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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07550—Modified Bituminous Sheet Roofing

REPORT HOLDER:

GAF MATERIALS CORPORATION
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EVALUATION SUBJECT:

RUBEROID® APP MODIFIED BITUMEN MEMBRANES, SBS MODIFIED BITUMEN MEMBRANES, SBS MODIFIED BITUMEN (HEAT-WELD) MEMBRANES, AND GAFGLAS® BUILT-UP ROOFING FELTS AND BASE SHEETS

1.0 EVALUATION SCOPE

Compliance with the following code:

2006 *International Building Code®* (IBC)

Properties evaluated:

- Physical properties
- Fire classification
- Wind uplift resistance
- Impact resistance

2.0 USES

RUBEROID® atactic polypropylene (APP) and styrene-butadiene-styrene (SBS) modified bitumen membranes are used as roof covering in Class A, B or C roof covering assemblies. GAFGLAS® built-up roofing felts and base sheets are used as base and ply sheets in modified bitumen membrane systems.

3.0 DESCRIPTION

3.1 General:

The RUBEROID® APP and SBS Modified Bitumen Membrane Roofing Systems consist of a modified bitumen membrane, insulation where used, flashing, mechanical fasteners, and construction adhesives that are installed on a combustible or noncombustible roof deck.

3.2 RUBEROID® APP Modified Bitumen Membranes:

3.2.1 RUBEROID® Torch: This membrane is a modified bitumen membrane with a core of nonwoven-polyester mat coated with APP polymer modified asphalt. It is available either smooth or surfaced with mineral granules and is manufactured in a thickness of 0.160 inch (4.0 mm). The membrane complies with ASTM D 6222, Type I.

3.2.2 RUBEROID® Torch Plus: This is a modified bitumen membrane with a core of nonwoven-polyester mat coated with APP polymer modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.197 inch (5.0 mm). The membrane complies with ASTM D 6222, Type II.

3.2.3 RUBEROID® Torch FR: This is a modified bitumen membrane with a core of nonwoven-polyester mat coated with APP polymer modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.197 inch (5.0 mm). The membrane complies with ASTM D 6222, Type II.

3.3 RUBEROID SBS Modified Bitumen Membranes:

3.3.1 RUBEROID Mop: This membrane is a modified bitumen membrane with a core of nonwoven-polyester mat coated with SBS polymer modified asphalt. It is available either smooth or surfaced with mineral granules and is manufactured in a thickness of 0.160 inch (4.1 mm). The membrane complies with ASTM D 6164, Type I.

3.3.2 RUBEROID® Mop Plus: This is a modified bitumen membrane with a core of nonwoven-polyester mat coated with SBS polymer modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.160 inch (4.1 mm). The membrane complies with ASTM D 6164, Type II.

3.3.3 RUBEROID® Mop FR: This is a modified bitumen membrane with a core of nonwoven-polyester mat coated with SBS polymer modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.160 inch (4.1 mm). The membrane complies with ASTM D 6164, Type II.

3.3.4 RUBEROID® Mop 170 FR: This is a modified bitumen membrane with a core of nonwoven-polyester mat coated with SBS polymer modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.160 inch (4.1 mm). The membrane complies with ASTM D 6164, Type I.

3.3.5 RUBEROID® 20: This is a modified bitumen membrane with a core of nonwoven-glass-fiber mat coated with SBS polymer-modified asphalt. It is smooth-surfaced and is manufactured in a thickness of 0.082 inch (2.1 mm). The membrane complies with ASTM D 6163, Type I.

3.3.6 RUBEROID® 30: This is a modified bitumen membrane with a core of nonwoven- glass-fiber mat coated with SBS polymer-modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.14 inch (3.6 mm). The membrane complies with ASTM D 6163, Type I.

3.3.7 RUBEROID® 30 FR: This is a modified bitumen membrane with a core of nonwoven-glass-fiber mat coated with SBS polymer-modified asphalt. It is surfaced with mineral granules and is manufactured in a thickness of 0.14 inch (3.6 mm). The membrane complies with ASTM D 6163, Type I.

3.3.8 RUBEROID® EnergyCap 30 FR: This is similar to the 30 FR except that it is surfaced with smaller granules and factory-coated with a white elastomeric coating.

3.3.9 RUBEROID® Modified Base Sheet: This is a roofing base sheet constructed with a glass fiber mat coated with SBS polymer-modified asphalt. It is manufactured in a roll size of 39.4 inches by 97.5 feet (1 m by 29.7 m). The base sheet complies with ASTM D 4601, Type II.

3.4 RUBEROID® SBS Modified Bitumen (Heat-Weld) Membranes:

3.4.1 RUBEROID® SBS Heat-Weld Plus: This is a heavy-duty SBS modified bitumen membrane that can be installed without the use of hot asphalt. It has a core of nonwoven-polyester mat, coated with a polymer-modified asphalt and surfaced with mineral granules. It is manufactured in a thickness of 0.16 inch (4.1 mm). The membrane complies with ASTM D 6164, Types I and II.

3.4.2 RUBEROID® SBS Heat-Weld Plus FR: This is a heavy-duty SBS modified bitumen membrane that can be installed without the use of hot asphalt. It has a core of nonwoven-polyester mat, coated with a polymer-modified asphalt and surfaced with mineral granules. It is manufactured in a thickness of 0.16 inch (4.1 mm). The membrane complies with ASTM D 6164, Types I and II.

3.4.3 RUBEROID® SBS Heat-Weld 170 FR: This is an SBS modified bitumen membrane that can be installed without the use of hot asphalt. It has a core of nonwoven-polyester mat, coated with polymer-modified asphalt and surfaced with mineral granules. It is manufactured in a thickness of 0.16 inch (4.1 mm). The membrane complies with ASTM D 6164, Type I.

3.4.4 RUBEROID® SBS Heat-Weld Granule: This is an SBS modified bitumen membrane that can be installed without the use of hot asphalt. It has a core of nonwoven-polyester mat, coated with a polymer-modified asphalt and surfaced with mineral granules. It is manufactured in a thickness of 0.16 inch (4.1 mm). The membrane complies with ASTM D 6164, Type I.

3.4.5 RUBEROID® SBS Heat-Weld Smooth: This is an SBS modified bitumen membrane with a core of nonwoven-polyester mat coated with a polymer-modified asphalt. It is smooth-surfaced and manufactured in a thickness of 0.16 inch (4 mm). The membrane complies with ASTM D 6164, Type I.

3.4.6 RUBEROID® SBS Heat-Weld 25: This is an SBS modified bitumen membrane with a core of nonwoven-glass mat coated with a polymer-modified asphalt. It is smooth-surfaced and manufactured in a thickness of 0.098 inch (2.5 mm). The membrane complies with ASTM D 6163, Type I.

3.5 GAFGLAS® Built-up Roofing Felts:

3.5.1 GAFGLAS® Ply 4: This roofing felt is constructed with a glass fiber mat coated with asphalt. It is manufactured in a roll size of 39.4 inches by 161.8 feet (1 m by 49.3 m). The membrane complies with ASTM D 2178, Type IV.

3.5.2 GAFGLAS® Flex Ply 6: This is a fiberglass roofing felt with a flexible, open-pore design. It is manufactured in a roll size of 39.4 inches by 161.8 feet (1 m by 49.3 m). The membrane complies with ASTM D 2178, Types IV and VI.

3.5.3 GAFGLAS® #75 Base Sheet: This is a roofing base sheet constructed with a glass mat coated with asphalt on both sides. It is manufactured in a roll size of 39.4 inches by 97.5 feet (1 m by 29.7 m). The membrane complies with ASTM D 4601, Type II.

3.5.4 GAFGLAS® Stratavent® Eliminator Base Sheet: This is a roofing base sheet constructed of glass fiber mat and asphalt. The bottom of the sheet is granule-surfaced. It is available for nailable or non-nailable substrates. It is manufactured in a roll size of 39.4 inches by 40.8 feet (1 m by 12.4 m). The membrane complies with ASTM D 4897, Type II.

3.6 Insulation:

Insulation must comply with the applicable material standards specified in IBC Table 1508.2. Foam plastic insulation, where used, must have a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E 84. See Tables 1 through 4 for insulations for use with specific roofing systems.

3.7 Fasteners:

Fasteners, used to mechanically fasten insulation and base sheets to the roof deck, must be Drill-Tec fasteners by Building Materials Corporation of America (BMCA). Spacing of fasteners must be in accordance with Table 4 of this report.

3.7.1 Drill-Tec Standard #12 Roofing Fastener: A steel screw with a corrosion-resistant coating, used in combination with Drill-Tec's fastening plates, to mechanically attach roofing insulation to steel or wood substrate. Fastener length must be sufficient to penetrate through the steel deck a minimum of $^3/_4$ inch (19.1 mm), and into the wood deck a minimum of 1 inch (25.4 mm).

3.7.2 Drill-Tec CD-10 Fastener: A hammer-in, nonthreaded steel fastener with a corrosion-resistant coating, used in combination with Drill-Tec's fastening plates, to mechanically attach roofing insulation to concrete roof deck. Fastener length must be sufficient to penetrate into the concrete deck a minimum of 1 inch (25.4 mm).

3.7.3 Drill-Tec 3-Inch Galvalume Plate: A galvalume-coated 3-inch-diameter (76 mm) steel plate designed to be used with Drill-Tec fasteners to mechanically attach roofing insulation to the roof deck.

3.8 Asphalts and Adhesives:

Asphalts used to hot mop GAFGLAS® and RUBEROID® membranes must conform to ASTM D 312, Type III or Type IV. Adhesive, for cold application of RUBEROID® SBS membranes must be "No. 81" by Karnak Chemical Company or "No. 6160" by Gibson-Homan.

3.9 Impact Resistance:

The modified bitumen roofing membranes described in this report meet requirements for impact resistance based on testing in accordance with FM 4470.

4.0 INSTALLATION

4.1 General:

Installation of the RUBEROID® modified bitumen roofing membranes must comply with the applicable code, the manufacturer's published installation instructions and this report. The manufacturer's published installation instructions must be available at all times on the jobsite during installation.

The slope of the roof on which the single-ply membranes are installed must be minimum $^1/_4$:12 (2-percent slope) and must not be more than the maximum slope indicated for the particular assembly as listed in Tables 1 through 3.

Penetrations and terminations of the roof covering must be flashed and made weathertight in accordance with the requirements of the membrane manufacturer and Section 1503.2 of the IBC.

4.2 Fire Classification:

4.2.1 New Construction: Roof assemblies which include the RUBEROID® modified bitumen membrane roof coverings described in, and installed in accordance with, this report are classified as Class A, B or C roof assemblies in accordance with ASTM E 108 or UL 790, as noted in Tables 1 through 3.

4.2.2 Reroofing: Prior to installation of new roof coverings, inspection in accordance with IBC Section 1510, and approval from the code official having jurisdiction, are required.

Class A, B, or C roof coverings may be installed over existing classified roof assemblies under the following conditions without additional roof classification tests, provided the resulting classification is the lower of the new and existing roofing classification:

- New uninsulated roof coverings installed only over existing uninsulated assemblies.
- New insulated roof coverings installed over existing uninsulated assemblies only.

4.3 Wind Resistance:

4.3.1 New Construction: The maximum allowable wind uplift pressures for the RUBEROID® modified bitumen membrane as part of roof assemblies are noted in Table 4. Metal edge securement for roofing systems must be designed in accordance with ANSI/SPRI ES-1, complying with IBC Section 1504.5.

4.3.2 Reroofing: Roof coverings employing mechanical fasteners must be qualified, to the satisfaction of the code official, on the adequacy of fasteners penetrating through existing roof coverings into structural substrates. Since the composition and/or condition of any particular underlying existing roofing material can vary widely, reroofing with adhered systems is outside the scope of this report.

5.0 CONDITIONS OF USE

The RUBEROID® modified bitumen membranes and GAFGLAS® roofing felts and base sheets described in this report comply with, or are suitable alternatives to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with the applicable code, the manufacturer's published installation instructions and this report. The instructions within this report govern if there are any conflicts between the manufacturer's installation instructions and this report.

5.2 The RUBEROID® modified bitumen membrane roof covering must be installed by professional roofing contractors who are trained and approved by the manufacturer.

5.3 Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4.1.5 unless otherwise noted in an ICC-ES evaluation report on the foam plastic insulation.

5.4 For all above-deck insulation except foam plastics, the roof covering assembly, including such insulation, must have passed testing in accordance with UL 1256 or FM 4450.

5.5 Foam plastic insulation, where used, must bear the label of an approved agency indicating that the foam plastic has a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E 84. Except for applications where a thermal barrier is not required, total thickness of foam plastic insulation must be limited to the lesser of the maximum thickness allowed in Tables 1 through 4 or the maximum thickness that limits the flame-spread index to not more than 75 when tested in accordance with ASTM E 84.

5.6 Design wind uplift pressure on any roof area, including edge and corner zones, must not exceed the allowable wind-uplift pressure for the system installed in that particular area. Refer to allowable wind uplift pressures for systems as listed in Table 4.

5.7 The allowable wind uplift pressures listed in Table 4 are for the roof covering only. The deck and framing to which the roof covering is attached must be designed for the applicable components and cladding wind loads in accordance with the applicable code.

5.8 Calculations demonstrating that the required wind resistance is less than the allowable wind resistance must be submitted to the code official for approval.

5.9 When application is over existing roofs, documentation of the wind-uplift resistance of the composite roof construction must be submitted to the code official for approval at the time of permit application.

5.10 The membranes are manufactured under a quality control program with inspections by Underwriters Laboratories Inc. (AA-668) at GAF facilities in the following locations: Fontana, California; Stockton, California; Savannah, Georgia; Mount Vernon, Indiana; and North Branch, New Jersey.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Membrane Roof-covering Systems (AC75), dated April 2007.

7.0 IDENTIFICATION

Each roofing membrane covered by this report is labeled with the product name; the manufacturer's name (GAF Materials Corporation) and address; the manufacturing location; the production date code; the evaluation report number (ESR-1274); and the name of the inspection agency (Underwriters Laboratories Inc.).

TABLE 1—CLASS A ROOFING SYSTEMS

SYSTEM NO.	SUBSTRATE[6]	MAX. ROOF SLOPE	INSULATION[1,2,5]	BASE SHEET[3,5]	PLY SHEET[3,5]	MEMBRANE[5]	SURFACING/ COATING[5]
1	Non-combustible	1/2:12	(Optional) Any thickness, 1 or more layers perlite, wood fiber, glass fiber, isocyanurate, urethane, perlite/isocyanurate composite, perlite/urethane composite, or wood fiber/isocyanurate composite	(Optional) 1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Torch" (smooth or granule), "Ruberoid Torch Plus" (granule), "Ruberoid Mop" (smooth or granule), or "Ruberoid Mop Plus" (granule).	Gravel, 400 lbs/sq loose laid or applied in a flood coat of hot roofing asphalt.
2	Non-combustible	1/2:12	—	(Optional) 1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Torch" (smooth), or "Ruberoid Mop" (smooth)	Karnak No, 97, 1 1/2 - 3 gal/sq.
3	Non-combustible	1/4:12	(Optional) Any thickness, 1 or more layers perlite, wood fiber, or glass fiber	(Optional) 1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Torch" (smooth), or "Ruberoid Mop" (smooth)	Karnak No, 97, 1 1/2 -3 gal/sq.
4	Combustible - 15/32 inch plywood min.	1/2:12	One or more layers, 1 1/2 inch minimum thickness, perlite, glass fiber, isocyanurate, urethane, perlite/isocyanurate composite, or perlite/urethane composite (off-set from plywood joints 6 inches)	1 or more layers of Type G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Torch" (smooth), or "Ruberoid Mop" (smooth)	Karnak No, 97, 1 1/2 - 3 gal/sq.
5	Non-combustible	1/2:12	—	(Optional) 1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Torch" (granule), "Ruberoid Torch Plus" (granule), "Ruberoid Mop" (granule) or "Ruberoid Mop Plus" (granule)	—
6	Combustible - 15/32 inch plywood min.	1/2:12	1 or more layers perlite, glass fiber, 3/4 inch minimum, isocyanurate, urethane, perlite/isocyanurate composite, or perlite/urethane composite, 1 1/2 inch min. thickness	(Optional) 1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Torch" (smooth or granule), "Ruberoid Torch Plus" (granule), "Ruberoid Mop" (smooth or granule), or "Ruberoid Mop Plus" (granule).	Gravel, 400 lbs/sq loose laid or applied in a flood coat of hot roofing asphalt.
7	Combustible - 15/32 inch plywood min.	1/2:12	(Optional) 1 or more layers perlite, wood fiber, glass fiber, isocyanurate, urethane, perlite/isocyanurate composite, perlite/urethane composite, or wood fiber/isocyanurate composite	2 or more layers of Type G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Torch" (smooth or granule), "Ruberoid Torch Plus" (granule), "Ruberoid Mop" (smooth or granule), "Ruberoid Mop Plus" (granule).	Gravel, 400 lbs/sq loose laid or applied in a flood coat of hot roofing asphalt.
8	Combustible - 15/32 inch plywood min.	1/2:12	(Optional) 1 or more layers perlite, glass fiber, isocyanurate, urethane, perlite/isocyanurate composite, perlite/urethane composite or wood fiber/ isocyanurate composite	(Optional) 1 or more layers of Type G2[4]	—	1 or more layers of "Ruberoid Torch" (smooth) or "Ruberoid Mop" (smooth)	Karnak No. 97, 1 1/2 - 3 gal/sq
9	Non-combustible	1/2:12	1 or more layers perlite, glass fiber, 3/4 inch min. isocyanurate, urethane, perlite/isocyanurate composite, or perlite/urethane composite, 1 1/2 inch min.	1 or more layers of Type G1 or G2[4]	—	"Ruberoid Torch FR" (smooth)	"GAF Fibered Aluminum Coating" at 1 - 2 gal/sq
10	Combustible - 15/32 inch plywood min.	1/2:12	1 or more layers perlite, glass fiber, 3/4 inch min., isocyanurate, urethane, perlite/isocyanurate composite, or perlite/urethane composite, 1 1/2 inch min.	1 or more layers of Type G2 "GAFGLAS #75 Base Sheet," hot mopped or mechanically fastened in place.	1 or more layers of Type G1 "GAFGLAS Ply 4" or "Ply 6" hot mopped in place.	"Ruberoid Mop FR" (granule).	—

(*Continued*)

TABLE 1—CLASS A ROOFING SYSTEMS (Continued)

SYSTEM NO.	SUBSTRATE[6]	MAX. ROOF SLOPE	INSULATION[1,2,5]	BASE SHEET[3,5]	PLY SHEET[3,5]	MEMBRANE[5]	SURFACING/ COATING[5]
11	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	(Optional) 1 or more layers of isocyanurate, perlite, urethane, glass fiber, perlite/isocyanurate composite, or perlite/urethane composite	1 or more layers of Type G2 "GAFGLAS #75 Base Sheet," hot-mopped or mechanically-fastened in place.	1 or more layers of Type G1 "GAFGLAS Ply 4" or "Ply 6" hot mopped in place.	"Ruberoid Torch 170FR" (granule).	(Optional) "GAF Fibered Aluminum Coating" at $1^{1}/_{2}$ gal/sq or GAF Weather Coat Emulsion at 3 gal/sq
12	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	Isocyanurate, 2 inch min., wood fiber, perlite or glass fiber, $^{3}/_{4}$ in. min. thickness, hot-mopped or mechanically-fastened in place. Joints offset 6 inches.	1 or more layers of Type G2 "GAFGLAS #75 Base Sheet," hot-mopped or mechanically-fastened in place.	(Optional) 1 or more layers of Type G1 "GAFGLAS Ply 4" or "Ply 6" hot mopped in place.	"Ruberoid Torch FR" (granule).	—
13	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	(Optional) Isocyanurate, perlite, or glass fiber, $^{3}/_{4}$ inch min. thickness, hot- mopped or mechanically-fastened in place. Joints off-set 6 inches.	1 or more layers of Type G2 "GAFGLAS #75 Base Sheet," hot-mopped in place.	(Optional) 1 or more layers of Type G1 "GAFGLAS Ply 4" or "Ply 6" hot-mopped in place.	"Ruberoid Torch FR" (granule).	—
14	Non-combustible	2:12	(Optional) Isocyanurate, wood fiber board, perlite, or glass fiber, $^{3}/_{4}$ inch min. thickness, hot- mopped or mechanically-fastened in place. Joints off-set 6 inches.	1 or more layers of Type G2[4] base sheet, hot-mopped or mechanically-fastened	(Optional) 1 or more layers of Type G14, hot-mopped in place.	"Ruberoid Torch FR" (granule).	—
15	Non-combustible	1:12	(Optional) Isocyanurate, wood fiberboard, perlite, or glass fiber, $^{3}/_{4}$ inch min. thickness, hot- mopped or mechanically-fastened in place. Joints off-set 6 inches.	1 or more layers of Type G2[4] base sheet, hot-mopped or mechanically-fastened	(Optional) One or more layers of Type G1[4], hot-mopped in place.	1 layer of "Ruberoid Torch FR" (granule)	—
16	Combustible - $^{15}/_{32}$ inch plywood min.	1:12	(Optional) Perlite, fiber glass, isocyanurate, urethane, or perlite/isocyanurate composite	1 or more layers of Type G2[4] base sheet, hot-mopped or mechanically-fastened	(Optional) One or more layers of Type G1[4] hot-mopped in place.	"Ruberoid Mop FR," (granule).	—
17	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	(Optional) Perlite, fiber glass, isocyanurate, urethane, or perlite/isocyanurate composite. Joints off-set 6 inches.	1 or more layers of Type G2[4] base sheet, hot-mopped or mechanically-fastened	(Optional) One or more layers of Type G1[4] hot-mopped in place.	One layer of "Ruberoid Mop" (smooth) and 1 layer of "Ruberoid Mop FR" (granule)	—
18	Non-combustible	1:12	(Optional) Perlite, fiber glass, isocyanurate, wood fiber board, urethane, or perlite/isocyanurate composite	1 or more layers of Type G2[4] base sheet, hot-mopped or mechanically-fastened	(Optional) One or more layers of Type G1[4] hot-mopped in place.	"Ruberoid Mop FR," (granule).	—
19	Non-combustible	1:12	(Optional) Perlite, fiber glass, isocyanurate, wood fiber board, urethane, or perlite/isocyanurate composite	1 or more layers of Type G2[4] base sheet, hot-mopped or mechanically-fastened	(Optional) One or more layers of Type G1[4] hot-mopped in place.	One layer of "Ruberoid Mop" (smooth) and 1 layer of "Ruberoid Mop FR" (granule)	—
20	Non-combustible	$^{1}/_{2}$:12	(Optional) 1 or more layers perlite, glass fiber, isocyanurate, urethane, perlite/isocyanurate composite, $^{3}/_{4}$ inch min. thickness.	1 or more layers of Type G1 or G2[4], hot-mopped or adhered w/Karnak Chemical Co. "No. 81" or Gibson-Homan "No. 6160" cold-applied adhesive at $1^{1}/_{2}$ gal/sq	—	1 layer of "Ruberoid Mop FR," or "Ruberoid Mop 170FR" (granule) hot-mopped or adhered w/Karnak Chemical Co. "No. 81" or Gibson-Homan "No. 6160" cold-applied adhesive at $1^{1}/_{2}$ gal/sq	—
21	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	Polyisocyanurate, $^{3}/_{4}$ inch min. thickness.	"GAFGLAS #75" (Type G2), mechanically-attached	—	1 or more layers of "Ruberoid Torch" (smooth), and 1 layer of "Ruberoid Torch 170FR" (granule)	—

(*Continued*)

TABLE 1—CLASS A ROOFING SYSTEMS (Continued)

SYSTEM NO.	SUBSTRATE[6]	MAX. ROOF SLOPE	INSULATION[1,2,5]	BASE SHEET[3,5]	PLY SHEET[3,5]	MEMBRANE[5]	SURFACING/ COATING[5]
22	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	(Optional) Polyisocyanurate, wood fiber, perlite, or glass fiber, $^{3}/_{4}$ inch min. thickness, hot mopped or mechanically fastened	1 or more layers of Type G2 "GAFGLAS #75" or "Ruberoid 20" base sheets, hot mopped or mechanically fastened in place	—	1 or more layers of "Ruberoid 30 FR," hot- mopped in place.	—
23	Combustible - $^{15}/_{32}$ inch plywood min.	1:12	(Optional) Polyisocyanurate, wood fiber, perlite, or glass fiber, $^{3}/_{4}$ inch min. thickness, hot mopped or mechanically fastened in place	1 or more layers of Type G2 "GAFGLAS #75", hot mopped or mechanically fastened in place.	1 or more layers of "Ruberoid 20," hot-mopped in place.	1 or more layers of "Ruberoid 30 FR" hot- mopped in place.	—

For **SI:** 1 inch = 25.4 mm; 1 gal = 3.785 L; 1 lb = 0.454 kg; 1 square = 9.29 m^2.

[1]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.
[2]Unless otherwise noted, the insulations are hot-mopped or mechanically-fastened.
[3]Unless otherwise noted, the base and ply sheets are solid-mopped, spot-mopped, or mechanically-fastened.
[4]Type G1 refers to GAFGLAS® Ply 4 or Flex Ply 6. Type G2 refers to GAFGLAS® #75 Base Sheet or GAFGLAS® Stratavent® Eliminator Base Sheet.
[5]Unless otherwise specified, the insulations, base sheets, ply sheets, adhesives, membranes and surface coatings must be UL classified for roofing systems.
[6]Wood deck must be minimum $^{15}/_{32}$-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (f_c) of 2,500 psi.

TABLE 2—CLASS B ROOFING SYSTEMS

SYSTEM NO.	SUBSTRATE[6]	MAX. ROOF SLOPE	INSULATION[1,2,5]	BASE SHEET[3,5]	PLY SHEET[3,5]	MEMBRANE[5]	SURFACING/ COATING[5]
1	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	(Optional) 1 or more layers, isocyanurate, wood fiber, perlite, glass fiber, urethane, perlite/isocyanurate composite, perlite/urethane composite, or wood fiber/isocyanurate composite, $^{3}/_{4}$ inch min. thickness.	2 or more layers of GAF Type G-1 or G-2[4] base sheet, hot-mopped or mechanically-fastened in place	—	1 or more layers of "Ruberoid Torch" (smooth), or "Ruberoid Mop" (smooth)	Karnak No. 97 applied at $1^{1}/_{2}$ gal/sq.
2	Combustible - $^{15}/_{32}$ inch plywood min.	1:12	(Optional) 1 or more layers, isocyanurate, wood fiber, perlite, glass fiber, urethane, perlite/isocyanurate composite, perlite/urethane composite or wood fiber/isocyanurate composite, $^{3}/_{4}$ inch min. thickness.	1 or more layers of Type G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Torch" (smooth) or "Ruberoid Mop" (smooth).	Karnak No. 97 applied at $1^{1}/_{2}$ - 3 gal/sq.

For **SI:** 1 inch = 25.4 mm; 1 gal = 3.785 L; 1 lb = 0.454 kg; 1 square = 9.29 m^2.

[1]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.
[2]Unless otherwise noted, the insulations are hot-mopped or mechanically-fastened.
[3]Unless otherwise noted, the base and ply sheets are solid-mopped, spot-mopped, or mechanically-fastened.
[4]Type G1 refers to GAFGLAS® Ply 4 or Flex Ply 6. Type G2 refers to GAFGLAS® #75 Base Sheet or GAFGLAS® Stratavent® Eliminator Base Sheet.
[5]Unless otherwise specified, the insulations, base sheets, ply sheets, adhesives, membranes and surface coatings must be UL classified for roofing systems.
[6]Wood deck must be minimum 15/32-inch-thick (11.9 mm) plywood.

TABLE 3—CLASS C ROOFING SYSTEMS

SYSTEM NO.	SUBSTRATE[6]	MAX. ROOF SLOPE	INSULATION[1,2,5]	BASE SHEET[3,5]	PLY SHEET[3,5]	MEMBRANE[5]	SURFACING/ COATING[5]
1	Combustible - $^{15}/_{32}$ inch plywood min.	2:12	1 or more layers of isocyanurate, wood fiber, perlite, glass fiber, urethane, perlite/isocyanurate composite, perlite/urethane composite, wood fiber/isocyanurate composite, or phenolic, $^{3}/_{4}$ inch min. thickness.	1 or more layers of Type G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Torch" (smooth) or "Ruberoid Mop" (smooth)	Karnak No. 97 applied at 3 gal/sq.
2	Combustible - $^{15}/_{32}$ inch plywood min.	2:12	—	1 or more layers of Type G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Torch" (smooth), or "Ruberoid Mop (smooth)	Grundy Ind. "20F Emulsion" applied at 3 gal/sq.
3	Non-combustible	$^{1}/_{2}$:12	1 or more layers, perlite, glass fiber, or wood fiber, $^{3}/_{4}$ inch min. thickness.	(Optional) 1 or more layers of Type G1 or G24	—	1 or more layers of "Ruberoid Torch" (smooth) or "Ruberoid Mop" (smooth)	(Optional) Karnak No. 97 or No. 169 applied at 1 - 3 gal/sq. or Grundy Ind. "20F Emulsion" at 3 gal/sq.
4	Combustible - $^{15}/_{32}$ inch plywood min.	1:12	1 or more layers perlite, glass fiber, wood fiber, isocyanurate, urethane, perlite/isocyanurate composite, perlite/urethane composite, or wood fiber/isocyanurate composite, $^{3}/_{4}$ inch min. thickness.	1 or more layers of Type G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Torch" (smooth) or . "Ruberoid Mop" (smooth)	Grundy Ind. "20F Emulsion" applied at 3 gal/sq.
5	Combustible - $^{15}/_{32}$ inch plywood min.	$^{1}/_{2}$:12	—	1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Torch" (granule), "Ruberoid Torch Plus" (granule), "Ruberoid Mop" (granule) or "Ruberoid Mop Plus" (granule).	—
6	Non-combustible	$^{1}/_{2}$:12	—	1 or more layers of Type G1 or G2[4]	(Optional) 1 or more layers of Type G1[4]	1 or more layers of "Ruberoid Mop FR" adhered in a uniform coating of Karnak No. 81 or Gibson-Homan No. 6160-900 applied at 1 - 2 gal/sq.	—
7	Combustible - $^{15}/_{32}$ inch plywood min.	1:12	(Optional) Perlite, glass fiber, wood fiber, isocyanurate, $^{3}/_{4}$ inch min. thickness, hot-mopped or mechanically-fastened.	1 or more layers of Type G2[4]	1 or more layers of Type G2 "GAFGLAS #75" or "Ruberoid 20" base sheets, hot mopped or mechanically-fastened	1 or more layers of "Ruberoid 30", hot-mopped in place.	—
8	Non-combustible	$^{1}/_{2}$:12	—	1 or more layers of Type G1 or G2[4]	—	1 or more layers of "Ruberoid Mop FR" adhered in a uniform coating of Karnak No. 81 or Gibson-Homan No. 6160-900 applied at 1 - 2 gal/sq.	—
9	Combustible - $^{15}/_{32}$ inch plywood min.	1:12	(Optional) Polyisocyanurate, wood fiber, perlite, glass fiber, any thickness, hot-mopped or mechanically-fastened.	1 or more layers of "Ruberoid 30" or Type G2 "GAFGLAS #75" base sheets, hot-mopped or mechanically-fastened.	—	1 or more layers of "Ruberoid 30", hot-mopped in place.	—

For **SI:** 1 inch = 25.4 mm; 1 gal = 3.785 L; 1 lb = 0.454 kg; 1 square = 9.29 m^2.

[1]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.
[2]Unless otherwise noted, the insulations are hot-mopped or mechanically-fastened.
[3]Unless otherwise noted, the base and ply sheets are solid-mopped, spot-mopped, or mechanically-fastened.
[4]Type G1 refers to GAFGLAS® Ply 4 or Flex Ply 6. Type G2 refers to GAFGLAS® #75 Base Sheet or GAFGLAS® Stratavent® Eliminator Base Sheet.
[5]Unless otherwise specified, the insulations, base sheets, ply sheets, adhesives, membranes and surface coatings must be UL classified for roofing systems.
[6]Wood deck must be minimum $^{15}/_{32}$-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (f_c) of 2,500 psi.

TABLE 4—WIND RESISTANCE

SYSTEM NO.	ALLOWABLE WIND UPLIFT	DECK[3]	INSULATION[1,2]	INSULATION FASTENING[1]	BASE SHEET	MEMBRANE
1	45 psf	New Steel No. 22 gage MSG min.	One of the following insulations, 1-inch min. to 4-inch max. thickness: Atlas "ACFoam-II" or "ACFoam III," BMCA "EnergyGuard," "EnergyGuard Ultra," or "EnergyGuard Composite," BMCA" EnergyGuard Fiberboard" or "EnergyGuard High Density Fiberboard."	Drill-Tec Standard #12 Roofing Fastener with 3-inch Galvalume Plate at the rate of 6 fasteners per 3 ft × 4 ft board.	GAFGLAS Ply4, GAFGLAS Ply 6, or GAFGLAS #75 is adhered to the insulation with 3-inch wide side and 6-inch wide end laps in either solid mopping of steep roofing asphalt or with 8-inch-wide ribbons at 16 inches o.c. (50% coverage).	Ruberoid Mop applied with a nominal 25 lbs/sq ±20%, continuous coating of steep asphalt. The membrane is installed with 4-inch-wide side and 6-inch-wide end laps. A minimum $^1/_4$ inch flow out of asphalt past the edge of the seam is required.
2	45 psf	Existing Steel No. 22 gage MSG	One of the following insulations: fiberglas (max. 1 inch), perlite (max. 1 inch) or wood fiber (max. 1 inch).	Drill-Tec Standard #12 Roofing Fastener with 3-inch Galvalume Plate at the following rates: Fiberglass - 6 fasteners per 3 ft × 4 ft board. Perlite - 4 fasteners per 2 ft × 4 ft board. Wood fiber - 16 fasteners per 4 ft × 8 ft board.	A base sheet listed by Factory Mutual Research is adhered to the insulation with 3-inch-wide side and 6-inch-wide end laps in either a solid mopping of steep roofing asphalt or with 8-inch-wide ribbons at 16 inches o.c. (50% coverage).	Ruberoid Mop applied with a nominal 25 lbs/sq ±20%, continuous coating of steep asphalt. The membrane is installed with 4-inch-wide side and 6-inch-wide end laps. A minimum $^1/_4$ inch flow out of asphalt past the edge of the seam is required.
3	45 psf	New or Existing Structural Concrete	One of the following insulations, 1-inch min. to 4-inch max. thickness: Atlas "ACFoam-II" or "ACFoam III," BMCA "EnergyGuard," "EnergyGuard Ultra," or "EnergyGuard Composite"; fiberglas (max. 1 inch), perlite (max. 1 inch) fastened at a rate of 4 fasteners per 2 ft × 4 ft board, or wood fiber (max. 1 inch) fastened at a rate of 16 fasteners per 4 ft × 8 ft board.	Drill-Tec CD-10 Fastener with 3-inch Galvalume Plate. Fasteners applied at a rate of 6 fasteners minimum per 3 ft × 4 ft board unless noted otherwise.	A base sheet listed by Factory Mutual Research is adhered to the insulation with 3-inch-wide side and 6-inch-wide end laps in either a solid mopping of steep roofing asphalt or with 8-inch-wide ribbons at 16 inches o.c. (50% coverage).	Ruberoid Mop applied with a nominal 25 lbs/sq ±20%, continuous coating of steep asphalt. The membrane is installed with 4-inch-wide side and 6-inch-wide end laps. A minimum $^1/_4$ inch flow out of asphalt past the edge of the seam is required.
4	45 psf	New or Existing Structural Concrete	One of the following insulations, 1-inch min. to 4-inch max. thickness: Atlas "ACFoam-II" or "ACFoam III," BMCA "EnergyGuard," "EnergyGuard Ultra," or "EnergyGuard Composite," fiberglas, perlite, or wood fiber	Attached to the roof deck with hot mop asphalt at a rate of 20 - 25 lbs./square. The concrete deck shall be primed with GAF Asphalt/Concrete primer prior to the application of the asphalt.	An FM-listed base sheet is adhered to the insulation with 3-inch-wide side and 6-inch-wide end laps in either a solid mopping of steep roofing asphalt or with 8-inch-wide ribbons at 16 inches o.c. (50% coverage).	Ruberoid Mop applied with a nominal 25 lbs/sq ±20%, continuous coating of steep asphalt. The membrane is installed with 4-inch-wide side and 6-inch-wide end laps. A minimum $^1/_4$ inch flow out of asphalt past the edge of the seam is required.
5	45 psf	New Structural Concrete	—	—	A GAFGLAS Base sheet is adhered to the primed concrete deck with hot asphalt (ASTM D 312, Type III or IV), applied at a nominal rate of 25 lbs/square. The concrete deck shall be primed with GAF Asphalt/Concrete Primer prior to the application of the asphalt	Ruberoid Mop applied with a nominal 25 lbs/sq continuous coating of hot asphalt. Or Ruberoid Torch is applied as a cap membrane.
6	45 psf	New Structural Concrete	—	—	The concrete deck shall be primed with GAF Asphalt/Concrete Primer prior to the application of the base sheet. A GAFGLAS Stratavent-Eliminator (Vent Ply) Perforated Base Sheet is laid dry over the primed concrete deck.	Ruberoid Mop applied with a nominal 25 lbs/sq continuous coating of hot asphalt

[1]Insulation and fasteners must be FM-approved.
[2]All foam plastic insulation must be UL-classified foamed plastic for roofing systems, and must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.
[3]Steel deck must be minimum No. 22 gage galvanized steel [base metal thickness 0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (f_c) of 2,500 psi. See Section 5.7 of this report.