INC.

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Elastomer Manufacturers

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## ORIGINAL PAGE IS OF POOR QUALITY




## ORIGINAL PAGE IS OF POOR QUALITY

HERCULES INC
HEXCEL CHEMICAI PRODUCTS


## ORIGINAL PAGE IS OF POOR QUALITY

manufacturer


## ORIGINAL PAGE IS OF POOR QUALITY

## MANUEACTURER



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MANUFACTURER


## Adhesive Manufacturer Product Designations



## ORIGINAL PAGE IS OF POOR QUALITY

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## GAISIHOV GNJ\&

 AREMI AP-2108 EPOXY LAMINATING RESE AKEMI AP-2118 HI TEMP LAMINATING
AREMI AP-2120 HI-TEMP LAMINATING EPOXY akEhI Ap-2410 quick set epoxy adhes ive

[^0]$\qquad$
 RUANTUK RTV-108 RTV-118 $\infty$

| AREMI | AP-1400 |  |
| :---: | :---: | :---: |
| AREMI | AP-2108 | epoxy laminating/adhesive |
| AREMI | AP-2110 | epoxy laminating resin |
| AKEMI | AP-2118 | hi temp laminating |
| AKEMI | AP-2120 | hi-temp laminating epoxy |
| AXEMI | AP-2400 |  |
| AKEmi | AP-2410 | QUICR SET epoxy adhes ive |

## $\%$ <br> $\varepsilon \varepsilon$ 88 28 68 $0 \angle 8$ 0. <br> CONCRESIVE GLOSS-FIX 1409

38



## PRODUCT

## ADVANCE COATINGS COMPANY

AREMI PIASTICS. INC.
allied resins corp

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## desigration / product

| DYMAX 901 |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| DYMAX 902 |  |  |  |  |  |  |
| DYMAX | OIL/GRIP |  | ADH | 810 |  |  |
| dymax | OIL/GRIP |  | ADH | 828 |  |  |
| dymax | OIL/GRIP |  | ADH | 832 |  |  |
| dymax | OIL/GRIP |  | ADH | 840 |  |  |
| DYMAX | OIL/GRIP |  | ENG | HEERING | ADH 847 |  |
|  | OIL/GRIP |  | ENG | NEERING | ADHESIVES | 845 |
| LIGHT-WELD 182 |  |  |  |  |  |  |
| LIGHT-WELD 183 |  |  |  |  |  |  |
| LIGHT-WELD |  | 184 |  |  |  |  |
| LIGHT-WELD |  | 185 |  |  |  |  |
| LIGHT-WELD |  | 305 | OPT | CAL ADH | ESIVE |  |
| LIGHT-WELD |  | 401 | OPT | Cal ADH | ESIVE |  |
| LIGHT-WELD |  | 415 | OPT | CAL ADH | ESIVE |  |
| LIGHT-WELD |  | 802 |  |  |  |  |
| LIGHT-WELD |  | 625 |  |  |  |  |
| LIGHI-WELD |  | PROD | DUCT | 811 |  |  |
| LIGHT-WELD |  | PROD | DUCT | 912 |  |  |




[^1]ADH FILM WITHOUT PRIMER
FILM WITHOUT PRIMER


## E2084




AKICON CORP. POLYMER PRODUCTS DIV


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wór $\quad 1$
WITH $8-71$
WITH
B-71
WITH B-100

908
$108-$
$908-$
$598-$
$298-$
$02 t-$
$91 t-$
-086
599
199
269
085
6008
$6 t z$
$918 t$




 AREMCO-BOND



AREMCO-BON
CERAMABOND
CERAMABOND
GNOEVKVYJS
GHOETVISXED
IEMPORARY WASH-AWAY ADHESIVES
TEMPORARY WASH-AWAY ADHESIVES

 300
318 56
5人 ${ }^{\circ}$
$\vec{\sim}$




| ARMSTRONG | A-6/A |
| :---: | :---: |
| Armstrong | A-b/E |
| Armstrong | A-8/H-20 |
| armstrong | A-66 |
| armstrong | A-701 |
| ARHSTRONG | A-702 |
| ARHSTRONG | A-708 |
| ARMSTRONG | A-708 |
| ARHSTRONG | C-1/activator a |
| ARMSTRONG | C-l/activator E |
| armstrong | c-3/activator a |
| ARHSTRONG | C-3/activator E |
| ARMSTRONG | C-4/D |
| ARMSTRONG | C-4/w |
| ARMSTRONG | C-7/H-20 |
| ARMSTRORG | C-7/W-1 |
| ARMSTRONG | C-7/w-2 |
| ARMSTRONG | C-7/w-3 |
| ARMSTRONG | X-81 Epoxy resin/activator a |
| armstrong | X-81 RESIN/activator E |
| ARMSTRONG | 520 ADHESIVE |
| armstrong | D-218 industrial adhesive |
| ARMSTRONG | D-222 industrial adhesive |
| Armstrong | D-234 CONTACT ADhesive |
| ARMSTRONG | D-283 INDUSTRIAL ADHESIVE |
| ARMSTRONG | D-284 |
| armstrong | D-500 contact adhesive |
| ARMSTRONG | f-1450 panel and wall board adhesive |
| ARMSTRONG | J-1162 |
| armstrong | J-1177 ADHESIVE, GREY |
| ARMSTRONG | J-1188 INDUSTRIAL ADHESIVE |
| ARMSTRONG | J-1190 tp industrial adhesive, part a |
| ARMSTRONG | J-1199 TP INDUSTRIAL ADHESIVE, PART B |
| ARMSTRONG | N-111 Industrial adhesive |
| Armstrong | N-117 industrial adhesive |
| armstrong | M-122 ADHESIVE |
| ARHSTRONG | S-1200 contact adhesive |
| ARMSTRONG | S-139 TILE-ON ADHESIVE |
| Arhstrong | s-140 glazecraft wall tile adhesive |
| armstrong | S-200 Adhesive (fart a and part b) |
| ARHSTRONG | S-235 multipurpose adhesive |
| ARMSTRONG | S-252 ADHESIVE (PAVIHAR) |
| Arhstrong | S-280 ADHES IVE |
| Armstrong | S-285 wall base adhesive |
| Armstrong | S-553 seam sealing adhesive |
| ARHSTRONG | S-580 ADHESIVE |
| armstrong | S-685 trowelable ifterflex adhesive |
| Arhstrong | S-670 latex interflex adhesive |
| ARMSTRONG | S-700 tile adhesive (brush-on) |
| ARMSTRONG | S-750 TILE ADHESIVE (ROLI ON) |
| ARMSTRONG | S-821 SEAM SEALING adhesive |
| ARMSTRORG | S-89 TILE ADHESIVE |
| ARMSTRONG | S-80 tile adhes ive |



100
$a_{1} 90$
COO SL EPOXYLITE 810
EPOXYLITE 813
MYSOL EPOXY

| PLD-700RTC EPOXY |  |
| :---: | :---: |
|  |  |
| DAP. 230 |  |
|  |  |
| DAP | acrylic latex caulk with sidicone |
| dap architectural caulk |  |
| DAP | black-tite roof sealant |
| dap butyl gutter y lap sealant |  |
| dap butyl-flex caulk |  |
| dAP | clear '230' sealant |
| dap latex concrete sealant w/silicone |  |
| DAP PAINTER'S ACRYIIC LATEX CAULK |  |
|  |  |
| dap reiy-on caulking compound |  |
| dap weatherstrip caulk |  |
| dap zooo construction adhesive |  |
| DAP | 4000 SUB floor and plywood adhesive |
| DAP 4000 SUB-FLOOR AND PLYWOOD |  |
| dap 999 CONSTRUCTION |  |
| dap | China and glass mender |
| dap crafter's epoxy |  |
| dap cramier sifast epoxy |  |
|  |  |
| dap fun-tak |  |
| dap glue stick |  |
| dap household cement |  |
| dap metal mender |  |
| DAP | permabokd super glue |
| dap permabond super glue for wood and leather |  |
| DAP PLASTIC MEMDER |  |
| dap weldwood acryitc latex contact cement |  |
| DAP | WELDWOOd all weather outdoor carpet adhesives |
| dap weldwood carpet cement |  |
| dap weldwood contact cement |  |
| dap weldwood heavy duty walicovering adh |  |
| DAP WELDWOOD HULTI-PURPOSE FLOOR ADHESIVE |  |
| dap weldwood origimal contact cement |  |
| dap weldwood rubber mender |  |
| dap weldwood wall coverimg adhesive |  |
| DAP WOOD DOUGH |  |
| epi-seal 10-10 |  |
| eri-senl 9 minute epoxy |  |
| epi-seal iron putty |  |
| EpI-SEAL PIUS |  |
| EPI-SEAL SPEC 20-20 |  |
| Mainte N-1000 |  |
| WESTAC 718 |  |
| POLYC | C0 117-SS |
| POLYC | CO 2113 |

氐昇芯




## DESIGNATIOR / PRODUCT


CASTALL ADHESIVE 110 A/B
$\stackrel{\text { ® }}{\infty}$

HERMOGRIP 6363






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CIBA-GEIGY CORP/RESINS DEPARTMENT.

> KWIKBOND 747
KWIKSTIR 1676 N/F
PANEL-GRIP 1229
> ~" cement CO
CON-BOND 885
KOIKBOND 518

F Spray adh $009+$ hes ive
adhes ive 114 ADHESIVE GEL
114 TYPE I LIQUID EPOXY ADHESIVE
114 TYPE II LIQUID EPOXY ADHESIV
116 ADHESIVE LOW MODULUS EPOXY ADH
ADHESIVE ALI PURPOSE MASTIC EPOX



円




## －TON CLEAR EPOXY

 LIQUID（DEVCON WR） T PUTTY（DEVCON WR－2）EPAIR PUTTY（DEVCON UW） xIIN
TEMPERATURE SILICONE TEMPERATURE SILICONE
PUTTY（DEVCON ST）


SF） $\square$ 4
：

## GEALER 100 RIP ATCH

 EK－1CARBIDE PUTTY（PLASTIC CARBIDE A）
EROXY
IUMINUK VERY LIQUID（DEV
ALUMINUM VERY LIQUID（DEVCON F－3）
BRUSHABLE CERAMIC COMPOUND

| dua |
| :--- |
| dus |

HIGH TEMP CERAMIC PUTTY（DEVCON C）
HIGH TEMP MOLD MARER（DEVCON C－2）

ILE ADHESIVE
SUPER LOCK－SCREW LOCKING GRADE
SUPER LOCK－STUD LOCKING GRADE
SUPER LOCK－THREAD LOCRING PENER
SUPER LOCK－THREAD LOCKING PENERATING
IILE ADHESIVE
300
50
SUPER GLUE ISIS
30vミ
台允
STAIKIESS SIEEL PUTTY（DEVCON ST）
SUPER LOCK－RETAINING GRADE SUPER LOCK－SCREW LOCKING GRADE
里禺品品品

## des ignation／product

$-$

## MANUFACTURER

DENNISON MFG CO
DEVCON CORP

designation / product



CUPRIMOL OUTDOOR CAULK

## E-B INDUSTRIES INC/DARWORTH CO

eastman chemical products inc
manufacturer EPOXY TECHNOLOGY INC

## EPOXYLITE CORP


tot-d yin-Od3
Ot-d MII-OdG

## PRODUCT <br> DESIGNATION /

- 

EPOXY TECHNOLOGY INC
EPOXYLITE CORP
ESSEX CHEMICAL CORP. SPECIALTY CHEMICAL DIV
BETAMATE 57 STRUCTURAL ADH. 57.511/57.512 BETAMATE 57 STRUCTURAL ADH
BETAMATE 57 STRUCTURAL ADH BETASEAL 20-601
 BETASEAL 553.02
GETASEAL SEALANT 551.02
GETASEAL XPO $1543-\mathrm{C}$ 1543 -C
ETHERINGTON CO/U S PROLAM INC

$$
--
$$

tRU-CAST 111M



CYCLEWELD

## hanufacturer

euclid cherical co

## MANUFACTURER




desigmation / product


SHUR-STIR 488

-- COATINGS UESIUS CO MACCO ADHESIVES

GOODRICH (BF) CO, ADHESIVES PRODUCTS DIV


HARDMAN INC

I W INDUSTRIES INC
ISOCHEM RESINS CO
JOMAR INTERNATIONAL. LTD

L M CERAMIC FLOOR ADH 16

> X-pert panel adhesive
silaprene

LEFKOWELD 157
LEFKOWELD 209
LEFKOWELD 211
LEFROWELD $218-5$
LEFKOWELD 221
BLACK MAX 380
DEPEND ADHESIVE 330
IMPRUV 349

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CHEMCOK 210



## 

 MANUFACTURER

DESIGNATION / PRODUCT
ASSURE ELECTRICAL TYPE RETAINER
ASSURE ELECTRICAL TYPE THREADLOCKER SSURE SURFACE CURING THREADIOCKER HYSOL EE4183
IMPRUV GENERAL PURPOSE ADHESIVE
IMPRUV SEALANT/ADHESIVE
IMPRUV SEALANT ADHESIVE LOCTITE RETAINING COMPOUND 609
LOCTITE ULTRA PERFORMANCE TAR PAR
OUTPUT THERMAL CONDUCTIVE ADHESIVE
 SUPERBONDER 414
REPAIRABLE
MCGHAN NUSIL CV-2588
MCGHAN NUSIL CVI-2570


 MANUFACTURER
PRODUCT




## SIGN


hanufacturer
des igmation / product
MIRACLE SCS-100
MIRACLE SFA-66
MIRACLE SILICONE CAULR
MIRACLE WALLBOARD ADHESIVE
HONOMER-POLYMER DAJAC LABORATORIES INC
mIRACLE ADHESTVES CORP
northern petrochemtcal co
EPIPHEN ER 825-B
EPIPHEN ER-825-A
BONDMASTER $4500+$
BONDMASTER E64S
$\stackrel{C H}{\mathrm{CH}-16}$号
ational adh
national starch e chemical corp.
MIRACLE ADHES
MIRACLE ADHESIVES CORP
 PERMA-LOK HH 100

PERMA-LOK HH 20 PERMA-LOR HHI9O | PERMA-LOK HL12B |
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| PERMA-LOK HL13B |



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$\bullet 1$ MARK 24 WET BONDER
MARK 25
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## desighation / product

## FLEXCONHECT T-1694 $\begin{array}{ll}\text { SHELDAHL } & \text { ADC-021 } \\ \text { SHELDAHL } & \mathrm{I}-1682 \\ \text { SHELDAHL } & \text { MKC-02 } \\ \text { SHELDAHL } & \text { T-100 } \\ \text { SHELDAHL } & \text { T-1401 } \\ \text { SHELDAHL } & \text { T-1502 } \\ \text { SHELDAHL } & T-1633 \\ \text { SHELDAHL } & \text { T-1650 } \\ \text { SHELDAHL } & \text { T-300 } \\ \text { SHELDAHL } & \text { T-380 } \\ \text { SHELDAHL } & \text { T-340 } \\ \text { SHELDAHL } & \text { T- } 400\end{array}$




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## thermalbond


technit emi shielding products
manufacturer

SIXA CHEMICAL COR
testworth lab．inc



## manufacturer <br> thermoset plastics inc

[^2]

THREE M CO (3M) ADHESIVES, COATINGS O SEALERS DIV


three m co (3m) adhesives, coatings e sealers div
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## DESIGNATION / PRODUCT



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## MANUFACTURER

ADEIL PLASTICS, INC.


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aremi plastics. inc.




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FRODUCT
 AKEMI FILLER 4
AKEMI FILLER 7
AKEMI TP-9OL
AKEMI TP-9O3
AKEMI TP-903 HARDSEI
AKEMI TP-906 HARDSET
AKEMI TP-908 CARVABLE

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ALLIED CORP;ALLIED FIBERS AND PLASTICS

## product






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## designation / product



##  No

 EZ-CAST 521 PLASTIC MOLDING COMPOUNDEZ-CAST 588 PLASTIC MOLDING COMPOUND ZONAREZ 7115
ZONAREZ 7115 LITE

## andeacturer

ahoco chemicals corp.


MANUFACTURER
arizona chemical co

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ASHLEY POLymers imc
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MANUFACTURER
 basf wyandotte corp, colors intermediates group





BORDEM INC. BORDEN CHEMICAL DIV. THERMOPLASTICS
borden
BHC TNC

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product
manufacturer
celanese engineering resins. inc


DESIGNATION / PRODUCT


MANUEACTURER
CELANESE ENGINEERING RESINS, INC

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> F FOR OMTTY


## manufacturer

chevron chemical company
ciba-geigy corp, ren plastics div
CIbA-GEIGY CORP/RESINS DEPARTMENT
colorite plastics co
designation / product


HANUFACTURER
COLORITE PLASIICS CO





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desigmation / product

Continental polymers inc

## COSDEN PETROCHEMICAL

COSHIC PLASTICS. INC.

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##  <br> TFE



## dart polymers. inc.

## SIIYISNGNI OY/X

[^6]CADCO ABS MATURAL
CADCO ACRYLIC PMM CAST

## MANUFACTURER

COSMIC PLASTICS. INC
CURBELL INC

## CUSTOM RESINS


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AMIDE TYPE 6/ CADCO POLACETAL HOMOPOLYMER CADCO POLYPROPYLENE NATURAL
CADCO POLYSTYRENE HI-IMPACT CADCO PVC RIGID
CADCO TEFLON PTFE VIRGIN



[^7]DEVCON CORP
PRODUCT





## $\pm \underset{\sim}{*}$














designation / product
 ALATHON 20
ALATHON $20-8084$
DOW CHEMICAL CO.
product
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DESIGNATION / PRODUCT



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ILLITE H-3Z

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 CATALYST 63
CATALYST 78 TOOL 13-301 ○OOO


## fluorocarbon co. amaheim div

formulated resins inc


general electric co, plastics dept
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goodyear tire rebber co. chemical div

## co <br> GREENE, TWEED

gULE-WANDES CORP



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SNI •SOIISVId GNOWHVH
haysite reinforced plastics co







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hexcel corporation，resin chemicals group

DESIGRATIOK / PRODUCT
 HANUFACTURER

HIMONT U.S.A.. INC

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## designation／product

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## designation／product

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[^8]DESIGNATION／PRODUCT

[^9]designation / product


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MORRISON MOLDED FIBER GLASS CO








CR-39

HIRI II CASTING RESIN（EXTRA）
HIRI II CASTING RESIN（NON－FLAMMABLE）





[^10]

LENCO 00713
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desigmation / product

MARK-231 EPOXY PUTTY
HIMOD NGBGL- 40 HIMOD NGEXV-20
HIMOD NGGL- 40 HIMOD NEKV-20 HIMOD PETGL-40 HIMOD PEEGLL-55 HIMOD PUGL- 20
HIMOD PUKV-20

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PLASTICS ENGINEERING CO

## polifil inc.

## POLY-CARB INC

POLYMER COMPOSITES INCORPORATED






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DESIGNATION / PRODUCT

HANUFACTURER


ROBERTSON (H H) CO/FREEMAN CHEMICAL CORP

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## RODUCT

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 ROBERTSON (H H) CO/FREEMAN CHEMICAL CORP


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 RTV SILICONE RUBBER SWS-04478
RTV SILICONE RUBBER SWS-843

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designation / product

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manufacturer
UNION CARBIDE CORP





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EILAMID 210-M TMGA-n
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| WESTLAKE | NORYI SE-1-GFN3 |  |
| WESTLARE | POLYMETHYLPENTENE MX 002 |  |
| WESTLAKE | POLYSTYRENE |  |
| WESTLAKE | PROPYLUX |  |
| WESTLAKE | STYROLUX |  |
| WESTLAKE | ULTRA ETHYLUX |  |
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manufacturer
manufacturer
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DAP ACRYIIC LATEX CAULR WITH SILICONE
DAP ARCHITECTURAL CAULX
DAP BLACK-TITE ROOF SEALANT
DAP BUTYL GUTTER \& LAP SEALANT
DAP BUTYL-FLEX CAULK
DAP CLEAR RSO SEALANT
DAP LATEX COMCRETE SEALAKT W/EILICONE
DAP LATEX CONCRETE SEALANT WITH SILICONE
AIG SIOndO\&d TVI\&ISAGNI 'OS GIKVNVRD NVOI\&GKV
AREMCO PRODUCTS INC
XNV
DRI SII\&ISNGNI GJITTV GBIVIJOSSV
ATLAS MINERALS CHEHICALS INC
BEECHAM INC. BEECHAM LABORATORIES DIV
SII\&OIV\&OGVT XIISATGV
ADHESIVE ENGINEERING CO
AMICON CORP, POLYMER PRODUCTS DIV
BACON INDUSTRIES IAC --

## CONAP inc



CREST PRODUCTS CORP

## devcon corp

 -DEXTER CORP, HYSOL DIV DOLPH (JOHN C) CO





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BETASEAL XPO $1543-\mathrm{C}$

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##  -3 SEALER  <br> 

 FR-7176FOMO 5-10
FOMOEIL
HANDI-FOAM
HANDI-FOAM \& $\square$
CR-3125
FD-4207
RESIWELD
EPIBOND $2580-$ TYPE 1
EPOCAST 290 - TYPE 2
ess) hehical corp. specialty chemical div
ESS] HEHICAL CORP, S
EUCLID CHEMICAL CO
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 MACCO AP-138
MACCO AP-130
MACCO FS-145
MACCO LIQUID ROOF REPAIR LR-808
MACCO LIQUID WEATHER STRIP LW-185 WEATHER STRIP LW-165 GC-1100


## MANUFACTURER

GOAL CHEMICAL SEALANTS CORP
HENKEL CORP/HENKEL ADHESIVES CO


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JOMAR SEAI TUFFER THAN TUFE
JOMAR SEAI W. O. G. SILAPRENE BLACK HAX 38 LOCIITE ROO
TYRITE 7802

LORD CORP, CHEMICAL PRODUCTS GROUP
I W INDUSTRIES INC
JOMAR INTERMATIONAL, LTD

## LEECH PRODUCTS, INC

LOCTITE CORP
 PERMA-LOK HH19O
PERMA-LOK HLI26
PERMA-LOK HM128
PERMA-LOK LM113
PERHA-LOK MHO15
PERMA-LOK PAS 10
PERMAIOK HH194
PERMALOK HH195




## RAY-BOND R-86009

RTV
RTV
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SIRA-15LM
SIKAFIEX-1A
SIRAFLEX-2C NS/WL

## dESIGNATION

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## sika chemical corp


TRA-BOND 2147
TRA-BOND $2162 D$

 SILAPRENE ADHESIVE/SEALANT
SILAPREAE ALL WEATHER SEALANT

Elastomer Manufacturer Product Designations


arron gasket packing co
akron gasket and packing co

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## BACON $\mathrm{X}-31$ ACON $\mathrm{X}-50$




ARMCO INC/ C H R industries inc

manufacturea
buckeye rubber products. inc.










 FLEXANE 80 LIQUID
FLEXANE 94 LIQUID
FLEXANE BRUSHABLE URETHANE
FLEXANE HIGH PERFORHANCE PUTTY
FLEXANE PUTTY FIEXANE PUTTY ECCOFOAM EPH
ECCOSIL 4553
ECCOTHANE 751
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D AIRCRAFT PRODUCTS Manufacturer
dewey almay chemical div, emerson cuming

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designation / product


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EMERSON CUMING
DOW CORNING CORP

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federal.-mogul corp, national o-ring div.

## firestone tire u rubber co

fluorocarbon co, flo-med div
furane products co
GALIAGHER CORP

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product


|  | 2,5 | DIMETHYL-2,5 | DI(T-BUT | YLPEROXY) | hexane | 50\% | ACTIVE |
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M3204
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DESIGMATION




 MANUFACTURER
GOODRICH (BF) CO, CHEMICAL GROUP MANUFACTURER
GOODRICH (BF) CO, CHEMICAL GROUP

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## MANUFACTURER

hercules inc
LORD

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DESIGNATION / PRODUCT










monsanto chemical company
MOORE (IRVING B) CORP



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MOORE (IRVING B) CORP






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## MANUFACTURER

 MOORE (IRVING B) CORP
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PRODUCI

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parker seal group, o-ring divisions

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## PUGL-40 PUXV-20



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 POLYMER COMPOSITES INCORPORATED

## PORTER SEAL CO

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SARGENT INDUSTRIES. STILLMAN SEAL DIV


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## EA14

|  | ASTM-D-2000-77A-2BG712-E014-E034-EF11-EF21-EA14 <br> ASTM-D-2000-77A-2BG712-E014-E034-EF11-EF21-E17-EA14 |
| :---: | :---: |
|  | ASTM-D-2000-77A-2BG712-E034-EF11-EF21-F17 |
|  | ASTM-D-2000-77A-2BG715-A14-B14-E034 |
|  | ASTM-D-2000-77A-2BG715-E14-B34-EF11-EF21-EA14 |
|  | ASTM-D-2000-77A-2BG715-B14-E014-EF11-EF21-EA14 |
|  | ASTM-D-2000-77A-2BG715-B34-E014-E034-EF21-E17-EA14-21 |
|  | ASTH-D-2000-77A-2BG715-E014-E034-EF11-EF21-F17- |
|  | ASTM-D-2000-77A-2BG715-E034-EF11-EF21-F17 |
|  | ASTM-D-2000-77A-2BG720-B14-B34-EF11-EF21 |
|  | ASTH-D-2000-77A-2BG720-B14-B34-EF11-EF21-F17-EAl4 |
|  | ASTM-D-2000-77A-2BG720-B14-B34-EO14-E034-EA14 |
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|  | ASTM-D-2000-77A-2BG720-B14-EF11-E014-E034-EA14-E17-EF21 |
|  | ASTM-D-2000-77A-2BG915-B14-834-E014-E034-EF11-EF21-EA14 |
|  | ASTM-D-2000-77A-2CA015-A25-B44-C12 |
|  | ASTM-D-2000-77A-2CA620-A25-B44-Z1 |
|  | ASTM-D-2000-77A-2CA720-A25-B44-C12 |
|  | ASTM-D-2000-77A-2CH610-A25-834-E016-E036-2 |
|  | ASTM-D-2000-77A-2CH610-A25-B44-G21-21 |
|  | ASTM-D-2000-77A-2CH612-A25-B34-F17-21 |
|  | ASTM-D-2000-77A-2CH710-A25-B34-E018-E036 |
|  | ASTM-D-2000-77A-2CH712-A25-E016-E036 |
|  | ASTM-D-2000-77A-2CH712-A25-E035-F17 |
|  | ASTH-D-2000-77A-2CH712-E016-E036 |
|  | ASTM-D-2000-77A-2CH715-A25-B34-E016-E036-21 |
|  | ASTM-D-2000-77A-2CH715-A25-E035-F17 |
|  | ASTM-D-2000-77A-2DA614-A2-B36-G11 |
|  | ASTM-D-2000-77A-2FK606-A10-EA36-EF31 |
|  | ASTM-D-2000-77A-2FX600-A10-EA30-EF31-2 |
|  | ASTM-D-2000-77A-2FK608-A19-EA36-F19-21 |
|  | ASTM-D-2000-77A-2FK708-A19-EA36-F19 |
|  | ASTM-D-2000-77A-2GE403-A19-837-E016-G11 |
|  | ASTM-D-2000-77A-2GE407-A19-B37-EO16-E036-F19-G11-EA14 |
|  | ASIM-D-2000-77A-2GE503-A19-B37-E016-G11 |
|  | ASTM-D-2000-77A-2GE703-A19-B37-E016-G11 |
|  | ASTM-D-2000-77A-2HK610-A110-B38-E078 |
|  | ASTH-D-2000-77A-2HK715-A10-B37-B38-C12-C20-EF31-E078- |
|  | ASTA-D-2000-77A-2Hx715-A110-B37-B38-EF31-E078-F15-21 |
|  | ASTM-D-2000-77A-2HK715-A110-B37-B38-EF31-E078-F15-22 |
|  | ASTM-D-2000-77A-2HK715-A110-B37-C12-C20-EF31-E078 |
|  | ASTM-D-2000-77A-2HR810-A110-837 |
|  | ASTM-D-2000-77A-3AA715-E13-B33-C20-F17-EA14 |
|  | ASTM-D-2000-77A-3BA520-A14-B13-F17 |
|  | ASTM-D-2000-77A-3BA820-A14-B13-F17 |
|  | ASTM-D-2000-77A-3BA715-A14-B13-C12-F17-F19 |
|  | ASTM-D-2000-77A-3BA720-A14-813-C12-F19 |
|  | ASTM-D-2000-77A-3BA720-A14-B13-F17 |
|  | ASTM-D-2000-77A-3BA820-A14-B13-C12-F19 |
|  | ASTM-D-2000-77A-3BA910-A14-813-C12-517 |
|  | ASTK-D-2000-77A-3BC615-A14-E14-C20-E34-F19-G21 |
|  | ASTM-D-2000-77A-3BC620-A14-814-E014-E034-F17-21 |
|  | ASTM-D-2000-77A-3BC71S-A14-H14-C12-E014-EO34 |
|  | ASTM-D-2000-77A-3BC715-A14-B14-E014-E034 |



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## pecification













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[^17] values. Sales specifications are available on request.

EASYPOXY* SPECIFICATION
EASYPOXY KIT NOS.

| GENEPALPURPOSS |  |  |
| :---: | :---: | :---: |
| CLEAR | O) BLACK | WWHITE |
| Papsté | 6 Paste | Paste |
| 1,40 | 1.40 | 11.40 |
| 12 z | $\bigcirc 12$ | 212 |


| ALUMINUM | GREY SEMI-FLEX | FAST-CURE -CLEAR | OPITCXLLY HIGH YAGC. CLEAR $\mathcal{Z}$ WHITE |
| :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { Heavy } \\ & \text { Paste } \end{aligned}$ | Heavy Paste | $\begin{aligned} & \text { Light } \\ & \text { Paste } \end{aligned}$ | $\begin{aligned} & \text { Light Heaw } \\ & \text { Paste } \mathrm{Paste} \end{aligned}$ |
| 1.53 | 1.24 | 116 | $1.11 \checkmark 158$ |
| 12 | 12 | 12 | $12 \times 12$ |

## haNDLING PROPERTIES

| Mixing Ratio, parts by weight- |
| :--- |
| Mix <br> Resin/Hardener |
| Pot Life $\left(100\right.$ gm mass $\left.25^{\circ} \mathrm{C}\right)$ Min. <br> Cure, Hours at $25^{\circ} \mathrm{C}$ 20 |
| Cure, Hours at $60^{\circ} \mathrm{C}$ |



| Tensile Shear, al/al @ $77^{\circ} \mathrm{F}$. psi | 2520 | 42520 | 2520 | 2120 | 2320 | 2520 | $2450-73320$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| @-670\%.psi | 1620 | 01620 | :1620 | $1530=$ | 1690 | 1800 | $1360-1980$ |
| @180 ${ }^{\circ} \mathrm{F}$. psi | 2320 | 2320 | c 2320 | $1260^{\circ}$ | 1270 | 440 | 1520 1800 |
| Thermal Conductivity <br> $\therefore \mathrm{cal} / \mathrm{sec} / \mathrm{cm}^{2} /{ }^{\circ} \mathrm{C} / \mathrm{cm} \times 10^{-4}$ | 5.7 | こ 5.7 | \& 5.7 | 11 | 5 | 5 | $5>$ |
| Linear Shrinkage, in/in | 007 | 4.007 | 18.007 | . 002 | . 002 | 010 | 2067 007 |
| Water Absorption, $24 \mathrm{hr} ., \%$ | $40^{\circ}$ | 2.40 | , 40 | . 19 | . 60 | 130 | 37 - 30 |
| Flexural Strength, psi | 6.000 | 16,000 | 6.000 | 5,500 | 8,500 | 7,800 | $10,000 \sqrt{ } 9,000$ |
| Compressive Strength, psi | 18,000 | (a)8,000 | 48,000 | 12000 | 15,000 | 15,000 | 18,000 12000 |
| TYPICAL ELECTRICAL PROPERTIES |  |  |  |  |  |  |  |
| Dielectric Constant $1 \mathrm{KHz} @ 25^{\circ} \mathrm{C}$ | 4.6 | J4.6 | 4.6 | 8.25 | 3.50 | 4.10 | $4.6 \cdot 7.463$ |
| Dissipation Factor 1 KHz @ $25^{\circ} \mathrm{C}$ | . 012 | 0.012 | 4.012 | 140 | . 025 | . 018 | .012 020 |
| Volume Resistivity @ $25^{\circ} \mathrm{C}$, ohm-cm | $4.0 \times 10^{13}$ | $4.0 \times 10^{13}$ | $4.0 \times 1 p^{13}$ | $8.5 \times 10^{13}$ | $3.5 \times 10^{14}$ | $2.5 \times 10^{14}$ | $4.0 \times 10^{13}$, $1.45 \times 10{ }^{14}$ |

@ $25^{\circ} \mathrm{C}$, ohm-cm
CHEMICAL RESISTANCE
(Measured on Sample $\%^{\prime \prime} \times 1^{\prime \prime} \times 3^{\prime \prime}$ Cured 2 hours @ $140^{\circ} \mathrm{F}$ )



The information presented here is based on carefully conducted laboratory tests and is believed to be accurate. However, results cannot be guaranteed and it is suggested that customers confirm results in their own laboratory belore plant
ests are made. Nothing contained in thus bulletun shall be construed as a recommendation to use any product or process in violation of the cleums of any patent now in effect.


NOTE: All values are typical of production materials and are not intended for use in preparing specifications.
"Not corrected for energy to loss.
${ }^{2}$ UL yellow card listed.
${ }^{13}$ Tested under $1 / 4$-inch electrodes. 500 volts/second rise, $1 / 8$-inch-thick specimen.
${ }^{H}$ Condition $A=$ as received.
${ }^{3}$ Condition $\mathrm{D}=$ after 24 -hour immersion in distilled water at 23 C ( 75 F).
"Optimum pressure will depend on length of runner, size of part to be filled and gate size.
${ }^{17}$ Suggested molding lemperature $177 \mathrm{C}(350 \mathrm{~F})$. Lower lemperatures will iead to longer molding times.
miAl 177 C ( 350 f). Molding time will depend on part size.
MOther pust cure times and temperatures may be employed depending on compound and device.
"UuMeasured on 2 -inch diameter by $1 / 8$-inch-thick transfer molded disk.
"'Orifice size $8 \times 80 \times 460$ mils, 1,000 psi at $177 \mathrm{C}(350 \mathrm{~F})$.
COSMIC EPOX MOLDING COMPOUNLS Electrica Grade

|  | Electrica | Grade |  | Encapsulation Grade |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 7084 Glass-Flber |  | filled |  | Mineral-Glass filled |  |  |
| \#1 E484 | \#2E486 | - |  |  |  |  |
|  |  |  |  | 14 E4930 | \#5E4920 | HE4905 |
| 1.84 22 | 1.867 | 1.85 | $\checkmark$ Specific Gravity $\sim$ | 1.85 |  |  |
| 2.2 | 2.2 | 2.2 | Bulk factor | 1.85 2.0 | $1.74{ }^{2}$ 2.0 | 1.90 , |
| 280-350 | 280-350 | 280-350 | Molding temperature: ${ }^{\circ} \mathrm{F}$ |  |  |  |
| 100-5000 $.002-.004$ | 100-5000 | 100-5000 | Molding pressure: psi | $250-350$ $50-1000$ | $\begin{aligned} & 25-=350 \\ & 50-1000 \end{aligned}$ | 250-350 |
| .002-.004 / | .002-.004 | $\checkmark$ - | -Molding shrinkage: in./in. $\downarrow$ | 50-1000 $.004-.006$ | $\begin{aligned} & 50-1000 \\ & .004-.006 \end{aligned}$ | 50-1000 .004-006 |
|  |  |  | Molded Properties |  |  |  |
| $\begin{aligned} & 0.2 \\ & 450 \checkmark \\ & 23.0 \end{aligned}$ | $\begin{aligned} & 0.3 \swarrow \\ & 500 \downarrow \end{aligned}$ |  | Water absorption: 48 hrs. @122 ${ }^{\circ} \mathrm{F}$ :\% <br> 4 Heat distortion: ${ }^{\circ} \mathrm{F}, 264 \mathrm{psi}$ Thermal Expansion: linear coefficient $/{ }^{\circ} \mathrm{C} \times 10^{-6}$ |  |  |  |
|  |  | $500 v$ |  | 0.3 380 | 0.32 3802 | $\begin{aligned} & 0.37 \\ & 340 \end{aligned}$ |
|  | 18.2 |  |  |  |  |  |
|  |  |  |  | 26.0 | 6.2 | 24.2 |
| Mechanical Properties |  |  |  |  |  |  |
| $\begin{aligned} & 11,000 V \\ & 0.6 / \\ & 19000 V \\ & 32000 \checkmark \end{aligned}$ | $\begin{aligned} & 12,000 \checkmark \\ & 0.5 ~ \\ & 16000 \checkmark \\ & 30000 \end{aligned}$ | 12,000 ${ }^{2}$ | ```Tensile strength: psi Mmpact strength:ft-lb/in.Izod Flexural strength: psi Compressive strength: psi``` |  |  |  |
|  |  | 0.6 |  |  |  | 10,000 |
|  |  | $18000 \sim$ |  | $\begin{aligned} & 0.5 \\ & 16000^{\prime} \end{aligned}$ |  |  |
|  |  | $34000<$ |  | $\begin{aligned} & 16000 \\ & 31000-V \end{aligned}$ | 15000 30000 | 14000 30000 |
| Electrical Properties |  |  |  |  |  |  |
| $186 \checkmark$400$4.7 \checkmark$$.012 \checkmark$$10 \times 10^{6}$$10 \times 10$ | $\begin{aligned} & \hline 180 r \\ & 370 v \\ & 5.0 \gamma \\ & .012 \\ & 10 \times 10^{6} r \\ & 10 \times 10^{6} \sigma \end{aligned}$ | $180 \%$$400 \%$4.8$.010 \%$$10 \times 10^{\prime} \%$$10 \times 10^{6}$ | TArc resistance: seconds <br> Dielectric strength: $\mathrm{s} / \mathrm{s}, \mathrm{v} / \mathrm{m}$ <br> Dielectric constant: 1 MHz <br> -Dissipation factor: 1 MHz <br> Xolume resistance: as is:megohms <br> Surface resistance: as is:megohms |  |  |  |
|  |  |  |  | ( $\begin{aligned} & 180 \% \\ & 380 \%\end{aligned}$ | 160 380 |  |
|  |  |  |  | - $480{ }^{\text {- }}$ | - 4.4 - | $\begin{aligned} & 400- \\ & 5.2 \end{aligned}$ |
|  |  |  |  | ro12 | 4.4 <br> 1212 | $\begin{aligned} & 5.2 \\ & .012 \end{aligned}$ |
|  |  |  |  | $10 \times 10^{6} V$ | $10 \times 10^{6} \mathrm{c}$ | $10 \times 10^{6} \text { - }$ |
|  |  |  |  |  | $10 \times 10^{6}$ - | $10 \times 10^{6}-$ |
| Physical Properties |  |  |  |  |  |  |
| $77 \%$ |  |  |  |  |  |  |
| vor | VO ${ }^{\text {² }}$ |  | OL-94 Flammability: 1/8" \| | 1 | 68- | V0 |  |
| 6-30 | 6-30 | 6-30 | Flow: EMMI spiral: inches |  |  |  |



THERMAL INSULATION MATERIALS


NOTE: All valuefare typical of production materials and are noc intended for use in preparing specifications.

"Pol Life is defined as time required to doulle viscosity after catalyst addition.
QUseful after exposure to this mesgard dose.
(H)Specific heal al 212 F 1100 c

M/460 BTU/fry OA Torch

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS OF POOR QUALITY



MIL-R-83397A
2 January 1979 SUPERSEDING
MIL-R-83397
3 October 1972

## MILITARY SPECIFICATION

RUBBER, POLYURETHANE, CASTABLE, HUMIDITY RESISTANT
This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE
1.1 Scope. This specification covers parts made from castable, general purpose, polyurethane rubber.
1.2 Classification. The polyurethane rubber parts covered by this specification shall be of the following classes, as specified (see 6.2):
Class $1-80 \pm 5$ hardness
Class $2-90 \pm 5$ hardness
2. APPLICABLE DOCUMENTS
2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

## SPECIFICATIONS

FEDERAL
UU-P-268 Paper, Kraft, Untreated Wrapping
PPP-B-601 Boxes, Wood, Cleated-Plywood
PPP-B-636 Box, Fiberboard
PPP-T-45 Tape; Paper, Gummed (Sealing and Securing)

> Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Air Force Materials Laboratory, MXA, WPAFB, Ohio 45433, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
to the polyurethane rubber. The marking shall not be obliterated by normal handling. When identification marking of the product is impracticable, the unit package shall show the identification. The identification shall show the specification number, the manufacturer, the manufacturer's designation (compound number), hardness, and the cure date by quarter and year.

| Example: | MIL-R-83397 |
| :--- | :--- |
| The Delectable Rubber Company |  |
| Compound No. 1980 |  |
|  | 80 Hardness |
| Cure Date $3 Q 77$ |  |

TABLE I. Properties.

| PROPERTIES | REQUIREMENTS |  |
| :---: | :---: | :---: |
|  | Class 1 | Class 2 |
|  | 80 Hardiness | 90 Hardness |
| Specific gravity* | As Determined | As Determined |
| Tensile strength, psi, min. | 4000 | 4500 |
| Elongation, \%, min. | 400 | 300 |
| Hardness, points | $80 \pm 5$ | $90 \pm 5$ |
| Tear strength, pounds/inch, min. | 250 | $4 \overline{0} 0$ |
| Temperature retraction ( 7 R-10) |  |  |
| After aging $22 \pm 1 / 4$ hours at $158^{\circ} \pm 2^{\circ} \mathrm{F}\left(70^{\circ} \pm 10\right)$ |  |  |
| Compressjon set, \%, max. | 35 | 35 |
| After aging 7 days at $212^{\circ} \pm 2{ }^{\circ} \mathrm{F}\left(100^{\circ} \pm 1^{\circ} \mathrm{C}\right)$ |  |  |
| Tensile strength change, \% | $\pm 20$ | $\pm 20$ |
| Elongation change, \% | $\pm 20$ | $\pm 30$ |
| Hardness change, points | $\pm 5$ | $\pm 5$ |
| After aging 120 days at $160^{\circ} \pm 2^{\circ} \mathrm{F}\left(71^{\circ} \pm 1^{\circ}\right)$ and $95 \%$ Relative Humidity |  |  |
| Tensile strength change, \% | $\pm 25$ | $\pm 25$ |
| Elongation change, \% | $\pm 20$ | $\pm 20$ |
| Hardness change, points | $\pm 10$ | $\pm 10$ |
| After aging 4 days at $180^{\circ} \pm 2^{\circ} \mathrm{F}\left(82^{\circ} \pm 1^{\circ} \mathrm{C}\right)$ over water (shor |  |  |
| Tensile strength。change, \% | $\pm 20$ | $\pm 20$ |
| Ultraviolet resistance |  |  |
| Tensile strength change, \% | $\pm 20$ | $\pm 20$ |
| Elongation change, \% | $\pm 20$ | $\pm 20$ |

* The permissible variation in specific gravity during actual production from that value established in preproduction tes'ts shall be $\pm 0.02$.


## MILITARY SPECIFICATION

RUBEER, ETHYLENE-PROPYLENE, GENERAL PURPOSE

1. 8COPE


#### Abstract

1.1 Scope. This apecification covers two grades of ethylene-propylene rubber having excellent resistance to ozone and hot water, but poor resiatance to hydrocarbon ofls or solvents.


1.2 Classification. The rubber covered by this specification shall be of the following grades, as specified (see 6.2):

Grade 6060 nominal Durometer Shore A hardness.
Grade 8080 nominal Durameter Shore A hardness.
2. APPLICABLE DOCUMENTS *
2.1 The following documents of the isace in effect on date of invitafion for bids or requeat for proposal, form a part of the specification to the extent specified herein.

## SPECIFICATIONS

## Federal

UU-P-268
PPP-B-585
PPP-B-591
PPP-B-601
PPP-B-621
PPP-B-636
PPP-T-45

Military

Paper, Kraft, Untreated Wrapping Box, Wood, Wirebound Box, Fiberbsard, Cleated Boxes, Wood, Cleated-Plywood Box, Wood, Nailed and Lock Corner Box, Fiberbiard Tape, Gummed, Paper, Reinforced and Plain, For Sealing and Securing

Packing, Preformed, Rubber Packing, Packaging of

MIL-R-83285 (USAF)
3.3.3 O-Rings. Unless otherwise specified, dimensions and tolerances of O-rings shall be in accordance with MS 33666.
3.4 Physical properties. The physical properties of che athylene-propylene rubber shall be as specified in table 11.

Table II. Phyaical properties

| Property and condition | Grade |  | Test method |
| :---: | :---: | :---: | :---: |
|  | 60 | 80 |  |
| Original physical values: |  |  |  |
| Tensale, psi, min | 2000 | 2000 | ASTM D 412 |
| Elongation, \%, min | 300 | 150 | ASTM D 4 ! 2 |
| Tear, ppi, min | 120 | 100 | ASTM D 6.4 |
| Hardness, Durometer, Shore A | $60+5$ | $80+5$ | ASTM D 2::40 |
| - Brittle Poinc, of, max | $-6 \overline{5}$ | -65 | ASTM D 7.6 |
| Specific gravity | $1 /$ | $1 / 1$ | ASTM D $2: 7$ |
| Ozone resiscance, 1000 pphm © $22^{\circ} \mathrm{F}$, bent 100 , hr. to first crack min | 168 | -168 | ASTM D 1149 |
| Compression set - wethod $\mathrm{B}, 70 \pm 1 \mathrm{hr} \cdot \mathrm{@} 100^{\circ} \mathrm{C}$ ( $212^{\circ}$ ) : $Z$ of original deflec̈tion | 20 | 25 | ASTM D 395 |
| Dry heat resistance, $70^{\circ} \pm 1 \mathrm{hr}$. $12129^{\circ} \mathrm{C}$ ( $257{ }^{\circ} \mathrm{F}$ ) |  |  |  |
| Teasile cl ange, \%, max | -25 | $-15$ |  |
| Stongation chenge, \%, max | -20 +10 | -20 +10 | ASTM D 412 ASTM D 2240 |
| dHardness change, $\mathrm{n}^{\text {ax }}$ | $+10$ | $+10$ | ASTM D 2240 |
| Resistance to hot water, 7 days ( $100{ }^{\circ} \mathrm{C}$ ( $2122^{\circ} \mathrm{F}$ ) |  |  |  |
| Tersile ct.ange, \%, max 21 | -15 | -15 | ASTM D 412 |
| Elongation, change, \%, max | -20 | -20 | ASTM D 412 |
| Hardness change, max | $\pm 5$ | $\pm 5$ | ASTM D 2240 |
| Volume change \% | $\begin{gathered} 0.10 \\ +5 \end{gathered}$ | $\begin{aligned} & 0 \text { to } \\ & +5 \end{aligned}$ | ASTM D 471 |

1/ "As Determined". This denotis that the value shall be determined during preproduction tefting. The giality cont srmance rest values shall not deviate from the original "As Determined" values by more than $\pm 0.02$.

21 Based on ares before immersion.

Listing of Various Mediums for Resistance Characteristics Tables

```
        1. ACETALDEHYDE
    2. ACETIC ACID
    3. ACETONE
    4. ACETONITRILE
    5. ALUM
    6. ALUMINUM CHLORIDE
    7. ALUMINUM NITRATE
    8. ALUMINUM POTASSIUM SULFATE
    9. ALUMINUM SULFATE
    10. AMMONIUM CHLORIDE
    11. AMMONIUM HYDROXIDE
    12. AMMONIUM NITRATE
    13. AMMONIUM PERSULFATE
    14. AMMONIUM SULFATE
    15. AMYL ACETATE
    16. AMYL ALCOHOL
    17. ANILINE
    18. ANILINE SULFATE
    19. ANTIMONY TRICHLORIDE
    20. AQUA REGIA
    21. BARIUM CHLORIDE
    22. BARIUM HYDROXIDE
    23. BARIUM NITRATE
    24. BARIUM SULFIDE
    25. BENZENE
    26. BENZENE SULFONIC ACID
27. BENZOIC ACID
2B. BLEACH LIQUDR
29. BORIC ACID
30. BROMINE WATER
31. BUTYL ACETATE
32. BUTYL ALCOHOL
33. BUTYRIC ACID
34. CADMIUM CHLORIDE
35. CADMIUM NITRATE
36. CADMIUM SULFATE
37. CALCIUM BISULFATE
38. CALCIUM CHLORATE
39. CALCIUM CHLORIDE
40. CALCIUM HYDROXIDE
41. CALCIUM HYPOCHLORITE
42. CALCIUM NITRATE
43. CARBON DIOXIDE
44. CARBON DISULFIDE
45. CARBON TETRACHLORIDE
46. CHLORINE DIOXIDE
47. CHLORINE GAS
48. CHLORINE WATER
49. CHLOROACETIC ACID
50. CHLOROBENZENE
```

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101. LEAD ACETATE
102. LEAD NITRATE
103. LINSEED OIL
104. MAGNESIUM CARBONATE
105. MAGNESIUM CHLORIDE
106. MAGNESIUM NITRATE
107. MAGNESIUM SULFATE
108. MALEIC ACID
109. MERCURIC ACETATE
110. MERCURIC CHLORIDE
111. MERCUROUS CHLORIDE
11E. METHYL ACETATE
113. METHYL ALCOHOL
114. METHYL ETHYL KETONE
115. METHYL ISOBUTYL KETONE
116. METHYL SULFATE
117. MINERAL OIL
118. MINERAL SPIRITS
119. MURIATIC ACID
120. NAPHTHA
121. NAPHTHALENE
122. NICKEL CHLORIDE
123. NICKEL NITRATE
124. NICKEL SULFATE
125. NITRIC ACID
126. NITROBENZENE
127. OLEIC ACID
12日. DXALIC ACID
129. PERCHLORIC ACID
130. PERCHLOROETHYLENE
131. PHENOL
132. PHOSPHORIC ACID
133. PHOSPHOROUS ACID
134. PHOSPHOROUS TRICHLORIDE
135. PHTHALIC ACID
136. PICRIC ACID
137. POTASSIUM BICARBONATE
138. POTASSIUM CARBONATE
139. POTASSIUM CHLDRIDE
140. POTASSIUM CYANIDE
141. POTASSIUM DICHROMATE
142. POTASSIUM FERRICYANIDE
143. POTASSIUM FERROCYANIDE
144. POTASSIUM HYDROXIDE
145. POTASSIUM NITRATE
146. POTASSIUM SULFATE
147. PROPYLENE GLYCOL
148. PYRIDINE
149. ROCHELLE SALT
150. SALICYLIC ACID
```

151. SILVER NITRATE
152. SODIUM ACETATE
153. SODIUM BICARBONATE
154. SODIUM CARBONATE
155. SODIUM CHLORIDE
156. SODIUM CYANIDE
157. SODIUM HYDROCHLORITE
158. SODIUM HYDROXIDE
159. SODIUM NITRATE
160. SODIUM NITRITE
161. SODIUM SULFATE
162. SODIUM SULFIDE
163. SODIUM SULFITE
164. SODIUM THIOSULFATE
165. SOYA OIL
166. STANNIC CHLORIDE
167. STANNOUS CHLORIDE
168. STEARIC ACID
169. SULFUR DIOXIDE
170. SULFUR TRIOXIDE GAS
171. SULFURIC ACID
172. SULFUROUS ACID -
173. TANNIC ACID
174. TARTARIC ACID *
175. TIN CHLORIDE
176. TIN SULFATE
177. TOLUENE

17日. TRICHLOROACETIC ACID
179. TRICHLDRDETHYLENE
180. TRISODIUM PHOSPHATE
181. TUNG OIL
182. UREA
183. WATER

## Written Coorespondance;

Follow-Up for Data Solicitation

December ㄹ． 19 ge

SNeme／08
EDGmpanys
\＆：Aderi／0？
EAcIdre／08
$\therefore$ Addr 3 ／os
が心ちystatezip／0心
Fe：Nom－metallic Materials
Dear iselutationi：
We are seliciting information，at the direction of NASA，to
implement an autometed data bese for nom－motallic material properties and have resparched a humber dif cources with less than satisfactory results．Dum conclusicm is thet the mamu－ fecturer will be the most viale and erowrete source for the date that llASA requires in its write．

Dut imitiel effort is geared trmard adhesivesen with other nor－metellic materisals to follow．Your eompenv has beon identified as a producer of materials which should be jn－ cluded in bASA＇s dete base，and any data shepts，brochmes， or ether infernation yeu can provide will be aopreciated．No reimbursement Ean be offered for the informetich，but the dete will be given visitility to all NASA renters and aerow space contractors．

If You have sucgestions to facilitate transferring vour data to ：end majntaining curaent infommation in．an automated date bese，they wruld also be most welcome．
 the nesed arise．
sincerely．

Tohm E．Lumietti
30าio Enruineer
NASA MEtETial F Froject

## OR!GINAL PAGE IS OF POOR QUALITY

Angie Glem
General Electric 205 Scientific Dr. Morcress, Georgia 3092

Fe: Froduct Information
Dear $M \equiv$. Glemin:
This letter is to follow-up cur recent telephone converser tion concerning product information.

We are Eoliciting informationg et the dirertion of Naga, to implement an automates date tase frot non-metallir matorisel properties and have resiearched a number of cources with less than setisfactory results. Our conelusion is thet the mamufacturer will be the mest viable and accurate source foir the data that MASA requires ir its wort:

Dur current effort is oeared touned el astomers and ruteres. with other mon-metallice materials to follow. Your compamy hes been identified ace aradurer of meteriels whict Ehauld be included in NASA's data bese, and any data sheets, bien chures, or other informaticu you -an provide will le appreEieted. No reimbrerement ran be offered for the informetions but the deta will be qiven wisibility te all NASA wenters and aerospace rontrartors. A $3 \mathrm{i} s t$ of your products which are in NASA's Gurrent data base is attached. Flease provide information on these products as well es any adtitional nomm metele vou produce.
 the meed erise.

Sincerely.

Johi E. Luzietti
Seniar Enginest
fABA Materizls Frojert

Enclecure

## Written Coorespondance;

## Request for "Most Wanted" Material Properties Data.

## ORIGINAL FAGE IS

OF POOR QUALITY

MaY Ee, 1907
-ADDF 13
$\therefore A D D F E B$
$\because A D D F 3 \%$
BADDE4:

Deat Brip:

This letter $i s$ to follow-up our recent telephone conversation cencerning product informetior.

As I mentianed before, we are ecljejtimg informetion at the direction of NABA, to implement an automated deta bese for nommetaljie materjal properties. be heve received some frinter metter from offDDFis on the enclosed list of matorials end that date has already been included in this dete tasen.

In order to fully and functional?y categorize thece materialv. NGGA has implemented a testing friterjen that utilizes some of the most often included techmieal dete ritained bu thre menufacturer. This liet $j=$ entitled "The Ten Most lantert Frogerties".

The enclozures include the iname of your materjals already included in the datia base and a listing ofthese properties in NASA 三 Weference list, that are not included in the brochure whith vou sent us.

If this additirinel technicsl date is aveilable and cen bo provided for the datia base. it would provide NASA the mecesesery deta to evaluate your materjajs and mate thedi- recommendations te all NASA Canters and their associated aerospace contractors. Your -woperatiom is greatly appreciated.

Floase feel free to eall at (eos) 536-4400 if you have am: questitons.

Eincerely.
\&NE
Svstems Anelyst
WhCA Materials Froject

May 5. 1737
ORIGINAL FAGE IS
OF POOR QUALTTY
Angie Glemb
Gemere? Electore EOS Ecientific Dr. Morcrose, Gecrgia sone

Dear Ms. Glenn:
This Jetter is to follow up our recent telephame comversatian coremensmg croduct information.

As I mentioned before, we are molicitima information et the dirertion of MASA, to implement an sutamated data tame for mommetallic materiaj properfaes, we have rexeived some prirted matter fom vou on the enclosed $1 \mathrm{i}=\mathrm{f}$ of materials and thet data Ras already been included in thim data base.

In order to fully and functionallv cetegroize these materiels. NASA Ras implemented a testing oriterion that utilizes some af the most often included tochmical deta gbtained by tae
 Froperties".

The enclesures include the name of youm meteriala alrearty included in the data base and a listing of these properties in NASA's reference list, that are not included in the brochme whith you Eent us.

If thie additionel technical data is available and an be provided for the data base, it would provide NASA the nerestary deta ta evaluate your materials and make their rocemmentations bo ajl NGEA Centers and their acsociated aerospace Eontractors. Your zabperation $j=$ greatly appreciated.

Flease feel free to -allat (205) 8St-8796 if you have an: questions.

Gincerely,

Fichard M. Adair
SYEtens Amalyst
Naga Materials Froject

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| DAP | BUTYL GUTTER LAP SEALAKT |
| DAP | BUTYL-FLEX CAULK |
| DAP | Clear '230' SEALAMT |
| DAP | LATEX CONCRETE SEALANT W/SILICONE |
| DAP | Latex concrete sealant with Silicione |
| DAP | PAIETER'S ACRYIIC LATEX CAULK |
| DAP | RELY-ON CAULRING COHPOUND |
| DAP | WEATHERSTRIP CAULX |

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## formulated resins inc

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C90-90 (BLACK NBR)
E50-70 (BLACK EPDM)
E59-80(BLACK EPDM)
F80-70 (BLUE FSI)
L57-70 (BLACK ACM)
N11 70 (BLACK CR)
S59-70 (RUST SI)
V14-75 (BLACK FKM)
V23-90 (BLACK FKM)

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[^21]STAR-GLO INDUSTRIES, INC

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[^12]:    EPOXYLITE 1462
    EPOXYLITE 203
    

[^13]:    product
    designation
    
    
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[^14]:    $\qquad$

[^15]:    PE192-101
    PE88-100
    PE8B-400
    PS40-300
    PS45S-100
    PSE2-300

[^16]:    $\begin{array}{ll}\text { TELCAR } 101 \\ \text { TELCAR } & 102\end{array}$

[^17]:    - Property value not determined.

    For optimum melt stability, mell temperature should not be maintained above $325^{\circ} \mathrm{F} \quad 130,000$ @ $450^{\circ} \mathrm{F}\left(232^{\circ} \mathrm{C}\right) \quad 62,000 @ 550^{\circ} \mathrm{F}\left(288^{\circ} \mathrm{C}\right)$ $130,000 @ 450^{\circ} F\left(232^{\circ} \mathrm{C}\right)$
    $85,000 @ 500^{\circ} \mathrm{F}\left(260^{\circ} \mathrm{C}\right)$
    cm ) container and weighing approximately $10 \mathrm{lb} .(4.54 \mathrm{~kg})$ net. $\mathrm{cm} \times 15.2 \mathrm{~cm} \times 15.2$ Properties reported above are typical of average lots; however, Eastman makes no representation that the material in any particular shipment will conform to the listed

[^18]:    HANUFACTURER

[^19]:    MANUFACTURER

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[^21]:    MANUFACTURER

