NRCA Roofing Materials Reference & Guide

Volume 1
February 1983

NATIONAL ROOFING CONTRACTORS ASSOCIATION

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Chicago, Illinois 60631

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NRCA ROOFING MATERIALS REFERENCE & GUIDE

This is the first issue of the NRCA ROOFING MATERIALS REFERENCE & GUIDE which will be published on the following schedule:

	1983		1984
Volume #1	February	Volume #4	February
#2	June	#5	June
#3	October	#6	October

The GUIDE provides important information on Built-Up Roofing and Single-Ply membrane products, product usage and background information on suppliers of roofing materials.

Future issues will include additional manufacturers and suppliers and an expanded listing of products. Also, additional "test results" data will be included as manufacturers and suppliers complete tests now being conducted in accordance with the referenced standards and criteria.

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Foreword

The ***NRCA ROOFING MATERIALS REFERENCE & GUIDE*** is published as a service to the roofing industry and is a comprehensive report containing technical data and other pertinent information on roofing and waterproofing membrane products.

An objective of the ***GUIDE*** is to provide information on those product features which will prove helpful to the user in determining the ***generic*** type of membrane which will meet his needs and the listing of material data from which the user may choose specific products. This kind of information will be of particular value to those associated with the design, specification, application and use of commercial roofing systems.

The range of information included in the ***GUIDE*** is extensive and includes facts relating to product usage, warranties and company background plus technical data relating to material properties.

The scope of material type covered by this ***GUIDE*** is presently limited to conventional **BUR multi-ply specifications** and those products generally referred to as sheet applied **Single-Ply** membranes.

The ***NRCA ROOFING MATERIALS REFERENCE & GUIDE*** program is a voluntary program and all manufacturers and suppliers of membrane materials may participate by submitting information on their company and on their products in accordance with the procedures developed for this purpose. For full details write: ***NATIONAL ROOFING CONTRACTORS ASSOCIATION, 8600 BRYN MAWR AVENUE, CHICAGO, IL 60631.***

The information contained in the ***GUIDE*** is a recording of data presented by manufacturers and suppliers through report forms provided by NRCA for this purpose. Only information submitted in accordance with these forms has been included in the ***GUIDE.***

NRCA has exercised due care in accurately recording the data as supplied by manufacturers and suppliers, but has not audited the test procedures used to secure the reported data and is not responsible for the accuracy or completeness of information as submitted.

The basis for "test results" appearing in the ***GUIDE*** are selected standards and criteria which are considered, for purposes of this program, to be the better ones available in the U.S. today. For multi-ply bituminous membrane products, the referenced documents fall into two categories: (1) ASTM material standards for the bituminous saturated reinforcing felts and (2) NBS BSS#55 Preliminary Performance Criteria for Bituminous Membrane Roofing—which describes performance parameters for tensile strength, thermal movement, and thermal shock.

The basis for "test results" relating to Single-Ply membrane products are Canadian General Standards Board (CGSB) standards. These standards were selected because they are the only **consensus** standards available in North America which cover a majority of Single-Ply products currently being marketed.

These CGSB standards are: (1) 37-GP-52M for Elastomeric membranes, (2) 37-GP-54M for Polyvinyl Chloride membranes and (3) 37-GP-56M for Modified Bituminous membranes.

To provide a method of listing sheet applied Single-Ply products which are not described by the referenced CGSB standards, a list of 18 optional tests (extracted from CGSB standards 37-GP-52M and 37-GP-54M) are offered as a basis for listing these types of materials.

NOTE:
The listing or non-listing of a product (or manufacturer or supplier) in the *GUIDE* does not imply that NRCA approves the products nor recommends the use or non-use of any specific materials.

The fact that a material listed herein does or does not meet all of the values suggested by ASTM and Canadian standards or NBS#55 criteria does not necessarily imply that it will or will not produce an acceptable roofing membrane.

NRCA does not develop standards but works toward and supports the improvement of existing standards and development of new standards by other consensus standards development organizations. As these new standards become available, the ***NRCA ROOFING MATERIALS REFERENCE & GUIDE*** will be updated to keep abreast of these state-of-the-art roofing standards activities by including the new standards and, where appropriate, replacing the old ones.

For listing purposes it is **not** mandatory that test results be provided for each of the test methods specified in the referenced standards and criteria. In many instances all test results are not shown because sufficient time was not available to complete testing prior to the publication closing date. Succeeding issues of the ***GUIDE*** will permit the inclusion of additional test results as they are reported.

An important feature of the ***NRCA ROOFING MATERIALS REFERENCE & GUIDE*** program is comparative testing which NRCA will perform on listed materials. The testing of materials will be conducted in NRCA designated commercial laboratories and these test results will be printed in the ***GUIDE.*** The comparative data will supplement that supplied by manufacturers and suppliers and will be shown in future issues of the ***GUIDE*** in a contrasting color.

Because of time constraints not all manufacturers and suppliers wishing to participate were able to meet the closing date for the first issue of the ***GUIDE***. For those suppliers who intend to list in the second (June 1983) issue, and for current participants who wish to update data appearing in this issue, the closing date is May 9, 1983.

NATIONAL ROOFING CONTRACTORS ASSOCIATION

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Important Notes

I. **Some SI metric units** have been converted to English customary units which may be approximate conversions.

II. **Restricted Regions;** when a "Restricted Region" is indicated, refer to manufacturer's printed literature to determine geographic region boundaries.

III. **Warranty;** the manufacturer's printed literature should be referenced to determine the exact terms, limitations, conditions, exclusions and remedies offered under the material/installation warranty.

IV. **UL & FM;** UL fire resistance and FM wind resistance ratings are awarded on the basis of tests conducted on complete roofing assemblies, of which, the membrane is one component. UL Ratings and FM Approvals for specific membrane products, which have been tested in prescribed assemblies, may be determined by referencing the "UL Fire Resistance Directory" and the "FM Approval Guide."

Description of Built-Up-Roofing and Single-Ply Sheet Applied Membrane Materials

BUILT-UP BITUMINOUS MEMBRANES: a built-up bituminous membrane is the continuous semi-flexible component of a roof system whose primary function is the exclusion of water. The membrane consists of two or more alternate plies of felts, fabrics or mats which are often saturated and sometimes coated with bituminous materials, assembled in place and adhered to each other with alternate layers of bituminous products. Surfacing and parts of the substrate are not considered components of the membrane.

MODIFIED BITUMEN: are composite sheets consisting of a copolymer modified bitumen often reinforced and sometimes surfaced with various types of films, foils and mats.

MB: Modified Bitumen Composite Self-Adhering Sheet Membrane System. A cold-applied self-adhering composite sheet with modified bitumen and plastic film. The modified bitumen base layer may contain plasticizers and oils. The top surface sheet of polyethylene film serves as a protective barrier and base for the liquid protective coating. Thickness varies from 60 to 80 mils (1/16" to 5/64") depending on the manufacturer. The surfacing may be a special protective liquid coating, mineral granules or aggregates.

MB/R: Modified Bitumen Reinforced Composite Sheet Membrane System. A composite sheet with modified bitumen and reinforcing sheets normally located at the sheets mid-depth. The reinforcement may be plastic sheeting, polyethylene film, heavy polyester mat, glass fiber felt or fabric, or combination thereof. Surfacing may be a thin embossed metal, special protective coating, or mineral aggregate. They are generally heat-applied in the field. The modified asphalt generally contains block polymers or special plasticizers depending on manufacturer. Total membrane thickness may be as thick as 160 mils (5/32"). Application can be loose laid and ballasted or fully adhered.

THERMOPLASTIC: is a plastic like polymer consisting of any of various complex organic compounds produced by polymerization which are capable of being molded, extruded or cast into various shapes or films. Generally they are thermoplastic in nature i.e. they will soften when heated and harden when cooled. Examples are:

CPE: Chlorinated Polyethylene Roof Membrane System. Chlorinated Polyethylene consists of a cured chlorinated polyethylene polymer. These materials are available in sheet applied systems. The sheet materials generally have an inorganic fiber backing which facilitates handling and application. The thickness of the membrane is generally about 35 mils (1/32") depending on manufacturer. Application can be fully adhered with hot asphalt or contact adhesive.

CSPE: Chlorosulfonated Polyethylene Roof Membrane System. Chlorosulfonated Polyethylene is a chlorinated polyethylene containing a small number of chlorosulphonyl groups produced by the simultaneous chlorination and sulfonation of high molecular weight, low density polyethylene. The chlorosulfonated polyethylene is available in both sheet and liquid forms. The sheet material generally has an inorganic fiber backing which facilitates handling and applications. Total membrane thickness is generally about 35 mils (1/32") depending on the manufacturer. Application can be fully adhered with hot asphalt or contact adhesive.

ECB: Ethylene-Copolymer-Bitumen and Anthracite Microdust Roof Membrane System. ECB is a material without any plasticizers. Thickness varies from 30 to 60 mils (1/32" to 1/16") depending on manufacturer. Application can be loose laid with ballast, mechanically fastened or fully adhered.

PIB: Polyisobutylene Roof Membrane System. This material is a blend of polyisobutylene, EPDM and other synthetic rubbers. Thickness varies from 30 to 60 mils (1/32" to 1/16") depending on manufacturer. Application can be loose laid with ballast, partially adhered or mechanically fastened.

PVC: Polyvinyl Chloride Roof Membrane System. A membrane composed of single-ply sheets that are made of polyvinyl chloride (PVC). PVC is a polymer, synthesized from vinyl chloride, that is thermoplastic in nature and contains plasticizers and stabilizers. Thickness varies from 32 to 60 mils (1/32" to 1/16") and reinforcement may be added with the use of fabric or fibers depending on manufacturer. Application can be loose laid and ballasted, fully adhered or mechanically fastened.

ELASTOMERIC: is a rubber like synthetic polymer that will stretch when pulled and will return quickly to its original shape when released. Examples are:

EPDM: Ethylene Propylene Diene Monomer Roof Membrane System. A single-ply sheet composed of synthetic rubber. Thickness varies from 30 to 60 mils (1/32" to 1/16"). In some cases the sheet is reinforced with fabric or fibers. EPDM sheets *cannot* be solvent or heat welded. The sheet laps are joined together by contact adhesive. Application can be loose laid and ballasted or fully adhered.

NEOPRENE: Polychloroprene Roof Membrane Systems. A membrane composed of single-ply sheets or synthetic rubber consisting of polymers or chloroprene. This particular synthetic rubber has good resistance to petroleum oils, solvents and weathering. Some formulations require a protective coating of Hypalon (chlorosulfonated polyethylene) to retard weathering. Thickness varies from 30 to 120 mils (1/32" to 1/8") depending on manufacturer. This system can be employed in an inverted roof assembly. Application can be loose laid and ballasted or fully adhered.

Type, Class and Grade of Single-Ply Products as Defined by CGSB Standards

MODIFIED BITUMEN (CGSB STANDARD 37-GP-56M)

Type	1.	For exposed roofing application
	1.a.	Fully adhered
	1.b.	Partially adhered
Type	2.	For covered roofing application
	2.a.	Fully adhered
	2.b.	Partially adhered
	2.c.	Loose laid
Class	A.	Granule surfaced
	B.	Metallic surfaced
	C.	Plain surfaced
Grade	1.	Standard service
	2.	Heavy duty service

POLYVINYL CHLORIDE (CGSB STANDARD 37-GP-54M)

Type	1.	Nonreinforced membrane
	2.	Reinforced membrane
Class	A.	Non-exposed membrane
	B.	Exposed membrane

ELASTOMERIC (CGSB STANDARD 37-GP-52M)

Type	1.	Nonreinforced membrane
	2.	Reinforced membrane
Class	A.	For exposed use
	B.	For non-exposed use

Test Significance Statements Relating to Test Requirements Specified in Referenced NBS BSS #55 Criteria and Canadian CGSB Standards

Built-Up Roofing (BUR); NBS BSS#55 Preliminary Criteria	Modified Bitumens; CGSB Standard 37-GP-56M	Polyvinyl Chloride; CGSB Standard 37-GP-54M	Elastomeric; CGSB Standard 37-GP-52M	
•	•	•	•	**1. BREAKING STRENGTH, TENSILE STRENGTH, STRENGTH OF MEMBRANE** Indicates the ability of a membrane material to resist stresses induced by thermal changes, moisture content changes, substrate movements and the like. Many roofing membranes are of an anisotropic nature, hence they are tested in both machine and across-machine directions.
•				**2. THERMAL EXPANSION** A fundamental property of a material which expresses the amount of dimensional change a material will undergo when subjected to a temperature change. Generally, a membrane having the lower values are the more forgiving to thermal movements imposed in service.
•				**3. THERMAL SHOCK FACTOR** A numerical value calculated from three properties of a membrane; tensile strength, thermal expansion and load-strain modulus. It expresses the resistance of a membrane to withstand large (50-100°F) and rapid (a few hours) temperature drops to subfreezing temperatures. Generally the higher the value, the more resistant the membrane is to these large and rapid temperature changes.
	•	•		**4. THICKNESS**
•	•	•		**5. LAP JOINT STRENGTH** Indicates the ability of both factory made and field made lap joints to remain watertight. The boiling water exposure test gives some indication of the durability of the lap joint.
•	•	•		**6. ULTIMATE ELONGATION, ELONGATION AT BREAK** A measure of the ability of a membrane to stretch without rupture when it is subjected to loads imposed by building movements, moisture and thermal changes, wind vibrations and the like.
•	•	•		**7. LOW TEMPERATURE FLEXIBILITY** Indicates the ability of a membrane to resist stresses applied during application at low temperatures as well as flexural loads experienced under service conditions including wind induced vibrations.
•	•	•		**8. RESISTANCE TO ACCELERATED WEATHERING** A measure of effects of radiation, heat and moisture on the membrane. Like other accelerated aging test procedures, no numerical ratio has been established between time and performance in weather-o-meter and time and performance in service.
	•	•		**9. WATER ABSORPTION** An indication of the moisture absorption characteristics of a membrane material when exposed to areas where water collects and stands. Further, this test procedure measures the property (strength and elongation) changes which occur due to moisture content of the membrane.
•				**10. WATER RESISTANCE** The resistance of a membrane to absorb moisture where water collects and stands, an indicator of dimensional change due to the absorbed moisture.
	•			**11. LOW TEMPERATURE IMPACT** A measure of the relative resistance of membranes to withstand the impact of falling objects (icicles, tree branches, etc.) or other sudden dynamic impacts at subfreezing temperatures.
•		•		**12. DYNAMIC IMPACT** A measure of the ability of a membrane to resist the impact of falling objects without harming the water tight integrity of the membrane.

Built-Up Roofing (BUR); NBS BSS#55 Preliminary Criteria	Modified Bitumens; CGSB Standard 37-GP-56M	Polyvinyl Chloride; CGSB Standard 37-GP-54M	Elastomeric; CGSB Standard 37-GP-52M	
			•	**13. STATIC PUNCTURING** A measure of the ability of a membrane to resist slowly applied and constant loads over some period of time.
		•	•	**14. WATER VAPOR TRANSMISSION, PERMEABILITY** A measure of the ability of a membrane to transmit moisture as vapor when a vapor pressure difference exists across the membrane. In some cases a high value is desireable while in others a low value is preferred.
			•	**15. GRANULE EMBEDMENT** A measure of the ability of mineral aggregate (granules) to adhere to a membrane when exposed to such abrasive conditions as walking, wind and rain erosion, and the like. Applies to granule surfaced products only.
			•	**16. THERMAL STABILITY** Measure of the ability of a membrane to resist dimensional change due to thermal cycles experienced in service.
			•	**17. CRACK BRIDGING CAPABILITY** A measure of the ability of a membrane to resist the stresses imposed by slowly moving joints in a substrate due to moisture and thermal changes as well as mechanical movements.
			•	**18. LOAD-STRAIN PRODUCT (1bf x %) (N x %)** A mathematical attempt to indicate the contribution of the two properties working in concert to the performance of the membrane. Difficult to interpret in terms of performance in service.
		•	•	**19. RESISTANCE TO HEAT AGING** Allegedly an accelerated aging test to measure the rate of deterioration of such membrane properties as strength and elongation when exposed to ambient roof conditions.
			•	**20. DIMENSIONAL CHANGE AFTER STRESS RELAXATION** A measure of the ability of membrane materials to resist shrinkage or growth after placement on the roof when inherent stresses such as those induced during the manufacturing or application process or by imposed loads during service and relieved. Due to the anisotropic behavior of most membranes, different values are given for each direction.
			•	**21. CONE PENETRATION** A measure of the ability of a membrane to resist punctures caused by ordinary roof conditions such as aggregate penetration, walking and the like.
			•	**22. DIMENSIONAL STABILITY AFTER WATER ABSORPTION** A measure of the resistance of a membrane to dimensional change such as shrinkage or growth when exposed in roof areas where water collects and stands.
			•	**23. TENSILE SET** The ability of an elastomeric (rubber like) membrane to recover its original dimensions after stretching.
			•	**24. OZONE RESISTANCE** A measure of the serviceability of a rubber like membrane when exposed to outdoor conditions especially in an urban environment.
			•	**25. TEAR RESISTANCE, TEARING STRENGTH** A measure of the resistance of a membrane under stress to the propagation of slight imperfections to proportions which may destroy the watertight integrity of the membrane.

THE CGSB STANDARDS REFERENCED IN THIS PROGRAM SPECIFY VALUES WHICH ARE APPROPRIATE FOR VARIOUS TESTS WHEN CONDUCTED IN ACCORDANCE WITH THE PRESCRIBED TEST PROCEDURES. SOME OF THESE TEST PROCEDURES REPRESENT AD HOC TEST METHODS AND SOME ARE ASTM TEST PROCEDURES. WHERE APPLICABLE, THE APPROPRIATE ASTM PROCEDURE IS NOTED WITHIN THE CGSB STANDARD.

Index of Listed Roofing Membranes

Manufacturer or Supplier	Built-Up Roofing	Modified Bitumen	PVC Polyvinyl Chloride	EPDM Ethylene Propylene Diene Monomer	NEOPRENE Polychloroprene	CSPE HYPALON Chlorosulfonated Polyethylene	CPE Chloronated Polyethylene	PIB Polyisobutylene	Other
1. AGR Company								Alphagard	
2. Alkor Division-Solvay Amer. Corp.			Alkorplan				Alkorflex 35093 Alkorflex 35094 Alkorflex 35096		
3. The Amer. Lubricants Co.		Tiffany MB Single-Ply							
4. American Roofing Corp.		ARC Standard ARC Aluminum ARC Premium ARC Granular							
5. Apache Building Products Co.		SAM							
6. Barra Corp. of America			Rhenofol C-34 Rhenofol C-45 Rhenofol C-52 Rhenofol CV40 Rhenofol CV48						
7. Bond Cote Systems									Nitrile Alloy Bond Grey 35
8. Bowe Company, Inc. (Dibiten)		Dibiten							
9. Carboline Building Products				EPDM 450 EPDM 600				Carboline PIB 1000	
10. Carlisle SynTec Systems				Sure-Seal EPDM	Sure-Seal Neoprene				
11. CertainTeed	•								
12. Consolidated Prot. Coatings Corp.		Conso-gard Conso-gard II							
13. Danosa Caribbean, Inc.		Glasdan R36 Esterdan R36 Glasdan AL80 Esterdon RM							
14. Durolast Roofing, Inc.									Trimeric Polymer Coated Polyester Duro-last
15. Firestone Industrial Products				Rubbergard .045 Rubbergard .060					
16. The Garland Co., Inc.		Stress Ply Pitch Ply							
17. Genstar Building Mat'ls Co.	•								
18. GAF Corporation	•			Gafply EP Ballasted Gafply EP Fully Adhered					
19. Hey'DI U.P.M.		Hey'DI ECB							
20. Hyload, Inc.		Hyload 150E							
21. IPW Interplastic			Interoof "U" Interoof "B"						
22. Kelly Energy Systems, Inc.				Whaleskin/81 C-EPDM Whaleskin/81 White C-EPDM Whaleskin/81 White EPDM Whaleskin/81 EPDM					
23. The Kimmenade Corp.		Duralasta P Duralasta M							
24. Manville Bldg. Mat'ls Corp.	•								
25. Mineral Fiber Mfg. Corp.	•								
26. Plymouth Rubber Co., Inc.			Plyroof PVC Grey Plyroof PVC White	Plyseal EPDM	Plyshield Neoprene				
27. J & P Petroleum Products		Aquashield 2001 AD							
28. PMS/Sucoflex			Sucoflex F132 Sucoflex F127						
29. Reeves Bros., Inc.				Reevetech					
30. Republic Powdered Metals								Geoflex	
31. Royal Oil Company		Royal Single-Ply							
32. Rubber & Plastics Compound, Inc.			Nervaply Nervaply UB						
33. Sarnafil (U.S.), Inc.			Sarnafil G21-410 Sarnafil G21-442 Sarnafil S21-327						
34. Seaman Corporation									Polyester Reinforced TPE Fibertite

Index of Listed Roofing Membranes *cont'd.*

Manufacturer or Supplier	Built-Up Roofing	Modified Bitumen	PVC Polyvinyl Chloride	EPDM Ethylene Propylene Diene Monomer	NEOPRENE Polychloroprene	CSPE HYPALON Chlorosulfonated Polyethylene	CPE Chloronated Polyethylene	PIB Polyisobutylene	Other
35. Siplast, Inc.		Veral (Aluminum Faced) Veral (Stain/ Steel Faced) Veral (Copper Faced) Parafon - 50 Paradiene 30 Paradiene 20							
36. SYenergy Methods, Inc.				SMI Rubber Roof Black SMI Rubber Roof White					
37. Teltex, Inc.		Rhoflex							
38. Texas Refinery Corp.		Mighty Plate							
39. Tropical Industrial Coatings, Inc.								Tropigard	
40. U.S. Intec/BRAI		BRAI							
41. U.S. Mineral Products Corp.			Flexhide 34 Flexhide 45 Flexhide LR50						
42. W.R. Grace		GRM-120 GRM-230 GRM-350 GRM-500							
43. Wat-Pro, Inc.			Flagon SF Flagon C	Agaper-E					
44. Weathergard Roofing Systems, Inc.				Weathergard					

BUILT-UP-ROOFING Part 1 *(See Part 2 for General Information)*

Manufacturer	CERTAINTEED CORPORATION														
Specification Number	4CG-GSW	3CG-GSW	4CG-SSW	RB-315-GSW	4CG-GS1	3CG-GS1	4CG-SS1	415-GS1	4CG-GSC	3CG-GSC	4CG-SSC	415-GSC			
1. DECK TYPE															
a. NAILABLE	•	•	•	•											
b. INSULATED					•	•	•	•							
c. NON—NAILABLE									•	•	•	•			
2. SLOPE															
a. 0"-½"	•	•	•	•	•	•	•	•	•	•	•	•			
b. ½"-3"	•	•	•	•	•	•	•	•	•	•	•	•			
c. 3"-6"			•				•				•				
3. PLIES															
a. TOTAL	4	3	4	4	4	3	4	4	4	3	4	4			
b. BASE				1											
c. INTERPLY		3		3	4	3	4	4	4	3	4	4			
d. CAP															
4. FELTS															
a. FIBERGLASS	•	•	•		•	•	•		•	•	•				
b. ORGANIC				•				•				•			
c. ASBESTOS															
d. POLYESTER															
e. OTHER															
5. INTERPLY BITUMEN															
a. ASPHALT	•	•	•	•	•	•	•	•	•	•	•	•			
b. COAL TAR															
6. SURFACE															
a. AGGREGATE (LBS. SQ. FT)	3, 4, 4.5*	3, 4, 4.5*		3, 4, 4.5*	3, 4, 4.5*	3, 4, 4.5*		3, 4, 4.5*	3, 4, 4.5*	3, 4, 4.5*		3, 4, 4.5*			
b. SMOOTH-ASPHALT															
-COAL TAR															
c. EMULSION — CUT BACK			•				•				•				
d. CAP SHEET															
7. APPROX. APPLIED WT. PER SQ. FT. (INCL. PLIES)															
a. AGGREGATE	5.8	5.5		6.3	6.1	5.7		6.2	6.1	5.7		6.2			
b. SMOOTH															
c. EMULSION-CUT BACK			1.4				1.6				1.6				
d. CAP SHEET															
8. RESTRICTED REGIONS *(See "Important Notes")*	A,B	A,B	A,B		A,B	A,B	A,B		A,B	A,B	A,B				
9. YR. OF FIRST COMMER'L INSTALLATION	1975	1975	1975	1920	1975	1975	1975	1920	1975	1975	1975	1920			
10. TEST RESULTS (PER BSS #55)															
a. ■ TENSILE STRENGTH — NOT LESS THAN 200 lb./in. @ 0°F—MD	335	222	335	498	335	222	335	425	335	222	335	425			
— NOT LESS THAN 200 lb./in. @ 0°F—XD	311	218	311	290	311	218	311	313	311	218	311	313			
b. ■ THERMAL EXPAN. — NOT EXCEED 40 x 10^{-6}/°F @ 0° to −30°F—MD	25	22	25	5	25	22	25	23	25	22	25	23			
— NOT EXCEED 40 x 10^{-6}/°F @ 0° to −30°F—XD	25	24	25	21	25	24	25	26	25	24	25	26			
c. ■ THERMAL SHOCK — NOT LESS THAN 100°F—MD	640	705	640	3520	640	705	640	700	640	705	640	700			
— NOT LESS THAN 100°F—XD	500	615	500	990	500	615	500	790	500	615	500	790			
11. LIMITATIONS OR RESTRICTED USE (SEE PART 2)	2	1, 2	1, 2	2	2	2	2	2	2	2	2	2			
12. WARRANTY *(See "Important Notes")*															
a. DURATION (YEARS)	5	5	5		5	5	5		5	5	5				
b. RENEWABLE AFTER INSPECTION	•	•	•		•	•	•		•	•	•				
c. SCOPE OF COVERAGE (REPAIR OF LEAKS)															
MATERIAL ONLY															
WORKMANSHIP AND MATERIAL	•	•	•		•	•	•		•	•	•				
d. MONETARY LIMITATION															
NONE															
ORIGINAL COST OF INSTALLATION															
$ PER SQUARE	•	•	•		•	•	•		•	•	•				
e. EXCLUSION FROM COVERAGE															
DAMAGE TO OTHER COMPONENTS	•	•	•		•	•	•		•	•	•				
CONSEQUENTIAL DAMAGES	•	•	•		•	•	•		•	•	•				
13. UL FIRE RESISTANCE *(See "Important Notes")*	•	•	•	•	•	•	•	•	•	•	•	•			
14. FM WIND RESISTANCE *(See "Important Notes")*															

*Slag = 3 lbs./sq. ft.; Gravel = 4 lbs./sq. ft.; Crushed Stone = 4.5 lbs./sq. ft.

BUILT-UP-ROOFING Part 1 *(See Part 2 for General Information)*

GENSTAR BUILDING MATERIALS CO.											
AAA1-1	AAA2-1	AAA3-1	AAA4-1	AAA5-1	AAAA6-1	A-1-M-1	A-2-M-1	A-3-M-1	A-4-M-1	MC-3R-1	MW-3R-1
	•		•		•		•		•		•
•	•	•	•	•	•	•	•	•	•	•	•
•		•		•		•		•		•	
•	•	•	•	•	•						
						•	•	•	•	•	•
3	3	3	3	4	4	4	4	4	4	3	3
3	3	3	3	1	1	1	1	1	1	1	1
				3	3	2	2	2	2	2	2
						1	1	1	1		
		•	•			•	•	•	•	•	•
•	•			•	•	•	•			•	•
•	•	•	•	•	•	•	•	•	•	•	•
4	4	4	4	4	4						
										•	•
						•	•	•	•		
6	6	6	6	6	6						
										2	2
						2	2	2	2		
None	None	None	None	None	None	None	None	None	None	1	1
160	160	126	222	222							
24	24	36	36	34	34						
246	246	170	170	171	171						
20	20	20	20	20	20	20	20	20	20	20	20
•	•	•	•	•	•	•	•	•	•	•	•
20	20	20	20	20	20	20	20	20	20	20	20
•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•

BUILT-UP-ROOFING Part 1 *(See Part 2 for General Information)*

Manufacturer	GAF														
Specification Number	105 G	105 S	104 G	104 S-B	103 G	103 G-B	103 S	103 S-B	103 M	103 M-B	102 M	106 G	104 GN	104 SN	103 GN
1. DECK TYPE															
a. NAILABLE													•	•	•
b. INSULATED	•	•	•	•	•	•	•	•	•	•	•	•			
c. NON—NAILABLE	•	•	•	•	•	•	•	•	•	•	•	•			
2. SLOPE															
a. 0″-½″	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
b. ½″-3″	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
c. 3″-6″		•		•			•	•	•	•	•			•	
3. PLIES															
a. TOTAL	4	4	4	4	3	3	3	3	4	4	3	3	4	4	3
b. BASE			1	1		1		1		1			1	1	1
c. INTERPLY	4	4	3	3	3	2	3	2	3	2	2	3	3	3	2
d. CAP									1	1	1				
4. FELTS															
a. FIBERGLASS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
b. ORGANIC															
c. ASBESTOS															
d. POLYESTER															
e. OTHER															
5. INTERPLY BITUMEN															
a. ASPHALT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
b. COAL TAR												•			
6. SURFACE															
a. AGGREGATE (LBS. SQ. FT)	4, 3*		4, 3*		4, 3*	4, 3*						4, 3*	4, 3*		4, 3*
b. SMOOTH-ASPHALT		•		•			•	•						•	
-COAL TAR															
c. EMULSION — CUT BACK		•		•			•	•						•	
d. CAP SHEET									•	•	•				
7. APPROX. APPLIED WT. PER SQ. FT. (INCL. PLIES)															
a. AGGREGATE	6		6		6	6						6	6		6
b. SMOOTH		2		2			2	2						2	
c. EMULSION-CUT BACK		2		2			2	2						2	
d. CAP SHEET									3	3	2				
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	None	None	None	N	N	N	N	N	N & S	None	None	None	None
9. YR. OF FIRST COMMER'L INSTALLATION	1974	1974	1974	1974	1974	1974	1974	1974	1974	1974	1974	1974	1974	1974	1974
10. TEST RESULTS (PER BSS #55)															
a. ■ TENSILE STRENGTH — NOT LESS THAN 200 lb./in. @ 0°F—MD															
— NOT LESS THAN 200 lb./in. @ 0°F—XD															
b. ■ THERMAL EXPAN. — NOT EXCEED 40 x 10^{-6}/°F @ 0° to −30°F—MD															
— NOT EXCEED 40 x 10^{-6}/°F @ 0° to −30°F—XD	*GAF: "Not an accepted industry standard."*														
c. ■ THERMAL SHOCK — NOT LESS THAN 100°F—MD															
— NOT LESS THAN 100°F—XD															
11. LIMITATIONS OR RESTRICTED USE (SEE PART 2)															
12. WARRANTY *(See "Important Notes")*															
a. DURATION (YEARS)	10	10	5												
b. RENEWABLE AFTER INSPECTION			5												
c. SCOPE OF COVERAGE (REPAIR OF LEAKS)															
MATERIAL ONLY	•	•													
WORKMANSHIP AND MATERIAL			•												
d. MONETARY LIMITATION	*All three types of warranty are available for all specifications.*														
NONE															
ORIGINAL COST OF INSTALLATION															
$ PER SQUARE	10	20	25												
e. EXCLUSION FROM COVERAGE															
DAMAGE TO OTHER COMPONENTS	•	•	•												
CONSEQUENTIAL DAMAGES	•	•	•												
13. UL FIRE RESISTANCE *(See "Important Notes")*	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
14. FM WIND RESISTANCE *(See "Important Notes")*			•	•						•					

*Slag = 3 lbs./sq. ft.; Gravel = 4 lbs./sq. ft.

BUILT-UP-ROOFING Part 1 *(See Part 2 for General Information)*

	GAF						MANVILLE *(continued on next page)*																			
	103 SN	103 MN	101 MN	106 GN			4AIS	4ANS	46NS	3AIS	3ANS	4AIG	3AIG	4ANG	3ANG	4ALG	3ALG	4AIC	4ANC	3AIC	3GNC	4GIS	4GNS	3GIS	3GNS	4GIG
	•	•	•	•				•	•		•			•	•	•	•		•		•		•		•	
							•			•		•	•					•		•		•		•		•
							•			•		•	•					•		•						
	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•			•		•	•	•	•	•
	•	•	•				•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
	•	•	•				•	•	•	•	•							•	•	•		•	•	•	•	
	3	4	3	3			4	4	4	3	3	4	3	4	3	4	3	4	4	3	3	4	4	3	3	4
	1	1	1	1					1		1			1	1	1	1		1		1		1		1	
	2	2	1	2			4	4	3	3	2	4	3	3	2	3	2	3	2	2	1	4	3	3	2	4
		1	1															1	1	1	1					
	•	•	•	•					•									•	•	•	•	•	•	•	•	•
							•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
				•																						
				4, 3*								4	4	4	4	4	4									4
	•						•	•	•	•	•											•	•	•	•	
	•						•	•	•	•	•															
		•	•															•	•	•	•					
				6								6	5.5	5.5	5	6	5.5	2.4	2	3						6
	2						1.9	1.6	1.4	1.5	1.2											1.7	1.0	1.4	1.2	
	2						1.9	1.6	1.4	1.5	1.2											1.7	1.0	1.4	1.2	
		3	2																		1.7					
	N	N	N & S	None					3	2 & 3	2 & 3				2 & 3	2 & 3	2 & 3			2	3				2, 3	
	1974	1974	1974	1974			1949	1981	1981	1981	1981	1979	1965	1981	1981	1981	1981	1981	1981	1981	1980	1976	1978	1980	1980	1978

"Manville does not endorse BSS #55 as a proven performance criteria for Built-Up Roofing Systems. Manville Research Engineers are currently working to establish a performance criteria for Built-Up Roofing which can realistically be used to predict actual performance expectations."

	103 SN	103 MN	101 MN	106 GN			4AIS	4ANS	46NS	3AIS	3ANS	4AIG	3AIG	4ANG	3ANG	4ALG	3ALG	4AIC	4ANC	3AIC	3GNC	4GIS	4GNS	3GIS	3GNS	4GIG
							10	10	10	5	5	10	5	10	5	10	5	10	10	5	5	10	10	5	5	10
							•			•	•	•	•		•		•			•	•	•		•	•	•
							•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
							•					•										•				•
								50	50	35	35		35	50	35	50	35	50	50	35	35		50	35	35	
							•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					•
	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

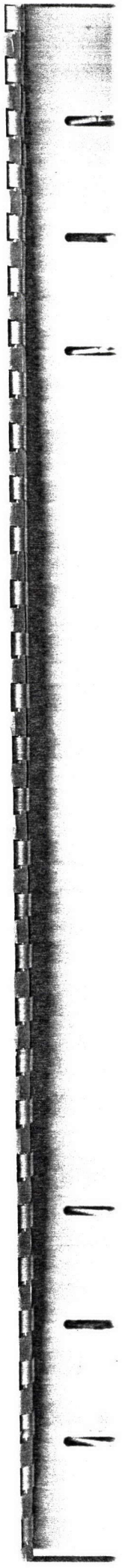
BUILT-UP-ROOFING Part 1 *(See Part 2 for General Information)*

Manufacturer	MANVILLE														
Specification Number	3GIG	4GNG	3GNG	4GLG	3GLG	4GIC	4GNC	3GIC	3ANC	3GNC Mod	100	102	103	151	630
1. DECK TYPE															
a. NAILABLE		•	•	•	•		•		•	•	•	•			•
b. INSULATED	•					•		•					•	•	
c. NON—NAILABLE													•	•	
2. SLOPE															
a. 0"-½"	•	•	•	•	•				•	•	•	•	•	•	•
b. ½"-3"	•	•	•	•	•	•	•		•	•	•	•	•	•	•
c. 3"-6"							•		•	•	•	•	•	•	
3. PLIES															
a. TOTAL	3	4	3	4	3	4	4	3	3	3	4	3	3	4	4
b. BASE		1	1	1	1		1			1	1	1	1	1	1
c. INTERPLY	3	3	2	3	2	3	2	2	2	1	3	2	2	3	3
d. CAP						1	1	1	1	1					
4. FELTS															
a. FIBERGLASS	•	•	•	•	•	•	•	•		•					
b. ORGANIC															
c. ASBESTOS									•	•	•	•	•	•	•
d. POLYESTER															
e. OTHER															
5. INTERPLY BITUMEN															
a. ASPHALT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
b. COAL TAR															
6. SURFACE															
a. AGGREGATE (LBS. SQ. FT)	4	4	4	4	4										4
b. SMOOTH-ASPHALT											•	•	•	•	
-COAL TAR															
c. EMULSION — CUT BACK											•	•	•	•	
d. CAP SHEET						•	•	•	•	•					
7. APPROX. APPLIED WT. PER SQ. FT. (INCL. PLIES)															
a. AGGREGATE	5.5	5.5	5	6	5.5	2.2	2.1								6
b. SMOOTH											1.6	1.2	1.5	1.9	
c. EMULSION-CUT BACK											1.6	1.2	1.5	1.9	
d. CAP SHEET								1.9	1.7	1.6					
8. RESTRICTED REGIONS *(See "Important Notes")*			2, 3	2, 3	2, 3			3	3	3		3	3		
9. YR. OF FIRST COMMER'L INSTALLATION	1978	1978	1980	1980	1980	1978	1978	1978	1981	1981	1965	1965	1965	1965	1977
10. TEST RESULTS (PER BSS #55)															
a. ■ TENSILE STRENGTH — NOT LESS THAN 200 lb./in. @ 0°F—MD															
— NOT LESS THAN 200 lb./in. @ 0°F—XD															
b. ■ THERMAL EXPAN. — NOT EXCEED 40 x 10^{-6}/°F @ 0° to −30°F—MD															
— NOT EXCEED 40 x 10^{-6}/°F @ 0° to −30°F—XD															
c. ■ THERMAL SHOCK — NOT LESS THAN 100°F—MD															
— NOT LESS THAN 100°F—XD															
11. LIMITATIONS OR RESTRICTED USE (SEE PART 2)															
12. WARRANTY *(See "Important Notes")*															
a. DURATION (YEARS)	5	10	5	10	5	10	10	5	5	5	5	5	5	5	5
b. RENEWABLE AFTER INSPECTION	•		•		•			•	•	•	•	•	•	•	•
c. SCOPE OF COVERAGE (REPAIR OF LEAKS)															
MATERIAL ONLY															
WORKMANSHIP AND MATERIAL	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
d. MONETARY LIMITATION															
NONE															
ORIGINAL COST OF INSTALLATION															
$ PER SQUARE	35	50	35	50	35	50	50	35	35	35	35	35	35	35	35
e. EXCLUSION FROM COVERAGE															
DAMAGE TO OTHER COMPONENTS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CONSEQUENTIAL DAMAGES															
13. UL FIRE RESISTANCE *(See "Important Notes")*	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
14. FM WIND RESISTANCE *(See "Important Notes")*	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

"Manville does not endorse BSS #55 as a proven performance criteria for Built-Up Roofing Systems. Manville Research Engineers are currently working to establish a performance criteria for Built-Up Roofing which can realistically be used to predict actual performance expectations."

UILT-UP-ROOFING Part 1 *(See Part 2 for General Information)*

ANVILLE							◀MINERAL FIBER MFG. CORP.▶							
400	401						43-GAW	43-GSW	43-GAC	43-GSC	52-PAW	52-PSW	52-PSC	52-PAC
•							•	•			•	•		
	•								•	•			•	•
	•								•	•			•	•
•	•						•	•	•	•	•	•	•	•
•	•							•		•				
4	4						4	4	3	4	3	3	2	2
1	1						1	1			1	1		
2	2						3	3	3	4	2	2	2	2
1	1													
•	•						•	•	•	•				
•	•	•									•	•	•	•
•	•	•					•	•	•	•	•	•	•	•
4							4		4		4			4
								•		•				
								•		•		•	•	
	•	•												
5							6	2	6	2	5	2	2	6
	2.1	2.4												
977	1949	1949					1976	1976	1976	1976	1982	1982	1982	1982
5	5	5												
•	•	•												
•	•	•												
35	35	35												
•	•	•												
•	•	•												
•	•	•												



UILT-UP-ROOFING Part 2

rtainTeed Corporation
) East Swedesford Road
ley Forge, PA 19482
5/687-5000

REGIONAL SERVICE LOCATIONS: 4

ICENSED APPLICATOR AGREEMENT ☐ YES ■ NO

PPLICATOR TRAINING ■ FIELD ☐ SEMINARS ☐ FACTORY

METHOD OF DISTRIBUTION: Ship to Distributors and Direct to Roofers

REFORMED ACCESSORIES AVAILABLE ☐ YES ■ NO

IMITATIONS OR RESTRICTED USE: (1) 3CG-GSW and 4CG-SSW; May not be applied to ight-weight concrete decks. (2) All roofs must have positive drainage (roof clear n 24 hours).

SALES INFORMATION CONTACT: Regional Sales Office

TECHNICAL INFORMATION CONTACT: Dr. Michael J. Noone (Blue Bell, PA)

FELTS TEST DATA:

Trade Name	Applicable ASTM Standard	(1)
Certaglass Ply Sheet	D-2178-81a	■ PASS ☐ FAIL
No. 15 Perforated Asphalt Felt	D226-81	■ PASS ☐ FAIL
Roofers Base Sheet	D2626-81	■ PASS ☐ FAIL

enstar Building Materials Company
80 Decker Drive
ving, TX 75062
14/659-9800

. # REGIONAL SERVICE LOCATIONS:

. LICENSED APPLICATOR AGREEMENT ■ YES ☐ NO

. APPLICATOR TRAINING ■ FIELD ☐ SEMINARS ☐ FACTORY

. METHOD OF DISTRIBUTION: Independent or Company Owned

. PREFORMED ACCESSORIES AVAILABLE ☐ YES ■ NO

. LIMITATIONS OR RESTRICTED USE: See Commercial Roofing Systems Specif. Manual

. SALES INFORMATION CONTACT: Don R. Hughes & C. T. Derry

. TECHNICAL INFORMATION CONTACT: Don R. Hughes & C. T. Derry

. FELTS TEST DATA:

Trade Name	Applicable ASTM Standard	(1)
All Weather Flaxine Base Sheet	D2626-80	■ PASS ☐ FAIL
Empire Base Sheet	D3158-78	■ PASS ☐ FAIL
Flintglas Base Sheet	None	☐ PASS ☐ FAIL
Flintglas Ply Sheet	D2178-81a	■ PASS ☐ FAIL
Flintglas Cap Sheet	D3909-81	■ PASS ☐ FAIL
No. 15 Saturated Felt	D226-76	■ PASS ☐ FAIL

GAF Corporation
140 W. 51st St.
New York, NY 10020
212/621-5000

1. # REGIONAL SERVICE LOCATIONS: 12

***2. LICENSED APPLICATOR AGREEMENT** ■ YES ☐ NO

3. APPLICATOR TRAINING ■ FIELD ☐ SEMINARS ☐ FACTORY

4. METHOD OF DISTRIBUTION: Wholesalers

5. PREFORMED ACCESSORIES AVAILABLE ■ YES ☐ NO

6. LIMITATIONS OR RESTRICTED USE: Refer to GAF Gafglas catalog

7. SALES INFORMATION CONTACT: District Sales Office

8. TECHNICAL INFORMATION CONTACT: District Sales Office

9. FELTS TEST DATA:

Trade Name	Applicable ASTM Standard	(1)
Gafglas Ply 4	D-2178 Type IV	■ PASS ☐ FAIL
Gafglas Ply 3	D-2178 Type III	■ PASS ☐ FAIL
Gafglas Mineral Surfaced Cap Sheet	D-3909	■ PASS ☐ FAIL
Gafglas #75 Base Sheet**	No ASTM Standard	☐ PASS ☐ FAIL
Gafglas Base & Ply Sheet**	No ASTM Standard	☐ PASS ☐ FAIL
Gafglas Stratavent (Vent Ply) Perforated	D-3672	■ PASS ☐ FAIL
Gafglas Stratavent (Vent Ply) for nailable decks	No ASTM Standard	☐ PASS ☐ FAIL

*Qualified Applicators
**Meets Federal Specification SS-R-620B Type III

Manville Building Materials Corp.
Ken-Caryl Ranch, P.O. Box 5108
Denver, CO 80217
303/978-2784

1. # REGIONAL SERVICE LOCATIONS: 8

2. LICENSED APPLICATOR AGREEMENT ■ YES ☐ NO

3. APPLICATOR TRAINING ■ FIELD ■ SEMINARS ☐ FACTORY

4. METHOD OF DISTRIBUTION:

5. PREFORMED ACCESSORIES AVAILABLE ■ YES ☐ NO

6. LIMITATIONS OR RESTRICTED USE:

7. SALES INFORMATION CONTACT: A. D. Sowers

8. TECHNICAL INFORMATION CONTACT: V. Graco

9. FELTS TEST DATA:

Trade Name	Applicable ASTM Standard	(1)
Glasply	D2178-81a	■ PASS ☐ FAIL
GlasBase	None	☐ PASS ☐ FAIL
Planet II	None	☐ PASS ☐ FAIL
GlasKap	D3909-81	■ PASS ☐ FAIL
Ventsulation	D3672-81	■ PASS ☐ FAIL
#18 Asbestos	D250-81 Type I	■ PASS ☐ FAIL
#15 Asbestos	D250-81 Type I	■ PASS ☐ FAIL
Centurion	D250-81 Type IV	■ PASS ☐ FAIL

Mineral Fiber Mfg. Corp.
P.O. Box 356
Cosh Octon, OH 43812
614/622-2645

1. # REGIONAL SERVICE LOCATIONS:

2. LICENSED APPLICATOR AGREEMENT ☐ YES ■ NO

3. APPLICATOR TRAINING ■ FIELD ☐ SEMINARS ☐ FACTORY

4. METHOD OF DISTRIBUTION: Manufacturers/Reps.

5. PREFORMED ACCESSORIES AVAILABLE ☐ YES ☐ NO

6. LIMITATIONS OR RESTRICTED USE:

7. SALES INFORMATION CONTACT: Robert S. Simpson

8. TECHNICAL INFORMATION CONTACT: Tom King

9. FELTS TEST DATA:

Trade Name	Applicable ASTM Standard	(1)
Duraply IV	D2178-81 Type IV	■ PASS ☐ FAIL

(1) Indicates PASS/FAIL status as determined by testing to appropriate ASTM standard.

MODIFIED BITUMENS Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME►	Tiffany	ARC Standard	ARC Aluminum	ARC Premium	ARC Granular	SAM
1. PRODUCT DESCRIPTION						
a) Thickness (mils)	157	160	160	160	175	75
b) Top surface	Modified Bitumen	Plain	Aluminum	Plain	Mineral	Polypropylene
c) Reinforcement	Polyester non-woven fabric	Fiberglass	Fiberglass	Polyester	Polyester	Polypropylene
d) Reinforcement						
e) Color	Black	Black	Aluminum	Black	Optional	Grey-Black
f) Installed wt. (psf w/o ballast)	0.82	.88	.88	.88	.96	.40
2. COATING REQUIRED	Alum.	None	None	None	None	Yes
3. USE						
a) New roofing	X	X	X	X	X	X
b) Reroofing	X	X	X	X	X	X
4. FIELD LAP JOINT METHOD	Torch	Torch	Torch	Torch	Torch	Self-Adhering
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)						X
b) Partially adhered-method	X					
c) Fully adhered-method	X	Torch	Torch	Torch	Torch	Self-Adhering
d) Prot. Memb. Rfg. Assy.		X		X		
6. MINIMUM SLOPE	Dead Level	Dead Level	Positive Drain	Dead Level	Positive Drain	Dead Level
7. USE OVER						
a) Perlite	X	X*	X*	X*	X*	
b) Urethane	X	X*	X*	X*	X*	X
c) Wood fibre		X*	X*	X*	X*	
d) Fibre glass	X	X*	X*	X*	X*	X
e) Exp. polystyrene		X*	X*	X*	X*	
f) Felt faced composites	X	X*	X*	X*	X*	X
g) Other		*Overlayment required	*Overlayment required	*Overlayment required	*Overlayment required	Concrete, Wd, BUR Rubber, Other M/B
8. RESTRICTED REGIONS *(See "Important Notes")*						None
9. WORKABLE TEMP RANGE	15° F-115° F	15° F-115° F	15° F-115° F	15° F-115° F	15° F-115° F	40° F-120°F
10. FLASHING MATERIAL	same mat'l	same mat'l.	same mat'l.	same mat'l.	same mat'l.	same mat'l
11. FLASHING METHOD	Torch	Torch	Torch	Torch	Torch	Self-Adhering
12. PRE-FORMED ACCESS AVAIL.	No	No	No	No	No	None
13. COUNTRY OF ORIGIN	Italy	Italy	Italy	Italy	Italy	U.S.A.
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	1967	1968	1968	1968	1968	
b) U.S.A. (Year, City-first installed)	1978-Detroit	1981-Chicago	1981-Chicago	1981-Chicago	1981-Chicago	1979-Greenville
16. NO. OF SQUARES INSTALLED						
a) Foreign						
b) U.S.A.		2,000	5,000	35,000	1,000	4,000
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	5	10	10	10	10	5
b) Renewable after inspection	+ 5 years					5 + 5
c) Scope of coverage (repair of leaks)						
c.1 Material only	X	X	X	X	X	
c.2 Workmanship & material		X	X	X	X	X
d) Monetary limitation						
d.1 None						X
d.2 Orig. cost of installation		X	X	X	X	
d.3 $ per square						
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X	X	
e.2 Consequential damages	X	X	X	X	X	X
18. LIMITATIONS OR RESTRICTED USE						
19. UL *(See "Important Notes")*	X	Pending	Pending	Pending	Pending	I.T.
20. FM *(See "Important Notes")*	X					I.T.
21. METHOD OF DISTRIB.	Sales Force	Distributors	Distributors	Distributors	Distributors	Direct/some distrs.
22. # REGIONAL SERVICE LOCATIONS	Throughout U.S.A.	9	9	9	9	50
23. LICENSED APPLICATOR AGREEMENT	No	Yes	Yes	Yes	Yes	Yes
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Seminars & Field
25. SALES INFO CONTACT	Tom Girard	Bud Jansen	Bud Jansen	Bud Jansen	Bud Jansen	Geoff Mercier
26. TECHNICAL INFO. CONTACT	Tom Girard	Bud Jansen	Bud Jansen	Bud Jansen	Bud Jansen	Bob Davis
27. COMPANY	The American Lubricants Co. 1227 Deeds Ave. Dayton, OH 45401 800/543-9720	American Roofing Corp P.O. Box 1516 Des Plaines, IL 60018 312/692-7701	American Roofing Corp P.O. Box 1516 Des Plaines, IL 60018 312/692-7701	American Roofing Corp P.O. Box 1516 Des Plaines, IL 60018 312/692-7701	American Roofing Corp P.O. Box 1516 Des Plaines, IL 60018 312/692-7701	Apache 2025 E. Linden Linden, NJ 07036 201/486-6723

MODIFIED BITUMENS Part 1 *(See Part 2 for Test Results)*

Dibiten	Conso-Gard	Conso-Gard II	Glasdan R-36	Esterdan R-36	Glasdan AL-80	Esterdan RM	Stressply	Pitchply
4	118	157	140	140	140	140	80	60
	Plain	Plain	Bitumen	Bitumen	Alum.	Mineral granules		
Polyester or Fiberglass	Polyester	Polyester	Glass Fiber	Polyester	Glass Fiber	Polyester	2 plies woven glass	unreinforced
Black	Black	Black	Black	Black	Alum.	White & Other Mineral Colors	Black	Black
88	60	90	0.77	.77	.77	77	1.65 lbs.*	1.50 lbs.*
None	Yes	Yes	Fibrated emulsion or second membrane	Fibrated Emulsion or Top Second Membrane	None	None	Gravel or Alum.	Gravel
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
Torch	Torch	Torch	Torch or Hot Asphalt	Torch or Hot Asphalt	Torch or Hot Asphalt	Torch or Hot Asphalt	Bitumen/Adhesive	Bitumen/Adhesive
	10 lb.	10 lb.	4					
	X	X						
Torch	X	X	Torch or Hot Asphalt	Torch or Hot Asphalt	Torch or Hot Asphalt	Torch or Hot Asphalt	X	X
	X	X					X	X
Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
							X	X
X	X	X	X	X	X	X	X	X
			X	X	X	X		
X	X	X	X	X	X	X	X	X
Any skinned insulation, wood, metal, concrete, protection board				X				
None	None	None		None				
10°F — 120°F	40° F-115° F	40° F-115° F	14° F-100°F	14°F-100°F	14°F-100°F	14° F-100°F	35° F-120° F	35° F-120° F
same mat'l	same mat'l.	same mat'l.	Glasdan AL-80 or Esterdan RM	Glasdan AL-80 or Esterdan RM	Same material or Esterdan RM	Glasdan AL-80 or Esterdan RM	same mat'l	same mat'l
Torch	Torch	Torch	Torch and Hot Asphalt	Torch or Hot Asphalt	Torch or Hot Asphalt	Torch or Hot Asphalt	Bitumen/Adhesive	Bitumen/Adhesive
No	No	No	No	No	No	No	No	Yes
Italy	U.S.A.	U.S.A.	Puerto Rico USA	Puerto Rico USA	Puerto Rico USA	Puerto Rico USA	U.S.A.	England
Italy	U.S.A.	U.S.A.	Puerto Rico USA	Puerto Rico USA	Puerto Rico USA	Puerto Rico USA	U.S.A.	U.S.A.
1969								1965
1978-Newark			1979 San Juan	1979 San Juan	1979 San Juan	1979 San Juan	1978-Cleveland	1976-Cleveland
4,100,000								5,000,000+
175,000			500,000	409,000	350,000	300,000	75,000	80,000+
10	10	10	10	10	10	10	10	10
			X	X	X	X		
	X	X						
X			X	X	X	X	X	X
							None	X
X			X	X	X	X		
			X	X	X	X		
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
			see specifications	see specifications	see specifications	see specifications		
							X	X
X							X	X
Distributors	Direct	Direct	Distributors	Distributors	Distributors	Distributors	Company Sales Force	Company Salesforce
2							58	58
No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Field, Seminars	Yes	Yes	Seminars — on job training	Seminars — on job training	Seminars — on job training	Seminars — on job training	Field, Seminars	Field, Seminars
Charles Whitley	F. Malloy	F. Malloy	Manuel del Rio	Manolo del Rio	Manuel del Rio	Manolo del Rio	Richard DeBacco	Richard DeBacco
Elmer Favaro	G. Kurtzhals	G. Kurtzhals	Rogelio Mur	Rogelio Mur	Rogelio Mur	Rogelio Mur	Joseph Fogel	Joseph Fogel
Bowe Company, Inc. (Dibiten) 24 Market Street Saddle Brook, NJ 07662 201/845-5900	Cons. Prot. Coatings Corp 1801 E. 9th Street Cleveland, OH 44114 800/321-7886	Cons. Prot. Coatings Corp 1801 E. 9th Street Cleveland, OH 44114 800/321-7886	Danosa Carribbean, Inc Box 13757 Santurce Station San Juan, PR 00908 809/785-4545	Danosa Caribbean, Inc Box 13757 Santurce Station San Juan, PR 00908 809/785-4545	Danosa Caribbean, Inc Box 13757 Santurce Station San Juan, PR 00908 809/785-4545	Danosa Carribbean, Inc Box 13757 Santurce Station San Juan, PR 00908 809/785-4545	The Garland Co., Inc. 3800 E. 91st Street Cleveland, OH 44105 216/641-7500 *includes gravel	The Garland Co., Inc. 3800 E. 91st St. Cleveland, OH 44105 216/641-7500 *includes gravel

MODIFIED BITUMENS Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME►	Hey 'Di ECB	HyLoad 150E	Duralasta P	Duralasta M	Aquashield 2001 AD	Royal
1. PRODUCT DESCRIPTION						
a) Thickness (mils)	83	150	160	160	60	157
b) Top surface		Black	Optional	Slate Chip		Modified Bitumen
c) Reinforcement	Non-woven Fiberglass	Dispersed	Polyester	Polyester	Polyester	Polyester non-woven fabric
d) Reinforcement		Fiber			Polyester	
e) Color	Black	Black	Black	Green/Blue	Grey/Black	Black
f) Installed wt. (psf w/o ballast)	.5 lb	.40	1.0	1.0	.80	0.82
2. COATING REQUIRED	None	Gravel	Surfacing	None	Yes	Alum.
3. USE						
a) New roofing	X	X	X	X	X	X
b) Reroofing	X	X	X	X	X	X
4. FIELD LAP JOINT METHOD	Hot air welding	Asphalt	Torch/Hot Asphalt	Torch/Hot Asphalt	Self-Adhered	Torch
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	10 lbs					
b) Partially adhered-method	Hot Asphalt		Torch/Hot Asphalt	Torch/Hot Asphalt		X
c) Fully adhered-method	Hot Asphalt	Asphalt	Torch/Hot Asphalt	Torch/Hot Asphalt	Primer	X
d) Prot. Memb. Rfg. Assy.			Torch/Hot Asphalt	Torch/Hot Asphalt		
6. MINIMUM SLOPE	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level
7. USE OVER						
a) Perlite	X	X			X	X
b) Urethane	X	X				X
c) Wood fibre	X	X			X	
d) Fibre glass	X	X			X	X
e) Exp. polystyrene	X					
f) Felt faced composites	X	X				X
g) Other		Base sht. #4 glass or perf. base sht.	Ctd glass fib. base sht. attached to insul. or existing rfg. membrane	Ctd glass fib. base sht. attached to insul. or existing rfg. membrane	Concrete, Steel	
8. RESTRICTED REGIONS *(See "Important Notes")*	X					
9. WORKABLE TEMP RANGE	–30°F - 150°F	32°F-115°F			40°F min.	15° F-115° F
10. FLASHING MATERIAL	ECB Cold Adhesive	same mat'l	same mat'l	same mat'l	same mat'l.	same mat'l
11. FLASHING METHOD	Hot Asphalt	Nailed/Asphalt	Torch/Hot Asphalt	Torch/Hot Asphalt	Primer	Torch
12. PRE-FORMED ACCESS AVAIL.	Yes	No	No	No	Yes	No
13. COUNTRY OF ORIGIN	W. Germany	England	Netherlands	Netherlands	U.S.A.	Italy
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	Germany	Germany	U.S.A.	U.S.A.
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	1964	1965	1978	1978	NA	1967
b) U.S.A. (Year, City-first installed)	1982-St. Louis	1976-Cleveland	1982-St. Louis	1982-St. Louis	NA	1978-Detroit
16. NO. OF SQUARES INSTALLED						
a) Foreign	Approx. 10,000,000	>5,000,000	25,000	15,000	NA	
b) U.S.A.	2,000	80,000	450	600	NA	
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	10	10	10	10	5
b) Renewable after inspection						+ 5 years
c) Scope of coverage (repair of leaks)						
c.1 Material only		X	X	X	X	X
c.2 Workmanship & material	X					
d) Monetary limitation						
d.1 None		X	X	X		
d.2 Orig. cost of installation					X	
d.3 $ per square	X					
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X	X	X
e.2 Consequential damages		X	X	X	X	X
18. LIMITATIONS OR RESTRICTED USE	See literature					
19. UL *(See "Important Notes")*		X			NA	X
20. FM *(See "Important Notes")*	X	X			NA	X
21. METHOD OF DISTRIB.	Distrs.	Distributors	Distrs./Contrs.	Distrs./Contrs.	Direct	Sales Force
22. # REGIONAL SERVICE LOCATIONS	12		3	3		Throughout U.S.A.
23. LICENSED APPLICATOR AGREEMENT	Yes	No			Yes	No
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Field, Seminars, Factory		Field	Field	Field, Factory, Seminars	Field, Seminars
25. SALES INFO CONTACT	Harold M. Muench	Alex Harkness	T. J. Evans	T. J. Evans	R. Wood	Pat Pate
26. TECHNICAL INFO. CONTACT	Harold M. Muench		Hugo Landheer	Hugo Landheer	R. Wood	Royal Oil Company
27. COMPANY	Hey 'Di UPM Corp. 2801 Crusader Circle Va. Beach, VA 23456 804/468-2200	HyLoad, Inc. 1006 McKnight Park Dr. Pittsburgh, PA 15237 412/367-0633	The Kimmenade Corp. 12820 Pennridge Drive Bridgeton, MO 63044 314/739-4594	The Kimmenade Corp. 12820 Pennridge Drive Bridgeton, MO 63044 314/739-4594	J & P Petroleum Products P.O. Box 4206 Sta. A Dallas, TX 75208 214/291-1591	Royal Oil Company 917 N. Main Ft.Worth, TX 76106 817/332-7001

ODIFIED BITUMENS Part 1 *(See Part 2 for Test Results)*

Aluminum Faced)	Veral (stain/steel)	Veral (Copper)	Parafor-50	Paradiene-30	Paradiene-20	Rhoflex	MightyPlate	Brai SP4
130	130	130	150	95	90	160	157	150
Aluminum	Stain/Steel	Copper	Mineral	Mineral	Plain	can be coated	Modified Bitumen	
Glass Scrim	Glass Scrim	Glass Scrim	Polyester	Glass Mat	Glass mat	Polyester	Polyester non-woven fabric	Polyester
N/A	N/A	N/A	N/A	N/A	N/A			
Aluminum	Stain/Steel	Copper	Various	Various	Black	Black	Black	Black
86	86	86	1.47	.77	.48	.88	0.82	0.88
None	None	None	None	None	Paradiene 30	None	Alum.	Alum.
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
Hot/Torch	Hot/Torch	Hot/Torch	Hot/Torch		Hot Asphalt	Torch	Torch	Torch
					Hot Asphalt		X	
Hot/Torch	Hot/Torch	Hot/Torch	Hot/Torch	Hot Asphalt	Hot Asphalt	Torch	X	Torch
				Hot Asphalt	Hot Asphalt	DOW IRMA		
½ inch	½ inch	½ inch	½ inch	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level
X	X	X	X		X	X	X	X
						X	X	X
X	X	X	X		X	X		X
X	X	X	X		X	X	X	X
						X		X
						X	X	X
Cellular Glass. Always use with Fiberglass base sheet as a system	Cellular Glass. Always use with Fiberglass base sheet as a system	Cellular Glass. Always use with Fiberglass base sheet as a system	Cellular Glass.	Always use with Paradiene 20 as a system	Cellular Glass Always use with Paradiene 30 as a system	X		
						Alaska		1
						0°F - 130°F	15° F-115° F	0° F-120° F
same mat'l.	same mat'l.	same mat'l.	Same/Veral	Veral	Veral	same mat'l.	same mat'l	same mat'l
Torch	Torch	Torch	Torch	Torch	Torch	Torch	Torch	Torch
Unnecessary	Unnecessary	Unnecessary	Unnecessary	Unnecessary	Unnecessary	No	No	No
France	France	France	France	France	France	Italy	Italy	Italy
France	France	France	France	U.S.A.	U.S.A.	U.S.A. & Italy	U.S.A.	U.S.A.
				1968	1968	1970	1967	1961
				1979-Jacksonville	1979-Jacksonville	1977-Westchester	1978-Detroit	1978-Detroit
						Millions		10,000,000
						Hundreds of Thousands		117,500
10	10	10	10	10	10	10 + 5	5	12
No	No	No	No	No	No	X	+ 5 years	No
							X	
X	X	X	X	X	X	X		X
X	X	X	X	X	X	X		X
X	X	X	X	X	X	X	X	
X	X	X	X	X	X	X	X	
Contact Siplast	Contact Siplast	Contact Siplast	Contact Siplast	Contact Siplast	Contact Siplast			
						X	X	X
						IT	X	X
Direct	Direct	Direct	Direct	Direct	Direct	Distributors	Sales Force	Distributors
5	5	5	5	5	5	22	Throughout U.S.A. & Canada	12
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Field, Seminars	Seminars, Factory
J. Mollenhoff	J. Mollenhoff	J. Mollenhoff	J. Mollenhoff	J. Mollenhoff	J. Mollenhoff	Gardner Rowbotham	Leroy Groce	Bailey King
G. Baumgardner	G. Baumgardner	G. Baumgardner	G. Baumgardner	G. Baumgardner	G. Baumgardner	Mat Bockh	Mark Buse	Craig Noble
Siplast, Inc. Hwy 67 South Arkadelphia, AR 71923 501/246-8094	Siplast, Inc. Hwy 67 South Arkadelphia, AR 71923 501/246-8094	Siplast, Inc. Hwy 67 South Arkadelphia, AR 71923 501/246-8094	Siplast, Inc. Hwy 67 South Arkadelphia, AR 71923 501/246-8094	Siplast, Inc. Hwy 67 South Arkadelphia, AR 71923 501/246-8094	Siplast, Inc. Hwy 67 South Arkadelphia, AR 71923 501/246-8094	Teltex, Inc. Commerce Drive N. Branford, CT 06471 800/243-6258	Texas Refinery Corp. One Refinery Place Ft.Worth, TX 76101 817/332-1161	U.S. Intec, Inc. 1212 Brai Drive P.O. Box 2845 Port Arthur, TX 77640 800/231-4631 800/392-4216 (in Texas)

MODIFIED BITUMENS Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME►	GRM-120	GRM-230	GRM-350	GRM-500		
1. PRODUCT DESCRIPTION						
a) Thickness (mils)	50	50	50	40		
b) Top surface	Polyethylene	Polyethylene	Polyethylene	Polyvinyl Fluoride		
c) Reinforcement	Alum. Foil			Polyethylene		
d) Reinforcement				Alum. Foil		
e) Color	Grey -Black	Grey -Black	Grey -Black	White		
f) Installed wt. (psf w/o ballast)	.34	.34	.34	.30		
2. COATING REQUIRED	White	Gravel	Insul. Board	None		
3. USE						
a) New roofing	X	X	X	X		
b) Reroofing	X	X	X	X		
4. FIELD LAP JOINT METHOD	Self-adhesive	Self-adhesive	Self-adhesive	Self-adhesive		
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)						
b) Partially adhered-method	Nailed Laps	Nailed Laps		Nailed Laps		
c) Fully adhered-method	Self-Adhesive	Self-Adhesive	Self-Adhesive	Self-Adhesive		
d) Prot. Memb. Rfg. Assy.			Self-Adhesive			
6. MINIMUM SLOPE	To Drain	To Drain	To Drain	To Drain		
7. USE OVER						
a) Perlite	X	X		X		
b) Urethane						
c) Wood fibre	X	X		X		
d) Fibre glass	X	X		X		
e) Exp. polystyrene	X	X		X		
f) Felt faced composites						
g) Other	Isopcyanurate, Foamed Glass	Isopcyanurate, Foamed Glass	Concrete, Gypsum, Plywood	Isopcyanurate, Foamed Glass		
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	None	None		
9. WORKABLE TEMP RANGE	40° F-120° F	40° F-120° F	40° F-120° F	40° F-120° F		
10. FLASHING MATERIAL	same mat'l	same mat'l	GRM-120 or GRM-500	same mat'l		
11. FLASHING METHOD	Self-Adhesive	Self-Adhesive	Self-Adhesive	Self-Adhesive		
12. PRE-FORMED ACCESS AVAIL.	No	No	No	No		
13. COUNTRY OF ORIGIN	U.S.A.	U.S.A.	U.S.A.	U.S.A.		
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	U.S.A.	U.S.A.		
15. YR. FIRST COMMER. USE						
a) Foreign (Year)			1971-Toronto			
b) U.S.A. (Year, City-first installed)	1979-Phoenix	1975-Toledo	1972-Boston	1980-Glenview		
16. NO. OF SQUARES INSTALLED						
a) Foreign						
b) U.S.A.	>250,000	>250,000	<250,000	<250,000		
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	10	10	10		
b) Renewable after inspection						
c) Scope of coverage (repair of leaks)						
c.1 Material only						
c.2 Workmanship & material	X	X	X	X		
d) Monetary limitation						
d.1 None	X	X	X	X		
d.2 Orig. cost of installation						
d.3 $ per square						
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X		
e.2 Consequential damages	X	X	X	X		
18. LIMITATIONS OR RESTRICTED USE			Only in PRMA Systems			
19. UL *(See "Important Notes")*	X	X	X	X		
20. FM *(See "Important Notes")*	X	X		X		
21. METHOD OF DISTRIB.	Direct Sale	Direct Sale	Direct Sale	Direct Sale		
22. # REGIONAL SERVICE LOCATIONS	5	5	5	5		
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes	Yes		
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Field, Regional Seminars	Field, Regional Seminars	Field, Regional Seminars	Field, Regional Seminars		
25. SALES INFO CONTACT	Regional Office	Regional Office	Regional Office	Regional Office		
26. TECHNICAL INFO. CONTACT	Regional Office	Regional Office	Regional Office	Regional Office		
27. COMPANY	W. R. Grace & Co. 62 Whittemore Avenue Cambridge, MA 02130 617/876-1400	W. R. Grace & Co. 62 Whittemore Avenue Cambridge, MA 02140 617/876-1400	W. R. Grace & Co. 62 Whittemore Avenue Cambridge, MA 02140 617/876-1400	W. R. Grace & Co. 62 Whittemore Avenue Cambridge, MA 02140 617/876-1400		

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-56M	Tiffany Type 1a, 2a Class Grade 2	ARC Standard Type 1a, 2a Class C Grade 1	ARC Aluminum Type 1a, 2a Class B Grade 1
1. BREAKING STRENGTH GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD 111 lbf XD 480 lbf	MD 106 lbf XD 71 lbf
GRADE 2-Min. 176 lbf (785N)	MD 208 lbf XD 180.4 lbf	MD 111 lbf XD 480 lbf	MD 106 lbf XD 71 lbf
2. ULTIMATE ELONGATION (ELONGATION AT BREAK) GRADE 1-Min. 4.0%	MD ____ % XD ____ %	MD 38 lbf XD 44 lbf	MD 40 lbf XD 38 lbf
GRADE 2-Min. 8.0%	MD 72.38 % XD 64.76 %	MD 38 lbf XD 44 lbf	MD 40 lbf XD 38 lbf
3. LOAD STRAIN PRODUCT [BREAK STRENGTH (N) x ULTIMATE ELONGATION (%)] GRADE 1-If breaking strength is not met; 19400			
GRADE 1-If breaking strength is met; 2940		18,770	18,840
GRADE 2-Min. 14700		18,770	18,840
4. WATER RESISTANCE Shall not absorb more than 1.0g. of water	0.0 g.	<1.0 g.	<1.0 g.
Dimensional change shall not exceed ± 1.0%	MD 1.0 % XD 1.0 %	MD <1.0 % XD <1.0 %	MD <1.0 % XD <1.0 %
5. LOW TEMP FLEXIBILITY — 4 out of 5 samples will pass water tightness test TYPE 1-After testing at −22°F (−30°C) (Pass/Fail)		Pass	Pass
TYPE 2-After testing at −14°F (−10°C) (Pass/Fail)	Pass	Pass	Pass
6. WATER VAPOR TRANSMISSION Max. 1.0g./m² x 24h.	0.06 g.	0.132 g.	0.132 g.
7. THERMAL STABILITY TYPE 1, CLASS B ONLY-Expansion or contraction less than 1 mm/m between 10 and 30 cycles	m.	N/A m.	IT m.
8. DYNAMIC IMPACT (PUNCTURING) Pass water tightness test after energy impact of: Grade 1 — 1.8 ft. lbf (2.45J) (Pass/Fail)		Pass	Pass
Grade 2 — 3.6 ft. lbf (4.9J) (Pass/Fail)	Pass	Pass	IT
9. STATIC PUNCTURING TYPE 1-After 1 hr. at 55 lbf (245N) shall pass water tightness test (Pass/Fail)	Pass	Pass	Pass
10. LAP JOINT STRENGTH **5 Day Conditioning** GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD 168 lbf XD 442 lbf	MD 84 lbf XD 76 lbf
GRADE 2-Min. 176 lbf (785N)	MD 166.32 lbf XD ____ lbf	MD 168 lbf XD 442 lbf	MD 84 lbf XD 76 lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)	Pass	Pass	Pass
Immersion at 50°C for 5 Days GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD 144 lbf XD 392 lbf	MD 99 lbf XD 73 lbf
GRADE 2-Min. 176 lbf (785N)	MD 176.8 lbf XD ____ lbf	MD 144 lbf XD 392 lbf	MD 99 lbf XD 73 lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)	Pass	Pass	Pass
Immersion at 50°C for 5 Days Plus Freeze Thaw Cycles GRADE 1-Min 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD 145 lbf XD 402 lbf	MD 95 lbf XD 63 lbf
GRADE 2-Min 176 lbf (785N)	MD 175.48 lbf XD ____ lbf	MD 145 lbf XD 402 lbf	MD 95 lbf XD 63 lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)	Pass	Pass	Pass
11. GRANULE EMBEDMENT CLASS A ONLY-Max. 0.5 g. loss	g.	N/A g.	N/A g.
12. ACCELERATED WEATHERING TYPE 1 ONLY-after prescribed no. of cycles (approx. 90 days) Shall not show cracking or blistering (Pass/Fail)	Pass	IT	IT
Retain 90% of breaking strength, Test 1	MD 189.69 % XD 165.97 %	MD IT % XD IT %	MD IT % XD IT %
Retain 90% of elongation at break, Test 2	MD 66.15 % XD 59.58 %	MD IT % XD IT %	MD IT % XD IT %
13. CRACK BRIDGING CAPABILITY Shall show no cracking, splitting or loss of adhesion TYPE 1.a. and 1.b.-at −22°F (−30°C) (Pass/Fail)		IT	IT
TYPE 2.a. and 2.b.-at −14° (−10°C) (Pass/Fail)	Pass	IT	IT
	The American Lubricants Co.	American Roofing Corp.	American Roofing Corp.

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

ARC Premium	Arc Granular	SAM	Dibiten	Conso-Gard	Conso-Gard II
Type 1a, 2a	Type 1a, 2a	Type	Type	Type 1a, 1b, 2a, 2b, 2c	Type 1a, 1b, 2a, 2b, 2c
Class C	Class A	Class	Class	Class C	Class C
Grade 1 & 2	Grade 1 & 2	Grade	Grade	Grade 1	Grade 2
MD 164 lbf XD 134 lbf	MD 158 lbf XD 124 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD 67.2 lbf XD 44.8 lbf	MD ___ lbf XD ___ lbf
MD 164 lbf XD 134 lbf	MD 158 lbf XD 124 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
MD 58 % XD 81 %	MD 89 lbf XD 106 lbf	MD ___ lbf XD ___ lbf	MD ___ % XD ___ %	MD 35 lbf XD ___ lbf	MD ___ lbf XD ___ lbf
MD 58 % XD 81 %	MD 89 lbf XD 106 lbf	MD ___ lbf XD ___ lbf	MD ___ % XD ___ %	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
42.300	62.600				
42.300	62.600				
< 1.0 g.	< 1.0 g.	___ g.	___ g.	nil g.	___ g.
MD < 1.0 % XD < 1.0 %	MD < 1.0 % XD < 1.0 %	MD ___ % XD ___ %	MD ___ % XD ___ %	MD nil % XD nil %	MD ___ % XD ___ %
Pass	Pass	NOT AVAILABLE	NOT AVAILABLE	Pass	
Pass	Pass				Pass
0.132 g.	0.132 g.	___ g.	___ g.	___ g.	___ g.
N/A m.	N/A m.	___ m.	___ m.	___ m.	___ m.
Pass	Pass			Pass	
Pass	Pass				Pass
Pass	Pass			Pass	Pass
MD 128 lbf XD 104 lbf	MD 168 lbf XD 130 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
MD 128 lbf XD 104 lbf	MD 168 lbf XD 130 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
Pass	Pass				
MD 155 lbf XD 137 lbf	MD 140 lbf XD 123 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
MD 155 lbf XD 137 lbf	MD 140 lbf XD 123 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
Pass	Pass				
MD 155 lbf XD 129 lbf	MD 164 lbf XD 127 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
MD 155 lbf XD 129 lbf	MD 164 lbf XD 127 lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
Pass	Pass				
N/A g.	.01g/cm² g.	___ g.	___ g.	___ g.	___ g.
IT	IT				
MD IT % XD IT %	MD IT % XD IT %	MD ___ % XD ___ %	MD ___ % XD ___ %	MD ___ % XD ___ %	MD ___ % XD ___ %
MD IT % XD IT %	MD IT % XD IT %	MD ___ % XD ___ %	MD ___ % XD ___ %	MD ___ % XD ___ %	MD ___ % XD ___ %
IT	IT				
IT	IT				
American Roofing Corp.	American Roofing Corp.	Apache	Bowe Company, Inc. (Dibiten)	Cons. Prot. Coatings Corp.	Cons. Prot. Coatings Corp.

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-56M	Glasdan R36 Type 2.A Class C Grade 1	Esterdan R-36 Type 2a Class C Grade	Glasdan AL-80 Type 1a Class B Grade 1
1. BREAKING STRENGTH GRADE 1-Min. 66 lbf (294N)	* MD ____ lbf XD * ____ lbf	MD ____ lbf XD ____ lbf	* MD ____ lbf XD * ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	* MD ____ lbf XD * ____ lbf	MD ____ lbf XD ____ lbf
2. ULTIMATE ELONGATION (ELONGATION AT BREAK) GRADE 1-Min. 4.0%	* MD ____ % XD * ____ %	MD ____ lbf XD ____ lbf	* MD ____ lbf XD * ____ lbf
GRADE 2-Min. 8.0%	MD ____ % XD ____ %	* MD ____ lbf XD * ____ lbf	MD ____ lbf XD ____ lbf
3. LOAD STRAIN PRODUCT [BREAK STRENGTH (N) x ULTIMATE ELONGATION (%)] GRADE 1-If breaking strength is not met; 19400	____	____	____
GRADE 1-If breaking strength is met; 2940	____	____	____
GRADE 2-Min. 14700	* ____	* ____	* ____
4. WATER RESISTANCE Shall not absorb more than 1.0g. of water	* ____ g.	* ____ g.	0 g.
Dimensional change shall not exceed ± 1.0%	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
5. LOW TEMP FLEXIBILITY — 4 out of 5 samples will pass water tightness test TYPE 1-After testing at – 22 °F (– 30 °C) (Pass/Fail)	____	____	Pass
TYPE 2-After testing at – 14 °F (– 10 °C) (Pass/Fail)	Pass	Pass	____
6. WATER VAPOR TRANSMISSION Max. 1.0g./m² x 24h.	6.29 g.	6.29 g.	3.42 g.
7. THERMAL STABILITY TYPE 1, CLASS B ONLY-Expansion or contraction less than 1 mm/m between 10 and 30 cycles	N/A m.	N/A m.	N/A m.
8. DYNAMIC IMPACT (PUNCTURING) Pass water tightness test after energy impact of: Grade 1 — 1.8 ft. lbf (2.45J) (Pass/Fail)	____	____	Pass
Grade 2 — 3.6 ft. lbf (4.9J) (Pass/Fail)	Pass	Pass	____
9. STATIC PUNCTURING TYPE 1-After 1 hr. at 55 lbf (245N) shall pass water tightness test (Pass/Fail)	____	____	____
10. LAP JOINT STRENGTH **5 Day Conditioning** GRADE 1-Min. 66 lbf (294N)	* MD ____ lbf XD ____ lbf	* MD ____ lbf XD ____ lbf	* MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)	Pass	Pass	Pass
Immersion at 50°C for 5 Days GRADE 1-Min. 66 lbf (294N)	* MD ____ lbf XD ____ lbf	* MD ____ lbf XD ____ lbf	* MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)	Pass	Pass	Pass
Immersion at 50°C for 5 Days Plus Freeze Thaw Cycles GRADE 1-Min 66 lbf (294N)	* MD ____ lbf XD ____ lbf	* MD ____ lbf XD ____ lbf	* MD ____ lbf XD ____ lbf
GRADE 2-Min 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)	Pass	Pass	Pass
11. GRANULE EMBEDMENT CLASS A ONLY-Max. 0.5 g. loss	N/A g.	N/A g.	N/A g.
12. ACCELERATED WEATHERING TYPE 1 ONLY-after prescribed no. of cycles (approx. 90 days) Shall not show cracking or blistering (Pass/Fail)	Pass	Pass	Pass
Retain 90% of breaking strength, Test 1	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
Retain 90% of elongation at break, Test 2	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
13. CRACK BRIDGING CAPABILITY Shall show no cracking, splitting or loss of adhesion TYPE 1.a. and 1.b.-at – 22 °F (– 30 °C) (Pass/Fail)	Danosa note: * indicates tests performed according to ASTM specifications (not CGSB standard 37-GP-56M); test results available from manufacturer.		
TYPE 2.a. and 2.b.-at – 14 ° (– 10 °C) (Pass/Fail)			

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Danosa Carribbean, Inc. | Danosa Carribbean, Inc. | Danosa Carribbean, Inc.

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

Esterdan RM	Stressply	Pitchply	Hey'Di ECB	Hyload 150E	Duralasta P
Type 1a	Type N/A	Type N/A	Type	Type 2A	Type 2.a, 2.b
Class A	Class C	Class C	Class	Class A	Class A
Grade 1	Grade 1 & 2	Grade 1 & 2	Grade	Grade	Grade 2
MD ___ lbf XD ___ lbf	MD 318 lbf XD 324 lbf	MD 247 lbf XD 157 lbf	MD ___ lbf XD ___ lbf	MD 247 lbf XD 157 lbf	MD ___ lbf XD ___ lbf
* MD ___ lbf XD ___ lbf	MD 318 lbf XD 324 lbf	MD 247 lbf XD 157 lbf	MD ___ lbf XD ___ lbf	MD 247 lbf XD 157 lbf	MD ___ lbf XD ___ lbf
MD ___ % XD ___ %	MD *340 lbf XD *240 lbf	MD 100 lbf XD 120 lbf	MD ___ % XD ___ %	MD 100 lbf XD 120 lbf	MD ___ lbf XD ___ lbf
* MD ___ % XD ___ %	MD *340 lbf XD *240 lbf	MD 100 lbf XD 120 lbf	MD ___ % XD ___ %	MD 100 lbf XD 120 lbf	MD ___ lbf XD ___ lbf
				132.000	
	14170	132.000			
*	14170			132.000	
* ___ g.	NA g.	0.051 g.	___ g.	0.051 g.	___ g.
MD ___ % XD ___ %	MD NA % XD NA %	MD −0.5 % XD 0.0 %	MD ___ % XD ___ %	MD 0.5 % XD ___ %	MD ___ % XD ___ %
	NA	NA		Fail	
Pass	NA	NA		Pass	
9.17 g.	NA g.	0.5 g.	___ g.	IT g.	___ g.
N/A m.	NA m.	NA m.	___ m.	IT m.	___ m.
	NA	NA		IT	
Pass	NA	NA		IT	
	NA	NA			
MD ___ lbf XD ___ lbf	MD NA lbf XD NA lbf	MD NA lbf XD NA lbf	MD ___ lbf XD ___ lbf	MD IT lbf XD IT lbf	MD ___ lbf XD ___ lbf
* MD ___ lbf XD ___ lbf	MD NA lbf XD NA lbf	MD NA lbf XD NA lbf	MD ___ lbf XD ___ lbf	MD IT lbf XD IT lbf	MD ___ lbf XD ___ lbf
Pass	NA	NA		IT	
* MD ___ lbf XD ___ lbf	MD NA lbf XD NA lbf	MD NA lbf XD NA lbf	MD ___ lbf XD ___ lbf	MD IT lbf XD IT lbf	MD ___ lbf XD ___ lbf
MD ___ lbf XD ___ lbf	MD NA lbf XD NA lbf	MD NA lbf XD NA lbf	MD ___ lbf XD ___ lbf	MD IT lbf XD IT lbf	MD ___ lbf XD ___ lbf
Pass	NA	NA		IT	
MD ___ lbf XD ___ lbf	MD NA lbf XD NA lbf	MD NA lbf XD NA lbf	MD ___ lbf XD ___ lbf	MD IT lbf XD IT lbf	MD ___ lbf XD ___ lbf
* MD ___ lbf XD ___ lbf	MD NA lbf XD ___ lbf	MD NA lbf XD NA lbf	MD ___ lbf XD ___ lbf	MD IT lbf XD IT lbf	MD ___ lbf XD ___ lbf
	NA	NA		IT	
___ g.	N/A g.	N/A g.	___ g.	IT g.	___ g.
Pass	Pass	Pass		IT	
MD ___ % XD ___ %	MD NA % XD NA %	MD NA % XD NA %	MD ___ % XD ___ %	MD IT % XD IT %	MD ___ % XD ___ %
MD ___ % XD ___ %	MD NA % XD NA %	MD NA % XD NA %	MD ___ % XD ___ %	MD IT % XD IT %	MD ___ % XD ___ %
	NA	NA			
	NA	NA		IT	
Danosa Carribbean, Inc.	The Garland Co., Inc.	The Garland Co., Inc.	Hey 'Di UPM Corp.	HyLoad, Inc.	The Kimmenade Corp.

NOT AVAILABLE

NOT AVAILABLE

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-56M	Duralasta M Type 2.a, 2.b Class C Grade 2	Aquashield 2001 AD Type 2a Class C Grade 1 & 2	Royal Single-Ply Type 1a, 2a Class Grade 2
1. BREAKING STRENGTH			
GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD 208 lbf XD 180.4 lbf
2. ULTIMATE ELONGATION (ELONGATION AT BREAK)			
GRADE 1-Min. 4.0%	MD ____ % XD ____ %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 8.0%	MD ____ % XD ____ %	MD ____ lbf XD 70 lbf	MD 72.38 lbf XD 64.76 lbf
3. LOAD STRAIN PRODUCT [BREAK STRENGTH (N) x ULTIMATE ELONGATION (%)]			
GRADE 1-If breaking strength is not met; 19400			
GRADE 1-If breaking strength is met; 2940			
GRADE 2-Min. 14700			
4. WATER RESISTANCE			
Shall not absorb more than 1.0g. of water	____ g.	____ g.	0.0 g.
Dimensional change shall not exceed ± 1.0%	MD ____ % XD ____ %	MD 0.25 % XD 0.25 %	MD 1.0 % XD 1.0 %
5. LOW TEMP FLEXIBILITY — 4 out of 5 samples will pass water tightness test			
TYPE 1-After testing at – 22 °F (– 30 °C) (Pass/Fail)	NOT AVAILABLE		
TYPE 2-After testing at – 14 °F (– 10 °C) (Pass/Fail)		Pass	Pass
6. WATER VAPOR TRANSMISSION			
Max. 1.0g./m² x 24h.	____ g.	____ g.	0.06 g.
7. THERMAL STABILITY			
TYPE 1, CLASS B ONLY-Expansion or contraction less than 1 mm/m between 10 and 30 cycles	____ m.	____ m.	____ m.
8. DYNAMIC IMPACT (PUNCTURING)			
Pass water tightness test after energy impact of:			
Grade 1 — 1.8 ft. lbf (2.45J) (Pass/Fail)			
Grade 2 — 3.6 ft. lbf (4.9J) (Pass/Fail)		Pass	Pass
9. STATIC PUNCTURING			
TYPE 1-After 1 hr. at 55 lbf (245N) shall pass water tightness test (Pass/Fail)		Pass	Pass
10. LAP JOINT STRENGTH			
5 Day Conditioning			
GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD 166.32 lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)		Pass	Pass
Immersion at 50°C for 5 Days			
GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD 176.8 lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)		Pass	Pass
Immersion at 50°C for 5 Days Plus Freeze Thaw Cycles			
GRADE 1-Min 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD 175.48 lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)		Pass	Pass
11. GRANULE EMBEDMENT			
CLASS A ONLY-Max. 0.5 g. loss	____ g.	N/A g.	____ g.
12. ACCELERATED WEATHERING			
TYPE 1 ONLY-after prescribed no. of cycles (approx. 90 days)			
Shall not show cracking or blistering (Pass/Fail)		N/A	Pass
Retain 90% of breaking strength, Test 1	MD ____ % XD ____ %	MD N/A % XD N/A %	MD 189.69 % XD 165.97 %
Retain 90% of elongation at break, Test 2	MD ____ % XD ____ %	MD N/A % XD N/A %	MD 66.15 % XD 59.58 %
13. CRACK BRIDGING CAPABILITY			
Shall show no cracking, splitting or loss of adhesion			
TYPE 1.a. and 1.b.-at – 22 °F (– 30 °C) (Pass/Fail)			
TYPE 2.a. and 2.b.-at – 14 ° (– 10 °C) (Pass/Fail)		NA	Pass

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

The Kimmenade Corp. | J & P Petroleum Products | Royal Oil Company

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

eral (aluminum faced)	Veral (stain/steel)	Veral (copper faced)	Parafor-50	Paradiene-30	Paradiene-20
ype 1a	Type 1a	Type 1a	Type 1a	Type 1a	Type 2a, 2b
lass B	Class B	Class B	Class A	Class A	Class C
rade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
D 139 lbf XD 137 lbf	MD 677 lbf XD 676 lbf	MD 139 lbf XD 137 lbf	MD 164 lbf XD 122 lbf	MD 91 lbf XD 71 lbf	MD 72 lbf XD 67 lbf
D ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
D 4.0 % XD 5.0 %	MD 3.0 lbf XD 3.0 lbf	MD 4.0 lbf XD 5.0 lbf	MD 90 % XD 90 %	MD 24 lbf XD 24 lbf	MD 29 lbf XD 27 lbf
D ____ % XD ____ %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ % XD ____ %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
3613	9039	3557	65,392	9801	9393
0.10 g.	0.10 g.	0.10 g.	0.25 g.	0.23 g.	0.30 g.
MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
				Pass	Pass
____ g.	____ g.	____ g.	____ g.	____ g.	____ g.
____ m.	____ m.	____ m.	N/A m.	N/A m.	N/A m.
Pass	Pass	Pass	Pass	Pass	Pass
MD 169 lbf XD 173 lbf	MD 169 lbf XD 173 lbf	MD 169 lbf XD 173 lbf	MD 161 lbf XD 116 lbf	MD 70 lbf XD 69 lbf	MD 74 lbf XD 72 lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
Pass	Pass	Pass	Pass	Pass	Pass
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
N/A g.	N/A g.	N/A g.	<1.0 g.	<1.0 g.	N/A g.
MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	N/A MD N/A % XD N/A %
MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD N/A % XD N/A %
Siplast, Inc.	Siplast, Inc.	Siplast, Inc.	Siplast, Inc.	Siplast, Inc.	Siplast, Inc.

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-56M	Rhoflex Type 1a, 2a, 2b, 2c Class C Grade 1	Mightyplate Type 1a, 2a Class Grade 2	Brai SP4 Type 2a Class C Grade 2
1. BREAKING STRENGTH			
GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD 208 lbf XD 180.4 lbf	MD 208 lbf XD 180.4 lbf
2. ULTIMATE ELONGATION (ELONGATION AT BREAK)			
GRADE 1-Min. 4.0%	MD 57 % XD 57 %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 8.0%	MD ____ % XD ____ %	MD 72.38 lbf XD 64.76 lbf	MD 72.38 lbf XD 64.76 lbf
3. LOAD STRAIN PRODUCT [BREAK STRENGTH (N) x ULTIMATE ELONGATION (%)]			
GRADE 1-If breaking strength is not met; 19400			
GRADE 1-If breaking strength is met; 2940			
GRADE 2-Min. 14700			
4. WATER RESISTANCE			
Shall not absorb more than 1.0g. of water	____ g.	0.0 g.	0.0 g.
Dimensional change shall not exceed ± 1.0%	MD ____ % XD ____ %	MD 1.0 % XD 1.0 %	MD 1.0 % XD 1.0 %
5. LOW TEMP FLEXIBILITY — 4 out of 5 samples will pass water tightness test			
TYPE 1-After testing at – 22 °F (– 30 °C) (Pass/Fail)			
TYPE 2-After testing at – 14 °F (– 10 °C) (Pass/Fail)		Pass	Pass
6. WATER VAPOR TRANSMISSION			
Max. 1.0g./m² x 24h.	0.78 g.	0.06 g.	0.06 g.
7. THERMAL STABILITY			
TYPE 1, CLASS B ONLY-Expansion or contraction less than 1 mm/m between 10 and 30 cycles	N/A m.	____ m.	____ m.
8. DYNAMIC IMPACT (PUNCTURING)			
Pass water tightness test after energy impact of:			
Grade 1 — 1.8 ft. lbf (2.45J) (Pass/Fail)			
Grade 2 — 3.6 ft. lbf (4.9J) (Pass/Fail)		Pass	Pass
9. STATIC PUNCTURING			
TYPE 1-After 1 hr. at 55 lbf (245N) shall pass water tightness test (Pass/Fail)		Pass	Pass
10. LAP JOINT STRENGTH			
5 Day Conditioning			
GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD 166.32 lbf XD ____ lbf	MD 166.32 lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)		Pass	Pass
Immersion at 50°C for 5 Days			
GRADE 1-Min. 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min. 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD 176.8 lbf XD ____ lbf	MD 176.8 lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)		Pass	Pass
Immersion at 50°C for 5 Days Plus Freeze Thaw Cycles			
GRADE 1-Min 66 lbf (294N)	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
GRADE 2-Min 176 lbf (785N)	MD ____ lbf XD ____ lbf	MD 175.48 lbf XD ____ lbf	MD 175.48 lbf XD ____ lbf
GRADE 1 & 2-Pass water tightness test (Pass/Fail)		Pass	Pass
11. GRANULE EMBEDMENT			
CLASS A ONLY-Max. 0.5 g. loss	____ g.	____ g.	____ g.
12. ACCELERATED WEATHERING			
TYPE 1 ONLY-after prescribed no. of cycles (approx. 90 days)			
Shall not show cracking or blistering (Pass/Fail)		Pass	Pass
Retain 90% of breaking strength, Test 1	MD ____ % XD ____ %	MD 189.69 % XD 165.97 %	MD 189.69 % XD 165.97 %
Retain 90% of elongation at break, Test 2	MD ____ % XD ____ %	MD 66.15 % XD 59.58 %	MD 66.15 % XD 59.58 %
13. CRACK BRIDGING CAPABILITY			
Shall show no cracking, splitting or loss of adhesion			
TYPE 1.a. and 1.b.-at – 22 °F (– 30 °C) (Pass/Fail)			
TYPE 2.a. and 2.b.-at – 14 ° (– 10 °C) (Pass/Fail)		Pass	Pass

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Teltex, Inc. | Texas Refinery Corp. | U.S. Intec, Inc.

MODIFIED BITUMENS Part 2: Test Results *(See Part 1 for General Information)*

GRM 120	GRM 230	GRM 350	GRM 500		
Type 1a, 1b	Type 2a, 2b	Type 2a	Type 1a, 1b	Type	Type
Class C	Class C	Class C	Class C	Class	Class
Grade 1	Grade 1	Grade 1	Grade 1	Grade	Grade
MD 102 lbf XD 122 lbf	MD 102 lbf XD 105 lbf	MD 51 lbf XD 75 lbf	MD 150 lbf XD 168 lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD 210 % XD 151 %	MD 169 lbf XD 139 lbf	MD 215 lbf XD 138 lbf	MD 164 % XD 109 %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ % XD ____ %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ % XD ____ %	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
95.550	76.900	49.000	109.700		
0.04 g.	0.04 g.	0.08 g.	0.07 g.	____ g.	____ g.
MD 0.0 % XD 0.0 %	MD 0.0 % XD 0.3 %	MD 0.0 % XD 0.3 %	MD 0.0 % XD 0.0 %	MD ____ % XD ____ %	MD ____ % XD ____ %
Pass	Pass	Pass	Pass		
____ g.	____ g.	____ g.	____ g.	____ g.	____ g.
____ m.	____ m.	____ m.	____ m.	____ m.	____ m.
MD 93 lbf XD 93 lbf	MD 93 lbf XD 93 lbf	MD 81 lbf XD 81 lbf	MD 104 lbf XD 104 lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
Pass	Pass	Pass	Pass		
MD 121 lbf XD 121 lbf	MD 121 lbf XD 121 lbf	MD 90 lbf XD 90 lbf	MD 121 lbf XD 121 lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
Pass	Pass	Pass	Pass		
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf	MD ____ lbf XD ____ lbf
____ g.	____ g.	____ g.	____ g.	____ g.	____ g.
MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
Pass	Pass	Pass	Pass		
W.R. Grace & Co.	W.R. Grace & Co.	W.R. Grace & Co.	W.R. Grace & Co.		

PVC POLYVINYL CHLORIDE Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	Alkorplan	Rhenofol C-34	Rhenofol C-45	Rhenofol C-52	Rhenofol CV40	Rhenofol CV48
1. PRODUCT DESCRIPTION						
a) Reinforcement	None	None	None	None	None	None
b) Color	Grey	Pale Grey	Pale Grey	Pale Grey	Pale Grey	Pale Grey/White
c) Installed wt. (psf w/o ballast)	.33	.23	.30	.336	.266	.327
2. COATING REQUIRED	None	None	None	None	None	None
3. USE						
a) New roofing	X	X	X	X	X	X
b) Reroofing	X	X	X	X	X	X
4. FIELD LAP JOINT METHOD	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	10	10	10		10	
b) Partially adhered-method				X		X
c) Fully adhered-method						
d) Prot. Memb. Rfg. Assy.		X	X	X	X	X
6. MINIMUM SLOPE	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level
7. USE OVER						
a) Perlite	X	X	X	X	X	X
b) Urethane	X	X	X	X	X	X
c) Wood fibre	X	X	X	X	X	X
d) Fibre glass	X	X	X	X	X	X
e) Exp. polystyrene	X	X	X	X	X	X
f) Felt faced composites	X	X	X	X	X	X
g) Other						
8. RESTRICTED REGIONS *(See "Important Notes")*	Tropical Climate	See Literature	See Literature	See Literature	See Literature	See Literature
9. WORKABLE TEMP RANGE	0°F-115°F	0°F-120°F	0°F-120°F	0°F-120°F	0°F-120°F	0°F-120°F
10. FLASHING MATERIAL	PVC Ctd. Metal	PVC/Ctd Mtl.	PVC/Ctd Mtl.	PVC/Ctd Mtl.	PVC/Ctd Mtl.	PVC/Ctd Mtl.
11. FLASHING METHOD	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat
12. PRE-FORMED ACCESS AVAIL.	Yes	Yes	Yes	Yes	Yes	Yes
13. COUNTRY OF ORIGIN	Belgium	W. Germany	W. Germany	W. Germany	W. Germany	W. Germany
14. COUNTRY OF MANUFACTURE	Belgium	W. Germany/U.S.A.	W. Germany/U.S.A.	W. Germany/U.S.A.	W. Germany/U.S.A.	W. Germany/U.S.A.
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	1970	1966	1966		1966	
b) U.S.A. (Year, City-first installed)	1980 Lincoln, NE	1976 - Indianapolis	1976 - Indianapolis		1976	1976
16. NO. OF SQUARES INSTALLED						
a) Foreign	NA	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
b) U.S.A.	50,000	500,000	500,000	500,000	500,000	500,000
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	5/10	5/10	5/10	5/10	5/10
b) Renewable after inspection						
c) Scope of coverage (repair of leaks)						
c.1 Material only						
c.2 Workmanship & material	X	X	X	X	X	X
d) Monetary limitation						
d.1 None	X					
d.2 Orig. cost of installation		X	X	X	X	X
d.3 $ per square						
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X	X	X
e.2 Consequential damages	X	X	X	X	X	X
18. LIMITATIONS OR RESTRICTED USE	Coal Tar	Coal Tar, Oils, Animal Fats (applicable with proper procedures	Coal Tar, Oils, Animal Fats (applicable with proper procedures)	Coal Tar, Oils, Animal Fats (applicable with proper procedures)	Coal Tar, Oils, Animal Fats (applicable with proper procedures)	Coal Tar, Oils, Animal Fats (applicable with proper procedures)
19. UL *(See "Important Notes")*	X	X	X		X	X
20. FM *(See "Important Notes")*		X	X		X	X
21. METHOD OF DISTRIB.	Mfgr/Reps.	Direct to Contr.	Direct to Contr.	Direct to Contr.	Direct to Contr.	Direct to Contr.
22. # REGIONAL SERVICE LOCATIONS		9	9	9	9	9
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes	Yes	Yes	Yes
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	On job training	Factory, Field	Factory, Field	Factory, Field	Factory, Field	Factory, Field
25. SALES INFO CONTACT	Office	Customer Service	Customer Service	Customer Service	Customer Service	Customer Service
26. TECHNICAL INFO. CONTACT	Office	Technical Service	Technical Service	Technical Service	Technical Service	Technical Service
27. COMPANY	Alkor-Division of the Solvay American Corp. 609 Fifth Ave. New York, NY 10017 212/935-5458	Barra Corporation of America, Inc. 190 Fairfield Avenue W. Caldwell, NJ 07006 201/226-2136 800/526-2201	Barra Corporation of America, Inc. 190 Fairfield Avenue W. Caldwell, NJ 07006 201/226-2136 800/526-2201	Barra Corporation of America, Inc. 190 Fairfield Avenue W. Caldwell, NJ 07006 201/226-2136 800/526-2201	Barra Corporation of America, Inc. 190 Fairfield Avenue W. Caldwell, NJ 07006 201/226-2136 800/526-2201	Barra Corporation of America, Inc. 190 Fairfield Avenue W. Caldwell, NJ 07006 201/226-2136 800/526-2201

/C POLYVINYL CHLORIDE **Part 1** *(See Part 2 for Test Results)*

teroof "U"	Interoof "B"	Plyroof PVC Grey	Plyroof PVC White	Sucoflex F132	Sucoflex F127	Nervaply	Nervaply UB	Sarnafil G21-410
None	None	None	None	Fiberglass	Polyester	None	None	Fiberglass
Gray	Gray	Grey	White	Light Grey	Light Grey	Slate	Bone	Grey & Asst'd
40	30	32	32	.33	.33	36	49	33
None	None	None	None	None	None	None	None	None
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
Vent/Thermal	Solvent/Thermal	Solvent/Heat	Solvent/Heat	Hot Air Weld	Hot Air Weld	Solvent/Heat	Solvent/Heat	Hot Air Weld
	12	10-13	10-13	12		10		
X		Batten	Batten	X	Mech. Fastened	Loose Laid	Bar/Strip Anchor	
				X			No	X
		X	X	X				
Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	1:12	6:12*	Dead Level
X	X	X	X	X	X	X	X	
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
	X	X	X	X	X	X	X	
X	X	X	X	X	X	X	X	
X	X	X	X		X	X	X	
		Approval of Plyroof Tech. Dept.	Approval of Plyroof Tech. Dept.	Concrete, Plywood	Concrete, Plywood			
None	None	None	None	None	None	None	None	None
0°F-110°F	0°F-100°F	5°F-120°F	5°F-120°F	0°F-120°F	0°F-120°F	5°F-140°F	5°F-140°F	0°F-120°F
PVC/Ctd Mtl.	PVC/Ctd Mtl.	PVC ctd. Metal	PVC Ctd. Metal	PVC Clad Metal	PVC Clad Metal	Self	Self	G21-410
Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat	Hot Air Weld	Hot Air Weld	Solvent/Heat	Solvent/Heat	Adhesive & Heat Weld
Yes	Yes	No	No			No	No	Yes
Austria	Austria	U.S.A.	U.S.A.	Switzerland	Switzerland	U.S.A.	U.S.A.	Switzerland
Austria	Austria	U.S.A.	U.S.A.	Switzerland	Switzerland	U.S.A.	U.S.A.	U.S.A.
1970	1968			1969	1969	1980	1981	1964
982 - Los Angeles	1982 - Detroit	1975-Pueblo	1981 Franklin	1980-Hawthorne	1980-El Segundo	1980 NY City	1980 Flint	1975-New Hampshire
				500,000		None	None	NA
		409,000	2,000	100,000		50,000	30,000	12,000,000
10	10	10	10	10	10	10	10	10
		No	No			X	X	No
								X
X	X	X	X	X	X	X	X	X
X	X			X	X	X	X	
		X	X					
						$3.00	$3.00	Replacement Value
								X
	X	X	X			X	X	X
Coal Tar	Coal Tar	Coal Tar	Coal Tar			Coal Tar	Needs Separate Sheet	Bitumen, Oils, Animal Fats
		X	X	X	X	X	X	X
X				X	X			X
Direct	Direct	Direct	Direct	Direct	Direct	Distributor	Distributor	Direct
		4	4	5	5	2	2	6
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Field	Field	Field	Field	Yes	Yes	Field	Field	Factory, Field
Michael Haas	Michael Haas	Charles Taft	Charles Taft	Steve Becker	Steve Becker	J. Klaus	J. Klaus	Ruth Warshaw
R. Coursey	R. Coursey	Steve Condren	Steve Condren	Ed Stevenson	Ed Stevenson	J. Lynch	J. Lynch	Ed Stewart
IPW Interplastic 156 Ludlow Avenue Northvale, NJ 07647 201/767-8073	IPW Interplastic 156 Ludlow Avenue Northvale, NJ 07647 201/767-8073	Plymouth Rubber Company, Inc. 104 Revere Street Canton, MA 02021 617/828-0220	Plymouth Rubber Company, Inc. 104 Revere Street Canton, MA 02021 617/828-0220	PMS/Sucoflex 21203 A Hawthorne Suite 5083 Torrance, CA 90503 213/320-3142	PMS/Sucoflex 21203 A Hawthorne Suite 5083 Torrance, CA 90503 213/320-3142	Rubber Plastics Compound Co., Inc. 36-15 23rd Street Long Island City, NY 11106 212/392-6780	Rubber Plastics Compound Co, Inc. 36-15 23rd Street Long Island City, NY 11106 212/392-6780	Sarnafil (U.S.) Inc. Canton Commerce Center P.O. Box 380 Canton, MA 02021 617/828-5400

PVC POLYVINYL CHLORIDE Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	Sarnafil G21-442	Sarnafil S21-327	Flexhide 34	Flexhide 45	Flexhide LR 50	Flagon SF
1. PRODUCT DESCRIPTION						
a) Reinforcement	Fiberglass	Polyester	None	None	Polyester	None
b) Color	Grey	Grey	Light Grey	Light Grey	Light Grey or White	Grey
c) Installed wt. (psf w/o ballast)	.33	.37	.23	.30	.32	.35
2. COATING REQUIRED	None	None	None	None	None	None
3. USE						
a) New roofing	X	X	X	X	X	X
b) Reroofing	X	X	X	X	X	X
4. FIELD LAP JOINT METHOD	Hot Air Weld	Hot Air Weld	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	10		10	10		
b) Partially adhered-method		Mechanically Fastened			Mech. Fast.	
c) Fully adhered-method						X
d) Prot. Memb. Rfg. Assy.	X		X	X		
6. MINIMUM SLOPE	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level
7. USE OVER						
a) Perlite	X		X	X	X	X
b) Urethane	X	X	X	X	X	X
c) Wood fibre	X	X	X	X	X	X
d) Fibre glass	X	X	X	X	X	X
e) Exp. polystyrene	with slip sheet	with slip sheet	X	X	X	X
f) Felt faced composites			X	X	X	X
g) Other			Isocyanurate, Extruded Polystyrene	Isocyanurate, Extruded Polystyrene	Isocyanurate, Extruded Polystyrene	
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	None	None	None	None
9. WORKABLE TEMP RANGE	0°F-120°F	0°F-120°F				0°F-120°F
10. FLASHING MATERIAL	G21-442	G21-410	Coated Metal	Coated Metal	Coated Metal	PVC/PVC Ctd. Mtl.
11. FLASHING METHOD	Adhesive & Heat Weld	Adhesive & Heat Weld	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat
12. PRE-FORMED ACCESS AVAIL.	Yes	Yes	Yes	Yes	Yes	Yes
13. COUNTRY OF ORIGIN	Switzerland	Switzerland	U.S.A.	U.S.A.	U.S.A.	Italy
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	Italy
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	1964	1964				1963
b) U.S.A. (Year, City-first installed)	1977-Massachusetts	1978-Illinois	1978 - Stanhope	1980 - Stanhope	1978 - Stanhope	1978
16. NO. OF SQUARES INSTALLED						
a) Foreign	NA	NA				80,000
b) U.S.A.	8,000,000	2,000,000	>10 million sq. ft.	>5 million sq. ft.	>3 million sq. ft.	40,000
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	10	5 or 10	5 or 10	5 or 10	10
b) Renewable after inspection	No	No				X
c) Scope of coverage (repair of leaks)						
c.1 Material only	X	X				
c.2 Workmanship & material	X	X	X	X	X	X
d) Monetary limitation						
d.1 None						X
d.2 Orig. cost of installation			X	X	X	
d.3 $ per square	Replacement Value	Replacement Value				
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X	X	
e.2 Consequential damages	X	X	X	X	X	Coal Tar
18. LIMITATIONS OR RESTRICTED USE	Bitumen, Oils, Animal Fats	Bitumen, Oils, Animal Fats	Petroleum, Coal Tar Products see specifications	Petroleum, Coal Tar Products see specifications	Petroleum, Coal Tar Products see specifications	
19. UL *(See "Important Notes")*	X	X	X	X	X	
20. FM *(See "Important Notes")*		X			X	X
21. METHOD OF DISTRIB.	Direct	Direct	Licensed Contractors Only	Licensed Contractors Only	Licensed Contractors Only	Direct, Distributors
22. # REGIONAL SERVICE LOCATIONS	6	6	1	1	1	7
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes	Yes	Yes	Yes
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Factory, Field	Factory, Field	Field, Seminars, Factory	Field, Seminars, Factory	Field, Seminars, Factory	Field, Seminars
25. SALES INFO CONTACT	Ruth Warshaw	Ruth Warshaw	G. Schubert	G. Schubert	G. Schubert	201/528-6727
26. TECHNICAL INFO. CONTACT	Ed Stewart	Ed Stewart	F. Neuwirth	F. Neuwirth	F. Neuwirth	201/528-6727
27. COMPANY	Sarnafil (U.S.) Inc. Canton Commerce Center P.O. Box 380 Canton, MA 02021 617/828-5400	Sarnafil (U.S.) Inc. Canton Commerce Center P.O. Box 380 Canton, MA 02021 617/828-5400	U.S. Mineral Products Co. Furnance St. Stanhope, NJ 07874 201/347-1200	U.S. Mineral Products Co. Furnance St. Stanhope, NJ 07874 201/347-1200	U.S. Mineral Products Co. Furnance St. Stanhope, NJ 07874 201/347-1200	Wat Pro, Inc. P.O. Box 336 Manasquan, NJ 08736 201/528-6727

VC POLYVINYL CHLORIDE **Part 1** *(See Part 2 for Test Results)*

Flagon C									
None									
Grey									
None									
X									
X									
Solvent/Heat									
10									
Dead Level									
X									
X									
X									
X									
X									
X									
None									
0°F - 120°F									
CPVC Ctd. Mtl.									
Solvent/Heat									
Yes									
Italy									
U.S.A.									
1963									
1978									
800,000									
400,000									
10									
X									
X									
X									
X									
Coal Tar									
X									
Distributor									
7									
Yes									
L. Seminars									
1/528-6727									
1/528-6727									
Pro, Inc. Box 336 Jan. NJ 08736 1528-6727									

PVC POLYVINYL CHLORIDE Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-54M	Alkorplan Type 1 Class A	Rhenofol C-45 Type 1, 2 Class A, B	Rhenofol C-34 Type 1, 2 Class A, B
1. THICKNESS			
TYPE 1-Min. 0.039 in (1.0 mm)	1.2 mm	mm	mm
TYPE 2-Min. 0.047 in (1.2 mm)	mm	mm	mm
TYPE 1 & 2-No measured thickness lower than 0.003 in (.08 mm) below nominal thickness (Pass/Fail)	Pass		
2. TENSILE STRENGTH			
TYPE 1-Shall not be less than 1700 psi (11.7 MPa)	MD 2800 psi XD 2800 psi	MD psi XD psi	MD psi XD psi
TYPE 2-Shall not be less than 1500 psi (10.3 MPa)	MD psi XD psi	MD psi XD psi	MD psi XD psi
3. LAP JOINT STRENGTH			
Before boiling condition:			
Shall not be less than 75% of the breaking strength of the material (Test 2)	MD % XD %	MD % XD %	MD % XD %
No shearing of lap joint shall occur (Pass/Fail)	Pass		
After one week in boiling water:			
Shall show no delamination (Pass/Fail)	Pass		
Shall not be less than 70% of the breaking strength of the material (Test 2)	MD % XD %	MD % XD %	MD % XD %
4. ELONGATION AT BREAK			
Shall not be less than 250%	MD >350 % XD >350 %	MD % XD %	MD % XD %
5. LOW TEMPERATURE IMPACT			
Shall not have more than 2 specimens out of 10 fail (Pass/Fail)	Pass	NOT AVAILABLE	NOT AVAILABLE
6. RESISTANCE TO HEAT AGING			
No decrease in tensile strength as received (Test 2)	MD psi XD psi	MD psi XD psi	MD psi XD psi
Elongation at break shall not change by more than 30% of value as received (Test 4)	MD <30 % XD <30 %	MD % XD %	MD % XD %
Shall show no delamination (Pass/Fail)	Pass		
7. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking at −22°F (−30°C) (Pass/Fail)	Pass		
8. RESISTANCE TO ACCELERATED WEATHERING			
CLASS B ONLY — after exposure to accelerated weathering:			
Shall not show cracking, blistering or color change (Pass/Fail)			
Elongation at break shall not be reduced by more than 50% as received	MD <5 % XD <5 %	MD % XD %	MD % XD %
Shall pass low temperature impact test (Pass/Fail)	Pass		
Shall pass low temperature flexibility test (Pass/Fail)	Pass		
9. PEARMEABILITY (WATER VAPOR TRANSMISSION)			
Max. 4.0 g./m² in 24h.	2.35 g.	g.	g.
10. WATER ABSORPTION			
Shall not absorb a mass of water greater than 2.0%	1.0 %	%	%
Elongation at break shall not be less than 90% of elongation at break as measured in test 4	MD NT % XD NT %	MD % XD %	MD % XD %
The tensile strength will not be less than that of the tensile strength as measured in test 2	MD NT psi XD NT psi	MD psi XD psi	MD psi XD psi
11. DIMENSIONAL CHANGE			
Without loading: TYPE 1-Shall not change more than 2.0%	MD <1.5 % XD <1.5 %	MD % XD %	MD % XD %
TYPE 2-Shall not change more than 0.5%	MD % XD %	MD % XD %	MD % XD %
With loading: Shall not change more than 0.5%	NT %	%	%
Shall not change more than 0.2%	NT %	%	%
12. CONE PENETRATION			
Shall not penetrate thru at less than 7 psi (30N) force	NT psi	psi	psi

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Alkor-Division of the Solvay American Corp.

Barra Corporation of America, Inc.

Barra Corporation of America, Inc.

PVC POLYVINYL CHLORIDE **Part 2: Test Results** *(See Part 1 for General Information)*

	Rhenofol C-52	Rhenofol CV40	Rhenofol CV48	Interoof "U"	Interoof "B"	Plyroof PVC Grey
	Type 1, 2 Class A, B	Type 1, 2 Class A, B	Type 1, 2 Class A, B	Type 1 Class B	Type 1 Class B	Type 1 Class B
	mm mm	mm mm	mm mm	* mm mm	* mm mm	1.14 mm mm
						Pass
	psi XD psi psi XD psi	MD psi XD psi MD psi XD psi	MD psi XD psi MD psi XD psi	MD * psi XD * psi MD psi XD psi	MD * psi XD * psi MD psi XD psi	MD 2147 psi XD 1873 psi MD psi XD psi
	% XD % % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %	MD 76.0 % XD 83.5 % MD 74 % XD 75 %
	% XD %	MD % XD %	MD % XD %	MD % XD * %	MD % XD * %	MD 260 % XD 255 %
				Pass	Pass	Pass
	psi XD psi % XD %	MD psi XD psi MD % XD %	MD psi XD psi MD % XD %	MD * psi XD * psi MD % XD %	MD * psi XD * psi MD % XD %	MD −8 psi XD −2 psi MD 9 % XD 20 % Pass
				Pass	Pass	Pass
	% XD % 	MD % XD % 	MD % XD % 	Pass MD % XD % 	Pass MD % XD % 	Pass MD 3.5 % XD 4.0 % Pass Pass
	g.	g.	g.	1.03 g.	1.03 g.	2.24 g.
	% % XD % psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi	0.93 % MD 91 % XD 90 % MD 1867 psi XD 1773 psi
	% XD % % XD % %	MD % XD % MD % XD % %	MD % XD % MD % XD % %	MD * % XD * % MD % XD % %	MD * % XD * % MD % XD % %	MD 2.5 % XD 1.0 % MD % XD % %
	psi	psi	psi	psi	psi	9 psi
	Barra Corporation of America, Inc.	Barra Corporation of America, Inc.	Barra Corporation of America, Inc.	IPW Interplastic	IPW Interplastic	Plymouth Rubber Company, Inc.

* All these tests have been performed according to ASTM specifications (not CGSB Standard 37-GP-54M) and are available upon request from Interplastic or can be seen in the Sweets architectural binders, Sec. 7.1, where our brochure is included.

NOT AVAILABLE

NOT AVAILABLE

NOT AVAILABLE

PVC POLYVINYL CHLORIDE Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-54M	Plyroof PVC White Type 1 Class B	Sucoflex F132 Type 2 Class B	Sucoflex F127 Type Class
1. THICKNESS			
TYPE 1-Min. 0.039 in (1.0 mm)	1.14 mm	mm	mm
TYPE 2-Min. 0.047 in (1.2 mm)	mm	0.048 mm	mm
TYPE 1 & 2-No measured thickness lower than 0.003 in (.08 mm) below nominal thickness (Pass/Fail)	Pass	Pass	
2. TENSILE STRENGTH			
TYPE 1-Shall not be less than 1700 psi (11.7 MPa)	MD 2147 psi XD 1873 psi	MD psi XD psi	MD psi XD psi
TYPE 2-Shall not be less than 1500 psi (10.3 MPa)	MD psi XD psi	MD 1420 psi XD psi	MD psi XD psi
3. LAP JOINT STRENGTH			
Before boiling condition:			
Shall not be less than 75% of the breaking strength of the material (Test 2)	MD 76.0 % XD 83.5 %	MD % XD %	MD % XD %
No shearing of lap joint shall occur (Pass/Fail)		NA	
After one week in boiling water:			
Shall show no delamination (Pass/Fail)		NA	
Shall not be less than 70% of the breaking strength of the material (Test 2)	MD 74 % XD 75 %	MD % XD %	MD % XD %
4. ELONGATION AT BREAK			
Shall not be less than 250%	MD 260 % XD 255 %	MD 270 % XD 260 %	MD % XD %
5. LOW TEMPERATURE IMPACT			
Shall not have more than 2 specimens out of 10 fail (Pass/Fail)	Pass	Pass	
6. RESISTANCE TO HEAT AGING			
No decrease in tensile strength as received (Test 2)	MD −8 psi XD −2 psi	MD psi XD psi	MD psi XD psi
Elongation at break shall not change by more than 30% of value as received (Test 4)	MD 9 % XD 20 %	MD % XD %	MD % XD %
Shall show no delamination (Pass/Fail)	Pass	Pass	
7. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking at −22°F (−30°C) (Pass/Fail)	Pass	Pass	
8. RESISTANCE TO ACCELERATED WEATHERING			
CLASS B ONLY — after exposure to accelerated weathering:			
Shall not show cracking, blistering or color change (Pass/Fail)	Pass	Pass	
Elongation at break shall not be reduced by more than 50% as received	MD 3.5 % XD 4.0 %	MD % XD %	MD % XD %
Shall pass low temperature impact test (Pass/Fail)	Pass	Pass	
Shall pass low temperature flexibility test (Pass/Fail)	Pass	Pass	
9. PEARMEABILITY (WATER VAPOR TRANSMISSION)			
Max. 4.0 g./m² in 24h.	2.24 g.	3g g.	g.
10. WATER ABSORPTION			
Shall not absorb a mass of water greater than 2.0%	0.93 %	%	%
Elongation at break shall not be less than 90% of elongation at break as measured in test 4	MD 91 % XD 90 %	MD % XD %	MD % XD %
The tensile strength will not be less than that of the tensile strength as measured in test 2	MD 1867 psi XD 1773 psi	MD psi XD psi	MD psi XD psi
11. DIMENSIONAL CHANGE			
Without loading: TYPE 1-Shall not change more than 2.0%	MD 2.5 % XD 1.0 %	MD % XD %	MD % XD %
TYPE 2-Shall not change more than 0.5%	MD % XD %	MD 0.0 % XD 0.0 %	MD % XD %
With loading: Shall not change more than 0.5%	%	%	%
Shall not change more than 0.2%	%	%	%
12. CONE PENETRATION			
Shall not penetrate thru at less than 7 psi (30N) force	9 psi	psi	psi

NOT AVAILABLE

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Plymouth Rubber Company, Inc. PMS/Sucoflex PMS/Sucoflex

PVC POLYVINYL CHLORIDE Part 2: Test Results *(See Part 1 for General Information)*

Nervaply	Nervaply UB	Sarnafil G21-410	Sarnafil S21-327	Sarnafil G21-442	Flexhide 34
Type 1	Type 1	Type 2	Type 2	Type 2	Type
Class A & B	Class A & B	Class B	Class B	Class A	Class
1.2 mm	1.2 mm	mm	mm	mm	mm
mm	mm	1.2 mm	* mm	* mm	mm
Pass	Pass	Pass			
MD 2610 psi XD psi	MD 2610 psi XD psi	MD psi XD psi	MD psi XD psi	MD psi XD psi	MD psi XD psi
MD psi XD psi	MD psi XD psi	MD 1566 psi XD 1523 psi	MD * psi XD * psi	MD * psi XD * psi	MD psi XD psi
MD % XD %	MD % XD %	MD 103 % XD %	MD % XD %	MD % XD %	MD % XD %
		Pass			
		Pass			
MD % XD %	MD % XD %	MD 105 % XD %	MD % XD %	MD % XD %	MD % XD %
MD 275 % XD 275 %	MD 275 % XD 275 %	MD 425 % XD 398 %	MD * % XD * %	MD * % XD * %	MD % XD %
Pass	Pass	Pass			
MD 0.0 psi XD psi	MD 0.0 psi XD psi	MD 103 psi XD psi	MD * psi XD * psi	MD * psi XD * psi	MD psi XD psi
MD 7 % XD %	MD 7 % XD %	MD +1 % XD %	MD * % XD * %	MD * % XD * %	MD % XD %
Pass	Pass	Pass			
Pass	Pass	Pass			
Pass	Pass	Pass			
MD 0.4 % XD 0.4 %	MD 0.4 % XD 0.4 %	MD 394 % XD %	MD % XD %	MD % XD %	MD % XD %
Pass	Pass	Pass			
Pass	Pass	Pass			
0.4 g.	0.4 g.	1.21 g.	* g.	* g.	g.
%	%	1.29 %	* %	* %	%
MD % XD %	MD % XD %	MD 389 % XD %	MD % XD %	MD % XD %	MD % XD %
MD psi XD psi	MD psi XD psi	MD 1610 psi XD psi	MD psi XD psi	MD psi XD psi	MD psi XD psi
MD 1.8 % XD 1.0 %	MD 1.8 % XD 1.0 %	MD % XD %	MD * % XD * %	MD * % XD * %	MD % XD %
MD % XD %	MD % XD %	MD 0.039 % XD 0.0196 %	MD * % XD * %	MD * % XD * %	MD % XD %
0.4 %	0.4 %	0.032 %	%	%	%
0.18 %	0.18 %	0.061 %	%	%	%
psi	psi	10.6 psi	psi	psi	psi
Rubber Plastics Compound Co., Inc.	Rubber Plastics Compound Co., Inc.	Sarnafil (U.S.) Inc.	Sarnafil (U.S.) Inc.	Sarnafil (U.S.) Inc.	U.S. Mineral Products Co.

NOT AVAILABLE

*indicates tests performed according to ASTM specifications (not CGSB Standard 37-GP-54M). Test results are available from manufacturer.

PVC POLYVINYL CHLORIDE Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-54M	Flexhide 45 Type ____ Class ____	Flexhide LR50 Type ____ Class ____	Flagon SF Type 1 Class A & B
1. THICKNESS			
TYPE 1-Min. 0.039 in (1.0 mm)	____ mm	____ mm	1.2 mm
TYPE 2-Min. 0.047 in (1.2 mm)	____ mm	____ mm	1.2 mm
TYPE 1 & 2-No measured thickness lower than 0.003 in (.08 mm) below nominal thickness (Pass/Fail)	____	____	Pass
2. TENSILE STRENGTH			
TYPE 1-Shall not be less than 1700 psi (11.7 MPa)	MD ____ psi XD ____ psi	MD ____ psi XD ____ psi	MD 1250 psi XD 1280 psi
TYPE 2-Shall not be less than 1500 psi (10.3 MPa)	MD ____ psi XD ____ psi	MD ____ psi XD ____ psi	MD 1280 psi XD 1280 psi
3. LAP JOINT STRENGTH			
Before boiling condition:			
Shall not be less than 75% of the breaking strength of the material (Test 2)	MD ____ % XD ____ %	MD ____ % XD ____ %	MD 95 % XD 95 %
No shearing of lap joint shall occur (Pass/Fail)	____	____	Pass
After one week in boiling water:			
Shall show no delamination (Pass/Fail)	____	____	____
Shall not be less than 70% of the breaking strength of the material (Test 2)	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
4. ELONGATION AT BREAK			
Shall not be less than 250%	MD ____ % XD ____ %	MD ____ % XD ____ %	MD 240 % XD 240 %
5. LOW TEMPERATURE IMPACT			
Shall not have more than 2 specimens out of 10 fail (Pass/Fail)	____	____	Pass
6. RESISTANCE TO HEAT AGING			
No decrease in tensile strength as received (Test 2)	MD ____ psi XD ____ psi	MD ____ psi XD ____ psi	MD ____ psi XD ____ psi
Elongation at break shall not change by more than 30% of value as received (Test 4)	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
Shall show no delamination (Pass/Fail)	____	____	Pass
7. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking at −22 °F (−30 °C) (Pass/Fail)	____	____	Pass
8. RESISTANCE TO ACCELERATED WEATHERING			
CLASS B ONLY — after exposure to accelerated weathering:			
Shall not show cracking, blistering or color change (Pass/Fail)	____	____	Pass
Elongation at break shall not be reduced by more than 50% as received	MD ____ % XD ____ %	MD ____ % XD ____ %	MD 3 % XD 3 %
Shall pass low temperature impact test (Pass/Fail)	____	____	Pass
Shall pass low temperature flexibility test (Pass/Fail)	____	____	Pass
9. PEARMEABILITY (WATER VAPOR TRANSMISSION)			
Max. 4.0 g./m² in 24h.	____ g.	____ g.	2.8 g.
10. WATER ABSORPTION			
Shall not absorb a mass of water greater than 2.0%	____ %	____ %	2.6 %
Elongation at break shall not be less than 90% of elongation at break as measured in test 4	MD ____ % XD ____ %	MD ____ % XD ____ %	MD ____ % XD ____ %
The tensile strength will not be less than that of the tensile strength as measured in test 2	MD ____ psi XD ____ psi	MD ____ psi XD ____ psi	MD ____ psi XD ____ psi
11. DIMENSIONAL CHANGE			
Without loading: TYPE 1-Shall not change more than 2.0%	MD ____ % XD ____ %	MD ____ % XD ____ %	MD 0.0 % XD 0.0 %
TYPE 2-Shall not change more than 0.5%	MD ____ % XD ____ %	MD ____ % XD ____ %	MD 0.0 % XD 0.0 %
With loading: Shall not change more than 0.5%	____ %	____ %	0.4 %
Shall not change more than 0.2%	____ %	____ %	____ %
12. CONE PENETRATION			
Shall not penetrate thru at less than 7 psi (30N) force	____ psi	____ psi	* ____ psi

NOT AVAILABLE

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

U.S. Mineral Products Co. | U.S. Mineral Products Co. | Wat Pro, Inc.

VC POLYVINYL CHLORIDE Part 2: Test Results *(See Part 1 for General Information)*

on C e 1, 2 s A & B	Type Class	Type Class	Type Class	Type Class	Type Class
1.0 mm 1.2 mm Pass	mm mm	mm mm	mm mm	mm mm	mm mm
2600 psi XD 2600 psi psi XD psi	MD psi XD psi MD psi XD psi	MD psi XD psi MD psi XD psi	MD psi XD psi MD psi XD psi	MD psi XD psi MD psi XD psi	MD psi XD psi MD psi XD psi
80 % XD 80 % Pass % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %	MD % XD % MD % XD %
350 % XD 350 %	MD % XD %	MD % XD %	MD % XD %	MD % XD %	MD % XD %
Pass					
-3 psi XD -3 psi -3 % XD -3 % Pass	MD psi XD psi MD % XD %	MD psi XD psi MD % XD %	MD psi XD psi MD % XD %	MD psi XD psi MD % XD %	MD psi XD psi MD % XD %
Pass					
Pass 3 % XD 3 % Pass Pass	MD % XD %	MD % XD %	MD % XD %	MD % XD %	MD % XD %
2.8 g.	g.	g.	g.	g.	g.
1.8 % % XD % psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi	% MD % XD % MD psi XD psi
0.5 % XD 0.5 % % XD % % %	MD % XD % MD % XD % % %	MD % XD % MD % XD % % %	MD % XD % MD % XD % % %	MD % XD % MD % XD % % %	MD % XD % MD % XD % % %
* psi	psi	psi	psi	psi	psi

Wat Pro, Inc.

EPDM ETHYLENE PROPYLENE DIENE MONOMER Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	EPDM 450	EPDM 600	Sure-Seal EPDM	RubberGard .045"	RubberGard .060" Adhered	Gafply EP Ballasted
1. PRODUCT DESCRIPTION						
a) Reinforcement	No	No	None	None	None	None
b) Color	Black	Black	Grey/Black	Black	Black	Black
c) Installed wt. (psf w/o ballast)	.27	.34	.30-.40	.28	.38	.28
2. COATING REQUIRED	None	None	None	None	None	None
3. USE						
a) New roofing	X	X	X	X	X	X
b) Reroofing	X	X	X	X	X	X
4. FIELD LAP JOINT METHOD	Contact Adhesive	Contact Adhesive	Adhesive/Sealant	Contact Adhesive	Contact Adhesive	Contact Adhesive
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	10	10	X	10	10	10
b) Partially adhered-method	Fastened	Fastened		Battens	Battens	
c) Fully adhered-method		X	X	X	X	
d) Prot. Memb. Rfg. Assy.		X	X	X	X	
6. MINIMUM SLOPE	Dead Level	Dead Level	None	Dead Level	Dead Level	No Ponding
7. USE OVER						
a) Perlite	X		X	X	X	X
b) Urethane	X	X	X	X	X	X
c) Wood fibre	X	X	X	X	X	X
d) Fibre glass	X	X	X	X	X	X
e) Exp. polystyrene	X		X	X	X	X
f) Felt faced composites	X	X	X	X	X	X
g) Other			see specifications			
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	None	None	None	None
9. WORKABLE TEMP RANGE	25°F-160°F	25°F-160°F	-25°F-180°F	0°F-100°F	0°F-100°F	
10. FLASHING MATERIAL	Uncured neo	Uncured neo	Elastoform	Uncured neo	Uncured neo	Uncured neo
11. FLASHING METHOD	Cement & Solvent	Cement & Solvent	Adhesive			Solvent Clean/ Contact Adhesive
12. PRE-FORMED ACCESS AVAIL.	No	No	Yes	Yes	Yes	No
13. COUNTRY OF ORIGIN	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	NA	NA	1963			1964
b) U.S.A. (Year, City-first installed)	1979-Chicago	1980	1963-Harsbg.	1980 Indianapolis	1980-Indianapolis	1964
16. NO. OF SQUARES INSTALLED						
a) Foreign	NA	NA	Millions			
b) U.S.A.	NA	NA		370,000	370,000	
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	10	10	10	10	5 and 10
b) Renewable after inspection						
c) Scope of coverage (repair of leaks)						
c.1 Material only				X	X	15
c.2 Workmanship & material	X	X	X	X	X	5/10
d) Monetary limitation						
d.1 None						
d.2 Orig. cost of installation	X	X	X	X	X	X
d.3 $ per square						$3.00
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	see specifications	X	X	X
e.2 Consequential damages	X	X	X	X	X	X
18. LIMITATIONS OR RESTRICTED USE	Contact supplier	Contact supplier	Petroleum see specifications	Hydrocarbon solvents see specifications	Hydrocarbon Solvents-see specifications	see specifications
19. UL *(See "Important Notes")*	X		X	X	X	X
20. FM *(See "Important Notes")*			X	X	X	X
21. METHOD OF DISTRIB.	Sales Reps.	Sales Reps.	Distrs./Reps.	Direct/Reps.	Direct/Reps.	Distributors
22. # REGIONAL SERVICE LOCATIONS	24	24	39	30	30	2
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes	Yes	Yes	Yes
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Field, Seminars	Field, Seminars	Seminars, Field, Factory	Field	Field	On job training, Seminars
25. SALES INFO CONTACT			Don Kyle	Dillinger/Moorhead	Dillinger/Moorhead	James P. LaCasse
26. TECHNICAL INFO. CONTACT	R. Bradley	R. Bradley	Ed Kane	Ross Robertson	Ross Robertson	B. Randall Ziegler
27. COMPANY	Carboline Company 350 Hanley Industrial Ct. St. Louis, MO 63144 314/644-1000	Carboline Company 350 Hanley Industrial Ct. St. Louis, MO 63144 314/644-1000	Carlisle SynTec Systems P.O. Box 7000 Carlisle, PA 17013 717/245-7000	Firestone Industrial Products 1700 Firestone Blvd. Noblesville, IN 46060 800/428-4442	Firestone Industrial Products 1700 Firestone Blvd. Noblesville, IN 46060 800/428-4442	GAF Corporation 140 W. 51st Street New York, NY 10021 212/621-5000

EPDM ETHYLENE PROPYLENE DIENE MONOMER **Part 1** *(See Part 2 for Test Results)*

Gafply EP Fully Adhered	Whaleskin/81 C-EPDM	Whaleskin/81 White EPDM	Whaleskin/81 White C-EPDM	Whaleskin/81 EPDM	Plyseal EPDM	Reevetech	SMI Rubber Roof Black	SMI Rubber Roof White
None	None	None	None	None	Yes	None	None	None
Black	Black	Black	White	Black	Black	Black	Black	Black
38	31-45 mil/.34-60 mil	31-45 mil/.34-60 mil	.31-45 mil/.34-60 mil	.31-45 mil/.34-60 mil	.31	.28	.35	.35
None	None	None	None	None	None	None	None	None
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive
	X	X	X	X	10-13	10	10#/sf Min.	10#/sf Min.
	X	X	X	X	Batten		X	X
X	X	X	X	X	X		X	X
	X	X	X	X	X		X	X
No Ponding	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level	Dead Level
	X*	X*	X*	X*	X	X	X	X
X	X*	X*	X*	X*	X	X	X	X
*	X*	X*	X*	X*	X	X	X	X
*	X*	X*	X*	X*	X		X	X
	X*	X*	X*	X*	X	X	X	X
X	X*	X*	X*	X*	X		X	X
*and others on a job-by-job basis	*Contact KES for application methods over each type	*Contact KES for application methods over each type	*Contact KES for application methods over each type	*Contact KES for application methods over each type	Approval of Plyroof Tech. Dept.			
None	None	None	None	None	None	None	None	None
					15°F-120°F	-40°F-180°F	32°F (Min.)	32°F (Min.)
Uncured neo	Uncured EPDM	Uncured EPDM	Uncured EPDM	Uncured EPDM	Uncured neo	Uncured neo	Uncured EPDM	Uncured EPDM
Solvent Clean/ Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Contact Adhesive	Adhesive	Contact Adhesive	Contact Adhesive
No					No	No	Yes	Yes
U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.
U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.	U.S.A.
1964								
1964	1979 - Thomaston	1965 - Mishawaka	1982 - Orlando	1965 - Mishawaka	1979-Salem	1981 Washington	1965 - Mishawaka	1965 - Mishawaka
						0	None	None
	20,000,000	20,000,000	20,000,000	20,000,000	426,000	7,000		
5 and 10	31 yrs (81 mil)/ 21 yrs (other)	31 yrs (81 mil) 21 yrs (other)	31 yrs (81 mil) 21 yrs (other)	31 yrs (81 mil) 21 yrs (other)	10	10	6 or 12 available	6 or 12 available
	X	X	X	X	No	No	X	X
15	also available	also available	also available	also available				
5/10	X	X	X	X	X	X	X	X
X					X	X	X	X
$3.00	X	X	X	X				
X	X	X	X	X		X	X	X
X	X	X	X	X	X	X	X	X
See specifications						Petroleum see specifications		
X	X	X	X	X	X	X	X	X
X	X	X	X	X			X	X
Distributors	Distributors	Distributors	Distributors	Distributors	Direct	Contractors	Distributor	Distributor
2					4	3	30	30
Yes	No	No	No	No	Yes	Yes	Yes	Yes
On job training, Seminars	Seminars, Field	Seminars, Field	Seminars, Field	Seminars, Field	Field	Field Training	Field, Seminars	Field, Seminars
James P. LaCasse	S. Griffin	S. Griffin	S. Griffin	S. Griffin	Charles Taft	K. Schwarz	D. Creed	D. Creed
B. Randall Ziegler	T. Arras	T. Arras	T. Arras	T. Arras	Steve Condren	B. Smith	T. Petrarca	T. Petrarca
GAF Corporation 140 W. 51st Street New York, NY 10021 212/621-5000	Kelly Energy Systems, Inc. P.O. Box 2583 Waterbury, CT 06723 203/575-9220	Kelly Energy Systems, Inc. P.O. Box 2583 Waterbury, CT 06723 203/575-9220	Kelly Energy Systems, Inc. P.O. Box 2583 Waterbury, CT 06723 203/575-9220	Kelly Energy Systems, Inc. P.O. Box 2583 Waterbury, CT 06723 203/575-9220	Plymouth Rubber Company, Inc. 104 Revere Street Canton, MA 02021 617/828-0220	Reeves Bros., Inc. P.O. Box 1531 Spartanburg, SC 29304 803/576-9210	SYenergy Methods, Inc. 1367 Elmwood Avenue Cranston, RI 02910 401/467-2600	SYenergy Methods, Inc. 1367 Elmwood Avenue Cranston, RI 02910 401/467-2600

EPDM ETHYLENE PROPYLENE DIENE MONOMER **Part 1** *(See Part 2 for Test Results)*

PRODUCT NAME ►	Agaper-E	.045 Weathergard				
1. PRODUCT DESCRIPTION						
a) Reinforcement	None	None				
b) Color	Black	Black				
c) Installed wt. (psf w/o ballast)	.31	.28				
2. COATING REQUIRED	None	None				
3. USE						
a) New roofing	X	X				
b) Reroofing	X	X				
4. FIELD LAP JOINT METHOD	Cold Tape	Contact Adhesive/Primer Optional				
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	8	10				
b) Partially adhered-method	X	X				
c) Fully adhered-method	X	X				
d) Prot. Memb. Rfg. Assy.		X				
6. MINIMUM SLOPE	Dead Level	Dead Level				
7. USE OVER						
a) Perlite	X	X				
b) Urethane	X	X				
c) Wood fibre	X	X				
d) Fibre glass	X	X				
e) Exp. polystyrene	X	X				
f) Felt faced composites	X					
g) Other						
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None				
9. WORKABLE TEMP RANGE	20°F-110°F	20°F-160°F				
10. FLASHING MATERIAL	EPDM	Uncured neo				
11. FLASHING METHOD	Tape	Cement & Solvent				
12. PRE-FORMED ACCESS AVAIL.	Yes	Yes				
13. COUNTRY OF ORIGIN	Italy	U.S.A.				
14. COUNTRY OF MANUFACTURE	Italy	U.S.A.				
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	1970	NA				
b) U.S.A. (Year, City-first installed)	New Jersey	1981-Memphis				
16. NO. OF SQUARES INSTALLED						
a) Foreign	900,000					
b) U.S.A.	3,000	80,000				
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	5/10	10				
b) Renewable after inspection	X	X				
c) Scope of coverage (repair of leaks)						
c.1 Material only						
c.2 Workmanship & material	X	X				
d) Monetary limitation						
d.1 None		Contract amount				
d.2 Orig. cost of installation		X				
d.3 $ per square	X					
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X				
e.2 Consequential damages	X	X				
18. LIMITATIONS OR RESTRICTED USE	Petroleum	Petroleum contaminants See specifications				
19. UL *(See "Important Notes")*		X				
20. FM *(See "Important Notes")*		X				
21. METHOD OF DISTRIB.	Distributors	Distrs./Reps.				
22. # REGIONAL SERVICE LOCATIONS	7	6				
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes				
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Seminars	On site, Seminars				
25. SALES INFO CONTACT	201/528-6727	John Doherty				
26. TECHNICAL INFO. CONTACT	201/528-6727	G. M. Bailey				
27. COMPANY	Wat Pro, Inc. P.O. Box 336 Manasquan, NJ 08736 201/528-6727	Weathergard P.O. Box 17824 Memphis, TN 38117 901/458-2222				

DM ETHYLENE PROPYLENE DIENE MONOMER **Part 2: Test Results** *(See Part 1 for General Information)*

st Description and Suggested Values As pecified in CGSB Standard 37-GP-52M	EPDM 450 Type 1 Class A	EPDM 600 Type 1 Class A	Sure-Seal EPDM Type 1 Class A & B
ICKNESS			
PE 1 & 2-Min. 0.039 in (1.0 mm)	1.15 mm	1.5 mm	1.43, 1.524 mm
-Max. tolerance ± 10% nominal thickness	10 %	10 %	±10 %
RENGTH OF MEMBRANE			
PE 1-Tensile strength: min. 870 psi (6MPa)	1400 psi	1400 psi	1640 psi
PE 2-Breaking strength: min 112 lbf (500N)	lbf	lbf	lbf
P JOINT STRENGTH			
PE 1 & 2			
ore exposure: min 68 lbf (300N)	90 lbf	90 lbf	TBD lbf
er exposure:			
Min. of 85% of value before exposure but not less than 68 lbf (300N)	77 lbf	77 lbf	TBD lbf
CLASS A-After immersion and freeze thaw cycles (min. 85%)	90 %	90 %	TBD %
CLASS B-After immersion (min. 85%)	%	%	TBD %
ONGATION AT BREAK			
PE 1-Min. 300% elongation	300 %	300 %	500 %
PE 2-Min. 200% elongation	%	%	%
NSILE SET			
PE 1 ONLY-Not greater than 5.0%	<5 %	<5 %	1 %
W TEMPERATURE FLEXIBILITY			
all show no cracking (Pass/Fail)	Pass	Pass	Pass
ATER ABSORPTION - after immersion in water:			
ange in mass not to exceed 5.0%	<2 %	<2 %	2 %
all not drop in strength by more than 10% as received (TEST 2)	<10 %	<10 %	TBD %
rength not less than:			
TYPE 1-Tensile strength: 870 psi (6MPa)	1260 psi	1260 psi	TBD psi
TYPE 2-Breaking strength: 112 lbf (500N)	lbf	lbf	lbf
IMENSIONAL STABILITY AFTER WATER ABSORPTION			
ange in length not to exceed 3.0%	MD <3 % XD <3 %	MD <3 lbf XD <3 lbf	MD TBD lbf XD TBD lbf
EAT AGING			
ter exposure:			
Shall retain 80% of strength as received and in no case less than min. strength measured in test 2	MD 85 % XD 85 %	MD 85 % XD 85 %	MD 100 % XD 100 %
TYPE 1-Tensile strength: min. 870 PSI (6 MPa)	1200 psi	1200 psi	1650 psi
TYPE 2-Breaking strength: min. 112 lbf (500N)	lbf	lbf	lbf
Pass low temperature flexibility test (Pass/Fail)	Pass	Pass	Pass
Have a min. elongation at break			
TYPE 1-210%	210 %	210 %	300 %
TYPE 2-140%	%	%	%
Dimensional change not to exceed 3.0%	MD 2 % XD 2 %	MD 2 % XD 2 %	MD 0.5 % XD 0.5 %
ZONE RESISTANCE			
lo visible cracks under 7 power magnification (Pass/Fail)	Pass	Pass	Pass
RESISTANCE TO ACCELERATED WEATHERING			
CLASS A ONLY			
TYPE 1 & 2-Shall show no cracking, blistering or visible defects (Pass/Fail)	Pass	Pass	Pass
Shall retain min. of 90% of strength prior to weathering and in no case less than min. strength specified in Test 2.			
TYPE 1-Shall retain 90% of tensile strength	90 %	90 %	100 %
TYPE 2-Shall retain 90% of breaking strength	%	%	%
TYPE 1-Min. tensile strength of 870 psi (6 MPa)	1260 psi	1260 psi	1670 psi
TYPE 2-Min. breaking strength of 112 lbf (500N)	lbf	lbf	lbf
DYNAMIC IMPACT (PUNCTURING) TEST			
Will withstand puncturing test of an energy impact of 1.8 ft. lbs (2.45J) (Pass/Fail)	Pass	Pass	Pass
TEAR RESISTANCE			
TYPE 1 ONLY-Shall exceed 6 lbf (26N) per mm of thickness	MD 14 lbf XD 14 lbf	MD 14 lbf XD 14 lbf	MD 7.4 lbf XD 7.4 lbf
TEARING STRENGTH			
TYPE 2 ONLY-Shall exceed 8 lbf (35N)	lbf	lbf	lbf
ND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined	Carboline Company	Carboline Company	Carlisle SynTec Systems

EPDM ETHYLENE PROPYLENE DIENE MONOMER Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-52M	Rubbergard .045" Type 1 Class A & B	Rubbergard .060" Type 1 Class A & B	Gafply EP Ballasted Type ___ Class ___
1. THICKNESS			
TYPE 1 & 2-Min. 0.039 in (1.0 mm)	1.14 mm	1.52 mm	___ mm
-Max. tolerance ± 10% nominal thickness	10 %	10 %	___ %
2. STRENGTH OF MEMBRANE			
TYPE 1-Tensile strength: min. 870 psi (6MPa)	1650 psi	1650 psi	___ psi
TYPE 2-Breaking strength: min 112 lbf (500N)	___ lbf	___ lbf	___ lbf
3. LAP JOINT STRENGTH TYPE 1 & 2			
Before exposure: min 68 lbf (300N)	IT lbf	IT lbf	___ lbf
After exposure:			
Min. of 85% of value before exposure but not less than 68 lbf (300N)	IT lbf	IT lbf	___ lbf
CLASS A-After immersion and freeze thaw cycles (min. 85%)	IT %	IT %	___ %
CLASS B-After immersion (min. 85%)	IT %	IT %	___ %
4. ELONGATION AT BREAK			
TYPE 1-Min. 300% elongation	450 %	450 %	___ %
TYPE 2-Min. 200% elongation	___ %	___ %	___ %
5. TENSILE SET			
TYPE 1 ONLY-Not greater than 5.0%	<5 %	<5 %	___ %
6. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking (Pass/Fail)	Pass	Pass	___
7. WATER ABSORPTION - after immersion in water:			
Change in mass not to exceed 5.0%	+2 %	+2 %	___ %
Shall not drop in strength by more than 10% as received (TEST 2)	___ %	___ %	___ %
Strength not less than:			
TYPE 1-Tensile strength: 870 psi (6MPa)	___ psi	___ psi	___ psi
TYPE 2-Breaking strength: 112 lbf (500N)	___ lbf	___ lbf	___ lbf
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION			
Change in length not to exceed 3.0%	MD <1 % XD <1 %	MD <1 lbf XD <1 lbf	MD ___ lbf XD ___ lbf
9. HEAT AGING			
After exposure:			
Shall retain 80% of strength as received and in no case less than min. strength measured in test 2	MD 97 % XD 97 %	MD -3 % XD -3 %	MD ___ % XD ___ %
TYPE 1-Tensile strength: min. 870 PSI (6 MPa)	1600 psi	1600 psi	___ psi
TYPE 2-Breaking strength: min. 112 lbf (500N)	___ lbf	___ lbf	___ lbf
Pass low temperature flexibility test (Pass/Fail)	Pass	Pass	___
Have a min. elongation at break			
TYPE 1-210%	295 %	295 %	___ %
TYPE 2-140%	___ %	___ %	___ %
Dimensional change not to exceed 3.0%	MD <1 % XD <1 %	MD <1 % XD <1 %	MD ___ % XD ___ %
10. OZONE RESISTANCE			
No visible cracks under 7 power magnification (Pass/Fail)	Pass	Pass	___
11. RESISTANCE TO ACCELERATED WEATHERING CLASS A ONLY			
TYPE 1 & 2-Shall show no cracking, blistering or visible defects (Pass/Fail)	IT	IT	___
Shall retain min. of 90% of strength prior to weathering and in no case less than min. strength specified in Test 2.			
TYPE 1-Shall retain 90% of tensile strength	IT %	IT %	___ %
TYPE 2-Shall retain 90% of breaking strength	___ %	___ %	___ %
TYPE 1-Min. tensile strength of 870 psi (6 MPa)	IT psi	IT psi	___ psi
TYPE 2-Min. breaking strength of 112 lbf (500N)	___ lbf	___ lbf	___ lbf
12. DYNAMIC IMPACT (PUNCTURING) TEST			
Will withstand puncturing test of an energy impact of 1.8 ft. lbs (2.45J) (Pass/Fail)	Pass	Pass	___
13. TEAR RESISTANCE			
TYPE 1 ONLY-Shall exceed 6 lbf (26N) per mm of thickness	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf	MD ___ lbf XD ___ lbf
14. TEARING STRENGTH			
TYPE 2 ONLY-Shall exceed 8 lbf (35N)	___ lbf	___ lbf	___ lbf
	Firestone Industrial Products	Firestone Industrial Products	GAF Corporation

NOT AVAILABLE

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

DM ETHYLENE PROPYLENE DIENE MONOMER **Part 2: Test Results** *(See Part 1 for General Information)*

Gatply EP Fully Adhered	Whaleskin/81 C-EPDM	Whaleskin/81 White C-EPDM	Whaleskin/81 EPDM	Whaleskin/81 EPDM	Plyseal EPDM
:	Type 1	Type 1	Type 1	Type 1	Type 2
s	Class A	Class A	Class A	Class A	Class A
mm	045 mm	.045 mm	.045 mm	.045 mm	1.02 mm
%	10 %	10 %	10 %	10 %	+4 −2 %
psi	1445 psi	1774 psi	1774 psi	1445 psi	psi
lbf	lbf	lbf	lbf	lbf	89 lbf
lbf	lbf	lbf	lbf	lbf	72 lbf
lbf	lbf	lbf	lbf	lbf	68 lbf
%	%	%	%	%	94 %
%	%	%	%	%	94 %
%	320 %	390 %	390 %	320 %	300 %
%	%	%	%	%	%
%	%	%	%	%	%
	Pass	Pass	Pass	Pass	Pass
%	2.2 %	3.2 %	3.2 %	2.2 %	+0.2 %
%	%	%	%	%	9 %
psi	psi	psi	psi	psi	psi
lbf	lbf	lbf	lbf	lbf	90 lbf
% XD %	MD 0.6 lbf XD 0.7 lbf	MD 1.0 lbf XD 0.7 lbf	MD 1.0 % XD 0.7 %	MD 0.6 lbf XD 0.7 lbf	MD −0.06 lbf XD +0.03 lbf
% XD %	MD % XD %	MD % XD %	MD % XD %	MD % XD %	MD 90 % XD 90 %
psi	1540 psi	1574 psi	1574 psi	1540 psi	psi
lbf	lbf	lbf	lbf	lbf	90 lbf
					Pass
%	230 %	267 %	267 %	230 %	%
%	%	%	%	%	250 %
% XD %	MD % XD %	MD % XD %	MD % XD %	MD % XD %	MD 1.0 % XD 1.0 %
	Pass	Pass	Pass	Pass	Pass
					Pass
%	%	%	%	%	%
%	%	%	%	%	93 %
psi	psi	psi	psi	psi	psi
lbf	lbf	lbf	lbf	lbf	91 lbf
lbf XD lbf	MD 180 lbf XD lbf	MD 170 lbf XD lbf	MD 170 lbf XD lbf	MD 180 lbf XD lbf	MD lbf XD lbf
lbf	lbf	lbf	lbf	lbf	9 lbf
GAF Corporation	Kelly Energy Systems, Inc.	Kelly Energy Systems, Inc.	Kelly Energy Systems, Inc.	Kelly Energy Systems, Inc.	Plymouth Rubber Company, Inc.

NOT AVAILABLE

EPDM ETHYLENE PROPYLENE DIENE MONOMER Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-52M	Reevetech Type 1 Class A	SMI Rubber Roof Black Type 1 Class A	SMI Rubber Roof White Type 1 Class A
1. THICKNESS			
TYPE 1 & 2-Min. 0.039 in (1.0 mm)	1.15 mm	1.397 mm	1.397 mm
-Max. tolerance ± 10% nominal thickness	7 %	— %	— %
2. STRENGTH OF MEMBRANE			
TYPE 1-Tensile strength: min. 870 psi (6MPa)	1700 psi	1400 psi	1400 psi
TYPE 2-Breaking strength: min 112 lbf (500N)	— lbf	— lbf	— lbf
3. LAP JOINT STRENGTH			
TYPE 1 & 2			
Before exposure: min 68 lbf (300N)	240 lbf	— lbf	— lbf
After exposure:			
Min. of 85% of value before exposure but not less than 68 lbf (300N)	240 lbf	— lbf	— lbf
CLASS A-After immersion and freeze thaw cycles (min. 85%)	— %	— %	— %
CLASS B-After immersion (min. 85%)	— %	— %	— %
4. ELONGATION AT BREAK			
TYPE 1-Min. 300% elongation	350 %	300 %	300 %
TYPE 2-Min. 200% elongation	— %	— %	— %
5. TENSILE SET			
TYPE 1 ONLY-Not greater than 5.0%	.5 %	— %	— %
6. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking (Pass/Fail)	Pass	Pass	Pass
7. WATER ABSORPTION - after immersion in water:			
Change in mass not to exceed 5.0%	1.0 %	— %	— %
Shall not drop in strength by more than 10% as received (TEST 2)	0 %	— %	— %
Strength not less than:			
TYPE 1-Tensile strength: 870 psi (6MPa)	— psi	— psi	— psi
TYPE 2-Breaking strength: 112 lbf (500N)	— lbf	— lbf	— lbf
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION			
Change in length not to exceed 3.0%	MD — % XD — %	MD 2.0 lbf XD 2.0 lbf	MD 2.0 lbf XD 2.0 lbf
9. HEAT AGING			
After exposure:			
Shall retain 80% of strength as received and in no case less than min. strength measured in test 2	MD 100 % XD 100 %	MD — % XD — %	MD — % XD — %
TYPE 1-Tensile strength: min. 870 PSI (6 MPa)	1750 psi	1225 psi	1225 psi
TYPE 2-Breaking strength: min. 112 lbf (500N)	— lbf	— lbf	— lbf
Pass low temperature flexibility test (Pass/Fail)	Pass	Pass	Pass
Have a min. elongation at break			
TYPE 1-210%	250 %	225 %	225 %
TYPE 2-140%	— %	— %	— %
Dimensional change not to exceed 3.0%	MD 1.0 % XD 1.0 %	MD — % XD — %	MD — % XD — %
10. OZONE RESISTANCE			
No visible cracks under 7 power magnification (Pass/Fail)	Pass	Pass	Pass
11. RESISTANCE TO ACCELERATED WEATHERING			
CLASS A ONLY			
TYPE 1 & 2-Shall show no cracking, blistering or visible defects (Pass/Fail)	Pass	Pass	Pass
Shall retain min. of 90% of strength prior to weathering and in no case less than min. strength specified in Test 2.			
TYPE 1-Shall retain 90% of tensile strength	100 %	— %	— %
TYPE 2-Shall retain 90% of breaking strength	— %	— %	— %
TYPE 1-Min. tensile strength of 870 psi (6 MPa)	— psi	— psi	— psi
TYPE 2-Min. breaking strength of 112 lbf (500N)	1750 lbf	— lbf	— lbf
12. DYNAMIC IMPACT (PUNCTURING) TEST			
Will withstand puncturing test of an energy impact of 1.8 ft. lbs (2.45J) (Pass/Fail)	Pass	Pass	Pass
13. TEAR RESISTANCE			
TYPE 1 ONLY-Shall exceed 6 lbf (26N) per mm of thickness	MD 7.0 lbf XD 7.0 lbf	MD 125 lbf XD 125 lbf	MD — lbf XD — lbf
14. TEARING STRENGTH			
TYPE 2 ONLY-Shall exceed 8 lbf (35N)	— lbf	— lbf	— lbf

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Reeves Bros., Inc. | SYenergy Methods, Inc. | SYenergy Methods, Inc.

PDM ETHYLENE PROPYLENE DIENE MONOMER

Agaper E	.045 Weathergard
pe 1	Type 1
ss A & B	Class A
1.1 mm	1.092 mm
10 %	7 %
1400 psi	1400 psi
115 lbf	N/A lbf
lbf	82 lbf
lbf	NT lbf
%	NT %
%	%
350 %	300 %
%	N/A %
4.0 %	+4 %
Pass	Pass
3.5 %	3 %
%	NT %
psi	NT psi
lbf	N/A lbf
D 1.0 % XD %	MD NT lbf XD NT lbf
D 110 % XD %	MD % XD %
psi	1200 psi
lbf	N/A lbf
Pass	
300 %	210 %
%	%
D % XD %	MD ±2 % XD ±2 %
Pass	Pass
%	NT %
%	N/A %
psi	NT psi
lbf	N/A lbf
Pass	NT
D lbf XD lbf	MD 11.11 lbf XD NT lbf
lbf	NT lbf

Wat Pro, Inc. | Weathergard

NEOPRENE POLYCHLOROPRENE Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	Sure-Seal Neo	Plyshield Neoprene	
1. PRODUCT DESCRIPTION			
a) Reinforcement	None	Yes	
b) Color	Grey/Black	Black	
c) Installed wt. (psf w/o ballast)	.46	.28	
2. COATING REQUIRED	None	None	
3. USE			
a) New roofing	X	X	
b) Reroofing	X	X	
4. FIELD LAP JOINT METHOD	Adhesive/Sealant	Contact Adhesive	
5. TYPE OF ROOF SYSTEM			
a) Loose laid/ballasted (ballast psf)	X	10-13	
b) Partially adhered-method		Batten	
c) Fully adhered-method	X	X	
d) Prot. Memb. Rfg. Assy.	X	X	
6. MINIMUM SLOPE	None	Dead Level	
7. USE OVER			
a) Perlite	X	X	
b) Urethane	X	X	
c) Wood fibre	X	X	
d) Fibre glass	X	X	
e) Exp. polystyrene	X	X	
f) Felt faced composites	X	X	
g) Other	see specifications	Approval of Plyroof Tech. Dept.	
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	
9. WORKABLE TEMP RANGE	−25°F-180°F	15°F-120°F	
10. FLASHING MATERIAL	Elastoform	Uncured neo	
11. FLASHING METHOD	Adhesive	Contact Adhesive	
12. PRE-FORMED ACCESS AVAIL.	Yes	No	
13. COUNTRY OF ORIGIN	U.S.A.	U.S.A.	
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	
15. YR. FIRST COMMER. USE			
a) Foreign (Year)	1960		
b) U.S.A. (Year, City-first installed)	1960-Carlisle	1963 Denver	
16. NO. OF SQUARES INSTALLED			
a) Foreign	Thousands		
b) U.S.A.		154,000	
17. WARRANTY *(See "Important Notes")*			
a) Duration (years)	10	10	
b) Renewable after inspection		No	
c) Scope of coverage (repair of leaks)			
c.1 Material only			
c.2 Workmanship & material	X	X	
d) Monetary limitation			
d.1 None			
d.2 Orig. cost of installation	X	X	
d.3 $ per square			
e) Exclusion from coverage			
e.1 Damage to other rfg. components	see literature		
e.2 Consequential damages	X	X	
18. LIMITATIONS OR RESTRICTED USE	see literature		
19. UL *(See "Important Notes")*		X	
20. FM *(See "Important Notes")*			
21. METHOD OF DISTRIB.	Distrs./Reps.	Direct	
22. # REGIONAL SERVICE LOCATIONS	39	4	
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Seminars, Field, Factory	Field	
25. SALES INFO CONTACT	Don Kyle	Charles Taft	
26. TECHNICAL INFO. CONTACT	Ed Kane	Steve Condren	
27. COMPANY	Carlisle SynTec Systems P.O. Box 7000 Carlisle, PA 17013 717/245-7000	Plymouth Rubber Company, Inc. 104 Revere Street Canton, MA 02021 617/828-0220	

NEOPRENE POLYCHLOROPRENE Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-52M	Sure-Seal Neoprene Type 1 & 2 Class	Plyshield Neoprene Type 2 Class A	Type Class
1. THICKNESS			
TYPE 1 & 2-Min. 0.039 in (1.0 mm)	1.143, 1.524 mm	0.8 mm	mm
-Max. tolerance ± 10% nominal thickness	± 10 %	−2 + 4 %	%
2. STRENGTH OF MEMBRANE			
TYPE 1-Tensile strength: min. 870 psi (6MPa)	1750 psi	psi	psi
TYPE 2-Breaking strength: min 112 lbf (500N)	lbf	90 lbf	lbf
3. LAP JOINT STRENGTH			
TYPE 1 & 2			
Before exposure: min 68 lbf (300N)	TBD lbf	76 lbf	lbf
After exposure:			
Min. of 85% of value before exposure but not less than 68 lbf (300N)	TBD lbf	69 lbf	lbf
CLASS A-After immersion and freeze thaw cycles (min. 85%)	TBD %	90 %	%
CLASS B-After immersion (min. 85%)	TBD %	90 %	%
4. ELONGATION AT BREAK			
TYPE 1-Min. 300% elongation	360 %	%	%
TYPE 2-Min. 200% elongation	%	250 %	%
5. TENSILE SET			
TYPE 1 ONLY-Not greater than 5.0%	1 %	%	%
6. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking (Pass/Fail)	Pass	Pass	
7. WATER ABSORPTION - after immersion in water:			
Change in mass not to exceed 5.0%	± 10 %	3.4 %	%
Shall not drop in strength by more than 10% as received (TEST 2)	TBD %	10 %	%
Strength not less than:			
TYPE 1-Tensile strength: 870 psi (6MPa)	TBD psi	psi	psi
TYPE 2-Breaking strength: 112 lbf (500N)	lbf	88 lbf	lbf
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION			
Change in length not to exceed 3.0%	MD TBD % XD TBD %	MD + 0.3 lbf XD + 0.3 lbf	MD lbf XD lbf
9. HEAT AGING			
After exposure:			
Shall retain 80% of strength as received and in no case less than min. strength measured in test 2	MD TBD % XD TBD %	MD 85 % XD 85 %	MD % XD %
TYPE 1-Tensile strength: min. 870 PSI (6 MPa)	TBD psi	psi	psi
TYPE 2-Breaking strength: min. 112 lbf (500N)	lbf	98 lbf	lbf
Pass low temperature flexibility test (Pass/Fail)	Pass	Pass	
Have a min. elongation at break			
TYPE 1-210%	TBD %	%	%
TYPE 2-140%	%	205 %	%
Dimensional change not to exceed 3.0%	MD 0.5 % XD 0.5 %	MD 1.0 % XD 1.0 %	MD % XD %
10. OZONE RESISTANCE			
No visible cracks under 7 power magnification (Pass/Fail)	Pass	Pass	
11. RESISTANCE TO ACCELERATED WEATHERING			
CLASS A ONLY			
TYPE 1 & 2-Shall show no cracking, blistering or visible defects (Pass/Fail)	Pass	Pass	
Shall retain min. of 90% of strength prior to weathering and in no case less than min. strength specified in Test 2.			
TYPE 1-Shall retain 90% of tensile strength	TBD %	%	%
TYPE 2-Shall retain 90% of breaking strength	%	95 %	%
TYPE 1-Min. tensile strength of 870 psi (6 MPa)	TBD psi	psi	psi
TYPE 2-Min. breaking strength of 112 lbf (500N)	lbf	95 lbf	lbf
12. DYNAMIC IMPACT (PUNCTURING) TEST			
Will withstand puncturing test of an energy impact of 1.8 ft. lbs (2.45J) (Pass/Fail)	Pass	Pass	
13. TEAR RESISTANCE			
TYPE 1 ONLY-Shall exceed 6 lbf (26N) per mm of thickness	MD 6.6 lbf XD 6.6 lbf	MD lbf XD lbf	MD lbf XD lbf
14. TEARING STRENGTH			
TYPE 2 ONLY-Shall exceed 8 lbf (35N)	lbf	10 lbf	lbf

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Carlisle SynTec Systems

Plymouth Rubber Company, Inc.

PE CHLORINATED POLYETHYLENE Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	Alkorflex 35093	Alkorflex 35094	Alkorflex 35096	Flexhide CPE		
PRODUCT DESCRIPTION						
a) Reinforcement	None	None	Polyester Fiber	Polyester		
b) Color	Light Grey	Light Grey	Light Grey	White		
c) Installed wt. (psf w/o ballast)	33	.30	.30	0.3		
COATING REQUIRED	None	None	None	None		
USE						
a) New roofing	X	X	X	X		
b) Reroofing	X	X	X	X		
FIELD LAP JOINT METHOD	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat		
TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	10		10			
b) Partially adhered-method		X		Mech. Fast.		
c) Fully adhered-method		X				
d) Prot. Memb. Rfg. Assy.			X			
MINIMUM SLOPE	Dead Level	Dead Level	Dead Level	Dead Level		
USE OVER						
a) Perlite	X	X	X	X		
b) Urethane	X		X	X		
c) Wood fibre	X		X	X		
d) Fibre glass	X	X	X	X		
e) Exp. polystyrene	X		X	X		
f) Felt faced composites	X	X	X	X		
g) Other				Isocyanurate, Extruded Polystyrene		
RESTRICTED REGIONS *(See "Important Notes")*	None	None	None	None		
WORKABLE TEMP RANGE	0°F-115°F	0°F-115°F	0°F-115°F			
FLASHING MATERIAL	CPE Ctd. Metal	CPE Ctd. Metal	CPE Ctd. Metal	Coated Metal		
FLASHING METHOD	Solvent/Heat	Solvent/Heat	Solvent/Heat	Solvent/Heat		
PRE-FORMED ACCESS AVAIL.	Yes	Yes	Yes	Yes		
COUNTRY OF ORIGIN	Belgium	Belgium	Belgium	U.S.A.		
COUNTRY OF MANUFACTURE	Belgium	Belgium	Belgium	U.S.A.		
YR. FIRST COMMER. USE						
a) Foreign (Year)	1973	1976	1974			
b) U.S.A. (Year, City-first installed)	1979 Madison	1980 St. Louis	1979-Madison	1982 - Stanhope		
NO. OF SQUARES INSTALLED						
a) Foreign	NA	NA	NA			
b) U.S.A.	>20,000	>20,000	>50,000	NA		
WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	10	10	5 or 10		
b) Renewable after inspection						
c) Scope of coverage (repair of leaks)						
c.1 Material only						
c.2 Workmanship & material	X	X	X	X		
d) Monetary limitation						
d.1 None	X	X	X			
d.2 Orig. cost of installation				X		
d.3 $ per square						
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X		
e.2 Consequential damages	X	X	X	X		
LIMITATIONS OR RESTRICTED USE				Petroleum, Coal Tar Products see specifications		
UL *(See "Important Notes")*	X	I.T.	X			
FM *(See "Important Notes")*			X			
METHOD OF DISTRIB.	Mfgr/Reps.	Mfgr/Reps.	Mfgr/Reps.	Licensed Contractors Only		
# REGIONAL SERVICE LOCATIONS				1		
LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes	Yes		
APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	On job training	On job training	On job training	Field, Seminars, Factory		
SALES INFO CONTACT	Office	Office	Office	G. Schubert		
TECHNICAL INFO. CONTACT	Office	Office	Office	F. Neuwirth		
COMPANY	Alkor-Division of the Solvay American Corp. 609 Fifth Avenue New York, NY 10017 212/935-5458	Alkor-Division of the Solvay American Corp. 609 Fifth Avenue New York, NY 10017 212/935-5458	Alkor-Division of the Solvay American Corporation 609 Fifth Avenue New York, NY 10017 212/935-5458	U.S. Mineral Products Co. Furnance St. Stanhope, NJ 07874 201/347-1200		

CPE CHLORINATED POLYETHYLENE Part 2: Test Results *(See Part 1 for General Information)*

PRODUCT NAME Alkorflex 35093 DESCRIPTION CPE		PRODUCT NAME Alkorflex 35094 DESCRIPTION CPE		PRODUCT NAME Alkorflex 35096 DESCRIPTION CPE	
TEST DESCRIPTION TEST METHOD	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**
1. THICKNESS D3083	48 mil.	1. THICKNESS D3083	40 mil. + fleece	1. THICKNESS D3083	44 mil.
2. TENSILE STRENGTH ASTM D412	>2,000 psi MD & XD	2. TENSILE STRENGTH ASTM D412	>2,000 psi MD & XD	2. TENSILE STRENGTH ASTM D412	>2,200 psi MD & XD
3. LAP JOINT STRENGTH D412	>75% MD & XD	3. LAP JOINT STRENGTH D412	>75% MD & XD	3. LAP JOINT STRENGTH D412	>75% MD & XD
4. ELONGATION AT BREAK D412	>400% MD & XD	4. ELONGATION AT BREAK D412	>400% MD & XD	4. ELONGATION AT BREAK ASTM D1682	>15% MD & XD
5. TENSILE SET ASTM D412	<5%	5. TENSILE SET ASTM D412	<5%	5. TENSILE SET not available	NA
6. LOW TEMPERATURE FLEXIBILITY Mandrel test	– 40°F	6. LOW TEMPERATURE FLEXIBILITY Mandrel test	– 40°F	6. LOW TEMPERATURE FLEXIBILITY Mandrel test	– 40°F
7. WATER ABSORPTION ASTM E 96	<1%	7. WATER ABSORPTION ASTM E 96	<1%	7. WATER ABSORPTION ASTM E96 Procedure BW	<1%
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION not tested	NT	8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION not tested	NT	8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION not tested	NT
9. HEAT AGING CGSB standard 37-GP-56M test 2, test 4, delamination	passed	9. HEAT AGING CGSB standard 37-GP-56M test 2, test 4, and delamination	passed	9. HEAT AGING CGSB standard 37-GP-54M test 2, test 4, delamination	passed
10. OZONE RESISTANCE ASTM D3041 100h	passed	10. OZONE RESISTANCE ASTM D3041 100h	passed	10. OZONE RESISTANCE ASTM D3041 100h	passed
11. RESISTANCE TO ACCELERATED WEATHERING Xenon 1200 DIN 53387 Xenon 150 DIN 53387	20,000 hrs.	11. RESISTANCE TO ACCELERATED WEATHERING Xenon 1200 DIN 53387 Xenon 150 DIN 53387	20,000 hrs.	11. RESISTANCE TO ACCELERATED WEATHERING Xenon 1200 DIN 53387 Xenon 150 DIN 53387	20,000 hrs.
12. DYNAMIC IMPACT (PUNCTURING) not tested	NT	12. DYNAMIC IMPACT (PUNCTURING) not tested	NT	12. DYNAMIC IMPACT (PUNCTURING) not tested	NT
13. TEAR RESISTANCE ASTM D624	>335 lbs/in. MD & XD	13. TEAR RESISTANCE ASTM D624	>335 lbs/in. MD & XD	13. TEAR RESISTANCE ASTM D624	>1010 lbs/in. MD7XD
14. TEARING STRENGTH not available	NA	14. TEARING STRENGTH not available	NA	14. TEARING STRENGTH not tested	NT
15. LOW TEMPERATURE IMPACT ASTM D746	– 50°F	15. LOW TEMPERATURE IMPACT ASTM D746	– 50°F	15. LOW TEMPERATURE IMPACT ASTM D746	– 60°F
16. PERMEABILITY ASTM E96, procedure E at 100° F	0.5g/m²d	16. PERMEABILITY ASTM E96, procedure E at 100° F	0.6g/m²d	16. PERMEABILITY ASTM E96, procedure E at 100° F	0.6g/m²d (d = 1.2mm)
17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION ASTM D1204 6 hrs at 176°C	< ±2%	17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION ASTM D1204 6 hrs at 176°C	< ±2%	17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION ASTM D1204 6 hrs at 176°C	< ±0.5%
18. CONE PENETRATION DIN 53443, Blatt 2, d = 1.5mm	1600N @ +23°C	18. CONE PENETRATION DIN 53443, Blatt 2, d = 1.5mm	1600N @ +23°C	18. CONE PENETRATION DIN 53443, Blatt 2, d = 1.5mm	1500N @ +23°C
Alkor-Division of the Solvay American Corp.		Alkor-Division of the Solvay American Corp.		Alkor-Division of the Solvay American Corp.	

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

CPE CHLORINATED POLYETHYLENE Part 2: Test Results *(See Part 1 for General Information)*

PRODUCT NAME Flexhide CPE DESCRIPTION Chlorinated Polyethylene		PRODUCT NAME DESCRIPTION		PRODUCT NAME DESCRIPTION	
TEST DESCRIPTION TEST METHOD	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**
1. THICKNESS ASTM D374, Method A	0.045 in.	1. THICKNESS		1. THICKNESS	
2. TENSILE STRENGTH ASTM D751, Grab Method	224 lbs.	2. TENSILE STRENGTH		2. TENSILE STRENGTH	
3. LAP JOINT STRENGTH ASTM D751 (Modified Grab Method)	92% of material breaking strength	3. LAP JOINT STRENGTH		3. LAP JOINT STRENGTH	
4. ELONGATION AT BREAK		4. ELONGATION AT BREAK		4. ELONGATION AT BREAK	
5. TENSILE SET		5. TENSILE SET		5. TENSILE SET	
6. LOW TEMPERATURE FLEXIBILITY ASTM D2136 – 1/8" Mandrel	– 40°F pass	6. LOW TEMPERATURE FLEXIBILITY		6. LOW TEMPERATURE FLEXIBILITY	
7. WATER ABSORPTION		7. WATER ABSORPTION		7. WATER ABSORPTION	
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION ASTM D1205, 176°F, 30 min.	0.5%	8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION		8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION	
9. HEAT AGING Breaking strength ASTM D751 after 7 days @ 176°F	Retains 100% Breaking strength	9. HEAT AGING		9. HEAT AGING	
10. OZONE RESISTANCE		10. OZONE RESISTANCE		10. OZONE RESISTANCE	
11. RESISTANCE TO ACCELERATED WEATHERING		11. RESISTANCE TO ACCELERATED WEATHERING		11. RESISTANCE TO ACCELERATED WEATHERING	
12. DYNAMIC IMPACT (PUNCTURING)		12. DYNAMIC IMPACT (PUNCTURING)		12. DYNAMIC IMPACT (PUNCTURING)	
13. TEAR RESISTANCE		13. TEAR RESISTANCE		13. TEAR RESISTANCE	
14. TEARING STRENGTH ASTM D751 (Tongue Tear) 8" × 8" specimen	81 lbs.	14. TEARING STRENGTH		14. TEARING STRENGTH	
15. LOW TEMPERATURE IMPACT ASTM D746	– 50°F pass	15. LOW TEMPERATURE IMPACT		15. LOW TEMPERATURE IMPACT	
16. PERMEABILITY ASTM E96	0.4 perm.	16. PERMEABILITY		16. PERMEABILITY	
17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION		17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION		17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION	
18. CONE PENETRATION		18. CONE PENETRATION		18. CONE PENETRATION	

U.S. Mineral Products Corp.

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

PIB POLYISOBUTYLENE Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	Alphagard	Geoflex	Tropigard	PIB 1000		
1. PRODUCT DESCRIPTION						
a) Reinforcement	60 mil PIB 40 mil fleece	Polyester	60 mil PIB 40 mil fleece	Yes		
b) Color	Black	Black	black	Black		
c) Installed wt. (psf w/o ballast)	.57	.57	.57	.32		
2. COATING REQUIRED	None	None	None	None		
3. USE						
a) New roofing	X	X	X	X		
b) Reroofing	X	X	X	X		
4. FIELD LAP JOINT METHOD	Self-sealing	Self-sealing	Self-sealing	Pressure Weld		
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	10	12	10			
b) Partially adhered-method	Asphalt/Adhesive	X	asphalt or adhesive			
c) Fully adhered-method	Asphalt/Adhesive		asphalt or adhesive			
d) Prot. Memb. Rfg. Assy.	X	X	X	X		
6. MINIMUM SLOPE	Dead Level	Dead Level	Dead Level	Dead Level		
7. USE OVER						
a) Perlite	X	X	X			
b) Urethane	X	X	X	X		
c) Wood fibre	X	X	X			
d) Fibre glass	X	X	X			
e) Exp. polystyrene	X	X	X			
f) Felt faced composites	recovery board	X	recovery board	X		
g) Other				Existing roof		
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	None	None		
9. WORKABLE TEMP RANGE	20°F-100°F	20°F-100°F	20°F-100°F	25°F-160°F		
10. FLASHING MATERIAL	Unbacked PIB	PIB	Unbacked PIB	PIB		
11. FLASHING METHOD	Solvent/Weld	Cement & Solvent	Solvent/Weld	Cement & Solvent		
12. PRE-FORMED ACCESS AVAIL.	Yes	Yes	Yes	Yes		
13. COUNTRY OF ORIGIN	Germany	West Germany	Germany	U.S.A.		
14. COUNTRY OF MANUFACTURE	Germany & U.S.	U.S.A.	Germany & U.S.	U.S.A.		
15. YR. FIRST COMMER. USE						
a) Foreign (Year)	1950	1960	1950	1968		
b) U.S.A. (Year, City-first installed)	1977-St. Louis	1979 St. Louis	1978 Amsterdam N.Y.	1979-St. Louis		
16. NO. OF SQUARES INSTALLED						
a) Foreign	75,000,000	7,000,000	75,000,000	NA		
b) U.S.A.	1,500,000	70,000	1,500,000	NA		
17. WARRANTY *(See "Important Notes")*						
a) Duration (years)	10	5 or 10	10	10		
b) Renewable after inspection	No	X	available on request			
c) Scope of coverage (repair of leaks)						
c.1 Material only						
c.2 Workmanship & material	X	X	X	X		
d) Monetary limitation						
d.1 None		X	X			
d.2 Orig. cost of installation				X		
d.3 $ per square		X				
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X	X	X	X		
e.2 Consequential damages	X	X	X	X		
18. LIMITATIONS OR RESTRICTED USE	Yes see specifications	X see literature	Yes see specifications	Contact supplier		
19. UL *(See "Important Notes")*	X	X	Class A & B	X		
20. FM *(See "Important Notes")*	X	X	X	X		
21. METHOD OF DISTRIB.	Distrs./Reps.		Distrs./Reps.	Sales Reps.		
22. # REGIONAL SERVICE LOCATIONS	2	4	2	24		
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes	Yes		
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Yes	Fields, Seminars, Factory	Yes	Field, Seminars		
25. SALES INFO CONTACT	Charles Kellar	Joe Chew	Ron Utzler			
26. TECHNICAL INFO. CONTACT	Werner H. Huhn	Joe Chew	Ron Utzler	R. Bradley		
27. COMPANY	AGR Company 2702 Pearl Road Brunswick, OH 44212 216/225-4524	Republic Powdered Metals 2628 Pearl Road Medina, OH 44256 216/225-3192	Tropical Industrial Coatings, Inc. P.O. Box 444 Brunswick, OH 44212 216/273-2564	Carboline Company 350 Hanley Industrial Ct. St. Louis, MO 63144 314/644-1000		

PIB POLYISOBUTYLENE Part 2: Test Results *(See Part 1 for General Information)*

PRODUCT NAME Alphagard DESCRIPTION Polyisobutylene PIB		PRODUCT NAME Geoflex DESCRIPTION PIB		PRODUCT NAME Tropigard Rfg. Sys. DESCRIPTION PIB	
TEST DESCRIPTION TEST METHOD	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**
1. THICKNESS Own quality control (high frequency)	100 mil ± 10%	1. THICKNESS ASTM D751	100 mils.	1. THICKNESS Own quality control (high frequency)	100 mil ± 10%
2. TENSILE STRENGTH ASTM D412 + D882	550 PSI	2. TENSILE STRENGTH ASTM D412 and D882	550 psi	2. TENSILE STRENGTH ASTM D412 + D882	500 PSI
3. LAP JOINT STRENGTH ASTM D 751	159.5 lbf	3. LAP JOINT STRENGTH		3. LAP JOINT STRENGTH ASTM D751	159.5 lbf
4. ELONGATION AT BREAK ASTM D 882	410%	4. ELONGATION AT BREAK ASTM D882 with backing	410%	4. ELONGATION AT BREAK ASTM D882	410%
5. TENSILE SET ASTM D 395 (method B)	91.5%	5. TENSILE SET		5. TENSILE SET ASTM D395 (method B)	91.5%
6. LOW TEMPERATURE FLEXIBILITY ASTM D 2136 – 40°F/ – 40°C	satisfactory 3 of 3 passed	6. LOW TEMPERATURE FLEXIBILITY ASTM D2136	– 40°F	6. LOW TEMPERATURE FLEXIBILITY ASTM D2136 – 40°F/ – 40°C	satisfactory 3 of 3 passed
7. WATER ABSORPTION ASTM D 570	0.032%	7. WATER ABSORPTION ASTM D570 Percent by weight (24 hr. immersion)	0.032	7. WATER ABSORPTION ASTM D 570	0.032%
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION not tested, because technically no water absorption	NT	8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION ASTM D1204 24 hrs. @ 212°F	– 0.7%	8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION not tested, because technically no water absorption.	NT
9. HEAT AGING ASTM D 573 after 6 hours	2.3% loss at 376°F	9. HEAT AGING ASTM D573 after 6 hrs. @376°F	2.3%	9. HEAT AGING ASTM D573 after 6 hours	2.3% loss at 376°F
10. OZONE RESISTANCE DIN 4102 (no U.S. test)	excellent	10. OZONE RESISTANCE		10. OZONE RESISTANCE DIN 4102 (no U.S. test)	excellent
11. RESISTANCE TO ACCELERATED WEATHERING U.S. Testing	15,000 hrs.	11. RESISTANCE TO ACCELERATED WEATHERING		11. RESISTANCE TO ACCELERATED WEATHERING U.S. Testing	15,000 hrs.
12. DYNAMIC IMPACT (PUNCTURING) FTMS-191 (method 5120)	208.4 lbs.	12. DYNAMIC IMPACT (PUNCTURING)		12. DYNAMIC IMPACT (PUNCTURING) FTMS-191 (method 5120)	208.4 lbs.
13. TEAR RESISTANCE ASTM D 1004	176 lbs/in. thickness	13. TEAR RESISTANCE		13. TEAR RESISTANCE ASTM D1004	176 lbs/in. thickness
14. TEARING STRENGTH ASTM D 751 a. Method B b. Grab Method	 a. 52 lbs. b. 139.4 lbs.	14. TEARING STRENGTH ASTM D624 without backing ASTM D624 without backing	 92 pli 190 pli	14. TEARING STRENGTH ASTM D751 a. Method B b. Grab Method	 a. 52 lbs. b. 139.4 lbs.
15. LOW TEMPERATURE IMPACT ASTM D2136 — 1/8" Mandrel	no cracks at – 30°F	15. LOW TEMPERATURE IMPACT		15. LOW TEMPERATURE IMPACT ASTM D2136 — 1/8" Mandrel	no cracks at – 30°F
16. PERMEABILITY ASTM E96	0.01 perm.	16. PERMEABILITY ASTM E96, (Procedure A) gms/24 hr./m²	0.112 W.V.T.	16. PERMEABILITY ASTM E96	0.01 perm.
17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION ASTM 2240 (24 hrs. at 212°F)	– 0.7%	17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION		17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION ASTM 2240 (24 hrs. at 212°F)	– 0.7%
18. CONE PENETRATION not available	NA	18. CONE PENETRATION		18. CONE PENETRATION not available	NA
AGR Company		Republic Powdered Metals		Tropical Industrial Coatings, Inc.	

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

PIB POLYISOBUTYLENE Part 2: Test Results *(See Part 1 for General Information)*

Test Description and Suggested Values As Specified in CGSB Standard 37-GP-52M	PIB 1000 Type Fabric backed Class	Type Class	Type Class
1. THICKNESS			
TYPE 1 & 2-Min. 0.039 in (1.0 mm)	1.39 mm	mm	mm
-Max. tolerance ± 10% nominal thickness	10 %	%	%
2. STRENGTH OF MEMBRANE			
TYPE 1-Tensile strength: min. 870 psi (6MPa)	380 psi	psi	psi
TYPE 2-Breaking strength: min 112 lbf (500N)	lbf	lbf	lbf
3. LAP JOINT STRENGTH			
TYPE 1 & 2			
Before exposure: min 68 lbf (300N)	72 lbf	lbf	lbf
After exposure:			
Min. of 85% of value before exposure but not less than 68 lbf (300N)	72 lbf	lbf	lbf
CLASS A-After immersion and freeze thaw cycles (min. 85%)	99 %	%	%
CLASS B-After immersion (min. 85%)	%	%	%
4. ELONGATION AT BREAK			
TYPE 1-Min. 300% elongation	550 %	%	%
TYPE 2-Min. 200% elongation	%	%	%
5. TENSILE SET			
TYPE 1 ONLY-Not greater than 5.0%	10 %	%	%
6. LOW TEMPERATURE FLEXIBILITY			
Shall show no cracking (Pass/Fail)	Pass		
7. WATER ABSORPTION - after immersion in water:			
Change in mass not to exceed 5.0%	<2 %	%	%
Shall not drop in strength by more than 10% as received (TEST 2)	<5 %	%	%
Strength not less than:			
TYPE 1-Tensile strength: 870 psi (6MPa)	360 psi	psi	psi
TYPE 2-Breaking strength: 112 lbf (500N)	lbf	lbf	lbf
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION			
Change in length not to exceed 3.0%	MD <3 % XD <3 %	MD lbf XD lbf	MD lbf XD lbf
9. HEAT AGING			
After exposure:			
Shall retain 80% of strength as received and in no case less than min. strength measured in test 2	MD 95 % XD 95 %	MD % XD %	MD % XD %
TYPE 1-Tensile strength: min. 870 PSI (6 MPa)	360 psi	psi	psi
TYPE 2-Breaking strength: min. 112 lbf (500N)	lbf	lbf	lbf
Pass low temperature flexibility test (Pass/Fail)	Pass		
Have a min. elongation at break			
TYPE 1-210%	300 %	%	%
TYPE 2-140%	%	%	%
Dimensional change not to exceed 3.0%	MD 2 % XD 2 %	MD % XD %	MD % XD %
10. OZONE RESISTANCE			
No visible cracks under 7 power magnification (Pass/Fail)	Pass		
11. RESISTANCE TO ACCELERATED WEATHERING			
CLASS A ONLY			
TYPE 1 & 2-Shall show no cracking, blistering or visible defects (Pass/Fail)	Pass		
Shall retain min. of 90% of strength prior to weathering and in no case less than min. strength specified in Test 2.			
TYPE 1-Shall retain 90% of tensile strength	95 %	%	%
TYPE 2-Shall retain 90% of breaking strength	%	%	%
TYPE 1-Min. tensile strength of 870 psi (6 MPa)	360 psi	psi	psi
TYPE 2-Min. breaking strength of 112 lbf (500N)	lbf	lbf	lbf
12. DYNAMIC IMPACT (PUNCTURING) TEST			
Will withstand puncturing test of an energy impact of 1.8 ft. lbs (2.45J) (Pass/Fail)	Pass		
13. TEAR RESISTANCE			
TYPE 1 ONLY-Shall exceed 6 lbf (26N) per mm of thickness	MD lbf XD lbf	MD lbf XD lbf	MD lbf XD lbf
14. TEARING STRENGTH			
TYPE 2 ONLY-Shall exceed 8 lbf (35N)	lbf	lbf	lbf

LEGEND: IT = in test; NA = not available; N/A = not applicable; TBD = to be determined

Carboline Company

OTHER SINGLE-PLY Part 1 *(See Part 2 for Test Results)*

PRODUCT NAME ►	Bond Grey 35	Duro-Last	FiberTite			
1. PRODUCT DESCRIPTION						
a) Reinforcement	Polyester	1000 Denier Polyester Scrim	Polyester			
b) Color	Grey	White	Light Grey			
c) Installed wt. (psf w/o ballast)	.22	.21	0.25			
2. COATING REQUIRED	None	None	None			
3. USE						
a) New roofing	X	X	X			
b) Reroofing	X	X	X			
4. FIELD LAP JOINT METHOD	Heat Weld	Heat Gun	Heat Weld			
5. TYPE OF ROOF SYSTEM						
a) Loose laid/ballasted (ballast psf)	X		Mech. fast. no ballast			
b) Partially adhered-method	X					
c) Fully adhered-method		Mechanically				
d) Prot. Memb. Rfg. Assy.						
6. MINIMUM SLOPE	Dead Level	Any	Dead Level			
7. USE OVER						
a) Perlite	X	X	X			
b) Urethane	X	X	X			
c) Wood fibre	X	X	X			
d) Fibre glass	X	X	X			
e) Exp. polystyrene	X	X	X			
f) Felt faced composites	X	X	X			
g) Other			Check with manufacturer			
8. RESTRICTED REGIONS *(See "Important Notes")*	None	None	None			
9. WORKABLE TEMP RANGE	None	– 30°F-160°F	– 10°F – 160°F			
10. FLASHING MATERIAL	Conventional	Roof Material	TPE			
11. FLASHING METHOD	Conventional	Heat Gun & Metal	Heat Weld			
12. PRE-FORMED ACCESS AVAIL.	Yes	Yes	Yes			
13. COUNTRY OF ORIGIN	U.S.A.	U.S.A.	U.S.A.			
14. COUNTRY OF MANUFACTURE	U.S.A.	U.S.A.	U.S.A.			
15. YR. FIRST COMMER. USE						
a) Foreign (Year)			1974			
b) U.S.A. (Year, City-first installed)		1978	1968 - Sarasota			
16. NO. OF SQUARES INSTALLED						
a) Foreign		None	10,000			
b) U.S.A.			40,000			
17. WARRANTY *(See "Important Notes")*		100,000				
a) Duration (years)	10	20 years	10			
b) Renewable after inspection		No				
c) Scope of coverage (repair of leaks)						
c.1 Material only		Last 10 years				
c.2 Workmanship & material	X	First 10 years	X			
d) Monetary limitation						
d.1 None						
d.2 Orig. cost of installation	X	X	X			
d.3 $ per square						
e) Exclusion from coverage						
e.1 Damage to other rfg. components	X		X			
e.2 Consequential damages	X		X			
18. LIMITATIONS OR RESTRICTED USE	See specifications	None	see specifications			
19. UL *(See "Important Notes")*	X	IT	X			
20. FM *(See "Important Notes")*	X	X	X			
21. METHOD OF DISTRIB.	Contrs./Direct	Reps/Dealers	Direct			
22. # REGIONAL SERVICE LOCATIONS			3			
23. LICENSED APPLICATOR AGREEMENT	Yes	Yes	Yes			
24. APPLICATOR TRAINING (FIELD, SEMINARS, FACTORY)	Yes	Field	Field, Seminars, Factory			
25. SALES INFO CONTACT	Steve Irwin	Bill Frederick	Sam Eisentrout			
26. TECHNICAL INFO. CONTACT	Wayne Holden	John Burt	Sam Eisentrout			
27. COMPANY	Bond Cote Systems 3rd Street Pulski, VA 24301 703/980-2262	Duro-Last Roofing, Inc. 525 Morley Drive Saginaw, MI 48601 1-800/248-0280 1-517/753-2186	Seaman Corporation 102B N. Washington St. Millersburg, Ohio 44654 216/674-0121			

OTHER SINGLE-PLY Part 2: Test Results *(See Part 1 for General Information)*

PRODUCT NAME Bond Grey 35 DESCRIPTION Nitrile Alloy		PRODUCT NAME Duro-Last DESCRIPTION Trimeric Polymer Coated Polyester		PRODUCT NAME FiberTite DESCRIPTION Polyester reinforced TPE	
TEST DESCRIPTION TEST METHOD	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**	**TEST DESCRIPTION TEST METHOD**	**TEST RESULTS**
1. THICKNESS ASTM D751	35 mils.	1. THICKNESS ASTM D751	30 mil.	1. THICKNESS ASTM D3083	Min. 0.030 in.
2. TENSILE STRENGTH ASTM D882	7,500 psi	2. TENSILE STRENGTH ASTM D751 Grab	390 × 390 lbs.	2. TENSILE STRENGTH ASTM D882 ASTM D751 grab method	8500 psi 375 lbs. × 350 lbs.
3. LAP JOINT STRENGTH		3. LAP JOINT STRENGTH		3. LAP JOINT STRENGTH ASTM D751	>300 lbs.
4. ELONGATION AT BREAK		4. ELONGATION AT BREAK ASTM D751	28%	4. ELONGATION AT BREAK ASTM D751	20% warp 30% fill
5. TENSILE SET		5. TENSILE SET		5. TENSILE SET	
6. LOW TEMPERATURE FLEXIBILITY ASTM D2136, −30°F	No cracks	6. LOW TEMPERATURE FLEXIBILITY ASTM D2136	−30°F, No Cracks	6. LOW TEMPERATURE FLEXIBILITY ASTM D2136	−30°F no crack
7. WATER ABSORPTION		7. WATER ABSORPTION		7. WATER ABSORPTION ShelterRite water wicking test 24 hrs.	1/8″ max.
8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION		8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION		8. DIMENSIONAL STABILITY AFTER WATER ABSORPTION same as above	less than 0.2%
9. HEAT AGING		9. HEAT AGING		9. HEAT AGING 160°F — 7 days	>95% strength retention
10. OZONE RESISTANCE ASTM D1149 7 days @ 100 pphm 104°F, 1/8″ Bent loop	No cracks, 7X	10. OZONE RESISTANCE		10. OZONE RESISTANCE 3 days at 100 pphm — 100°F +3 days at 300 pphm — 100°F	no cracking
11. RESISTANCE TO ACCELERATED WEATHERING Fed. Std. 191(M5804)	3,000 hrs. no cracking or blistering	11. RESISTANCE TO ACCELERATED WEATHERING Carbon Arc Fed. Standard (Method 5408)	3000 hrs. no creasing	11. RESISTANCE TO ACCELERATED WEATHERING Carbon arc weather-o-meter with water spray — 5000 hrs.	no cracking
12. DYNAMIC IMPACT (PUNCTURING)		12. DYNAMIC IMPACT (PUNCTURING)		12. DYNAMIC IMPACT (PUNCTURING) Fed. Std. 101B (M 2031)	250 lbs.
13. TEAR RESISTANCE		13. TEAR RESISTANCE		13. TEAR RESISTANCE ASTM D-751 8″ × 10″ sample	100 lbs.
14. TEARING STRENGTH ASTM D751 8″ × 10″ specimen	100 × 90 lbs.	14. TEARING STRENGTH ASTM D751 Tongue	90 × 90 lbs.	14. TEARING STRENGTH Same as above	
15. LOW TEMPERATURE IMPACT		15. LOW TEMPERATURE IMPACT		15. LOW TEMPERATURE IMPACT ASTM D2136 −30°F	no cracking
16. PERMEABILITY ASTM E96, Method A	0.379 U.S. Perm.	16. PERMEABILITY ASTM E-96 Proc. B gr./hr./m²	0.151g	16. PERMEABILITY Water vapor transmission ASTM E96 Proc. A	1.3g/m²/24h
17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION		17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION		17. DIMENSIONAL CHANGE AFTER STRESS RELAXATION 37-GP-54M	Shall not change more than 0.24
18. CONE PENETRATION		18. CONE PENETRATION		18. CONE PENETRATION 37-GP-54M para. 7.2.7	Pass
Bond Cote Systems		Duro-Last Roofing, Inc.		Seaman Corporation	

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