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SPACE GATEWAY SUPPORT (SGS) **SGS-07 01 60.71 99 (November 2006)**

Preparing Activity: SGS-DE **Superseding SGS-07 01 60.71 99 (April 2006)**

SGS GUIDE SPECIFICATIONS

References are NOT in Agreement with UMRL dated 09 October 2006

Revised throughout - changes not indicated by CHG tags
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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

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FLASHING AND SHEET METAL REHABILITATION

11/06

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SECTION 07 01 60.71 99

FLASHING AND SHEET METAL REHABILITATION
11/06

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NOTE: This guide specification covers the requirements for the repair of roofing edges, including but not limited to gravel stops and other fascia components, to match adjacent sound construction.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.
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PART 1 GENERAL

1.1 SECTION INCLUDES

During the course of re-painting, make repairs necessary to provide proper substrate which [involves] [does not involve] repair of [gravel stops or other] fascia components integrated with roofing systems. This section covers repair of roofing edges to match adjacent sound construction.

Submit catalog cut sheets and shop drawings for all materials including required joint/seam placements. Submit qualifications and Certificationof roof repair team and quality control supervisor.

1.2 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update

the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this section and the work requirements:

ASTM INTERNATIONAL (ASTM)

ASTM A 307	(2004) Standard for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 653/A 653M	(2006) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B 209/B 209M	(2004) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 370	(2003) Standard Specifications for Copper Sheet and Strip for Building Construction
ASTM D 1668	(1997a) Standard Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing
ASTM D 2178	(2004) Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
ASTM D 226	(2005) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D 227	(2003) Standard Specification for Coal-Tar-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D 2822	(2005) Standard Specification for Asphalt Roof Cement
ASTM D 3018	(2003) Standard Specification for Class A Asphalt Shingles Surfaced With Mineral Granules
ASTM D 312	(2005) Standard Specification for Asphalt Used in Roofing
ASTM D 3909	(1997b; 2004e1) Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules
ASTM D 4022	(1994; R 2000e1) Standard Specification for Coal Tar Roof Cement, Asbestos Containing

ASTM D 41	(2005) Standard Specification for Asphalt Primer Used in Roofing
ASTM D 450	(1996; R 2006) Standard Specification for Coal-Tar Pitch used in Roofing, Dampproofing, and Waterproofing
ASTM D 4586	(2000) Standard Specification for Asphalt Roof Cement, Asbestos-Free
ASTM D 4601	(2004) Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing

1.3 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Keep submittals to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Subcontractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Subcontractor Quality Control approval for Navy, Air Force, and NASA projects.

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Submit the following in accordance with Section 01 33 00, SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-01 Preconstruction Submittals

Qualifications

SD-02 Shop Drawings

Shop Drawings

SD-03 Product Data

Catalog Cut Sheets

SD-07 Certificates

Certification of qualification of roof repair team and Quality Control Supervisor

[1.4 ASBESTOS CONTAINING MATERIALS

Roofing assembled or previously repaired with asbestos containing materials may be encountered during roof repair. The extent of asbestos containing materials is documented on contract drawings to the extent it is known to exist. If materials suspect of containing asbestos are encountered, stop work and notify the Contracting Officer for direction. Comply with Standard Specifications for Asbestos Containing Material Abatement for removal and disposal of asbestos containing materials.]

1.5 STORAGE

Store all roofing materials off grade under cover in accordance with the manufacturer's printed instructions.

1.6 COORDINATION

Coordinate work so that flashing/gravel stops/insulation are installed the same day as felts and that the roof waterproofing completion occurs that same day if practical. Perform repairs when weather conditions do not affect the final product and in accordance with manufacturer's requirements.

PART 2 MATERIALS AND PRODUCTS

2.1 MATERIALS

Use American Society of Testing and Materials (ASTM) approved materials of equal or superior quality, to those existing in a sound condition adjacent to the repair. Do not use dissimilar metals or dissimilar bituminous products. Use only moisture pressure treated wood components.

2.1.1 Bitumen

a. Primer - ASTM D 41, asphalt primer
b. ASTM D 312, asphalt
c. ASTM D 450, Type I & III

2.1.2 Felts, Fabrics, Mats and Walkways

a. ASTM D 1668, Type I for asphalt, Type II for coal tar systems
b. ASTM D 227, for coal tar-saturated organic felt
c. ASTM D 226, for asphalt-saturated felt
d. ASTM D 3909, for asphalt roll roofing(glass felt)

e. ASTM D 4601, for asphalt coated glass fiber base sheet
f. ASTM D 2178, for asphalt glass felt

2.1.3 Cements

a. Asphalt base roofing cement - ASTM D 2822, Type II
b. Coat tar base - ASTM D 4022
c. Plastic cement - ASTM D 4586

2.1.4 Sheet Metal

a. Galvanized steel - ASTM A 653/A 653M - G90 non-treated, oiled or phosphatized
b. Copper - ASTM B 370 - cold rolled copper sheet

[2.1.5 Aluminum

a. Sheet Aluminum: ASTM B 209/B 209M, alloy 3003, temper H14, AA-C22A41 finish to match existing
[b. Extruded Aluminum: Manufacturers standard extrusion of size to match existing, 60063-T52, AA-C22A41 finish to match existing 0.08-inch minimum thickness]

][2.1.6 Asphalt Shingles

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NOTE: Use the following paragraphs for small asphalt shingle repair projects only (under 500 sf0. For larger scale asphalt shingle projects, incorporate full asphalt shingle section.
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[a. Asphalt Shingles: ASTM D 3018,Class A with Type I - Self Sealing, UL Rating of A and Wind Resistant Label, glass fiber mat base, mineral granule surface type; 300 lb/sq ft.; laminated overlay type; color as selected by the Contracting Officer. Provide manufacturer's fungus and algae resistant products, appropriately labeled as such.]

[b. Underlayment: ANSI/ASTM D 226, No. 15 imperforated asphalt saturated felts as recommended for use in waterproofing and in construction of built-up roofs.]

[c. Nails: Standard round wire shingle type, hot dipped zinc coated steel minimum 0.125 inch shank diameter, 1-1/4 inch long.]

[d. Plastic Cement: ANSI/ASTM D 2822, asphalt type with mineral fiber components, free of toxic solvents, capable of setting within 24 hours at temperatures of 75° F and 50% relative humidity.]

[e. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents.]

]2.1.7 Miscellaneous

a. Insulation: FS HH-1972/2 insulation board, thermal, polyisocyanurate faced with asphalt/organic felt, polymer/organic mat, asphalt/glass mat, or polymer glass mat both sides of foam, Class I, size and thickness as required to match existing. Stagger insulation joints between layers. Minimum of 2 layers.

b. Ballast: To match existing.

c. Fasteners: Nails: non-ferrous or galvanized steel

Metal Type	Fastener Material
Galvanized Steel	Galvanized or Cadmium Plated
Copper	Copper or Bronze
Lead	Galvanized or Cadmium Plated

Bolt and Nuts: ASTM A 307, carbon steel externally and internally threaded standard fasteners, hot dipped galvanized.

PART 3 EXECUTION

3.1 REMOVAL OF DETERIORATED MATERIALS

Remove damaged components leaving roofing in tact if possible. Do not remove during inclement weather. Proceed to remove components which tie into roofing only as necessary to reach sound materials. On built-up roofs, continue partial removal for an additional 2'-0" distance beyond apparent damage to provide adequate splice area on existing sound roofing. Removals must result in a clean and dry substrate, except for residual stains, providing a surface suitable to apply new materials. A substrate surface is suitable when materials bond to the substrate. For shingled roofs, remove shingle courses only as necessary to complete repairs.

[Remove existing roof-top equipment. Coordinate removal with the Contracting Officer. All equipment remains Government property unless otherwise designated. Re-install when roof repair is complete.]

[Lift or remove metal and metal accessories to remain, to aid the installation of new materials.]

If conditions are uncovered or created that are detrimental to the application of specified work, immediately notify the Contracting Officer of such conditions for determination of treatment.

3.2 APPLICATION

[3.2.1 Shingle Repair and Replacement

Shingles removed and replaced in the course of fascia or roof edge repair must match the color and weight of the existing undisturbed shingles to the extent possible. Remove shingles as completely as possible without disturbing existing sound roofing. Repair damaged fascia, replace edge sheet metal work securing with nails 6" O.C. Replace shingles starting at the roof edge. Continue installation to sound shingles. Lift top row of shingles and install a cut course of shingles securing with a bituminous mastic roofing cement/sealer.

][3.2.2 Built Up Roofing Systems

a. Finish the entire roofing system, excluding aggregate surfacing, in one operation up to the line of termination at the end of day's work.

b. Application of roofing must immediately follow application of insulation as a continuous operation.

c. Phased construction is not permitted.

d. Install Built Up Roofing System and graveling-in according to Built Up Roofing System manufacturer's requirements and specifications.

e. To ensure a waterproof membrane, preclude bare spots (voids) between piles. To prevent slippage, preclude use of excessive amounts of bitumen.

[f. If kettles are used, kettle attendants must be present at the kettle at all times during the heating. Measure application temperatures at the mop bucket or mechanical applicator. Apply asphalt at or not less than 25° F below the manufacturer's stated temperature. Asphalt at a temperature below this must be returned to the kettle. Coal tar is not to be heated above 410° F for ASTM D 450, Type I and 425° F for ASTM D 450, Type III. Apply coal tars at the roofing felt manufacturer's recommended temperature range. Coal tar at a temperature below this range must be returned to the kettle. Broom the surface of the felts in full width to obtain complete adhesion between plies and to eliminate air pockets. Mopping a half sheet width and turning the sheet back to mop under the other half is not permitted.]

]3.3 SUBSTRATE INTERFACE

[3.3.1 Gypsum Decks

a. Apply one ply of the specified felt underlayment with 4-inch laps and 6-inch end laps minimum.

b. Attach with specified mechanical fasteners through-side laps on 6 to 9-inch centers.

c Stagger nail center of sheets at approximately 18-inches on center, in two parallel rows, 10 to 12-inches from the edges of the base ply. Do not drive fasteners into or between the metal edges of the gypsum planks.

][3.3.2 Wood Decks

a. Completely cover the deck with one ply of sheathing paper. Lap each sheet a minimum of 2-inches and nail sufficiently to hold in place.

]3.3.3 Over Sheathing Paper

a. Apply one ply of the specified felt underlayment with 2-inch side laps and 6-inch end laps minimum.

b. Nail through side laps on 6 to 9-inch centers and stagger-nail center of sheets approximately 18-inches on center in two parallel rows, 10 to 12-inches from the edges of the base ply.

[3.3.4 Concrete Decks

a. Set insulation on cleaned concrete on hot solid mopping of Type III asphalt, applied within temperature range of EVT ± 25° F(14° C) and a rate of 25 pounds(± 15% on the job, all-job average basis) per 100 sq. ft.

b. Run long joints of insulation in continuous straight line, perpendicular to roof slope, with end joints staggered between rows.

][3.3.5 Steel Decks

a. Set insulation on cleaned concrete on hot solid mopping of Type III asphalt, applied within temperature range of EVT ± 25° F(14° C) and a rate of 25 pounds(± 15% on the job, all-job average basis) per 100 sq. ft.

b. Run long joints of insulation in continuous straight line, perpendicular to roof slope, with end joints staggered between rows.

]3.4 INSULATION INSTALLATION

3.4.1 General Requirements

a. On slopes of 1-inch per foot or more, provide pressure treated wood insulation stops according to the roof insulation manufacturer's requirements.

b. Secure cant and tapered edge strips in place with asphalt; cut and neatly fit all joint and miters. Cant strip may be tacked in place for ease of installation (approximately 3 nails every 4 feet).

c. Insulation board, cant strips and tapered edge strips that can be readily lifted or displaced by hand are not adequately secured. Reinstall all lifted and displaced items that are not damaged. Replace damaged items with new material.

d. Follow additional applicable requirements of the roof insulation manufacturer and BURS manufacturer.

[3.4.2 Over Steel, Wood and Gypsum Decks

First (bottom) layer:

a. Place insulation so that side joints between boards are fully supported at all times.

b. Stagger end joints by a minimum of 6 inches; bring boards into moderate, uniform contact.

c. Also, secure all insulation boards in the first layer with mechanical fasteners over the entire roof deck according to Factory Mutual Loss Prevention Data Sheet 1-28. Filler pieces must have at least two fasteners. Locate all fasteners such that there is at least 1 fastener every 2 square feet, or comply with Factory Mutual Windstorm Class Factory Mutual 1-90, whichever is more stringent.

d. Use those driving methods prescribed by the fastener manufacturer.

Second or additional layers:

a. Secure in full and uniform moppings of hot, fluid bitumen; stagger end joints by minimum 6 inches; bring boards into moderate, uniform contact at sides and ends while the bitumen is hot and fluid.

b. Offset all joints between layers by maximum dimensions in both

directions.

][3.4.3 Over Non-Nailable Decks With Underlayments

a. Secure all insulation in full and continuous moppings of hot fluid bitumen.

b. Stagger end joints by a minimum 6 inches; bring boards into moderate, uniform contact at sides and ends while the bitumen is hot and fluid. Offset all joints between layers by maximum dimensions in both directions.

][3.5 MEMBRANE INSTALLATION

General Requirements:

Except as modified and supplemented herein, apply membrane (4-ply) to meet the quality standards of the Built Up Roofing System manufacturer's 20-year warranted system. On slopes over 1-inch per foot, provide nailers and backnail felts, and if required by the Built Up Roofing System manufacturer on lower slopes.

Felt and Roll Goods:

Apply felts shingle fashion and maintain proper lap distance to result in a 2 inch nominal headlap (1 inch minimum, no maximum). Maintain a straight run of felts so that kinks or fishmouths do not result, and the felts are completely flat.

Bitumen Dams:

Provide felt envelopes at the eaves and rakes and sheet metal dams at deck penetrations to prevent bitumen drippage. Felt envelopes are required for membranes using coal tar pitch, Type I and Type II asphalt bitumen. Install sheet metal bitumen dams with the flange set in plastic cement on top of the insulation. Apply roofing felts over the flanges with the sleeve of the dam set to prevent drippage of bitumen.

Edge envelopes must be organic felt strips at least 18 inches wide. Set the strip in plastic cement or Type IV asphalt and position to extend 9 inches onto the nailer around the perimeter of the building with 9 inches lapped over the edge of the building. After roofing felt application is complete, the 9 inch overlapped section must be folded back over the plies and mopped down to form an envelope around the perimeter of the membrane.

Once established, do not change the direction of felt application. Provide organic felt envelopes at gravel stop roof edges and sheet metal pitch dams at deck penetrations to prevent bitumen drippage.

Broom or squeegee each ply of roll goods into place, full width, while the bitumen is not and fluid, such that the felt does not touch felt interply voids or skips in the bitumen do not occur. Broom or squeegee and do not walk on the freshly laid felt until bitumen has reached set temperature. Bitumen must be visible continuously along both edges of the felt. Use NCRA Publication, "Application Techniques for Glass Fiber Roofing Felts", as a recommended procedure.

]3.6 FLASHING INSTALLATION

Install flashing as detailed in NRCA, SMACNA manuals and/or as recommended by the manufacturer. Modified Bitumen type membranes may be used if approved and installed per Built Up Roofing System manufacturer's instructions (torched, hot, cold applied, etc.).

Prime all surfaces to be flashed with asphalt primer and allow to dry.

Completely bond all flashing's to the substrate, and the flashing plies to each other without voids. Coat all flashing substrate and ply interfaces to achieve a full and uniformly bonded laminate. Apply flashing cement in a continuous layer. Brushing application is not acceptable.

Follow additional applicable published requirements of the BURS manufacturer.

Tops of all membrane base flashing's must be mechanically attached to the vertical substrate with large-headed nails 6 to 9 inches on-center.

All side laps of membrane flashing surfacing sheets must be sealed with roofing cement reinforced with woven glass fiber 4 inches wide centered over the lap.

Tops of all membrane base flashings must be sealed with roofing cement reinforced with 4 inch wide woven glass fiber fabric.

3.7 METAL INSTALLATION

Fabricate and install metal to match existing conditions. Meet the requirement of the components of materials manufacturers, NRCA, SMACNA, and Copper Development Association, as they apply to this project.

The Subcontractor is responsible for all work required to make any displaced mechanical components operational. Reinstallation must be to the original level of performance as determined by the Contracting Officer.

Prime all sheet metal that comes in contact with bituminous materials with asphalt primer and allow to dry before applying bitumen.

Isolate dissimilar metals in contact by painting with a compatible bituminous coating, or by using an uncured neoprene gasket.

Sheet metal with flanges: Follow applicable published requirements of Built Up Roofing System manufacturer.

Do not overlap edge metal. Allow 1/4 inch minimum spacing between edge metal pieces. Cover gap between adjacent edge metal with joint cover 4 to 6 inches wide set in mastic.

3.8 WOOD INSTALLATION

Provide wood members to match existing sound construction.

Provide fasteners at not more than 2 feet 8 inches on-center, and also within approximately 6 inches of each end to secure nailers to the building construction. Anchors must not be less than 3/8 inch in diameter and must be countersunk and flush with top of nailer.

Where nailers are stacked, secure the top nailer to the lower with spikes or nails of proper length, spaced maximum 18 inches on-center, staggered and within approximately 6 inches of all nailer ends.

Ends of stacked nailers must be offset approximately 12 inches in long runs and staggered (alternated) at corners.

Brush apply one coat of copper napthenate solution onto all cut surfaces of preservative-treated lumber.

Wood cants are to be used in critical wind areas and securely anchored to prevent warping.

3.9 SEALANT INSTALLATION

Follow sealant manufacturer's installation requirements except as specified herein.

Clean the substrate so no contaminants such as bitumen, concrete curing compound, paint, dirt, or moisture prevent bonding of the primer or sealant directly to the substrate.

Prime with sealant primer, all substrates to which sealant is to be applied and allow the primer to cure. This must be done regardless of whether the sealant manufacturer requires priming.

Except for sheet metal joints, install sealant backup material.

3.10 CLEANING AND REPAIRING

Clean work under provisions of Section 01 11 00.00 99 SUMMARY OF WORK and UFGS Section 09 90 00.00 40 PAINTING AND COATING prior to application.

Clean adjacent soiled surfaces.

Repair or replace defaced or disfigured finishes caused by work of this section.

3.11 PROTECTION OF FINISHED WORK

Protect finished installation as stated in UFGS Section 09 90 00.00 40 PAINTING AND COATING.

-- End of Section --