Project No. _____

ISSUED: SEPTEMBER 1966

SECTION NO._____

STAINLESS STEEL ROOFING, FLASHINGS AND ACCESSORIES

1. SCOPE OF WORK:

(A) EXTENT: The work required under this section shall consist of furnishing and installing all stainless steel roofing, flashings, accessories and related items necessary to complete the work indicated on drawings and described in specifications.

(B) ITEMS INCLUDED: In general the work to be performed under this section shall include the following items:

See Note 1

(1) _____

(2) _____

( ) _____

( ) _____

( ) _____

(C) RELATED ITEMS INCLUDED IN OTHER SECTIONS: The following items of related work are included in other sections of the project specification:

(1) Roof drains, inside conductors and leaders.

(2) Flashing around pipes, ducts and other mechanical and electrical work that passes through roofs or exterior walls.

(3) Wood blocking and nailers for fastening sheet metal flashings, gravel stops and similar items.

(4) Adjustable type louvers.

(5) Sheet metal work in connection with heating and ventilating systems.

(6) Caulking, except as specified herein.

(7) Installation of metal reglets and _____.

(8) Insulation and vapor barriers under metal roofs.

( ) _____.

(D) ALTERNATES: Note that alternate No._____ affects the work required under this section. Refer to Bid Form and to Section _____ for a detailed description of the alternates required.

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2. COMPLIANCE WITH STANDARD AND INDUSTRY SPECIFICATIONS:

(A) Any material or operation specified by reference to the published specification or standard of a manufacturer, trade association, technical organization or other published standard, shall comply with the requirements of the current specification or standard listed and include all additions and amendments in effect on the date of invitation for bids.

(1) In case of conflict between the referenced specification or standard and the project specification, the project specification, shall govern.

(2) The contractor, when directed, shall furnish an affidavit from the manufacturer, certifying that the materials or products delivered to the job meets the requirements specified.

3. SHOP DRAWINGS:

(A) Submit _____copies of shop drawings for sheet metal work to Architect for approval. Submit drawings in accordance with requirements described in Section entitled "(General Conditions) - (_____)". Obtain approval of drawings prior to proceeding with fabrication. Shop drawings shall indicate thickness and dimensions of all parts, fastening and anchoring methods, details and locations of all seams, joints and other provisions necessary for thermal expansion and contraction.

4. SAMPLES:

(A) Submit samples in duplicate of the items hereinafter listed. Label and submit samples in accordance with requirements described in Section entitled "(General Conditions) - (_____)". Approval must be obtained prior to fabrication or delivery.

(1) Metal samples approximately 6 by 12 inches of each finish and on each kind of sheet metal specified.

(2) Fasteners, each type.

(3) _____.

5. SHEET METAL MATERIALS, FINISHES AND ACCESSORIES:

(A) STAINLESS STEEL SHEETS OR STRIPS: Stainless steel sheets shall conform to ASTM Specification A 167, Type 302 or 304 unless other Types are specified. Use finish 2D for concealed and exposed flashings, metal roofing and _____; use (No. 2B) - (No. 4) - (matte) - (ribbed) - (cross corrugated) - (textured) finish at locations designated for specific items. The thickness and gauges of stainless steel shall be as indicated on drawings or as hereinafter specified for each item.

5. SHEET METAL MATERIALS, FINISHES AND ACCESSORIES: (Continued)

(B) STAINLESS STEEL WIRE: Wire shall conform to ASTM Specification A 478, Type 302 or 304 and of gauge indicated or specified.

(C) SOLDER: Solder shall conform to ASTM Specification B 32, (50-50 percent) - (60-40 percent) - (80-20 percent) block tin and pig lead.

(D) FLUX: For tinning stainless steel surfaces, use acid type flux designed especially for use in soldering stainless steel. For pre-tinned surfaces, use regular rosin type flux.

(E) SEALING COMPOUND: Sealing compound shall be a single component synthetic-rubber base type complying with Federal Specification TT-S-00230 or a two component type complying with Federal Specification TT-S-2276b. Color of compound shall be as approved to match or blend with adjacent materials.

6. GENERAL REQUIREMENTS:

(A) SCHEDULING AND COORDINATING WORK: Schedule and coordinate sheet metal installations with the work of other trades where it is integral or contiguous therewith. Materials furnished under this section which are to be built-in by other trades shall be delivered to the site in sufficient time to avoid delays to construction progress. Instruct other trades concerning the location and placement of reglets, wood nailers and cleats.

(B) PROPER SURFACES: Surfaces to which roofing and sheet metal are to applied shall be even, smooth, sound, thoroughly clean and dry and free from projecting nail heads or other defects that would affect the application. Report in writing any unsatisfactory surfaces to Architect.

(C) DISSIMILAR METALS: Where stainless steel abuts or members into adjacent dissimilar metals, the juncture shall be executed in a manner that will facilitate drainage and thus minimize the possibility of galvanic action.

(D) ACCESSORIES: All accessories or other items essential to the completeness of the sheet-metal installation, though not specifically shown or specified, shall be provided. All such items, unless otherwise indicated on drawings or specified, shall be of the same kind of material as the item to which applied and the gauges shall conform to recognized industry standards of sheet metal practice.

6. GENERAL REQUIREMENTS: (Continued)

(E) PROVISIONS FOR EXPANSION AND CONTRACTION: Provide expansion joints in sheet metal work at intervals as indicated or specified. Expansion joints shall be fabricated in accordance (with details on project drawings) - (with applicable details as indicated in the SMACNA Manual).

(F) WORKMANSHIP: Fabricate and install sheet metal with lines, arrises and angles sharp and true, and plane surfaces free from objectional wave, warp or buckle. Exposed edges of sheet metal shall be folded back to form a 1/2 inch wide hem on the side concealed from view. Finished work shall be free from water leakage under all weather conditions. The workmanship and methods employed for forming, anchoring, cleating and the expansion and contraction of sheet metal work shall conform to applicable details and description as indicated in current edition of the following publications unless other methods are indicated on project drawings or specified herein.

(1) Stainless Steel Data Manual - Suggested Practices For Roofing, Flashing, Copings, Gravel Stops, Fascia and Drainage as published by the Committee of Stainless Steel Producers AISI, August, 1966 and hereinafter referred to as "The Stainless Steel Data Manual".

(2) Architectural Sheet Metal Manual as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. and hereinafter referred to as "The SMACNA Manual".

7. SOLDERING:

(A) Except where other methods of jointing are indicated or specified, all joints, seams and connections of sheet metal work shall be soldered as follows:

See Note 3

(1) Remove grease and dirt from metal surfaces; use clean rag soaked in solvent. Smooth surfaces to be soldered shall be roughened with clean emery cloth or sandpaper (not steel wool). Apply acid-type flux and pre-tin all surfaces to be joined.

(2) Remove all flux residue by scrubbing, neutralizing with ammonia or a 5-10% solution of washing soda and followed by a clear-water rinse.

(3) Assemble parts and solder using regular non-corrosive rosin flux. Heat metal thoroughly to completely sweat solder through full contact area.

8. WELDING:

(A) Welding may be used in lieu of soldering for sheet metal shop fabrication and for field fabrication of _____ _____. Weld other joints, seams and connections at locations indicated on drawings or as hereinafter specified.

8. WELDING: (Continued)

(B) In exposed locations such as_____, dress weld beads smooth and finish to match and blend with adjacent parent metal.

See Note 4

9. FASTENINGS:

(A) Unless other materials are indicated or specified, all nails, screws, bolts, rivets and other fastenings for sheet metal shall be Type 302, 304 or 305 stainless steel and of size and type suitable for the intended use. Unless otherwise indicated or specified, all fastenings shall be concealed; all nails shall be 12 gauge, flat head annular-thread type, and of sufficient length to penetrate backing at least 3/4 inch. Space nails on 6 inch centers unless other spacing is designated.

10. CLEATING:

(A) Generally cleats shall be 2 inches wide by 3 inches long and formed of stainless steel of the same thickness as the member being fastened. Secure cleats to wood deck or to nailing strips with 2 nails spaced 3/4 inch from the end; turn end of cleat back to cover nail heads. Lock other end of cleat into seam or the folded edge of member being fastened. Where seams are to be soldered, roughen and tin the cleats. Use cleats for securing edges of sheet metal members over 12 inches wide and other locations indicated or specified. Space cleats not more than 12 inches apart unless other spacings are indicated or specified.

11. CONTINUOUS EDGE STRIPS:

(A) Provide continuous edge strips at eaves, gables and_____ _____ for attaching exposed terminating edge of gravel stops, fascia-gravel stops and metal roofing. Fabricate edge strips from (.025 inch) - (a double thickness of .015 inch) stainless steel in lengths of 8 or 10 feet. Edge strips shall be (1-1/4 inches) - (____inches) wide. Set edge strips straight and true and secure in place with stainless steel (nails) - (screws) of proper size and spaced not more than 6 inches apart.

12. REGLETS:

(A) Provide watertight reglets in masonry and concrete to receive cap flashings and _____ at locations indicated. Form reglets of stainless steel not less than .012 inches thick.

(B) In masonry, use open type reglets having suitable means for anchoring into mortar joints and with flashing receiver slots at least 1 inch deep by 3/16 inch wide. Insert cap flashing and _____into receiver slot full depth and lock in place.

12. REGLETS: (Continued)

(C) In concrete, use open type reglets having flashing receiver slot at least 1 inch deep by 3/16 inch wide and sloped upward at 45 degrees. Fasten to concrete forms with double head galvanized steel nails spaced 12-inches apart.

(D) Insert cap flashing and ---------- to full slot depth; wedge metal in place with lead-strips spaced on 12 inch centers or with lead caulking rope. When wedges are used, caulk reglet with (an approved weather-resistant fibrous compound) - (sealing compound hereinbefore specified).

(E) Where cap flashing in connection with reglets is designed to have a special snap-lock feature, the reglets shall be a factory prefabricated product designed with suitable anchorage features to hold the flashing in place.

13. FELT UNDER STAINLESS STEEL ROOFS:

(A) Cover roof decks under metal roofs with a layer of 15 lb. asphalt or coal-tar saturated felt; lap joints 3 inches. Turn felt up 6 inches on abutting vertical surfaces; double felt in valleys, over hips and at ridges. Nail felt to sheathing at 6 inch centers on all laps and edges; use large head hot-dipped galvanized nails, (except use special gypsum staples for nailing into gypsum roof decks). Apply a layer of rosin-sized building paper over felt to prevent bonding between the metal and felt.

14. STAINLESS STEEL ROOFS - FLAT SEAM PAN-TYPE:

(A) Cover roof surfaces of ---------- with (.015 inch) - (_____inch) thick stainless steel (Type 302 or 304) - (Type_____), (2D finish) - (____finish), dead soft fully annealed. Lay roof with flat seams and in rectangular pattern.

See Note 5

(B) Apply felt and building paper over deck as hereinbefore specified. Lay sheet of roofing metal, not larger than (15 by 20 inches) - (16 by 18 inches) - (18 by 24 inches) - (20 by 28 inches) with long dimension parallel with eaves and the cross joints staggered. For joints that require soldering, sheets shall be pre-tinned 1-1/2 inches back from all edges and on both sides of sheet.

(C) Form sheets into pans so that two adjacent edges of each sheet are folded over the upper surface 1/2 inch, and the other two edges folded under 1/2 inch. Secure metal pans to deck with stainless steel cleats as hereinbefore specified; use a minimum of four cleats for each sheet; space cleats along each edge at mid points of sheet. Fold edge of sheets and cleats together, carefully flatten seams and fill with (solder) - (compound).

14. STAINLESS STEEL ROOFS - FLAT SEAM PAN-TYPE: (Continued)

(D) Where metal roofs abut walls or other vertical surfaces, the roofing pans shall be locked and soldered to the cleated base flashings. Extend metal base flashings up on vertical surfaces at least _____inches and terminate as indicated. Where metal roofs abut slate or other shingle type roofs, extend roofing under the _____roofs at least _____ inches and secure to deck with cleats. Terminate metal roofing along eave and rake edges by bending the metal up 1 inch at an angle to retain drainage water and then turning it down and hooking the lower end over a previously-installed continuous edge strip. Edge strips shall be as hereinbefore specified.

(E) Where a flat seam roof with soldered seams exceeds (1500) - (____) sq. ft. in area or exceeds (40 feet) - (____feet) in any direction, expansion joints or battens shall be provided to divide the roof into sections (as indicated on drawings) - (approximately 36 feet square). Form expansion joints or battens (as detailed on project drawings) - (as indicated in The SMACNA Manual, Plate No _____, Detail No._____).

See Note 6

15. STAINLESS STEEL ROOFS - STANDING SEAM TYPE:

(A) Cover roof surfaces of _____ with stainless steel sheets (Type 302 or 304) - (Type_____), (2D Finish) - (_____ finish) dead soft fully annealed. Roofing sheets shall be (18 inches) - (24 inches) wide and in lengths of 8 or 10 feet. The minimum metal thickness shall be (.015 inch when 18 inch wide sheets are used) - (.018 inch when 24 inch wide sheets are used). Install roofing with standing seams using either the roll or pan method. When roll method is used, lengths of sheets may be increased to _____ feet.

See Note 7

(B) Apply felt and building paper over deck as hereinbefore specified. Lay sheets of roofing with long dimension following the roof slope. Double-lock the sheets together to form a strip the full length of roof slope. Stagger cross seams in adjacent strips; do not solder cross seams. Secure metal roofing to decking or to wood nailing strips with stainless steel cleats as hereinbefore specified; space cleats 12 inches on center along each standing seam.

(C) Space seams accurately (to layouts indicated) - (_____ inches on centers) and finish them 7/8 to 1 inch high, except on curved roofs where they shall finish 1/2 inch high. Make locked portion of finished standing seams 5 plies thick. Finished seams shall be straight and of uniform height. Form ridges and hips (with standing seams as specified for main roof) - (to details shown on project drawings) - (as indicated in The SMACNA Manual, Plate No._____, Detail No._____).

15. STAINLESS STEEL ROOFS - STANDING SEAM TYPE: (Continued)

(D) Form valleys of separate strips not more than 10 feet long. Lap joints 6 inches. Extend valley sheets under roofing sheets 6 inches on each side and fasten with cleats spaced not more than 18 inches on centers. At valley line, fold and lock roofing sheets to valley cleats.

(E) At eaves without connecting gutters or connecting flashings, hook ends of roofing sheets over a previously-installed continuous edge strip as indicated and specified. At eaves where connection of roofing to gutters or flashings is required, make connections with loose lock and unsoldered joints (as detailed) - (as indicated on Plate No._____, Detail No. _____ in The SMACNA Manual).

(F) At gable and rake edges, terminate metal roofing (by turning edges of sheets up to form a standing seam and extend lower end down and hook over a previously installed continuous edge strip) - (as detailed on project drawings) - (as indicated on Plate No. 87, Detail No._____ in The SMACNA Manual).

(G) Where metal roofs abut walls or other vertical surfaces; the roofing sheets shall form a loose-locked joint near the wall line with the cleated base flashings. Extend metal base flashings up on vertical surfaces at least _____ inches and terminate as indicated.

(H) Where metal roofs abut slate or other shingle type roofs, extend roofing under the _____ roofs at least _____ inches and secure to deck with cleats.

16. STAINLESS STEEL ROOFS - BATTEN SEAM TYPE:

(A) Cover roof surfaces of _____ with stainless steel sheets laid with batten seams spaced as indicated. Roofing sheets shall be (Type 302 or 304) - (Type_____) - (2D finish) - (___finish), dead soft fully annealed, (18 inches) - (24 inches) - (30 inches) wide and in lengths of 8, 10 or _____ feet. The minimum metal thickness shall be (.015 inch for 18 inch wide sheets) - (.018 inch for 24 inch wide sheets) - (.021 inch for 30 inch wide sheets).

See Note 8

(B) Apply felt and building paper over deck as hereinbefore specified. Install treated and tapered wood battens (or rolled formed stainless steel battens) of size, shape and spacing as indicated. Secure battens to wood deck with stainless steel nails of proper size and with heads driven flush with batten surface. For decks other than wood, secure battens to flush wood inserts with nails or direct to deck with countersunk flat head bolts.

16. STAINLESS STEEL ROOFS - BATTEN SEAM TYPE: (Continued)

(C) Form roofing pans and batten cover strips by brake-forming sheets (to design indicated on project drawings) - (to design indicated in The Stainless Steel Data Manual) - (to design indicated on Detail No._____, Plate No. 88 in The SMACNA Manual). Lay starting pans at eaves in alternate half and full lengths, thus staggering the transverse seams. Fasten pans together at cross seams and secure to deck with 2 inch wide cleats; place one cleat at center of each cross seam and space cleats 16-inches apart along each side of battens.

(D) Cleats shall extend across underside of batten, be nailed to bottom of batten strip and turned up on each side to engage the roofing sheets. At contractor's option, cleats may be fastened to the side of batten strips, or split cleats may be used and fastened to the top and side of batten strips.

(E) On roofs with a slope of 6 inches or more per foot, form cross joints with loose-lock unsoldered seams as indicated by Detail 4-F or C; Plate 89 of The SMACNA Manual. On roofs with a slope of less than 6 inches per foot, form cross seams with upper ends of lower pans secured to deck by hooking to cleats and lower ends of top pans secured by hooking over a 1-3/4 inch wide lock strip which is soldered or welded to the lower pan; all as indicated by Detail 4-A, Plate 89 of The SMACNA Manual. (Fill all cross seams with white lead paste or an approved compound or sealant).

(F) Place cover strips over battens, fold edges under horizontal flanges of adjacent roof pans and flatten down against sides of wood battens. (Where formed stainless steel battens are used, bed cover strips in sealing compound as hereinbefore specified and secure to batten with stainless steel screws, clips and neoprene washers (as detailed on project drawings) - (as indicated in The Stainless Steel Data Manual) - (in accordance with manufacturer's recommendations). Cover batten ends with a cap folded and locked into cover strips and to the vertical sides of pans. Cover battens at ridges and hips similar to battens on main roof (refer to Detail 5, Plate 89 of The SMACNA Manual). Battens flush with gable or rake ends shall have the metal cover extended down and hooked to a previously placed continuous edge strip, (refer to Detail 6, Plate 90 of the SMACNA Manual).

(G) Form valley sheets in lengths not more than 10 feet and lay each sheet to lap over lower sheet at least 6 inches. Extend valley sheets under roofing sheets at least 6 inches on both sides;

16. STAINLESS STEEL ROOFS - BATTEN SEAM TYPE: (Continued)

fold edges 1/2 inch and cleat at 16 inches on center. At valley line adjacent to lower edge of roofing sheets, provide a 3/4 inch double fold in the valley sheets to engage a 3/4 inch single fold in the roofing sheets. Notch lower end of wood battens to permit folded edge of valley sheet to pass under the battens; (refer to Detail 7, Plate 90 of The SMACNA Manual).

(H) At eaves without built-in or rectangular type gutters, hook each pan over a previously placed continuous edge strip; extend edge strip up on roof deck under roofing at least 4 inches and nail on 6 inch centers. At eaves where built-in or rectangular type gutters occur, connect roofing pans to gutters as indicated and specified.

(I) Where metal roofs abut walls or other vertical surfaces, the roofing sheets shall form a loose-locked joint near the wall line with the cleated base flashings. Extend metal base flashings up on vertical surfaces at least _____ inches and terminate as indicated.

17. STAINLESS STEEL BASE FLASHING:

(A) Provide stainless steel base flashings where built-up and _____type roofs abut vertical surfaces without a cant strip and at other locations indicated on drawings. Fabricate base flashings from (.015 inch) - (_____inch) thick stainless steel, (Type 302 or 304) - (Type____) - (2D finish) - (_____ finish) dead soft fully annealed.

See Note 9

(B) Where metal base flashing is used in connection with built-up roofs, extend flashing not less than 4 inches out on the roof and at least _____inches up on vertical surfaces; terminate base flashing 4 inches under metal cap flashing or lock into back edge of metal wall coping, or to other work as detailed. (Fold outside edge of horizontal leg 1/2 inch and fasten with cleats 12 inches on center) - (Nail outside edge of horizontal leg 6 inches on center). Provide loose-locked joints not more than 8 feet from external and internal corners and in straight runs at not over 24 foot intervals; fill joints with plastic cement or sealing compound. Other joints in flashings shall be locked or lapped and soldered.

(C) On sloping slate and other shingle type roofs, build in base flashing with each course of roofing material. Lap each piece of flashing over underlying flashing at least 4 inches and extend it up under the cap flashing not less than 4 inches.

18. STAINLESS STEEL CAP FLASHING:

(A) Provide metal cap flashing at top edges of metal base flashings and at other locations indicated on drawings. Fabricate cap flashings from (.015 inch) - (_____inch) thick stainless steel, (Type 302 or 304) - (Type _____) - (2D finish) - (_____finsh), dead soft fully annealed.

(B) Form flashing in 8 or 10 foot lengths, except where shorter pieces are required; lap end joints a minimum of 3 inches; do not solder or weld joints. Stagger cap flashing joints with relation to base flashing joints. Make flashing continuous at angles. Cap flashing shall overlap base flashing a minimum of 4 inches, except where it shall be concealed or is otherwise indicated. Bottom edge of cap flashing shall be folded back 1/2 inch on underside.

(C) Extend cap flashing into masonry and ----------walls not less than (1-1/2 inches) - (------inches). Where cap flashing terminates in raked joints or reglets, fasten flashing with lead wedges every 12 inches. Fill reglets on horizontal surfaces continuously with molten lead (or sealing compound). Fill reglets on vertical surfaces with sealing compound. Sealing compound shall be synthetic rubber type as hereinbefore specified.

(D) Where pre-fabricated cap flashing and reglet system is used, the upper edge of cap flashing shall be formed with an approved snap-lock flange to engage the reglet receiver and to provide a spring action at bottom edge against the base flashing.

(E) Where sloping shingle type roofs abut vertical surfaces, install continuous step flashings of separate pieces woven in with each course of shingles. Install each step to overlap underlying step by 4 inches; do not solder or weld joints.

19. FLASHING VALLEYS IN SHINGLE TYPE ROOFS:

(A) TYPE OF VALLEYS: Form valleys for (slate) - (tile) - (concrete) - (cement asbestos) shingle type roofs open or closed type as noted on drawings. Use stainless steel (Type 302 or 304) - (Type------) - (2D finish) - (------ finish), dead soft fully annealed, and of thickness indicated or specified.

(B) OPEN TYPE: Open valleys shall be(8 inches) - (____inches) wide between the shingles for the entire length. Flash valleys with (.015 inch) - (----inch) thick, stainless steel sheets in lengths of 10 feet maximum and with ends lapped 6 inches. Extend metal flashing under shingles at least 6 inches on each side of valley. Fold long edges of flashing for cleating;

19. FLASHING VALLEYS IN SHINGLE TYPE ROOFS: (Continued)

provide cleats of the same metal used for flashing; hook cleats into folded edges and space cleats 24 inches on centers. Nail cleats to the roof sheathing or wood nailing strips.

(C) CLOSED TYPE: Flash closed valleys underneath shingles with separate strips of (.015 inch) - (_____inch) thick stainless steel built in with each course of shingle roofing. Where roof slope is 6 inches or more per foot, extend flashing pieces at least 9 inches under shingles adjoining valley intersection. Where roof slope is less than 6 inches per foot, extend flashing pieces at least 12 inches under shingles adjoining valley intersection. Each flashing piece shall be as long as the diagonal line of intersection of each shingle with the valley line. Nail upper edge of each flashing piece to roof sheathing or to wood nailing strips. Keep bottom edge of flashing 1/2 inch short of the shingle butt line.

20. METAL COVERING AND FLASHING OF EQUIPMENT SUPPORTS ON ROOFS:

(A) Cover raised bases and equipment supports on roofs, for fans and _____ with (.015 inch) - (_____inch) thick stainless steel, (Type 302 or 304) - (Type_____) - (2D finish) - (_____finish) dead soft fully annealed. Fabricate the metal to shapes required and provide flanges extending out a minimum of 4 inches over built-up roofing; or member with metal roofing in a manner to provide watertight construction. Where the flashing is punctured for bolt connections, provide 4 pound sheet lead washers, 2 inches larger than the bolt holes.

21. METAL THROUGH-WALL FLASHING:

(A) Provide metal though-wall flashing under stone and _____ wall copings, under _____ sills and at other locations indicated. Flashings shall be formed of stainless steel (Type 302 or 304) - (Type _____) - (2D finish) - (_____ finish) dead soft fully annealed. Typical flashings above roof line shall be (.010 inch) - (____inch) thick minimum. Typical flashings below roof line shall be (.006 inch) - (_____inch) thick, min. Flashings shall be a prefabricated product similar to "_____" as manufactured by _____; it shall be especially formed to bond in the mortar bed, prevent lateral movement in both directions, and be free of breaks or perforations. Bonding features shall consist of a series of ribs, extending transversely or diagonally across the sheet, or by a small rolled pattern in the sheet surface. The bonding features shall be formed so as not to pocket water

21. METAL THROUGH-WALL FLASHING: (Continued)

on the surface. Lap cross joints to interlock design pattern at least 3 inches. Stop typical flashing in mortar joint 1/2 inch from the exterior face of wall. Pointing of mortar joint is specified under Section "_____". Where metal through-wall flashing connects with other metal flashing, provide a specially formed edge to engage the adjacent sheet. Flashings that form cap flashings shall turn down face of wall at least 4 inches, overlap base flashings not less than 4 inches and have bottom edge folded back 1/2 inch on under side.

22. MISCELLANEOUS FLASHINGS:

(A) Provide miscellaneous flashing for the items as listed below. Unless otherwise specified, fabricate flashings of (Type 302 or 304) - (Type _____) stainless steel, (2D finish) - (_____ finish) dead soft fully annealed and of thickness indicated and specified. The forming and installation of flashings shall be as indicated on project drawings and in accordance with the applicable details and plate numbers listed in The SMACNA Manual.

(1) Flashing at Roof Penetrations: Use (.015 inch) - (____ inch) thick stainless steel. Refer to Plates 58, 59, 60, 61 and 63.

(2) Chimney Flashing: Use (.015 inch) - (_____ inch) thick stainless steel. Refer to Plate 62.

(3) Ledge Flashing: Use (.015 inch) - (_____ inch) thick stainless steel. Refer to Plate 64.

(4) Flashing Shingle Roofs at Eaves, Rakes Ridges and _____: Use (.015 inch) - (_____inch) thick stainless steel. Refer to Plates 56, 57 and 66.

(5) Water Diverters: Use (.015 inch) - (_____inch) thick stainless steel. Refer to Plate 24.

(6) Spandrel and Sill Flashing: Use (.036 inch) - (_____ inch) thick stainless steel with through-wall pattern. Refer to Plates 46 and 47.

23. GRAVEL STOPS AND FASCIAS:

(A) Provide gravel stops (and fascia) at exposed edges of all built-up roofs except _____. Fabricate gravel stops from (.015 inch) - (_____inch) thick stainless steel, (Type 302 or 304) - (Type _____) with a (2D finish) - (No. 4 finish) - (_____finish).

See Note 10

(B) Form gravel stops and fascias to sizes and details indicated and in 8, 10 or_____foot units. Form corner sections by mitering and spot welding or riveting the flange and sealing with solder or

23. GRAVEL STOPS AND FASCIAS: (Continued)

sealant; or by a continuous weld on back side. Unless other methods are indicated, the joints between the units shall be made with a 3/16 inch expansion joint between sheets and 6 inch wide back-up plates or cover plates formed to exact profile of gravel stop and fascia. Fill space between gravel stops and plates with an approved sealing compound and nail plates to deck or nailer at the 3/16 inch expansion joint; (Refer to Plate 68 of The SMACNA Manual and to Fascia and Gravel Stop Details in The Stainless Steel Data Manual).

(C) Extend flanges of gravel stops out on top of built-up roofing felts not less than 3-1/2 inches; secure flange to wood nailers with No. 12 flat head, annular thread, stainless steel nails, 1 inch long; space nails 6 inches on center.

(D) Where gutters (other than half-round type) occur directly under a gravel stop, extend the gravel stops down into gutters at least 2 inches and fold the edges of stops back. Where the gravel stops extend down on vertical surface to form a finished fascia, hook the bottom edge over a previously-placed edge strip.

24. HANGING GUTTERS - RECTANGULAR TYPE:

(A) Provide rectangular type hanging gutters of size and shape indicated at eaves of _____roofs. Fabricate gutters from (.015 inch) - (_____ inch) thick stainless steel, (Type 302 or 304) - (Type_____) with (2D finish) - (_____ finish). Form gutters in 8, 10 or _____foot long sections; lap cross joints 1-1/2 inches, rivet and solder or weld. Provide loose-locked expansion joints midway between all outlet tubes and where gutter ends adjoin masonry walls. Form expansion joints to provide for 1/2 inch movement in either direction. Fit joints with cover strips in a manner to provide watertight connections.

See Note 11

(B) Gutters shall be supported (by stainless steel spike and ferrule spaced 30 inches on center and in accordance with figure B on Plate 15) - (by overhead stainless steel straps .037 inch thick by _____inch wide, spaced 30 inches on center and in accordance with figure _____ on Plate _____) - (by 1/8 inch thick by _____inch wide, stainless steel gutter brackets spaced 30 inches on center and in accordance with details on Plate 13 or 14) of The SMACNA Manual. Reinforce outer edges of gutters when so indicated. When bottom of gutters are supported on brackets, provide spacers across top of gutter at approximately mid-point between brackets. Provide flashings or gutter extensions at roof edges as shown on details.

24. HANGING GUTTERS - RECTANGULAR TYPE: (Continued)

(C) Provide outlet tubes with flanges riveted and soldered to gutters; extend tubes 3 inches into downspouts. Set gutters level unless otherwise indicated.

25. HANGING GUTTERS - HALF ROUND TYPE:

(A) Provide half-round metal gutters of sizes indicated at eaves of _____roofs. Fabricate gutters from (.015 inch) - (_____inch) thick stainless steel, (Type 302 or 304) - (Type _____) with a (2D finish) - (_____ finish). Form gutters in a 8, 10 or _____ foot long sections, to sizes and shapes indicated. Join sections by tongue-and-groove slip joints. Fill joints with a thick mixture of white lead paste or an approved sealing compound. Provide a rolled bead on (front side) - (each side) of gutters. Provide all necessary end pieces, caps, outlet tubes and miters; solder or weld and make watertight.

See Note 11

(B) Support gutters on hangers located near ends and spaced not over 30 inches apart. Gutters shall be set level unless otherwise indicated on drawings. Hangers, not shown or specified otherwise, shall be formed of 1 inch by (.037 inch) - (_____inch) thick stainless steel, extending 6 inches on roof boarding and fastened thereto with 2 countersunk stainless steel screws. Hangers for gutters of _____ shall be adjustable stock type stainless steel similar to type No. _____ as manufactured by _____.

26. BUILT - IN GUTTERS:

(A) Install built-in gutters at _____. Cover surface under gutter lining with roofing felt and cover felt with building paper as hereinbefore specified. Fabricate gutter lining of (.018 inch) - (_____inch) thick stainless steel sheets, (Type 302 or 304) - (Type _____) - (2D finish) - (_____finish) dead soft fully annealed. The metal sheets shall conform to profile of gutter; longitudinal seams will not be permitted. Make cross seams 48 inches apart where sectional contour of gutter is more than 36 inches and 8 feet apart where sectional contour is 36 inches or less. Join ends of sheets together by 3/4 inch lock and soldered seams.

See Note 11

26. BUILT - IN GUTTERS: (Continued)

(B) Provide loose-locked expansion joints midway between all outlet tubes and where ends of gutters abut masonry or _____ walls. Form expansion joints to provide for _____inch movement in either direction; fit joints with cover strips in manner to provide free movement and watertight connection. Form expansion joints as indicated on Plates 6, 9 and 10 of The SMACNA Manual. (Refer to Plates 4 and 6 for gutter design and allowance for expansion) - (refer to Chart 7 on Plate 4 for recommended metal gauges.)

(C) Where built-in gutters occur at shingle type roofs, extend roof edge of gutter lining under the_____ roof shingles not less than 6 inches and terminate in a folded edge. A separate apron strip of stainless steel, not less than 6 inches wide shall be loose-locked into the folded edge of gutter lining. Nail upper edge of apron to roof boarding at 4 inch centers. Do not pierce gutter lining with nails.

(D) Where built-in gutters occur at metal roofs, extend roof edge of gutter lining under metal roofing not less than 6 inches, terminate in a folded edge and attach to roof boarding by cleats at 24 inch centers. Provide a continuous lock strip, of same material as gutter lining, and solder to gutter lining at lower ends of roofing sheets. Connect roofing metal to lock strip with a loose-lock joint.

(E) Terminate the outer edge of gutter lining over top of cornice as detailed and in accordance with Plate No. _____ of The SMACNA Manual.

(F) Form outlet tubes of same material as gutter lining, with lock and soldered longitudinal seam. Upper end of tube shall be flanged, riveted and soldered to lining. Extend tubes into downspouts at least 3 inches.

27. DOWNSPOUTS:

(A) Provide metal downspouts on outside walls from gutters, leader heads, scuppers and _____ as indicated. Fabricate downspouts from (.015 inch) - (_____ inch) thick, (Type 302 or 304) - (Type _____) stainless steel with a (2D finish) - (_____finish). Form downspouts to sizes indicated, in 8 to 10 foot lengths. Telescope end joints 1-1/2 inches and lock longitudinal joints. Fasten downspouts to walls with (.018 inch) - (_____inch) thick stainless steel straps, 3 inches wide or concealed clamp supports of stainless steel as manufactured by _____. Space straps or clamps not more than 8 feet apart. Provide a shoulder of solder on each side of downspout above each strap; fasten straps to walls with stainless steel screws in plastic sleeves, or _____.

(B) Form downspout conductor heads to design indicated. Lock,

27. DOWNSPOUTS: (Continued)

and solder or weld without flux all seams. Close tops of downspout heads with a removable type 1/2 inch mesh stainless steel wire screen.

(C) Where downspouts empty onto splash blocks or roof pans, provide elbows at bottom. Fit downspouts into cast iron boots or drain pipes where indicated and caulk with cement.

(D) Where downspouts empty onto built-up roofs, provide metal splash pans of .015 inch thick stainless steel with a 2D finish. The size and shape of splash pans shall be in accordance with Plate 35 of The SMACNA Manual. Embed pans in hot bitumen.

28. SCUPPER LININGS:

(A) Line scuppers with (.015 inch) - (_____ inch) thick stainless steel (Type 302 or 304) - (Type _____) with a (2D Finish) - (_____ finish) dead soft fully annealed. Extend lining through walls and project into downspout conductor heads or into _____. Join scupper linings with roof flashings by full soldered, or welded seams. On built-up roofs with gravel or slag surfacing, provide a 3/4 inch high gravel stop across scupper opening. Scupper design shall be (as indicated on drawings) - (in accordance with details shown on Plate No._____ of The SMACNA Manual).

29. STRAINERS:

(A) Provide in each gutter outlet to downspout a removable basket type wire strainer. Construct strainers of 1/16 inch diameter stainless steel wire. Fit strainers snugly into outlets.

30. FORMED METAL COPINGS:

(A) Cover top of masonry and _____parapet walls where indicated with (.018 inch) - (_____inch) thick stainless steel coping formed to design shown. Stainless steel shall be (Type 302 or 304) - (Type _____) with a (2D finish) - (_____ finish). Before applying metal, cover top of wall or wood blocking with felt and paper as hereinbefore specified. Unless other methods are indicated, the cross joints between coping sheets shall be made with a 3/16 inch expansion joint between sheets and 6 inch wide back-up plates or cover plates formed to profile of coping. Fill space between coping and plates with an approved mastic or sealant. The method of forming cross joints in coping shall be (in accordance with details on Plate 68, Alternate 4 and 5 of the SMACNA Manual) - (as indicated for coping details in The Stainless steel Data Manual) - (as detailed on project drawings).

30. FORMED METAL COPINGS: (Continued)

(B) Front edge of coping covering shall extend down over and lock into a previously placed continuous edge strip of stainless steel; use .025 inch thick edge strip when securing to wood blocking and .037 inch thick edge strip when securing to masonry. Secure edge strips to wood with nails spaced 6 inches apart and to masonry with stainless steel screws in expansion shields and spaced 12 inches apart.

(C) Rear edge of coping covering shall be (terminated as indicated on project drawings and on Plate _____) - (joined to adjacent flashing as indicated on project drawings and by details on Plate _____) of The SMACNA Manual.

(D) All corners of coping shall be mitered, seamed and sealed with solder.

31 BUILDING EXPANSION JOINTS:

(A) JOINTS IN WALLS: At expansion joints in exterior walls, provide accordion type water stops of (.015 inch) - (____ inch) thick, stainless steel (Type 302 or 304) - (Type_____) with a 2D finish, dead soft fully annealed. Joints shall be formed as indicated (on the project drawings) - (on Plate 82 of The SMACNA Manual). Form water stops in 8, 10 or ____ foot lengths and provide them continuously from the top of walls to the top of footings. Lap joints 4 inches in the direction of water flow; solder, or weld all joints below grade. Fit joints closely, but with ample provision for expansion and contraction. Provide a folded edge on each flange and build the flange 4 inches into masonry.

(B) JOINTS IN ROOF: At exposed top surfaces of expansion joints on roofs and _____ form expansion covers of (.015 inch) - (_____ inch) thick stainless steel with a 2D finish) - (_____ finish). Joints shall be formed as indicated (on the project drawings) - (on Plate _____ of The SMACNA Manual). Fabricate the covers in sections not more than 10 feet long; lap joints 3 inches. Fit joints closely and form them to be watertight, but with ample provision for expansion and contraction. Exposed edges of joint covers shall overlap the flashings at least 4 inches and be turned under a continuous strip of stainless steel. Form continuous strips of .025 inch thick stainless steel or of .015 inch thickness bent double; fasten strips in place with stainless steel screws spaced not more than 12 inches on centers. Screw fastenings in masonry or concrete shall be in lead or _____ shields. At contractor's option, covers for expansion joints may be a combination of stainless steel and neoprene as (indicated on Plate 79, figure _____ in the SMACNA Manual) - (detailed on project drawings and as manufactured by _____).

32. FORMED METAL LOUVERS - STATIONARY TYPE:

(A) Provide stationary type formed sheet metal louvers of sizes indicated in exterior walls of_____and for interior walls in _____. See Note 12

(B) Construct louvers and frames of (Type 302 or 304) - (Type _____) stainless steel with a (2D finish) - (_____ finish). Unless otherwise indicated, the minimum metal thickness for louver blades and frames shall be .025 inch for louvers up to 24 inches wide; .031 inch for louvers 25 to 36 inches wide; .037 inch for louvers 37 to 48 inches wide and .050 inch for louvers 49 to 60 inches wide. (Where louver blades exceed 36 inches in width, a 1/8 by 1 inch stainless steel bar (may) - (shall) be used to connect the louver blades; where bar connectors occur, fabricate louver blades from _____inch thick stainless steel).

(C) Form louver blades (to shapes indicated on project drawings) - (to shapes indicated on Plate No.___ and Figure No._____ of The SMACNA Manual); set blades level and space accurately. At corners and intersections, lap metal, rivet and solder or weld. Provide vertical mullions where indicated or where the unsupported length of louver blades between jambs exceeds_____ inches. Construct louver as a unit so it can be inserted in wall openings and the frame anchored to walls and/or sub-frame as indicated on the approved shop drawings.

(D) Provide metal collars of sheet _____where ducts are to be connected to louvers. Provide a removable screen on (outside) - (inside) of louvers. Fabricated screen frame of _____ inch thick stainless steel of same finish as louver; where louvers are connected to ducts, use (1/4 inch) - (1/2 inch) mesh stainless steel wire screens; for louvers not connected to ducts, use 16 by 16 or 14 by 18 mesh stainless steel wire screens.

33. ROOF SCUTTLES - ACCESS TYPE:

(A) Provide roof scuttles at locations indicated for access to roof areas. Scuttles shall be prefabricated type similar to Model No. _____ as manufactured by _____ and of sizes shown. Furnish scuttles complete with curbs, flashings cover, compensating spring hinges, lifting handles, automatic lock bar, spring latch with padlock lug, 1-inch (fiberboard) - (cork) insulation on cover and on curbs, neoprene draft stops and other appurtenances as required for a complete installation. Metal for cover, curbs and flashings shall be stainless steel (Type 302 or 304) - (Type _____) with a 2D finish; use _____ inch thck metal for cover, _____inch thick metal for curbs and _____ inch thick metal for counter flashings.

34. ROOF VENTILATORS:

(A) Roof ventilators shall be (directional) - (stationary) - (revolving) - (gravity) type of sizes shown, similar to Model No._____ as manufactured by _____. Construct ventilators of _____inch thick stainless steel with a (2D finish) - (_____ finish). Ventilators shall be weatherproof under all conditions and braced properly to provide rigid construction. Provide substantial bases complete with flashing flanges. Provide manually-operated dampers, except where specified otherwise. Ventilators shall be provided with 1/2 inch mesh woven wire bird screens. Wire shall be stainless steel with 0.0475 inch minimum diameter. Install screens on the exterior of frames so they are readily removable for cleaning. Anchor ventilators to curbs, decking, framing, or _____ and flash to provide watertight construction.

35. METAL COVER FOR TOP OF INCINERATOR AND BOILER STACKS:

(A) The top of masonry stacks for (incinerators) - (boiler flues) - (_____) shall be covered with (.025 inch) - (.031 inch) thick stainless steel Type 316 with a (2D finish) - (_____finish). The cover shall be formed as detailed with watertight locked and soldered seams except that expansion seams shall be provided at approved locations and as indicated on approved shop drawings. Where the cover turns down around outside edges of stack and on inside of flue it shall be locked under a continuous edge strip of .031 inch stainless steel; fasten edge strip to the masonry with stainless steel screws spaced not more than 6 inches on centers and in lead shields. (On incinerator tops where metal spark arrestor screens are required, the connections between the screens and metal cover shall be as detailed on approved shop drawings).

36. CLEANING STAINLESS STEEL:

(A) Upon completion of soldering operations for each area or item, all flux residue shall be removed from the stainless steel surfaces. Remove residue by swabbing areas with a solution of washing soda or ammonia, scrubbing and then rinsing with clear water. Use particular care to remove residue from any crevices.

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