***** *The Design Professional shall include the following PSFA requirements as noted and complete this section, edited as necessary with information for the specific project. Refer to the latest version of the "State of New Mexico Public School Facilities Authority Roofing Program Handbook" at www.nmpsfa.org.* *****

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, general project requirements and Division 01 Specification Sections, apply to this Section.

B. Documents specifically related to this section include:

***** *Include additional sections as necessary.* *****

1. Section [00 4113] [00 4166] - Bid Form: **Roofing production rates required by Contract.**

2. Section 01 3100 – Project Management and Coordination: Coordination of roofing work with Owner; roofing sequence inclusion in Project Schedule.

3. Section 01 4100 – Quality Requirements: **Roofing observation services** and reports; Contractor's responsibilities.

4. Section [ ] -

1.2 SCOPE OF WORK

*****Summarize scope of work involving existing system components to remain or be removed, if re-roofing project.* *****

A. Furnish and install roof related sheet metal work per the drawings and specifications, include all clips, sealant, fasteners, and joining to make weather and watertight.

1.3 CODE COMPLIANCE

*****Designer shall complete the following code compliance information for all projects. Wind uplift pressures shall be calculated per the Building Code and include a factor of safety of 2.* *****

A. The installed copings and edge metal shall comply with ANSI/SPRI ES-1 Standards and shall meet the following design wind pressures:

1. Horizontal: _____ psf

2. Vertical: _____ psf

1.4 QUALIFICATIONS

A. Installer Qualifications

1. The installer of the roofing shall have been engaged in the business of installing the specified roofing system for not less than five (5) years and shall be certified by the roofing system Manufacturer in the layout and application of this system. The installer shall have successfully installed the specified system as follows:

   a. At least once, and;

   b. At least five (5) years prior to Bid on this Project.

2. The crew shall be composed of experienced and skilled workers in this work.

1.5 QUALITY ASSURANCE

A. Standards: Comply with latest edition of standards specified in this section and as referenced below:

1. *ANSI/SPRI ES-1*.

2. *Architectural Sheet Metal Manual*, Sheet Metal and Air Conditioning Contractors National Association, Fifth edition, 1993, as published by SMACNA.

3. *The NRCA Roofing and Waterproofing Manual* – National Roofing Contractors Association.

4. Published installation instructions from Manufacturers of selected products.

5. *Annual Book of ASTM Standards,* Latest Revision – ASTM International.

B. Qualifications of Installers: Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this section.

C. In acceptance or rejection of the work of this section, the Owner will make no allowance for lack of skill on the part of the workers.

1.6 SUBMITTALS

A. General: Comply with the provisions of the General Conditions of the Contract and Division 01 specification sections. Submittal schedule shall allow ample time for processing and approval prior to Pre-Roofing Coordination Meeting and start of roof system installation work.

B. Drawings of all shop and pre-Manufacturered components to show type and gauge of metal used. Gauges of sheet metal specified in this section are minimums.

C. Submit product information or material list noting fasteners, sealants, sealant primers, sealant tapes, and other required accessories.

D. Submit color chart or physical samples for selection of prefinished metal color by the Design Professional.

E. Submit color chart or physical samples for selection of sealant color by the Design Professional.

F. Submit copies of all required warranties.

1.7 DELIVERY, STORAGE AND HANDLING

A. Use all means to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades. Roof surfaces shall be protected from damage at all times.

B. Deliver only new materials to the job site. Materials to be stored in such a manner as to be protected from rain, snow, or inclement weather. When storing materials on the roof, do not overstress the deck.

C. In the event of damage, immediately make all repairs and replacements to the approval of the Owner and at no additional cost to the Owner.

D. Follow the Manufacturer's recommendations for storage of temperature sensitive materials.

***** *Include next item if re-roofing project.* *****

E. Securely store and protect materials designated for removal and re-installation as part of the re-roofing work.

1.8 SCHEDULING

A. Work is to be performed on a daily basis with each section completed before progressing to the next day's work, unless specifically directed otherwise by the Design Professional.

B. Substantial Completion of sheet metal flashing and trim work will be defined as the contractually required and weathertight installation of all specified roof preparation, insulation, field membrane, flashings, counterflashings, sheet metal, fasteners and caulking.

C. All new sheet metal work shall be closely coordinated with the installation of the new roofing membrane.

D. Sheet metal shall be installed directly after roofing work such that roofing terminations shall not be left unprotected by metal.

E. Once roofing is started, the roofing application must be Substantially Complete within the time period required by the Contract. All punch list items must be complete prior to Final Completion.

1.9 WARRANTY

A. The Roofing Contractor shall warrant all materials and workmanship for a period of two years from the date of acceptance of the completed work by the Owner. The Roofing Contractor shall make good any defects in materials or workmanship that may develop during the two-year period by repairing or replacing such defects at his own expense without cost to the Owner. Roofing

Contractor shall use the form entitled “Sheet Metal Contractor’s Warranty” provided in this section.

B. 20-year warranty for Kynar 500/Hylar 5000 metal finish.

C. 25-year standard warranty from copper Manufacturer covering defects in materials and pre-patinated finish.

PART 2 – PRODUCTS

2.1 GENERAL

A. All materials used on this project shall be compatible with the existing conditions and with each other.

B. No product shall contain any asbestos or asbestos-related products.

2.2 MATERIALS

A. Sheet metal components, metal types, finishes, gauges/thicknesses, joint types, and ANSI/SPRI ES-1 compliance data are specified in the detail drawings.

B. Where sheet metal is required and no material or gauge is indicated on the drawings, provide the highest quality and gauge commensurate with the referenced standards.

C. Contractor shall use gauges or thicknesses listed in the schedule or as prescribed in the referenced standards for specific girths, whichever is greater.

D. Continuous clip shall be fabricated with material one gauge heavier than connecting component.

2.3 MATERIAL SPECIFICATIONS

********Design Professional shall modify and supplement the following text to address conditions related to re-roofing projects, if applicable.********

A. Aluminum

1. The aluminum alloy and temper for sheet metal work shall be 3003-H14.

2. Specification References

a. Fed. Spec. QQ-A-250d, Aluminum and Aluminum Alloy, Plate and Sheet.

b. ASTM B209 Specification for Aluminum Alloy, Sheet and Plate.

c. ASTM B221 Specification for Aluminum Extrusions.

B. Copper

1. Specification References

a. Fed. Spec. QQ-C-576b, Copper Flat Products (Plate, Bar, Sheet and Strip).

b. ASTM B370, Copper Sheet and Strip for Building Construction.

c. ASTM B152 Specification for Copper Sheet, Strip, Plate and Rolled Bar.

2. Copper metal work shall be soldered using 50/50 solder and neutralize flux after soldering.

C. Galvanized Steel

1. Galvanized steel shall be G-90 material.

2. Specifications References

a. Fed. Spec. AA-S-775d.

b. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy – Coated (Galvannealed) by the Hot Dip Process.

D. Stainless Steel

1. Specification References

a. Fed. Spec. QQ-S-766C, Steel Plates, Sheets, and Strip, Corrosion Resisting.

b. ASTM - A167 Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

2. Finish shall be selected by the Design Professional.

E. Kynar Prefinished Steel

1. Approved Products

a. PAC-CLAD by Peterson Aluminum Corporation

b. TUFFCLAD by Clad-Tex Metals

c. Color Klad by Vincent Metals

d. UNA-CLAD by Firestone Building Products

e. Approved equal

2. Color shall be selected by the Design Professional from the Manufacturer's standard colors.

2.4 CARBON STEEL FASTENERS

A. All fasteners shall be carbon steel with corrosion-resistant coating, unless otherwise noted. Fasteners shall show no more than 15% red rust corrosion after 30 cycles of Kesternich testing.

B. Masonry / Concrete Fasteners

1. Fasteners shall be threaded or expansion type as required by site conditions.

2. Threaded fasteners shall be corrosion-resistant with hex washer head.

3. Expansion fasteners shall be zinc-alloy jacketed with stainless steel drive pin and mushroom head (nylon or plastic anchors are not approved).

4. Corrosion-resistant, watertight, EPDM sealing washer shall be supplied for either threaded or expansion type fasteners.

5. Fasteners shall be approved by FM Global.

6. Approved Products

a. Tapcon Hex Washer Head with Blue Climaseal or White UltraShield Coating by ITW Buildex

b. Tapper with Perma-Seal Coating by Powers Fasteners, Inc.

c. Metal Hit Anchor by Hilti

d. Zamac Hammer-Screw with Carbon Steel Drive Screw by Powers Fasteners, Inc.

e. Masonry Anchor by OMG

f. Approved equal

7. Fasteners to be nominal ¼" thickness minimum and of sufficient length to penetrate the masonry/concrete 1".

C. Steel / Wood Fasteners

1. Corrosion-resistant, self-drilling, self-tapping screw with hex washer head for exposed fastening.

2. Corrosion-resistant, watertight, EPDM sealing washer for exposed fastening.

3. Approved Products – Steel Fasteners

a. Tek Screw with Climaseal Coating by ITW Buildex

b. Dekfast Zac Anchor with Sentri XP Coating by SFS intec, Inc.

c. Owner approved equal

4. Approved Products – Wood Fasteners

a. TruGrip GT with Climaseal Coating by ITW Buildex

b. Dekfast Zac Anchor with Sentri XP Coating by SFS intec, Inc.

c. Owner approved equal

5. Fasteners to be nominal ¼" thickness minimum and of sufficient length to penetrate the steel ½" or into wood minimum 1".

6. 1¼" x 11-gauge, galvanized, ring shank roofing nails shall be used for concealed fastening into wood.

2.5 STAINLESS STEEL FASTENERS

A. All fasteners shall be Type 304 or Series 400 stainless steel, or zinc alloy in composition.

B. Masonry / Concrete Fasteners

1. Fasteners shall be threaded or expansion type as required by site conditions.

2. Threaded fasteners shall be corrosion-resistant with hex washer head.

3. Expansion fasteners shall be zinc alloy with stainless steel nail and mushroom head (nylon or plastic anchors are not approved).

4. Stainless steel, watertight, EPDM sealing washer shall be supplied for either threaded or expansion type fasteners.

5. Fasteners shall be approved by FM Global.

6. Fasteners to be nominal ¼" thickness minimum and of sufficient length to penetrate the masonry/concrete 1".

7. Approved Products

a. Scots Tapcon Hex Washer Head with Silver Climaseal Coating by ITW Buildex

b. Metal Hit Anchor by Hilti

c. Zamac Hammer Screw with Stainless Steel Drive Screw by Powers Fasteners, Inc.

d. Masonry Anchor by OMG

e. Owner approved equal

C. Steel / Wood Fasteners

1. Corrosion-resistant, stainless steel, self-drilling, self-tapping screw with hex washer head for exposed fastening.

2. Stainless steel, watertight, EPDM sealing washer for exposed fastening.

3. Approved Products – Steel Fasteners

    a. 12 - 14 Scots Tek Screw with Climaseal Coating by ITW Buildex

    b. Owner approved equal

4. Approved Products – Wood Fasteners

    a. 17 - 14 Scots Tek Screw with Climaseal Coating by ITW Buildex

    b. Owner approved equal

5. Fasteners to be of sufficient length to penetrate the steel ½" or into wood minimum 1".

6. 1¼" x 11-gauge, stainless steel, ring shank, roofing nails shall be used for concealed fastening into wood.

2.6 OTHER MATERIALS

A. Membrane Closure / Cover

1. Sheet waterproofing underlayment at parapets, expansion joints, etc., shall be 36-mil (minimum) single-ply material and associated seaming materials. Sheet waterproofing material shall be compatible and approved by the primary roofing membrane Manufacturer.

B. Sealants and Related Accessories

1. General: Except as specifically otherwise directed by the Owner's Representative, use only the type of sealants described in this section.

    a. Silyl-Termination Polyether (Hybrid) Sealant

        1) Approved Products

            A) Sonolastic 150 VLM by BASF Building Systems

            B) Approved Equal

2. Cleaner

    a. Industrial solvent recommended by the sealant Manufacturer, such as Isopropyl Alcohol, Naphtha, Mineral Spirits, Xylol, Toluene, MEK, or Manufacturer-supplied cleaner.

3. Primer

    a. General: Use only those primers that are specifically recommended for this installation by the caulking Manufacturer.

    b. Primer shall be one of the following:

        1) Primer 733 BASF Building Systems

        2) Approved Equal

4. Backer Rod

   a. General: Use only those backup materials that are specifically recommended for this installation by the sealant Manufacturer and that are non-absorbent, non-staining, and non-gassing when punctured. Backup materials must be 1½ times the width of the joint.

   b. Backer rod shall be one of the following:

      1) Soft Backer-Rod by BASF Building Systems

      2) Approved Equal

5. High Temperature Resistant Sealant

   a. Trade Mate® Hi-Temp Silicone Sealant by Dow Corning Corporation

   b. Approved equal

C. Sealant Tape

1. Permanently elastic isobutylene tripolymer tape or isobutylene isoprene copolymer tape that will bond to galvanized steel; aluminum; siliconized polyester, and polyvinyl flouride painted metals; as well as wood, concrete, etc., 1/8" x 1" nominal cross section, meeting Federal Specification TT-C 1796A, Type II, Class B, with minimum 20 psi adhesive tensile strength according to ASTM C 907, with a service temperature range of -60° F to 212° F.

   a. Approved Products

      1) Sika Lastomer – 95 Gray by Sika Corp.

      2) Sika Lastomer – 93 Black by Sika Corp.

      3) Sika Lastomer – 65 White by Sika Corp.

D. Gutter Brackets & Downspout Straps

1. Where referenced on the drawings, 1/8" x 1" gutter brackets and downspout straps shall be provided.

2. If gutters and downspouts are fabricated using prefinished or galvanized steel, shop primed and painted carbon steel brackets and straps shall be used (color to match gutters and downspouts).

3. If gutters and downspouts are fabricated using mill finished aluminum or stainless steel, stainless steel brackets and straps shall be used.

4. If gutters and downspouts are fabricated using prefinished aluminum or copper, shop primed and painted stainless steel brackets and straps shall be used (color to match gutters and downspouts).

E. Solder

1. ASTM B 32, flux type and alloy composition as required for use with metals to be soldered.

F. Rivets

1. Use copper, copper alloy, bronze, brass, or stainless steel for copper and stainless steel for stainless steel and aluminum alloy, galvanized steel or stainless steel for galvanized steel.

2. Not less than 1/8" diameter.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 FABRICATION

A. Sheet metal shall be formed accurately to sheet shapes as indicated on the drawings and in conformance with details on the approved shop drawings. Contractor shall be responsible for all dimensions.

B. Counterflashing shall be furnished where indicated on drawings. Form flashing sections not less than 8'0" in length, unless otherwise approved prior to fabrication and installation. Counterflashing shall overlap base flashing a minimum of 3".

C. Coping caps and edge metal shall be furnished where indicated on drawings. Form coping and edge metal in sections not less than 8'0" in length, unless otherwise approved prior to fabrication and installation.

D. Where loose lock lap joints are specified on the drawings, adjacent sections of metal shall overlap a minimum of 3".

E. Where joint covers are specified on the drawings, they shall be slightly larger than the primary component to ensure a proper fit. Edges of joint covers shall be tipped toward primary component to form a compression seal.

F. Miter all inside and outside corner joints in coping caps, edge metal, and expansion joints. Joints adjacent to inside and outside corners shall be placed exactly 24" each direction from the corner, unless otherwise approved prior to fabrication and installation.

G. Break counterflashing, coping cap, or edge metal sections where they cross building expansion joints, if applicable.

H. Horizontal flanges of edge metal, soil pipe leads, pitch pans, lower flanges, pipe jacks, etc., shall be 4" minimum with rounded corners.

I. All exposed edges of cut sheet metal shall be folded back on concealed surfaces.

J. Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished work.

K. Where a continuous clip is specified on the drawings, the primary component shall be continuously crimped along the bottom edge of the clip.

L. Fabricate radial coping/edge metal in uniform length sections using radial components with finished edges.

3.3 DISSIMILAR METALS

A. Dissimilar materials in contact, which are subject to electrolysis, shall be protected against such action prior to installation. Protective materials shall not be visible after installation. Protect metals using coatings recommended by Manufacturer, or separated using felt or EPDM membrane.

3.4 WEATHERPROOFING

A. Finish all sheet metal watertight and weathertight where so required.

B. Where lap seams do not have a joint cover, lap 3" minimum according to pitch.

C. Make all lap seams in the direction of the water flow.

D. Where roof membrane is not already carried over top of parapet wall, expansion joint blocking, etc., the top of each is to be covered with sheet waterproofing membrane (or the flashing membrane material if the roof system is a single-ply). Unless otherwise shown on the drawings, the membrane is to be fastened only on sides as required to hold it in place and make the wall or curb watertight until sheet metal cover can be installed over it. All laps in the membrane material shall be seamed watertight per the Manufacturer's published installation instructions.

3.5 JOINTS

A. Join parts with rivets or sheet metal screws where necessary for strength or stiffness.

B. Provide suitable watertight expansion joints for all sheet metal as required for proper installation in accordance with the schedule of roof related sheet metal and detail drawings.

C. Sealant application shall be neatly and thoroughly performed for a watertight seal. Sealant shall be installed within all loose lock joints under joint cover plates, and in other locations shown on the drawings. All exposed caulking joints shall be dry tooled to the profile shown on the detail drawings. If required, Contractor shall build custom tools on job site to provide the specified profile(s).

D. Surfaces to receive sealant shall be thoroughly cleaned as recommended by the sealant Manufacturer. All bitumen coating materials, roof cement, adhesive residue, rust, old caulking and/or other contaminants shall be removed down to the substrate to which sealant bonding is intended.

E. All surfaces to receive sealant shall be primed initially with the sealant Manufacturer's recommended primer.

F. Provide solder/weld joints where noted on the drawings.

3.6 FASTENING

A. Only stainless steel fasteners shall be used to fasten aluminum components, where specified.

B. Only stainless steel fasteners shall be used to fasten copper components, where specified.

C. Secure metal as per detail drawings. Do not in any case install exposed fasteners on a horizontal plane, unless specifically shown on a particular detail drawing.

D. All clips and cleats are to be fastened 6" o.c., unless otherwise noted on the drawings.

E. On the roof facing side, copings are to be fastened 12" o.c. with EPDM washered fasteners, unless noted otherwise on the drawings.

F. Do not fasten adjacent coping, counterflashing, or edge metal sections together at laps or at joint covers, so as to limit expansion/contraction ability. Fasten through center of joint cover through butt joint gap between primary component sections.

G. Embedded metal flanges are to be fastened 3" o.c., staggered.

H. The specified spacings for all fasteners in perimeter metal work shall be reduced by a factor of two in the corner zones of each roof section. Corner zones shall be as calculated based upon the applicable version of ASCE-7.

I. For concealed fastening into wood, use annular ring shank roofing nails.

J. For fastening into concrete, use masonry/concrete anchors with EPDM washers. Use only metal anchors. Plastic anchors shall not be used.

K. For exposed fastening into wood, use screws with EPDM washers. Deformed shank nails shall not be used.

L. Ensure that fasteners are not overdriven such that EPDM washer damage results. Remove and replace all such damaged fasteners, using oversized fasteners.

3.7 PROTECTION

A. Roof surfaces and flashing shall be adequately protected to prevent damage during the installation of metal work. The Contractor shall repair, at no cost to the Owner, any materials damaged.

3.8 CLEANUP

A. Debris from sheet metal work shall be frequently removed from building site as it accumulates.

B. Leave job site absolutely clean at completion of work, and properly dispose of all construction debris such as metal trimmings, fasteners, rivet nails, caulk tube ends, etc.

SHEET METAL CONTRACTOR'S WARRANTY

Trade: _____

_____

Contractor: _____

Contract Number and Date: _____

Project and Location: _____

_____

_____

_____

_____

Area of Roof Installation: _____

Date of Acceptance
(Effective Warranty Date): _____

1. Contractor warrants to Owner that the roof related sheet metal have been installed in accordance with the specifications of the contract referenced above, and the specifications of the Manufacturers of all materials used in performance of the work.

2. Contractor warrants to Owner that Contractor for a period of two (2) years commencing with the date of Owner's acceptance of the installation, will make good any deficiencies that develop as a direct result of workmanship defects, by repairing or replacing such defects. All corrective work shall utilize materials and installation procedures in strict accordance with the specifications. The Contractor will respond within 24 hours and repair within 5 business days, any leaks or defects in the roofing assembly.

3. Contractor warrants to Owner that Contractor for a period of two (2) years commencing with the date of Owner's acceptance of the installation, will maintain all sheet metal flashing in a watertight condition without cost to the Owner.

4. Contractor's liability hereunder shall be limited to the repair or necessary replacement of any defective component of the work without cost to Owner and shall not include incidental or consequential damages.

CONTRACTOR

By: _____
(Officer)

Title: _____

Company: _____

Date Executed: _____

- End of Section -