AVAILABLE PROJECT INFORMATION
SECTION 00 31 00

1. GENERAL

1.1. SITE

1.1.1. Information in this Section is provided only to establish general description. The Contractor is responsible for visiting the site and satisfying himself as to the existing conditions, roof composition, size of roof areas, etc. before submitting his Bid.

1.1.2. Roof Section 2 has an approximate area of 450 ft^2 (42 m^2). The existing roof structure and roof system are as described below.

1. Wood Deck
2. 4 Ply BUR Membrane
3. 4 Ply BUR Membrane
4. 1/2 inch (13 mm) Fiberboard
5. 4 Ply BUR Membrane
6. Wood Sleepers
7. Wood Deck

1.1.3. Roof Section 2 has an approximate wall area of 525 ft^2 (49 m^2). The existing wall profile is as described below.

1. Plywood
2. Tar Paper
3. Cladding

2. PRODUCTS

2.1. NOT USED

3. EXECUTION

3.1. NOT USED

END OF SECTION

GENERAL REQUIREMENTS
SECTION 01 00 00

1. GENERAL

1.1. SUMMARY OF WORK

1.1.1. The Work under this Contract consists of furnishing all labour, materials and equipment necessary to perform the work of the Project, as described herein and shown on the Project Drawings. The work will include, but is not necessarily limited to, the following:

1.1.1.1. Roof Section 2:

1.1.1.1.1. Remove and discard the existing observation deck.

1.1.1.1.2. Remove and discard the existing conduit and wiring.

1.1.1.1.3. Remove and discard the existing drains, if possible without damaging the deck.

1.1.1.1.4. Remove and discard the deteriorated or damaged sections of drain leaders.

1.1.1.1.5. Remove and discard the existing roof membrane and insulation down to the deck.

1.1.1.1.6. Remove and discard the existing wall cladding.

1.1.1.1.7. Remove and discard the existing base flashings and stripping.

1.1.1.1.8. Remove and discard the existing rough carpentry as required by the contract documents.

1.1.1.1.9. Remove and discard the existing metal flashings and trim.

1.1.1.1.10. Remove and discard the existing sealant and accessories.

1.1.1.1.11. Inspect the deck and walls for damage or other issues. Ensure the deck is dry before installation of new materials.

1.1.1.1.12. Infill holes and openings in the deck left from the removal of abandoned equipment, skylights and penetrations.

1.1.1.1.13. Furnish and install new asphaltic core board on all parapets, curbs and walls.

1.1.1.1.14. Furnish and install new tapered PolyISO insulation.

1.1.1.1.15. Furnish and install new SBS base sheet composite panel.

1.1.1.1.16. Furnish and install new SBS cap sheet membrane.

1.1.1.1.17. Furnish and install new roof and overflow drains.

1.1.1.1.18. Furnish and install new drain leaders.

1.1.1.1.19. Furnish and install new SBS base flashings on all parapets, walls and curbs.

1.1.1.1.20. Furnish and install new waterproofing membrane and wood cladding where indicated on the drawings.

1.1.1.1.21. Furnish and install new sheet metal flashings and trim.

1.1.1.1.22. Furnish and install new wood-framed observation deck.

1.1.1.1.23. Furnish and install new conduit and wiring.

1.1.1.1.24. Install new sealant and accessories to ensure the roof system remains watertight.

1.2. WORK RESTRICTIONS

1.2.1. Special Scheduling Requirements

1.2.1.1. The Contractor shall have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work.

1.2.1.2. The facility will remain in normal operation during the entire construction period. The Contractor shall conduct his operations so as to cause the least possible interference with normal operations of the facility.

1.2.1.3. Any necessary service cutoffs, such as power, water, or HVAC must be coordinated with the Contract Administrator.

1.2.1.4. The Contractor shall be working on and around existing buildings. Do not enter the buildings without prior approval of the Contract Adminstrator. The existing buildings and their contents shall be kept secure at all times. Provide dust covers or protective enclosures to protect existing work that remains and material located in the building during the construction period.

1.2.1.5. Interior access to roof for the roofing project will only be granted by special permission from the Contract Administrator.

1.2.1.6. Working Hours

1.2.1.6.1. Regular working hours within the facility shall consist of an 8-hour period between 8:00 a.m. and 5:00 p.m., Monday through Friday.

1.2.2. Work Outside Regular Hours

1.2.2.1. Work outside regular working hours requires Contract Adminstrator approval. Make application 7 calendar days prior to such work to allow arrangements to be made by the Contract Adminstrator for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contract Adminstrator may approve work outside regular hours.

1.2.2.2. The Contract Adminstrator reserves the right to require that work be completed outside of regular work hours to reduce disruptions to occupants within the facility. This work will be completed on a price request basis.

1.2.3. Heavy Equipment/ Loading

1.2.3.1. Plywood sheets or other methods of load distribution must be installed prior to the use of heavy equipment.

1.2.3.2. Contractor must notify the Contract Administrator with any concerns regarding the roof loading of temporary, tools, equipment materials or other loads. Notification must be given prior to the execution of loading.

1.2.4. Utility Cutovers and Interruptions

1.2.4.1. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays and holidays. Conform to procedures required in the paragraph "Work Outside Regular Hours."

1.2.5. Parking

1.2.5.1. Parking for workers will be allocated at the preconstruction meeting.

1.2.6. Material Storage

1.2.6.1. Materials shall be stored in areas designated by the Contract Adminstrator, and as allocated at the preconstruction meeting.

1.2.7. Code of Conduct

1.2.7.1. Ensure compliance with the following Code of Conduct when working onsite:

1.2.7.1.1. Compliance with all Contract Administrator established safety procedures and protocols.

1.2.7.1.2. No smoking on property, even in vehicles.

1.2.7.1.3. No rude, lewd or offensive behavior and/or comments by workers while onsite.

1.2.7.1.4. No bandanas or other clothing with colourings or markings associated with gang activity.

1.2.7.1.5. Violations of this Code will result in expulsion from work site.

1.3. CONSTRUCTION PROGRESS DOCUMENTATION

1.3.1. The Contractor shall be responsible for documenting existing site conditions prior to the start of the Work.

1.4. FIELD OR SITE CONDITIONS

1.4.1. Report any unacceptable existing conditions to the Contract Administrator immediately. Do not proceed until unsatisfactory conditions are corrected. Application of new materials shall constitute approval of the existing conditions by the Contractor.

1.4.2. Do not install waterproofing or insulating materials during any form of precipitation, including fog, or when there is ice, frost, moisture, or any other visible dampness on the substrate.

1.5. QUALITY ASSURANCE

1.5.1. Conduct a minimum of one cut test (1 ft. by 1 ft. (305 mm by 305 mm)) per 4,000 square feet (372 square meters) of roof replacement (Minimum of one cut test per roof section if less than 4,000 square feet (372 square meters) as determined by the Contract Administrator). All repairs are the responsibility of the roofing contractor. If deficiencies are identified, the Contractor will be responsible for conducting additional cut tests as directed by the Contract Administrator to determine extent of the non-compliant area.

1.6. QUALITY CONTROL

1.6.1. All items of work are to be constructed and installed by tradesmen skilled in the particular task or activity to which they are assigned. Construction failing to meet the accepted standards of workmanship will be termed Nonconforming Work and will be removed and replaced at Contractor's expense with Work conforms to the highest quality standards of the trades concerned, or otherwise corrected to the satisfaction of the Contract Administrator, the Contract Adminstrator, the Manufacturer, or other inspecting authority, as applicable.

1.6.2. Protect and secure the Work site and Work from loss or damage of any kind. This includes damage to materials and equipment required for the project as well as other components of the roof system. In addition, the contractor is responsible for securing any openings into the roof system that provides access to the interior of building at the end of each work day.

1.6.3. Failure of the Contract Adminstrator or Contract Administrator to discover or reject defective work, or work not in accordance with the Contract, shall not be deemed an acceptance thereof, nor a waiver of Contract Adminstrator's rights to Contractor's compliance with the Contract or performance of the work, or any part thereof. No partial or final payment, or partial or entire occupancy, by Contract Adminstrator shall be deemed to be an acceptance with the Contract, nor shall it be deemed a waiver by Contract Adminstrator or any of Contract Adminstrator's rights pursuant to this Contract or otherwise.

1.6.4. If the Contractor fails to maintain adequate quality control over the project, the Contract Adminstrator may require additional inspections of the work on a full/part time basis performed by the Contract Administrator. The cost of these additional inspections will be billed directly to the Contractor, or deducted from the Contract Amount.

1.6.5. Contractors are responsible for repairing and/or replacing all building components, equipment, furnishings, exterior grounds, fences and other exterior structures that have been damaged as result of contractor activities and/or project related moisture leakage. The Contractor is responsible for covering all related costs for services, labour and materials required to mitigate risks to occupants, make repairs and/or replace damaged materials. The Contractor is responsible to take immediate action upon notification to address the identified issues. If the Contractor fails to take immediate and/or effective action, the Contract Adminstrator reserves the right to complete the required work and subtract the cost for services, labour and materials from the Contract.

1.7. TEMPORARY UTILITIES

1.7.1. Contractor shall provide for temporary utilities required for the performance of the project except as otherwise noted. Such items include, but are not necessarily limited to, utilities such as heat, water, electricity and telephone.

1.8. CONSTRUCTION FACILITIES

1.8.1. Provide portable washroom facilities for workers. Contractors to ensure that no portable washroom is installed within 30 feet (9 meters) of any facility. The portable washroom must be properly secured to the security compound fence to avoid tip overs.

1.9. VEHICULAR ACCESS AND PARKING

1.9.1. Contractors can access the site and park in areas only where approved by the Contract Adminstrator.

1.9.2. Vehicular traffic onsite must be conducted with a spotter outside the vehicle at all times to ensure the safety of all individuals.

1.10. TEMPORARY BARRIERS AND ENCLOSURES

1.10.1. Provide a fenced compound to prevent access to work, kettles and material storage areas by unauthorized individuals.

1.11. BASIC PRODUCT REQUIREMENTS

1.11.1. Products include materials, equipment and systems.

1.11.2. Do not use materials and equipment removed from the existing structure, except as specifically required or allowed by the Contract documents.

1.11.3. Employ only new materials in manufacturer's original packaging, of the best quality, unless specific instructions are received in writing by the Contract Adminstrator's Representative, and apply them with the highest caliber of workmanship.

1.12. PHASED CONSTRUCTION

1.12.1. Phased installation of roofing materials is permitted on a 3-day cycle only, when no inclement weather is forecasted. Sections of the roof that are removed must be covered with the vapour barrier the same day. The rest of the roof assembly to the first waterproofing layer must be installed by the end of the third day.

1.12.1.1. On SBS roof systems, all components of the specified system up to the base sheet must be installed for the work area by the end of the third day. Cap sheet installation may follow at a later date. Base sheet must not remain exposed for more than 30 days.

1.13. PRODUCT DELIVERY, STORAGE AND PROTECTION

1.13.1. Deliver only new materials to the site, undamaged. Damaged materials will not be accepted. If damaged materials are delivered, clearly mark the damaged materials and have them removed at the earliest opportunity.

1.13.2. Test the materials upon delivery and immediately prior to installation to determine if the materials have elevated moisture levels. Materials with elevated moisture levels shall be marked as damaged and removed from the site.

1.13.3. Protect all materials from damage. Secure materials left on the site to prevent theft and vandalism.

1.13.4. Store all materials off the ground a minimum of 6 inches (152 mm) and cover with tarpaulins. Factory applied wrapping will not qualify as a covering.

1.13.5. All materials that become wet or damaged while on site shall be clearly marked and removed at the earliest convenience.

1.13.6. Store temperature sensitive materials in accordance with the manufacturer's written instructions.

1.13.7. Combustible materials are not permitted to be stored inside the facility or within 20 feet (6 meters) of the facility, or as otherwise required by the National Fire Code, Provincial Supplements and Municipal Bylaws.

1.13.8. The Contractor shall inspect all arrangements of materials stored on the project site on a weekly minimum basis.

1.13.9. All storage areas are subject to approval by the Contract Adminstrator.

1.13.10. Limit size of work sections to safeguard adjacent materials, structures, etc., and to minimize dust and noise.

1.13.11. Protect existing facilities from damage during work. Do not overload existing paving, curbs, sidewalks, etc. with vehicle traffic. Do not overload new or existing construction with demolition debris, equipment, etc.

1.13.12. Protect existing facilities from fire as a result of operations. Contractor shall provide suitable and adequate fire extinguishers conveniently located on the roof at staging areas, storage areas and at areas or equipment where an open flame is being used. Competent operators shall be in attendance at all times and shall be properly trained or instructed in fire protection.

1.13.13. Install a chute for the removal of materials from the roof.

1.13.14. Walls, windows, roof edges, etc., adjacent to hoists, and staging areas shall be protected using canvas tarpaulins. Plastic or felt will not be acceptable.

1.13.15. Confine roof traffic to work areas. Contractor shall be responsible for leaks that develop in traffic areas during and after project completion.

1.13.16. Protect interior of the facility from moisture intrusion and damage during roofing operations.

1.14. WARRANTY DOCUMENTATION

1.14.1. Warranty shall be for a period of two years that the roof system, as installed, is free from defects in installation workmanship, to include the roof membrane, flashing, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight roof system assembly. The roof system installer is responsible for correction of defective workmanship and replacement of damaged or affected materials. The roof system installer is responsible for all costs associated with the repair or replacement work.

2. PRODUCTS

2.1. NOT USED

3. EXECUTION

3.1. NOT USED

END OF SECTION

DEMOLITION
SECTION 02 41 00

1. GENERAL

1.1. SUMMARY

1.1.1. Includes the demolition, deconstruction, salvage, removal and disposal of select materials.

1.2. RELATED SECTIONS

1.2.1. Section 07 52 00 SBS Modified Bitumen Membrane Roofing

1.2.2. Section 07 62 00 Sheet Metal Flashing and Trim

1.2.3. Section 07 92 00 Joint Sealants

1.3. REGULATORY REQUIREMENTS

1.3.1. Conform to applicable code for demolition work, dust control and electrical work.

1.3.2. Obtain required permits from authorities.

1.3.3. Do not close or obstruct egress width to any building or site exit.

1.3.4. Do not disable or disrupt building fire or life safety systems without prior written approval from the Contract Administrator.

1.3.5. Conform to applicable regulatory procedures when discovering and removing hazardous or contaminated materials.

2. PRODUCTS

2.1. Equipment

2.1.1. Use the tools and equipment necessary to remove the required materials without damaging the facility or materials to remain. Equipment is subject to approval by the Contract Administrator.

3. EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions

3.1.1.1. Inspect the area of work for any unusual or potential hazardous or dangerous materials or conditions. Notify the Contract Administrator in writing of any concerns.

3.1.1.2. Verify the location and quantity of all materials identified to be removed.

3.1.1.3. Check for indication of conduit in or on the roof deck, or in other areas of the building that could be affected by the work.

3.1.1.4. Check all decks from the underside for indications of rust or deterioration.

3.1.1.5. Identify all decommissioned equipment and penetrations. Confirm with the Contract Administrator.

3.1.1.6. Verify that all necessary materials and labour are available and on site to replace the removed materials on the same day.

3.2. PREPARATION

3.2.1. Utilities and Related Equipment

3.2.1.1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contract Administrator and then only after temporary utility services have been approved and provided.

3.2.2. Relocations

3.2.2.1. Perform the removal and reinstallation of relocated items or items to be reinstalled with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contract Administrator.

3.3. DEMOLITION / REMOVAL

3.3.1. General

3.3.1.1. Do not begin demolition or deconstruction until authorization is received. The Contract Administrator retains the first right of refusal of all demolished or deconstructed materials. The work of this section is to be performed in a manner that maximizes salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the buildings. The work includes demolition, deconstruction, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from site daily unless otherwise directed. Store and secure materials that cannot be removed daily in areas approved by the Contract Administrator.

3.3.1.2. Proceed with demolition only when weather conditions are favorable and no precipitation is imminent. Remove only as much as can be replaced in the same day.

3.3.2. Items to Remain in Place

3.3.2.1. Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Contract Administrator. Repair or replace damaged items as approved by the Contract Administrator and to the satisfaction of the Contract Administrator. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contract Administrator prior to performing such work. Cease operations immediately if structure appears to be in danger and notify Contract Administrator. Do not resume operations until directed.

3.3.3. Existing Limits and Protection

3.3.3.1. Do not disturb existing conditions beyond the extent necessary for installation of new construction. Remove debris from work areas daily.

3.3.3.2. Protect the interior of the facility from damage during Work. Erect and maintain temporary partitions, such as sheet plastic, to prevent spread of dust, odours, and noise. Contractor shall be responsible to repair, replace or restore all materials, furnishings or equipment damage from the Work to the satisfaction of the Contract Administrator.

3.3.3.3. Installation of temporary protection must be coordinated with the Contract Administrator, and must not interfere with the normal operations of the facility, unless written permission otherwise is provided by the Contract Administrator.

3.3.3.4. Partial or temporary facility shutdowns must be coordinated with the Contract Administrator. All areas of the facility are to remain accessible and operational during the project, unless written permission otherwise is provided by the Contract Administrator.

3.3.4. Existing Conditions

3.3.4.1. Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions showing the condition of other facilities and other sections of the facility on which the work is to be performed adjacent to areas of alteration or removal. Photographs will be acceptable as a record of existing conditions. Include in the record the location and extent of existing cracks and other damage and description of surface conditions that exist prior to starting work.

3.3.5. On all Roof Sections:

3.3.5.1. Remove and dispose of observation deck wood framing.

3.3.5.2. Remove materials in an orderly fashion. Unless otherwise noted, remove all of the existing roof surfacing, membrane, and insulation down to the deck and discard. Do not store demolished materials on the roof. Perform any demolition work in accordance with CSA Code of Practice for Safety to CAN3-S350-M80 and all relative Sections of the Manitoba Workplace Safety and Health Act.

3.3.5.3. Remove and discard all metal flashings.

3.3.5.4. Remove and discard all internal roof drains if possible without damaging the deck, unless otherwise noted.

3.3.5.5. Remove and discard all deteriorated or damaged sections of the deck.

3.3.5.6. Remove and discard existing wall cladding.

3.3.5.7. Remove and discard all rough carpentry unless otherwise noted.

3.3.5.8. Remove and discard all base flashings.

3.3.5.9. Remove and discard all other existing components identified for removal in the specifications and on the project drawings.

3.3.5.10. Remove and discard all other materials that are not expressly identified but will interfere with the installation of the new materials.

3.3.6. Deteriorated Wood Deck and Sheathing Repair/Replacement

3.3.6.1. Furnish and install new deck and sheathing material in all locations that have been previously removed or deteriorated. The deck and sheathing material must be of equal or better quality then original and be installed using the appropriate screws or nails to ensure the deck is fastened to underlying structure.

3.3.6.2. All fasteners must penetrate a minimum 1/2 inch (13 mm] into the underlying structure. Any fastener that punctures through the side of the underlying structure causing to it be exposed when inspected from below the deck will not be accepted.

3.3.6.3. The replaced decking and/or sheathing must be fastened to a minimum of 3 structural members.

3.3.6.4. The deck and sheathing must be sanded and maintain a smooth transition from the replaced decking to the surrounding decking upon completion of the deck repair.

3.3.7. Temporary Work

3.3.7.1. Remove all temporary Work, including but not limited to shoring, bracing and partitions that were installed during the execution of the Work, but not part of the permanent Work.

3.3.8. Disposition of Material

3.3.8.1. Title to Materials

3.3.8.1.1. Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from the site. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor. The Contract Administrator will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.8.2. Reuse of Materials and Equipment

3.3.8.2.1. Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses. Store materials to be reused or relocated in a secure area on site. Any damage to the stored materials shall be the responsibility of the Contractor.

3.3.8.3. Salvaged Materials and Equipment

3.3.8.3.1. Salvage items and material to the maximum extent possible. Remove salvaged items to remain the property of the Contract Administrator in a manner to prevent damage. Items to be re-installed shall be installed in the same location they were removed from, unless directed otherwise. Items damaged during removal or storage must be repaired or replaced to match

existing items. Deliver the following items reserved as property of the Contract Administrator to the areas designated by the Contract Administrator.

3.3.8.4. Disposal of Removed Materials

3.3.8.4.1. Dispose of unsalvageable and non-recyclable, noncombustible material resulting from removal operations with all applicable federal, provincial and local regulations.

3.3.8.5. Reuse of Salvaged Items

3.3.8.5.1. Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

END OF SECTION

ROUGH CARPENTRY
SECTION 06 10 00

1. GENERAL

1.1. SUMMARY

1.1.1. Installation of new framing, blocking and nailers.

1.2. RELATED SECTIONS

1.2.1. Section 07 52 00 SBS Modified Bituminous Membrane Roofing

1.2.2. Section 07 62 00 Sheet Metal Flashings and Trim

1.2.3. Section 07 92 00 Joint Sealants

1.3. REFERENCES

1.3.1. CSA-O80 Series-08 - Wood Preservation.

1.3.2. CSA-O121-08 - Douglas Fir Plywood

1.3.3. CAN/CSA-O141-05 (R2009) - Softwood Lumber.

1.3.4. CSA-O151-09 - Canadian Softwood Plywood.

1.3.5. CSA-O153-M1980 (R2008) - Poplar Plywood.

1.3.6. CSA-O437-93 (R2006) - OSB and Waferboard.

1.3.7. NPA A208.1-2009 - Particleboard.

1.3.8. APA (American Plywood Association) - Grades and Specifications.

1.3.9. CANPLY (Canadian Plywood Association) - Canadian Plywood Handbook.

1.3.10. National Lumber Grades Authority (NLGA) - Standard Grading Rules for Canadian Lumber, 2007 Edition.

1.3.11. CAN/ULC-S702 - Thermal Insulation, Mineral Fibre, for Buildings.

1.4. WARRANTY

1.4.1. Installer's Warranty

1.4.1.1. Include all work performed under this section in the warranty in D.22.

2. PRODUCTS

2.1. LUMBER

2.1.1. Dimensional Lumber

2.1.1.1. For the observation deck: NLGA Standard Grading Rules for Canadian Lumber; CAN/CSA-O141. 14% maximum moisture content. Pressure treated, SPF No. 1 grade.

2.1.1.2. Elsewhere: NLGA Standard Grading Rules for Canadian Lumber; CAN/CSA-O141. 14% maximum moisture content. SPF structural grade.

2.1.2. Plywood:

2.1.2.1. Douglas Fir. Minimum thickness of 1/2 inch (13 mm), unless otherwise noted.

2.1.3. Wall Cladding

2.1.3.1. Cedar. Minimum thickness of 3/4 inch (19 mm), unless otherwise noted.

2.2. ACCESSORIES

2.2.1. General

2.2.1.1. Unless otherwise indicated or specified, rough hardware, clips and fasteners shall be stainless steel or galvanized, and of the type and size necessary for the project requirements. Sizes, types, and spacing of fastenings of manufactured building materials shall be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware, clips and fasteners in contact with or fastened into pressure treated wood must be stainless steel, or approved for installation in pressure treated wood. All galvanized metal shall be ACQ approved.

2.2.2. Nails

2.2.2.1. ASTM F 547, size and type best suited for purpose. For sheathing, length of nails shall be sufficient to extend 1 inch (25 mm) into supports. For fastening framing members to each other, length of nail shall be sufficient to extend 1-1/2 inches (38 mm) into the base member. Nailing shall be in accordance with the recommended nailing schedule contained in AF&PA T101. Where detailed nailing requirements are not specified, nail size and spacing shall be sufficient to develop an adequate strength for the connection. The connection's strength shall be verified against the nail capacity tables in AF&PA T101. Reasonable judgment backed by experience shall ensure that the designed connection will not cause the wood to split. If a load situation exceeds a reasonable limit for nails, a specialized connector shall be used.

2.2.3. Wood Screws

2.2.3.1. For sheathing, length of screw shall be sufficient to extend 1 inch (25 mm) into supports. For fastening framing members to each other, length of screw shall be sufficient to extend 1-1/2 inches (38 mm) into the base member. Where detailed fastening requirements are not specified, size and spacing shall be sufficient to develop an adequate strength for the connection. Reasonable judgment backed by experience shall ensure that the designed connection will not cause the wood to split.

2.2.4. Other Fasteners

2.2.4.1. Provide other fasteners as required to secure the new framing to the deck, walls and other substrates. Fasteners shall be suitable for their use and approved for their use by the manufacturer. Install these fasteners in accordance with the manufacturer's instructions.

2.2.5. Waterproof Membrane

2.2.5.1. CAN/CGSB-37.58-M86; self-sealing SBS modified bitumen membrane with a laminated woven polyethylene film facer. Min thickness 40 mils (1.0 mm) with a release film on the adhesive side.

2.2.5.1.1. Sopraseal Stick 1100 T by Soprema

2.2.5.1.2. Or approved equivalent in accordance with B.7.

3. EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions

3.1.1.1. Inspect the substrate. Verify the substrate is ready to receive new framing.

3.1.2. Evaluation and Assessment

3.1.2.1. Ensure the compatibility of the proposed fasteners to the deck. Ensure that the proposed fasteners will secure the new rough carpentry to the deck without causing damage to the deck or the framing. Perform tests as required. In the event the proposed fasteners are incompatible with the deck, will not properly secure the rough carpentry or will cause non-incidental damage to the deck, do not install additional fasteners and notify the Contract Administrator.

3.2. INSTALLATION / APPLICATION

3.2.1. General

3.2.1.1. Existing rough carpentry may be left in place without modification if in good condition, of adequate dimensions, without rot, properly secured to the deck, and can be incorporated into the finished roof system without compromising the overall integrity of the new roof system.

3.2.1.2. New rough carpentry assemblies shall be rigid, shall not deflect or deform when placed under the service loads and shall be properly secured to the deck, wall or other substrate and other framing members. When complete, rough carpentry assemblies shall function as a unit, receive other applicable building materials as designed and be incorporated into the overall roof system without compromising the overall roof system.

3.2.1.3. All new curbs, equipment supports, parapets and other vertical rough carpentry transitions or penetrations through the roof system shall be a minimum of 8 inches (203 mm) above the finished roof level unless otherwise noted.

3.2.2. Wood Observation Deck

3.2.2.1. Furnish and install new wood joists and pressure treated 1 inch x 6 inch (25 mm x 152 mm) wood decking boards to construct new observation deck to match dimensions of removed deck.

3.2.3. Wood Wall Cladding

3.2.3.1. Furnish and install waterproofing membrane, new wood wall cladding, and trim to match existing cladding. Stain to match existing cladding colour.

3.3. SITE QUALITY CONTROL

3.3.1. Non-Conforming Work

3.3.1.1. Non-conforming Work must be removed and new materials installed in accordance with these specifications.

3.4. PROTECTION

3.4.1. Protect new and existing rough carpentry from damage from reroofing operations.

3.4.2. Protect new and existing rough carpentry from fire.

3.5. SCHEDULE

Feature	Roof Section 2
Wood Deck	New
Waterproofing Membrane	New
Wood Cladding	New

END OF SECTION

SBS MODIFIED BITUMINOUS MEMBRANE ROOFING
SECTION 07 52 00

1. GENERAL

1.1. SUMMARY

1.1.1. This section specifies the supply and installation of the components required for a two ply SBS Roofing System.

1.1.2. Minimum two ply SBS modified bitumen roof system consisting of vapour barrier support panels, vapour barrier, insulation, cover boards, and modified bitumen base sheet and cap sheet. All work must follow the CRCA guidelines, manufacturer's requirements and standards stated within this Section.

1.2. RELATED SECTIONS

1.2.1. Section 06 10 00 Rough Carpentry

1.2.2. Section 07 62 00 Sheet Metal Flashing and Trim

1.2.3. Section 07 92 00 Joint Sealants

1.3. REFERENCES

1.3.1. All References shall be the current edition.

1.3.2. ASTM C578 - Rigid, Cellular Polystyrene Thermal Insulation.

1.3.3. ASTM C1289 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

1.3.4. ASTM D6162 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

1.3.5. ASTM D6163 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements

1.3.6. ASTM D6164 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements

1.3.7. CAN/CGSB-37.56-M - Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.3.8. CAN/CSA-A123.4-04 - Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

1.3.9. CAN/ULC-S701 - Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3.10. CAN/ULC-S702 - Thermal Insulation, Mineral Fibre, for Buildings.

1.3.11. CAN/ULC-S704 - Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3.12. CRCA (Canadian Roofing Contractors' Association) – CRCA Roofing Specifications Manual.

1.3.13. ULC (Underwriters Laboratories of Canada) - List of Equipment and Materials for:

1.3.13.1. Building Materials.

1.3.13.2. Fire Resistance.

1.4. SUBMITTALS

1.4.1. Slope Package

1.4.1.1. Submit to the Contract Administrator the sloped insulation design obtained directly from the sloped insulation manufacturer.

1.4.2. Manufacturer Reports

1.4.2.1. Submit the manufacturer's field reports, including the date and time of the visit, observations, statement of acceptance or non-acceptance of the work, and any supplemental instructions provided to the installers.

1.5. DELIVERY, STORAGE, AND HANDLING

1.5.1. Delivery and Acceptance Requirements

1.5.1.1. Deliver materials in sufficient quantity to allow continuity of the work. Deliver materials to site in manufacturer's unopened and undamaged standard commercial containers bearing the following legible information:

1.5.1.1.1. Name of manufacturer

1.5.1.1.2. Type

1.5.1.1.3. Brand designation

1.5.1.2. Mark and remove wet or damaged materials from the site. Deliver materials in sufficient quantity to allow work to proceed without interruption.

1.5.2. Storage and Handling Requirements

1.5.2.1. Protect materials against moisture absorption and contamination or other damage.

1.5.2.2. Completely cover materials stored outdoors, on and off roof, with waterproof canvas protective covering. Do not use polyethylene sheet as a covering. Tie covering securely to pallets to make completely weatherproof. Provide sufficient ventilation to prevent condensation. Distribute materials temporarily stored on roof to stay within live load limits of the roof construction. Maintain a minimum distance of 35 feet (11 meters) for all stored flammable materials, including materials covered with shrink wraps, craft paper and/or tarps from all torch/welding applications. Immediately remove wet, contaminated or otherwise damaged or unsuitable materials from the site. Damaged materials may be marked by the Contract Administrator.

1.5.2.3. Avoid crushing or crinkling of roll materials. Store roll materials on end on clean raised platforms or pallets one level high in dry locations with adequate ventilation, such as an enclosed building or closed trailer. Do not store roll materials in buildings under construction until concrete, mortar, and plaster work is finished and dry. Do not store materials outdoors unprotected. Prevent

damage to edges and ends of roll materials. Do not install damaged materials in the work. Select and operate material handling equipment to prevent damage to materials or applied roofing.

1.5.2.4. Store adhesives and solvent-based mastics at a minimum of 10 °C (50°F), unless more stringent requirements are provided by the manufacturer.

1.6. FIELD OR SITE CONDITIONS

1.6.1. Ambient Conditions

1.6.1.1. Do not install roofing system during any form of precipitation, including fog, or when there is ice, frost, moisture, or any other visible dampness on the roof deck. Follow manufacturer's printed instructions for Cold Weather Installation. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Contract Administrator.

1.6.2. Existing Conditions

1.6.2.1. Report any unacceptable existing conditions to the Contract Administrator immediately. Do not proceed until unsatisfactory conditions are corrected. Application of new materials shall constitute approval of the existing conditions by the Contractor.

1.7. SAFETY

1.7.1. The Contractor is solely responsible all means and methods as they relate to the project safety shall comply with all applicable local, provincial and federal requirements that are safety related.

1.7.2. Prior to the start of work, conduct a site assessment to ensure its safety in order to minimize fire risks and hazards.

1.7.3. Property Protection

1.7.3.1. Take all precautions necessary to prevent ignition of combustible materials during application of roofing. Immediately call the fire department if a fire commences. Review all fire safety procedures as outlined at the pre-construction conference. Install materials using the techniques recommended by the manufacturer. Do not store flammable liquids on the roof.

1.7.3.2. Provide a minimum of one multipurpose ABC portable fire extinguisher within 20 feet (6 meters) of each torch in use, or on the roof being covered or repaired.

1.7.3.3. Check all fire extinguishers prior to commencement of work, and upon completion of the day's work, to ensure fullness and operability.

1.7.3.4. Seal off voids or openings in the substrate with non-combustible materials prior to installing torch-applied materials in the area. When working around intakes and openings, temporarily disconnect and block to prevent flame of torch from being drawn into the opening. Provide non-combustible shielding or flame guard protection where gaps or voids occur in the construction in area of torch work.

1.7.3.5. Do not torch in areas of poor and/or no visibility (curbs, corners, eaves, expansions joints, flashing, other voids and small penetrations) which could allow a torch flame to ignite combustible material(s) hidden from view or within the underside of the roof deck or building interior.

1.7.4. Fire Watch

1.7.4.1. All personnel on the roof during torch application must be properly trained to use a fire extinguisher. Provide a fire watch for a minimum of two hours after completion of all hot work at the end of each work shift. Maintain the fire watch for additional time required to ensure no potential ignition conditions exist.

1.7.4.2. Utilize heat sensing meters to scan for hot spots in the work. Fire watch to be conducted by personnel properly trained to survey the underside of the roof deck (where possible) and the topside of possible smoldering elements. Do not leave the rooftop unattended during breaks in work during a work shift. Walk and scan all areas of application checking for hot spots, fumes, or smoldering, especially at wall and curb areas, prior to departure at the end of each work shift. Ensure any and all suspect conditions are eliminated prior to leaving the site each work shift.

1.7.5. Open Flame Application (Torch) Equipment and Personnel Safety

1.7.5.1. Only trained and qualified roofing applicators are allowed to operate any torching equipment.

1.8. WARRANTY

1.8.1. Manufacturer Warranty

1.8.1.1. Provide the Manufacturer's 15 year no dollar limit full roof system, materials and installation, workmanship warranty, including flashing, insulation and accessories necessary for a watertight roof system construction. Provide warranty directly to the Contract Administrator and commence warranty effective date at time of Contract Administrator's acceptance of the roof work.

1.8.2. Installer Warranty

1.8.2.1. Warranty shall be for a period of two years that the roof system, as installed, is free from defects in installation workmanship, to include the roof membrane, flashing, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight roof system assembly. The roof system installer is responsible for correction of defective workmanship and replacement of damaged or affected materials. The roof system installer is responsible for all costs associated with the repair or replacement work.

1.9. CONFORMANCE AND COMPATIBILITY

1.9.1. The entire roofing and flashing system must be in accordance with specified and indicated requirements, including fire and wind resistance requirements. Work not specifically addressed and any deviation from specified requirements must be in general accordance with recommendations of the CRCA guidelines, membrane manufacturer published recommendations and details, and compatible with surrounding components and construction. Submit any deviation from specified or indicated requirements to the Contract Administrator for approval prior to installation.

1.9.2. All waterproofing materials will be provided by the same manufacturer.

2. PRODUCTS

2.1. MANUFACTURERS

2.1.1. All specifications and details are based on a complete system including warranties as manufactured by manufacturers listed

2.1.1.1. Soprema

2.1.1.2. IKO

2.2. MATERIALS

2.2.1. Primer

2.2.1.1. For Heat Welded Membranes:

2.2.1.1.1. A blend of bitumen, volatile solvents and adhesive enhancing additives. Used as a primer to enhance the adhesion of torch-applied waterproofing membranes.

2.2.1.1.1.1. Elastocol 500 by Soprema

2.2.1.1.1.2. Mod-Bit Primer by IKO

2.2.1.1.1.3. Or approved equivalent in accordance with B.7.

2.2.1.2. For Self-Adhesive Membranes:

2.2.1.2.1. A blend of SBS synthetic rubber, volatile solvents, and adhesive enhancing resins. Used as primer to enhance the adhesion of self-adhesive membranes.

2.2.1.2.1.1. Elastocol Stick by Soprema

2.2.1.2.1.2. Self-adhered Membrane (SAM) Adhesive Primer by IKO

2.2.1.2.1.3. or approved equivalent in accordance with B.7.

2.2.2. Adhesives

2.2.2.1. Low-rise, two part urethane adhesive compatible with the insulation and substrate and approved for its intended use by the insulation manufacturer.

2.2.2.1.1. DuoTack by Soprema

2.2.2.1.2. Millennium by IKO

2.2.2.1.3. or approved equivalent in accordance with B.7.

2.2.3. Fire Protection Tape

2.2.3.1. Self-adhesive membrane composed of a reinforced glass mat and SBS modified bitumen designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.

2.2.3.1.1. Fireguard Tape by Soprema

2.2.3.1.2. Modiflex Tape by IKO

2.2.3.1.3. Or approved equivalent in accordance with B.7.

2.2.4. Insulation Fasteners

2.2.4.1.1. Fasteners shall conform to manufacturer's recommendations. Flush-driven through flat round or hexagonal steel plates. Steel plates shall be zinc-coated, flat round not less than 3-inch (76 mm) diameter or hexagonal not less than 28 gauge. Fastener head shall recess fully into the plate after it is driven. Plates shall be formed to prevent dishing. Do not use bell-or cup-shaped plates. Fasteners shall be spaced to withstand an uplift pressure as required by the National Building Code and CSA standards.

2.2.5. Membrane Fasteners and Plates

2.2.5.1. Provide coated, corrosion-resistant fasteners as recommended by the modified bitumen sheet manufacturer's printed instructions and meeting the requirements of CSA and the wind uplift resistance specified. For fastening of membrane or felts to wood materials, provide fasteners driven through 1 inch (25 mm) diameter metal discs, or one piece composite fasteners with heads not less than 1 inch (25 mm) in diameter or 1 inch (25 mm) square with rounded or 45 degree tapered corners.

2.2.5.2. Metal Plates

2.2.5.2.1. Provide flat corrosion-resistant round stress plates as recommended by the modified bitumen sheet manufacturer's printed instructions; not less than 2 inch (51 mm) in diameter. Form discs to prevent dishing or cupping.

2.2.6. Insulation

2.2.6.1. Roof insulation shall be one or an assembly of the following materials and compatible with attachment methods for the specified insulation and roof membrane:

2.2.6.1.1. Fiberglass Faced Polyisocyanurate Board

2.2.6.1.1.1. CAN/ULC-S704 Type II; ASTM C 1289 Type II, Class 2, Grade 2 glass mat membrane both sides. Minimum compressive strength shall be 20 pounds per square inch (psi) (138 kPa); Min 1 inch (25 mm) thickness; Min R-5.60 (per inch (RSI-0.99 per 25 mm).

2.2.6.1.1.1.1. Sopra-Iso Plus by Soprema

2.2.6.1.1.1.2. IKOtherm III by IKO

2.2.6.1.1.1.3. H-Shield CG by Hunter

2.2.6.1.1.1.4. or approved equivalent in accordance with B.7.

2.2.7. Roof Cover Board

2.2.7.1. Factory Laminated Cover Board/Membrane Composite Panels

2.2.7.1.1. Bituminous Core Board/Base Sheet Composite Panels

2.2.7.1.1.1. Polyester reinforced SBS modified base sheet membrane with selvedge technology factory-laminated on a semi-rigid asphaltic board. The top surface is covered with thermofusible plastic film.

2.2.7.1.1.2. CGSB 37-56-M; the SBS base sheet membrane must meet the same requirements of the base sheet membrane listed in this section.

2.2.7.1.1.3. Bituminous Core Board

2.2.7.1.1.3.1. CAN/ULC S702; Semi-rigid roofing support panel composed of a mineral-reinforced asphaltic core between two asphalt-saturated fiberglass liners; Min 3/16-inch (5 mm) thickness.

2.2.7.1.1.3.1.1. Soprasmart Board 180 by Soprema

2.2.7.1.1.3.1.2. Protectobase 180 by IKO

2.2.7.1.1.3.1.3. Or approved equivalent in accordance with B.7.

2.2.8. Parapet and Curb Cover Board

2.2.8.1. Bituminous Core Board

2.2.8.1.1. CAN/ULC S702; Semi-rigid roofing support panel composed of a mineral-reinforced asphaltic core between two asphalt-saturated fiberglass liners. Minimum thickness of the core board to be 1/8 inch (3 mm).

2.2.8.1.1.1. SopraBoard by Soprema

2.2.8.1.1.2. ProtectoBoard by IKO

2.2.8.1.1.3. or approved equivalent in accordance with B.7.

2.2.9. Roofing Membranes

2.2.9.1. Modified Bitumen Field Sheets

2.2.9.1.1. Furnish a combination of specified materials that comprise the modified bitumen manufacturer's standard system of the number and type of plies specified. Materials provided must be suitable for the service and climatic conditions of the installation. Modified bitumen sheets must be watertight and visually free of pinholes, particles of foreign matter, non-dispersed raw material, factory splices, or other conditions that might affect serviceability. Polymer modifier must be uniformly dispersed throughout the sheet. Edges of sheet must be straight and flat.

2.2.9.2. Torch Applied Membrane:

2.2.9.2.1. SBS Base Sheet: CAN/CGSB-37.56-M, 9th draft; ASTM D6164, Type I, Grade S, minimum 90 mils thick (2.2 mm). Membrane must have a burn off film on both sides.

2.2.9.2.1.1. Sopralene Flam 180 by Soprema

2.2.9.2.1.2. Torchflex TP-180-FF by IKO

2.2.9.2.1.3. or approved equivalent in accordance with B.7.

2.2.9.2.2. SBS Cap Sheet: CAN/CGSB-37.56-M, 9th draft; ASTM D6164, Type II, Grade G, minimum 150 mils thick (3.8 mm). The underside of the membrane must have a burn off film.

2.2.9.2.2.1. Sopralene Flam 250 GR by Soprema

2.2.9.2.2.2. Torchflex TP-250- Cap by IKO

2.2.9.2.2.3. or approved equivalent in accordance with B.7.

2.2.9.3. Flashing Membrane

2.2.9.3.1. Membrane manufacturer's standard, minimum two-ply modified bitumen membrane flashing system compatible with the roof membrane specified and as recommended in membrane manufacturer's published literature. Flashing membranes must meet or exceed the properties of the material standards specified for the modified bitumen base and cap sheet, except that flashing membrane thickness must be as recommended by the membrane manufacturer.

2.2.9.4. End Lap Cover Strip

2.2.9.4.1. Membrane strip made of SBS modified bitumen and composite reinforcement. Both faces are covered with a plastic thermofusible film. The strip to be torch applied over aligned end laps the ensure water-tightness.

2.2.9.4.1.1. Sopralap by Soprema

2.2.9.4.1.2. Torch Tape by IKO

2.2.9.4.1.3. Or approved equivalent in accordance with B.7.

2.2.10. Modified Bitumen Roof Cement

2.2.10.1. ASTM D4586, Type II for vertical surfaces, Type I for horizontal surfaces, compatible with the modified bitumen roof membrane.

2.2.10.1.1. Sopramastic and Sopramastic ALU by Soprema

2.2.10.1.2. AquaBarrier Mastic by IKO

2.2.10.1.3. or approved equivalent in accordance with B.7.

2.2.11. Liquid Flashing

2.2.11.1. Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcements.

2.2.11.1.1. Alsan Flashing and Flashing Reinforcement by Soprema

2.2.11.1.2. IKO MS Detail and Reinforcement by IKO

2.2.11.1.3. or approved equivalent in accordance with B.7.

2.2.12. Protection Mat/Slip Sheet

2.2.12.1. Minimum 6 ounce per square yard ultraviolet resistant polypropylene, non-woven, needle punched fabric for use as protection mat under ballast system and as recommended by the roof membrane manufacturer.

2.2.12.1.1. Soprafiltre Mat by Soprema

2.2.12.1.2. Or approved equivalent in accordance with B.7.

3. EXECUTION

3.1. EXAMINATION

3.1.1. The Contractor shall inspect and approve the deck condition (deteriorated deck, repairs as required etc.), as well as drains, curbs, control joints, expansion joints, perimeter walls, roof penetrating components, and equipment supports are in place and all adjustments and modifications to these elements are performed as required. Commencement of work shall imply acceptance of the surfaces and conditions.

3.1.2. Ensure that the following conditions exist prior to application of the roofing materials:

3.1.2.1. Surfaces are rigid, clean, dry, smooth, and free from cracks, holes, and sharp changes in elevation. Joints in the substrate are sealed to prevent dripping of bitumen into building or down exterior walls.

3.1.2.2. Wood nailers are in place on non-nailable surfaces, to permit nailing of base flashing at minimum height of 8 inch (203 mm) above finished roofing surface.

3.1.2.3. Protect all combustible materials and surfaces which may contain concealed combustible or flammable materials.

3.1.2.4. Wood nailers are fastened in place at eaves, gable ends, openings, and intersections with vertical surfaces for securing of membrane, edging strips, attachment flanges of sheet metal, and roof fixtures. Embedded nailers are flush with deck surfaces. Surface-applied nailers are the same thickness as the roof insulation.

3.2. PREPARATION

3.2.1. Equipment

3.2.1.1. Maintain all equipment and tools in good working order.

3.2.1.2. Use torch types recommended by the membrane manufacturer.

3.2.2. Surface Preparation

3.2.2.1. Apply membrane to clean, dry surfaces only. Do not apply membrane to surfaces that have been wet by rain or frozen precipitation within the previous 12 hours. Provide cleaning and artificial drying with heated blowers or torches as necessary to ensure clean, dry surface prior to membrane application.

3.3. PROTECTION

3.3.1. Provide temporary watertight cutoffs at the end of each work day or whenever precipitation is imminent. Fill all profile voids in cut-offs to prevent entrapping of moisture into the area below the membrane. Seal off flutes in metal decking along the cutoff edge. Cutoffs shall be removed when work is resumed.

3.3.2. Provide temporary flashing at drains, curbs, walls and other penetrations and terminations of roofing sheets until permanent flashings can be applied. Remove temporary flashing before applying permanent flashing. Ensure that the roof will not hold water. Install temporary drainage measures as required.

3.3.3. Do not permit storing, walking, wheeling, and trucking directly on applied roofing materials. Provide temporary walkways, runways, and platforms of smooth clean boards, mats or planks as necessary to avoid damage to applied roofing materials, and to distribute weight to conform to live load limits of roof construction. Use rubber-tired equipment for roofing work.

3.4. INSTALLATION / APPLICATION

3.4.1. General

3.4.1.1. Apply roofing materials as specified herein and in accordance with manufacturer's recommendations. Keep roofing materials dry before and during application. Complete application of roofing in a continuous operation. Begin work at the drainage point on the roof, either the eaves or the drains. As much as is possible, apply the entire roll in a continuous manner. Do not permit foot or equipment traffic on newly installed membrane.

3.4.1.2. Furnish and install new prefabricated and sheet metal flashings as indicated or required to ensure a water tight system.

3.4.1.3. Ensure proper sheet alignment prior to installation. Apply membrane layers perpendicular to slope of roof in shingle fashion to shed water, including application on areas of tapered insulation that change slope direction. Bucking or backwater laps are prohibited. Fully adhere membrane sheets to underlying substrate materials. Provide minimum 3-inch (76 mm) side laps and minimum 6-inch (152 mm) end laps or as more stringently required by membrane manufacturer. Stagger end laps minimum 24 inch (610 mm). Offset side laps between membrane layers a minimum of 12 inch (305 mm). Offset end laps between membrane layers a minimum of 24 inch (610 mm).

3.4.1.4. Provide tight smooth laminations of each membrane layer. Ensure full membrane adhesion and full lap seals. Rework to seal any open laps prior to application of subsequent membrane layers. The completed membrane application must be free of surface abrasions, air pockets, blisters, ridges, wrinkles, buckles, kinks, fishmouths, voids, or open seams.

3.4.1.5. Ensure waterproofing conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.).

3.4.2. Fire Protection Tape Installation

3.4.2.1. Adhere the fire protection tape directly onto an approved substrate and firmly pressing the membrane onto the surface. Roll the membrane with a steel roller to ensure positive adhesion.

3.4.2.2. Cover all joints, cracks or open areas where flame can enter from subsequent torch welding of membranes.

3.4.3. Parapet and Curb Cover Board Installation

3.4.3.1. Install asphaltic core boards on the walls using plates and fasteners in accordance with the ARCA Technical Bulletin dated May 13, 2005. A copy of this bulletin has been included after this section.

3.4.4. Insulation Installation

3.4.4.1. General

3.4.4.1.1. Refer to Detail 3 on Drawing No. A 4.01 for Insulation Staggering Requirements.

3.4.4.1.2. Probe insulation for moisture content prior to installation. Insulation with elevated moisture content shall be marked and removed immediately from the site.

3.4.4.1.3. Apply insulation in two layers with staggered joints when total required thickness of insulation exceeds 3 inches (76 mm). Lay insulation so that continuous longitudinal joints are perpendicular to direction of roofing. Apply insulation with end joints staggered approximately 12 inches (305 mm) minimum. Tapered insulation is not required to be staggered between rows.

3.4.4.1.4. When using multiple layers of insulation, joints of each succeeding layer shall be parallel and offset in both directions with respect to layer below. Stagger insulation joints from the preceding layer 12 inches (305 mm) min. Fit insulation units snugly to each other and to all vertical surfaces. Remove and replace damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness. Joints between the individual pieces of insulation and vertical surfaces should be 1/4-inch (6 mm) max. Any joint greater than 1/4 inch (6 mm) must be filled with like material.

3.4.4.1.5. Insulation which can be readily lifted after installation is not considered to be adequately secured. Insulation shall be applied so that all roof insulation applied each day is waterproofed the same day.

3.4.4.1.6. Adhesively Attached

3.4.4.1.6.1. Refer to Details 1 and 2 on Drawing No. A 4.01 for Insulation Adhesive Installation Details.

3.4.4.1.6.2. Apply the adhesive to the substrate in continuous strips of 3/4 inch (19 mm) wide as indicated. Spacing of beads varies based on the wind zones. Apply additional beads of adhesive along the edge of all vertical surfaces and 3 inches (76 mm) from the vertical surface. Immediately place insulation boards in the adhesive while adhesive is still wet. If adhesive sets, remove the adhesive from the board without damaging the substrate and reapply. Ballast each board for a period of 10 minutes minimum, and ensure full adhesion of the board to the substrate. Boards that rock or shift shall be removed and new materials installed. Uneven substrates may require additional ballast.

3.4.4.2. Tapered Insulation

3.4.4.2.1. Contractor is required to verify all on site conditions prior to ordering sloped insulation, and obtain the sloped insulation design directly from the manufacturer.

3.4.4.2.2. Install tapered insulation with a minimum slope of 1%. For tapered insulation with an exposed minimum edge thickness of 1/2 inch (13 mm), shave the edge down for a smooth transition.

3.4.4.2.3. Start tapered construction by striking chalk lines for outer edges of tapered units. Install the first row along the chalk lines, mitering and fitting at the points where lines break.

3.4.4.3. Drain Sumps

3.4.4.3.1. Refer to Detail 1 on Drawing No. A 5.04 for Drain Sump Details.

3.4.4.3.2. Form sumps at drains 3/4 inches (19 mm) lower than the adjacent insulation. Prior to the installation of the tapered insulation, install a 4 ft. by 4 ft. (1219 mm by 1219 mm) min base layer(s) of insulation that shall have a thickness that matches the top of the drain bowl, but no less than 2 inches (51 mm). Install the thin edge of the tapered insulation immediately adjacent to the outside edge of the sump. Bevel the adjacent edges of the tapered insulation. Ensure there is a 0 to 1/4 inch (0 to 6 mm) max drop from the tapered insulation into the sump.

3.4.5. Factory Laminated Cover Board/Membrane Composite Panel Installation

3.4.5.1. Adhesively Attached

3.4.5.1.1. Refer to Details 1 and 2 on Drawing No. A 4.02 for Adhesive Installation Details.

3.4.5.1.2. Apply the adhesive to the substrate in continuous strips of 3/4 inch (19 mm) wide as indicated. Spacing of beads varies based on the wind zones. Apply additional beads of adhesive along the edge of all vertical surfaces and 6 inches (152 mm) from the vertical surface. Immediately place insulation boards in the adhesive while adhesive is still wet. If adhesive sets, remove the adhesive from the board without damaging the substrate and reapply. Ballast each board at a minimum for a period of 10 minutes minimum, and ensure full adhesion of the board to the substrate. Boards that rock or shift shall be removed and new materials installed. Uneven substrates may require additional ballast.

3.4.5.1.3. All side laps to be sealed and end lap cover strip installed the same day as the composite panel.

3.4.6. SBS Membrane InstallationGeneral

3.4.6.1.1. Ensure substrate surfaces are warmed either naturally or by torch during the installation. Apply heat evenly to underside of roll membrane being installed and exposed side lap area of previously installed sheet in an L-pattern. Provide for slight, uniform flow of bitumen in front of roll and full width of roll as the material is being rolled or set into place. Ensure the torch is facing downward, and is not blowing air under the membrane.

3.4.6.1.2. Apply uniform positive pressure to ensure membrane is fully adhered and all laps are sealed. Tool all end and side laps of the base sheet with a torch and heated trowel. Prior to forming lap over granulated surfaces, embed granules of the receiving sheet by heating and troweling-in the granules to form a uniform black compound surface.

3.4.6.1.3. Roll all lap areas with a weighted roller immediately after forming lap. Provide for visual bleed out of compound in lap area. Avoid overheating the membrane or burning through to membrane reinforcement. Membrane that is overheated shall be removed, or have an additional ply installed over top.

3.4.6.2. Base Sheet Installation

3.4.6.2.1. Underlying substrate must be inspected and free of abrasions and any other defects, and free of moisture, loose materials, debris, sediments, dust, and any other conditions required by the membrane manufacturer prior to base sheet installation. Beginning at the point of drainage (eaves or drains), apply one ply of smooth-surfaced modified bitumen membrane to the substrate. Align membrane and apply by the specified method with the proper side and end lap widths. Cut at a 45 degree angle across selvage edge of membrane to be overlapped in end lap areas prior to applying overlapping membrane.

3.4.6.2.2. Install reinforcing gussets at all inside and outside corners.

3.4.6.3. Phased Membrane Construction

3.4.6.3.1. Any delay in modified bitumen cap sheet installation will result in thorough cleaning of the applied membrane material surface and drying immediately prior to cap sheet installation. Priming of the applied membrane surface may be required at the discretion of the Contract Administrator prior to cap sheet installation.

3.4.6.4. Cap Sheet Installation

3.4.6.4.1. Underlying applied membrane must be inspected and repaired free of damage, holes, puncture, gouges, abrasions, and any other defects, and free of moisture, loose materials, debris, sediments, dust, and any other conditions required by the membrane manufacturer prior to cap sheet installation. Do not apply cap sheet if rain or frozen precipitation has occurred within the previous 24 hours. Beginning at the point of drainage (eaves or drains), apply one ply of granule-surfaced modified bitumen membrane to the smooth-surfaced modified bitumen membrane. Align cap membrane and apply by the specified method with the proper side and end lap widths. Cut at a 45 degree angle across selvage edge of cap membrane to be overlapped in end lap areas prior to applying overlapping cap membrane. Finished roof surfaces must have a uniform appearance throughout. Apply matching granules in any areas of bitumen bleed out while the asphalt is still hot.

3.4.6.5. Membrane Base Flashing

3.4.6.5.1. Base flashings shall be laced into the field plies. Install bituminous flashings at all curbs, walls and vertical surfaces where other types of flashings are not specified or shown on drawings. Where possible or where indicated on the drawings, extend over the top of the vertical surface. Tie the base flashing into the waterproofing membrane and vapour barrier to form a complete envelope.

3.4.6.5.2. Apply two-ply modified bitumen strip flashing and sheet flashing in the angles formed where the roof deck abuts walls, curbs, ventilators, pipes, and other vertical surfaces, and where necessary to make the work watertight. Apply a strip of smooth-surfaced modified bitumen

without voids, extending at least 4 inches (102 mm) on the roof and least 8 inches (203 mm) up the vertical surface. Lap sections a minimum of 3 inches (76 mm).

3.4.6.5.3. Apply a strip of granule-surfaced modified bitumen cap flashing without voids, extending at least 6 inches (152 mm) on the roof or 2 inches (51 mm) past the base sheet, and at least 8 inches (203 mm) up the vertical surface. Offset laps from the previous layer a minimum of 6 inches (152 mm). Lap the side ends at least 3 inches (76 mm).

3.4.6.5.4. Apply membrane flashing in accordance with the roof membrane manufacturers printed instructions and as specified. Cut at a 45 degree angle across terminating end lap area of cap membrane prior to applying adjacent overlapping cap membrane. Press flashing into place to ensure full adhesion and avoid bridging. Ensure full lap seal in all lap areas.

3.4.6.5.5. Termination of Base Flashing

3.4.6.5.5.1. Where the horizontal or vertical edge of the base flashings are exposed, furnish and install a nominal 1 inch (25 mm) termination bar along the edge of the base flashing fastened to the substrate with appropriate fasteners at 6 inches (152 mm) OC. A fastener shall be located within 1 inch (25 mm) of the end of the bar. In the event that multiple termination bar sections are used, leave a 1/4-inch (6 mm) gap between sections. Cover the top edges and fasteners with a nominal 1/8 inch (3 mm) thick trowelling of compatible roof cement. Install metal counter flashings over the exposed edge in accordance with 07 62 00 Sheet Metal Flashings and Trim.

3.4.7. Membrane Strip Flashing

3.4.7.1. Set primed flanges of metal flashing in full bed of modified bituminous cement material and securely fasten through to attachment substrate over the base sheet. Strip flashings shall be laced into the field plies. Apply a strip of smooth-surfaced modified bitumen membrane without voids, 4 inches (102 mm) min beyond outer edge of flange. Lap sections a minimum of 3 inches (76 mm). Apply a strip of cap sheet without voids, extending at least 6 inches (152 mm) on the roof, 2 inches (51 mm) past the base sheet. Offset laps from the previous layer a minimum of 6 inches (152 mm). Lap the ends at least 3 inches (76 mm). Seal the edge with compatible roof cement.

3.4.8. Membrane Flashing at Roof Drain

3.4.8.1. Extend the base sheet into the sump and under the drain assembly. Install the drain bowl. Apply a 36 inch by 36-inch (914 mm by 914 mm) min smooth modified bituminous sheet centered over the drain. Extend the cap sheet over the drain bowl. Securely clamp membrane sheets in the flashing clamping ring. Secure clamps so that sheets are free from wrinkles and folds. Trim stripping 1 inch (25 mm) inside of clamping ring. Apply a continuous bead of modified bituminous cement to the outside perimeter of the clamping ring. Do not tool; embed granules in the cement. Clamping rings and stripping plies shall be installed prior to the end of each workday.

3.4.9. Set-On Accessories

3.4.9.1. Where pipe or conduit blocking, supports and similar roof accessories are set on the membrane, adhere walk pad material to bottom of accessories prior to setting on roofing membrane. Specific method of installing set-on accessories must permit normal movement due to

expansion, contraction, vibration, and similar occurrences without damaging roofing membrane. Do not mechanically secure set-on accessories through roofing membrane into roof deck substrate.

3.5. SITE QUALITY CONTROL

3.5.1. Construction Monitoring

3.5.1.1. During progress of the roof work, Contractor is responsible for making visual inspections to ensure compliance with specified parameters. Additionally, verify the following:

3.5.1.1.1. Equipment is in working order.

3.5.1.1.2. Materials are not installed in adverse weather conditions.

3.5.1.1.3. Substrates are in acceptable condition, in compliance with specification, prior to application of subsequent materials.

3.5.1.1.4. Materials comply with the specified requirements.

3.5.1.1.5. All materials are properly stored, handled and protected from moisture or other damages.

3.5.1.1.6. The proper number and types of plies are installed, with the specified overlaps.

3.5.1.1.7. Applied membrane surface is inspected, cleaned, dry, and repaired as necessary prior to cap sheet installation.

3.5.1.1.8. Membrane is without ridges, wrinkles, kinks, fishmouths, or other voids or delaminations.

3.5.1.1.9. Installer adheres to specified and detailed application parameters.

3.5.1.1.10. Associated flashings and sheet metal are installed in a timely manner in accordance with the specified requirements.

3.5.1.1.11. Temporary protection measures are in place at the end of each work shift.

3.5.2. Inspections

3.5.2.1. Manufacturer

3.5.2.1.1. The roofing product manufacturer can delegate a technical representative to visit the work site at the start of or during the roof installation. The contractor must at all times enable and facilitate access to the work by said representative. After each inspection, submit a report signed by the manufacturer's technical representative to the Contract Administrator within 3 working days.

3.5.3. Non-Conforming Work

3.5.3.1. Non-conforming Work must be removed and new materials installed in accordance with these specifications.

3.6. SCHEDULE

3.6.1. Roof Membrane Schedule

Roof Section	2	On Walls, Curbs and Combustible Substrates	Behind Cladding or Sheet Metal Or on Top of Through Wall Flashing
1st Insulation Layer	1% Sloped PolyISO	N/A	N/A
Application Method	Adhesive		
Composite Panel	3/16 (5 mm) Composite Panel	1/8 inch (3 mm) Asphaltic Core Board	
Application Method	Adhesive	Mechanically Attached	
Base Sheet	N/A	SBS 180 Base Sheet	
Application Method		Torch Applied	
Cap Sheet	SBS 250 Cap Sheet	SBS 250 Cap Sheet	
Application Method	Torch Applied	Torch Applied	
Cap Sheet Colour	Grey	Grey	

END OF SECTION

ARCA Warranty Ltd.

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May 13, 2005

TECHNICAL BULLETIN

Asphalt Coreboard Application Procedure for Torch Adhered Modified Bitumen Membrane Flashing

For Certificate of Assurance issuance, the application of an asphalt coreboard underlay / covering, heat formed and fastened over combustible substrates permits the application of a torch adhered two ply modified bitumen membrane flashing.

The following procedure does not replace the use of self-adhering membrane flashing base sheets as outlined in the minimum requirement but provides the roofing contractor with an alternate method for modified bitumen membrane flashing application over combustible substrates as follows:

Cut minimum 3mm (1/8”) thick asphalt coreboard sheets to length in maximum 1200mm (4 ft.) wide widths allowing for a minimum 75mm (3”) wide side lap.

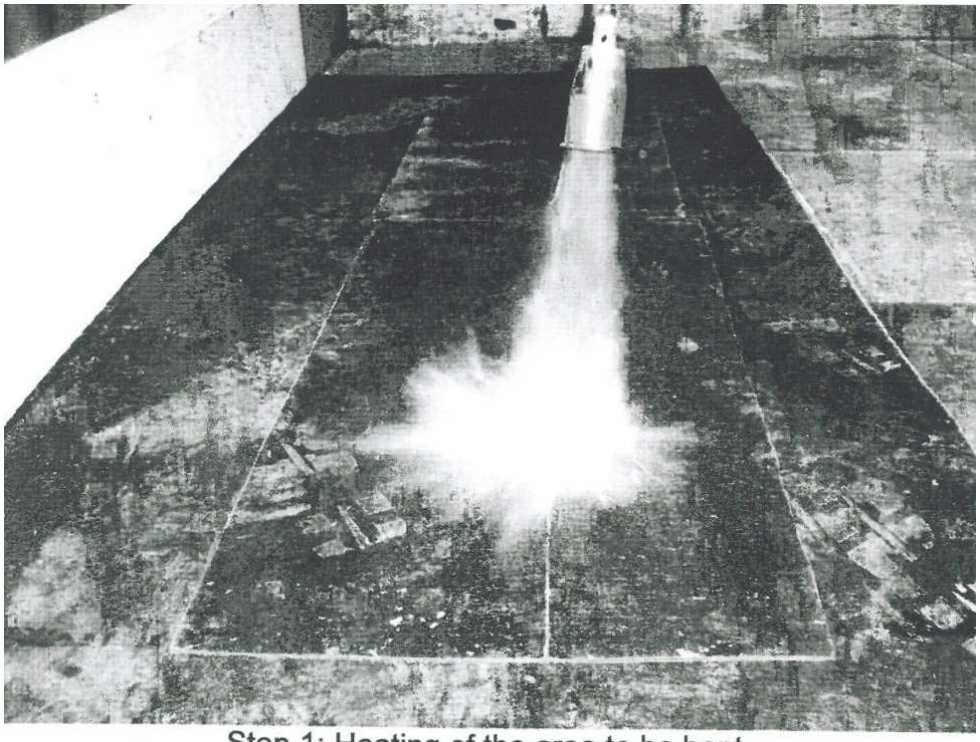
Away from any combustible surfaces, heat the back of the prepared coreboard panel in the area to be bent. Place the heated panel against the vertically up-stand and bend it horizontally until it conforms tightly to the parapet’s profile. Heat form additional coreboard panels in a similar manner to completely cover all combustible surfaces.

Gaps, cracks and voids formed at inside / outside corners and at the primary membrane base sheet board junction must be covered with fire prevention tape prior to the attachment of the coreboard panels.

Place the heated formed coreboard panels over the combustible substrate with side laps overlapping a minimum distance of 75mm (3”). Fastened each coreboard panel with minimum 25mm (1”) diameter round top nails placed at maximum 150mm (6”) centres in the side laps and along the bottom of each panel. The round top nails securing the bottom of each coreboard panel shall be placed no lower than 50mm (2”) above the surface of the primary membrane base sheet. The field of the asphalt core board shall be fastened to an ARCA accepted substrate with round top nails placed at a minimum spacing of one (1) fastener per one (1) square foot of surface area. Add additional round top nails where coreboard attachment is in doubt.

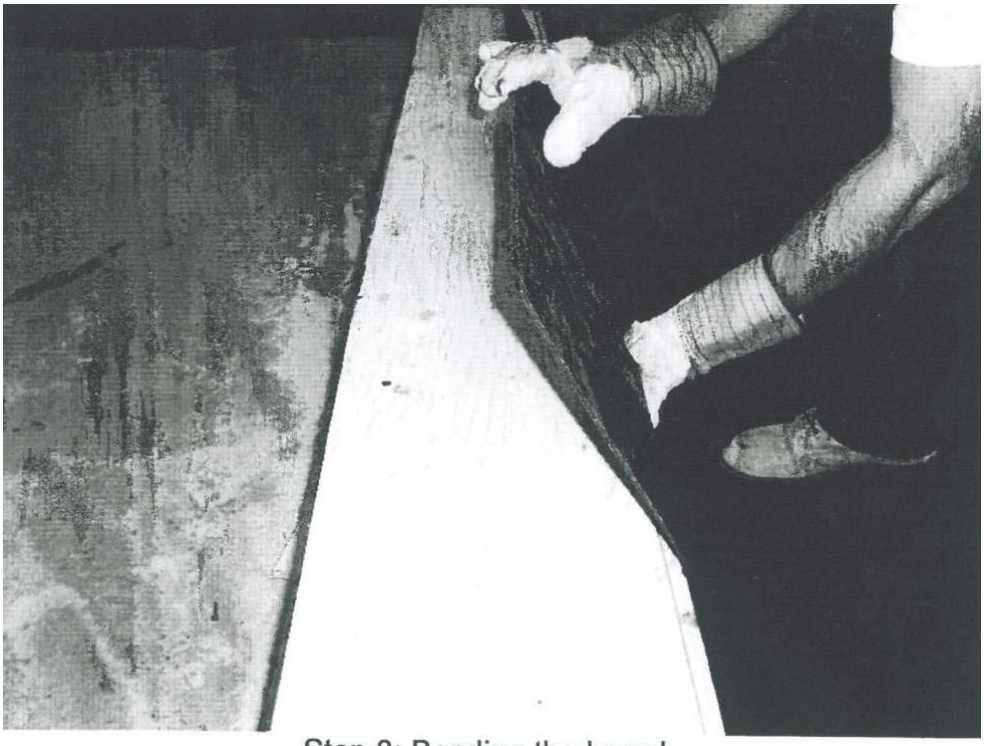
The two ply torch membrane flashing shall be adhered in accordance with the application standards outlined in the Modified Bitumen minimum requirements.

Please see attached drawing and photographs that illustrates the coreboard application procedure.



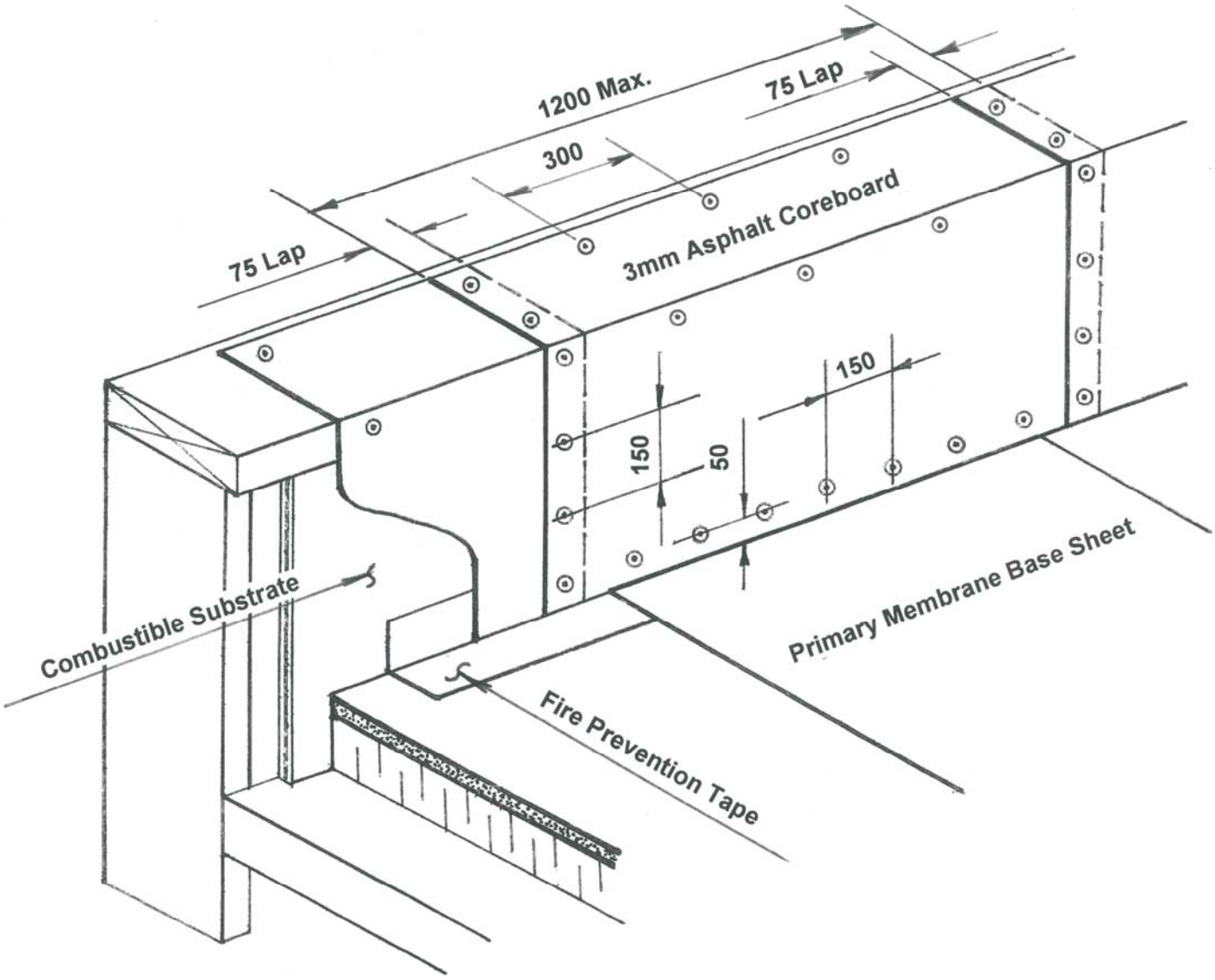
Step 1: Heating of the area to be bent.

Step 2: Installation on the parapet.



Step 3: Bending the board.

Step 3: Final fitting.


1200 Max.
75 Lap
300
75 Lap
3mm Asphalt Coreboard
150
150
50
Combustible Substrate
Primary Membrane Base Sheet
Fire Prevention Tape

SHEET METAL FLASHING AND TRIM
SECTION 07 62 00

1. GENERAL

1.1. SUMMARY

1.1.1. Includes the fabrication and installation of sheet metal and related accessories. Finished sheet metalwork will form a weather-tight construction without waves, warps, buckles, fastening stresses or distortion, which allows for expansion and contraction. Responsible for cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades.

1.2. RELATED SECTIONS

1.2.1. Section 06 10 00 Rough Carpentry

1.2.2. Section 07 52 00 SBS Modified Bituminous Membrane Roofing

1.2.3. Section 07 92 00 Joint Sealants

1.3. REFERENCES

1.3.1. Reference Standards

1.3.1.1. NRCA Roofing and Waterproofing Manual

1.3.1.2. SMACNA Architectural Manual

1.4. DELIVERY, STORAGE, AND HANDLING

1.4.1. Storage and Handling Requirements

1.4.1.1. Package and protect materials during shipment. Uncrate and inspect materials for damage, dampness, and wet-storage stains upon delivery to the job site. Remove from the site and replace damaged materials that cannot be restored to like-new condition. Handle sheet metal items to avoid damage to surfaces, edges, and ends. Store materials in dry, weather-tight, ventilated areas until immediately before installation.

1.5. FIELD OR SITE CONDITIONS

1.5.1. Existing Conditions

1.5.1.1. Report any unacceptable existing conditions to the Consultant immediately. Do not proceed until unsatisfactory conditions are corrected. Application of new materials shall constitute approval of the existing conditions by the Contractor.

1.6. WARRANTY

1.6.1. Installer's Warranty

1.6.1.1. Include all work performed under this section in the warranty in D22.

2. PRODUCTS

2.1. DESCRIPTION

2.1.1. Materials

2.1.1.1. Conform to the requirements in these specifications and to the thicknesses and configurations established in SMACNA Arch. Manual for the materials. Different items need not be of the same metal, except as noted in this specification and that if copper is selected for any exposed item, all exposed items must be copper. Furnish sheet metal items in maximum 10 foot (3 m) lengths. Single pieces less than 10 feet (3 meters) long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Fabricate corner pieces with minimum 12 inch (305 mm) legs unless otherwise noted. Provide accessories and other items essential to complete the sheet metal installation. Provide accessories made of the same or compatible materials as the items to which they are applied. Fabricate sheet metal items of the materials specified below and to the gage, thickness, or weight shown in Table I at the end of this section. Provide sheet metal items with a factory applied coating unless specified otherwise. Where more than one material is listed for a particular item in Table I, each is acceptable and may be used except as follows:

2.1.1.1.1. Exposed Sheet Metal Items

2.1.1.1.1.1. Must be of pre-coated galvanized steel, unless otherwise noted or if required to be soldered. Consider the following as exposed sheet metal: gutters, including hangers; downspouts; gravel stops and fasciae; cap, valley, stepped, base, and eave flashings and related accessories.

2.1.1.1.1.2. For sheet metal that is not prefinished, perform one of the following:

2.1.1.1.1.2.1. Apply paint primer over the exposed surfaces of the exposed sheet metal that is not prefinished and allow to thoroughly dry. Apply two coats of the approved paint to match the exposed sheet metal and flashing in accordance with the written instructions provided by the manufacturer.

2.1.1.1.1.2.2. Install cover plates on the exterior from the same prefinished metal used for the metal flashings on the project.

2.1.1.2. Pre-coated Galvanized Steel Sheet

2.1.1.2.1. ASTM A653 G90 zinc coating designation.

2.1.1.3. Stainless Steel

2.1.1.3.1. ASTM A167, Type 302 or 304, 2D Finish, fully annealed, dead-soft temper.

2.1.1.4. Aluminum Alloy, Extruded Bards, Rods, Shapes and Tubes

2.1.1.4.1. ASTM B221

2.2. ACCESSORIES

2.2.1. Solder

2.2.1.1. ASTM B 32, 95-5 tin-antimony.

2.2.2. Self-Adhering Underlayment

2.2.2.1. Polyethylene-sheet-backed, self-adhering, polymer-modified, bituminous sheet underlayment; complying with ASTM D 1970; minimum 40 mils (1 mm) thick. Provide primer when recommended by underlayment manufacturer.

2.2.3. Asphalt Primer

2.2.3.1. ASTM D 41

2.2.4. Fasteners

2.2.4.1. Use the same metal or a metal compatible with the item fastened. Use stainless steel fasteners to fasten dissimilar materials. Use appropriate fasteners to secure sheet metal to the substrate.

3. EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions

3.1.1.1. Inspect all surfaces to which metal is to be applied. Do not install metal unless surfaces are even, sound, clean, dry and free from defects which might affect the application.

3.2. INSTALLATION / APPLICATION

3.2.1. General

3.2.1.1. Follow recommendations of the current SMACNA Architectural Sheet Metal Manual for fabricating in-shop and on-site, and for installation, unless otherwise specified herein.

3.2.1.2. Follow published instructions of the product manufacturer for installation of extruded or proprietary metal products, unless otherwise specified herein.

3.2.1.3. Do not place dissimilar metals in direct contact or in positions where water sheds across both metals.

3.2.1.4. Any deviations to requirements in this Section shall be submitted to the Consultant for approval along with documentation from a licensed engineer or testing firm that the revised detail meets the wind uplift requirements.

3.2.1.5. Workmanship

3.2.1.5.1. Make lines and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 3/4-inch (19 mm) hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction. Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections. For installation of items not shown in detail or not

covered by specifications conform to the applicable requirements of the current SMACNA Architectural Sheet Metal Manual.

3.2.1.5.2. Fabricate vertical faces with bottom edge formed outward 3/4 inch (19 mm) and hemmed to form drip.

3.2.1.6. Soldering

3.2.1.6.1. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

3.2.1.7. Nailing

3.2.1.7.1. Confine nailing of flashing to one edge only. Space nails evenly not over 3 inch (76 mm) on center and approximately 1/2 inch (13 mm) from edge unless otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is applied to other than wood surfaces, include in shop drawings the locations for sleepers and nailing strips required to secure the work.

3.2.1.8. Cleats

3.2.1.8.1. Cleats shall be continuous unless otherwise specified or indicated. Unless otherwise specified, provide cleats of the same material and thickness as the sheet metal being installed.

3.2.1.9. Bolts, Rivets and Screws

3.2.1.9.1. Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.

3.2.1.10. Seams

3.2.1.10.1. Make the seams straight and uniform in width and height with no solder showing on the face.

3.2.1.10.2. For seams and laps that are not soldered, apply a continuous bead of sealant between any lapped metal sections less than 3 inches (76 mm) and two continuous beads between any lapped metal sections greater than 3 inches (76 mm). The application of sealant after metal components have been lapped will not be accepted.

3.2.1.10.3. Flat Lock Seams

3.2.1.10.3.1. Not less than 1-1/2 inches (38 mm) wide, double locked without solder. Apply a continuous bead of sealant between the flanges in the seam.

3.2.1.10.4. Lap Seams

3.2.1.10.4.1. Finish soldered seams not less than one inch wide. Overlap seams not soldered not less than 3 inch (76 mm).

3.2.1.10.5. S-Lock Seams

3.2.1.10.5.1. Finish seams not less than 1 inch (25 mm) wide. Allow for 1/2 inch (13 mm) of movement for every 10 feet (3 meters). of flashing. Secure the female end of the seam to the

substrate with appropriate fasteners 6 inches (152 mm) on center unless otherwise noted. Apply a bead of sealant in the lap.

3.2.1.10.6. Standing Seams

3.2.1.10.6.1. Not less than 1-1/2 inches (38 mm) high, double locked without solder. Apply a continuous bead of sealant between the flanges in the seam.

3.2.1.11. Primer

3.2.1.11.1. Prime all sheet metal flashings and trim that are to be set in or on asphalt or bituminous products with asphalt primer.

3.2.1.12. Aluminum

3.2.1.12.1. Do not allow aluminum surfaces in direct contact with other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, paint the dissimilar metal with a primer followed by two coats of aluminum paint. Where drainage from a dissimilar metal passes over aluminum, paint the dissimilar metal with a non-lead pigmented paint.

3.2.1.13. Metal Surfaces

3.2.1.13.1. Paint surfaces in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.2.1.14. Wood and other Absorptive Materials

3.2.1.14.1. Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

3.2.1.15. Expansion and Contraction

3.2.1.15.1. Provide expansion and contraction joints at not more than 32 foot (10 meter) intervals for aluminum and at not more than 40 foot (12 meter) intervals for other metals. Provide an additional joint where the distance between the last expansion joint and the end of the continuous run is more than half the required interval. Space joints evenly.

3.2.2. Standard Metal Flashings and Trim

3.2.2.1. Cap Flashing

3.2.2.1.1. Refer to Detail 7 on Drawing No. A 5.05 for Cap Flashing Details.

3.2.2.1.2. Prefabricate in the shapes and sizes indicated and in lengths not less than 24 inches (610 mm). Provide prefabricated, mitered internal and external corners. Each leg shall be a min of 24 inches (610 mm).

3.2.2.1.3. Secure the outside vertical leg of the cap flashing to a continuous cleat nailed to the wood blocking. The drip edge shall be folded snugly over the cleat. Both vertical legs shall be 4 inches (102 mm) minimum, and counter flash the wall cladding 1 inch (25 mm) minimum.

3.2.2.1.4. Secure the inside leg of the cap flashing with appropriate watertight screws through slightly oversized holes at 24 inches (610 mm) OC max.

3.2.2.1.5. Join sections with an S lock seam. Secure the female end of the S-lock to the substrate with one fastener on each side and two on the top.

3.2.2.2. Cap Flashing End Closure

3.2.2.2.1. Where cap flashing terminates at walls above roof level, furnish and install an end closure.

3.2.2.2.2. Lap and solder all seams.

3.2.2.2.3. Turn the cap flashing up the wall a min of 2 inches (51 mm) and set the flange against the wall in a solid application of sealant. Apply a continuous bead of sealant to the back of the closure and fasten the end closure to the wall using appropriate fasteners at 6 inches (152 mm) OC max and located approximately 1 inch (25 mm) from the edge of the flange. Lap the portion of the closure on top of the parapet over the adjacent cap flashing section a minimum of 6 inches (152 mm). Install counter flashing over the top edge of the closure in accordance with this Section.

3.2.2.2.4. Apply paint primer over the exposed surfaces of the closure and allow to thoroughly dry. Apply two coats of the approved paint to match the exposed sheet metal and flashing in accordance with the written instructions provided by the manufacturer.

3.2.2.3. Fascia Extension

3.2.2.3.1. Refer to Detail 5 on Drawing No. A 5.05 for Fascia Extension Details.

3.2.2.3.2. Furnish and install fascia extension where the cap flashing outside vertical leg will exceed 6 inches (152 mm).

3.2.2.3.3. Secure the fascia extension to a continuous cleat nailed to the wood blocking. The drip edge shall be folded snugly over the cleat. Secure at the top edge with nails 24 inches (610 mm) on center.

3.2.2.3.4. Extend the fascia extension behind the cap flashing 2 inches (51 mm) minimum.

3.2.2.3.5. Notch and lap sections a minimum of 3 inches (76 mm).

3.2.2.4. Continuous Cleat

3.2.2.4.1. Refer to Detail 1 on Drawing No. A 5.05 for Continuous Cleat Details.

3.2.2.4.2. Form a continuous cleat with a 3-inch (76 mm) min vertical flange and a 3/4 inch (19 mm), 45° flange along the bottom.

3.2.2.4.3. Secure the cleat to the blocking with flat head screws penetrating a min of 1 inch (25 mm). Install the screws 6 inches (152 mm) OC max staggered 1-1/2 inches (38 mm) in the center of the vertical flange. Provide a minimum clearance of 1/2 inch (13 mm) between the screws and the top and bottom of the vertical flange.

3.2.2.4.4. Provide a 1/4-inch (6 mm) clearance between sections of the cleat.

3.2.2.5. Counter Flashing

3.2.2.5.1. Refer to Detail 6 on Drawing No. A 5.05 for Counter Flashing Details.

3.2.2.5.2. Install counter flashing over the horizontal and vertical termination of the base flashing and other materials.

3.2.2.5.3. Form counter flashing 4 inches (102 mm) min high, not including the section for termination or lapping behind wall cladding or other materials. Lap counter flashing over base flashing or other material 2 inches (51 mm) min.

3.2.2.5.4. Install counter flashing to provide a spring action against the base flashing.

3.2.2.5.5. Notch and lap sections a min of 3 inches (76 mm).

3.2.2.5.6. Notch and lap joints and inside corners. Notch and seam outside corners. Apply sealant or solder in the laps at corners.

3.2.2.5.7. Set vertical termination flange against the vertical surface in a solid bed of sealant. Furnish and install a termination bar and secure over the counter flashing using appropriate fasteners at 6 inches (152 mm) OC max.

3.2.2.5.8. Where the top edge of the counter flashing is lapped behind wall cladding, frame, existing sheet metal or other material, a cove is not required. Lap behind the other material a minimum of 2 inches (51 mm) or until refusal, but no less than 1 inch (25 mm).

3.2.3. Sheet Metal Flashing and Trim for Steep Slope Roofing

3.2.3.1. Fascia

3.2.3.1.1. Prefabricate in the shapes and sizes indicated and in lengths not less than 12 inches (305 mm). Flashing shall cover entire fascia board on the perimeter. Provide prefabricated, mitered internal and external corners.

3.2.3.1.2. Terminate the vertical flange of the fascia behind the eave flashing.

3.2.3.2. Headwall Flashing

3.2.3.2.1. Extend the flashing up vertical surfaces 6 inches (152 mm) min. Where finish wall coverings form a counter flashing, extend the vertical leg of the flashing up behind the applied wall covering not less than 2 inch (51 mm) or until refusal. Secure the vertical leg with appropriate fasteners 24 inches (610 mm) OC, min in the concealed portion of the flange. Secure flashing at their lower edge with appropriate weather tight fasteners 24 inches (610 mm) OC staggered from the fasteners above.

3.2.3.2.2. Extend the metal flashings onto the roof covering 6 inches (152 mm) min.

3.2.3.2.3. Lay the headwall flashings shingle fashion with other flashings, where sloped roofs abut chimneys, curbs, walls, or other vertical surfaces.

3.2.3.2.4. Install counter flashing over the top edge where headwall flashing is not installed behind a wall covering or other sheet metal.

3.3. SITE QUALITY CONTROL

3.3.1. Non-Conforming Work

3.3.1.1. Non-conforming Work must be removed and new materials installed in accordance with these specifications.

3.4. CLEANING

3.4.1. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub-clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

3.5. CLOSEOUT ACTIVITIES

3.5.1. Repairs to Finish

3.5.1.1. Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and variations of colour and surface texture. Replace items which cannot be repaired.

3.6. PROTECTION

3.6.1. Protect installed sheet metal from damage.

3.7. SCHEDULE

Table 1- Sheet Metal Gauges and Finish

Sheet Metal Item	Stainless Steel inch	Galvanized Steel Gauge	Finish
Cap Flashing	N/A	24	Factory applied coating
Cap Flashing End Closure	0.015	24	Field applied coating
Fascia	N/A	24	Factory applied coating
Cleat	N/A	24	Factory applied coating/galvanized
Counter Flashings	N/A	24	Factory applied coating
Headwall Flashing	N/A	24	Factory applied coating

END OF SECTION

JOINT SEALANTS
SECTION 07 92 00

1. GENERAL

1.1. SUMMARY

1.1.1. Preparation of substrate surfaces and the installation of sealant and accessories.

1.2. RELATED SECTIONS

1.2.1. Section 07 62 00, Sheet Metal Flashing and Trim

1.3. REFERENCES

1.3.1. ASTM C920- Elastomeric Joint Sealants.

1.3.2. ASTM C1193 - Guide for Use of Joint Sealants.

1.3.3. ASTM C1311- Solvent Release Sealants.

1.3.4. ASTM C1330-02 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

1.3.5. ASTM C1401-09a - Guide for Structural Sealant Glazing.

1.3.6. CGSB-19-GP-14M - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

1.3.7. CAN/CGSB-19.13-M - Sealing Compound, One-component, Elastomeric, Chemical Curing.

1.4. DELIVERY, STORAGE, AND HANDLING

1.4.1. Delivery and Acceptance Requirements

1.4.1.1. Accept materials on site in manufacturers unopened original packaging. Inspect for damage.

1.4.2. Storage and Handling Requirements

1.4.2.1. Store primers and sealants in cool dry location with ambient temperature range of 60-80°F (15-27°C), unless otherwise required by the manufacturer.

1.5. FIELD OR SITE CONDITIONS

1.5.1. Ambient Conditions

1.5.1.1. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40°F (4°C), unless otherwise required or permitted by the manufacturer.

1.5.2. Existing Conditions

1.5.2.1. Report any unacceptable existing conditions to the Contract Administrator immediately. Do not proceed until unsatisfactory conditions are corrected. Application of new materials shall constitute approval of the existing conditions by the Contractor.

1.6. WARRANTY OR BOND

1.6.1. Include all work performed under this section in the warranty in D22.

2. PRODUCTS

2.1. MANUFACTURERS

2.1.1. Manufacturer List

2.1.1.1. Tremco Sealant/Weatherproofing Division of RPM International, Inc.

2.1.1.2. BASF Building Systems

2.1.1.3. Pecora Corporation

2.2. DESCRIPTION

2.2.1. Materials, General

2.2.1.1. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2.1.2. All Sealants shall be Type S, Grade NS, unless otherwise noted or approved in advance by the Contract Administrator. The Sealant Use shall be identified on the drawings, or field determined and approved.

2.2.2. Exterior Urethane Sealants

2.2.2.1. CAN/CGSB-19.37-M87, Classification MCG-2-25-A-N, No. 81026.

2.2.2.2. ASTM C 920, Type S, Grade NS, Class 25, Uses NT, M, A, O; single component, moisture curing, nonstaining, non-bleeding, colour as selected. BASF NP-1 or approved equivalent in accordance with B.7.

2.2.3. Exterior Silicone Joint Sealants

2.2.3.1. CAN2 -19.13-M82.; STM C 920, Type S, Grade NS, Class 50, Uses NT, G, A, O; single component, neutral curing, nonstaining, non-bleeding, colour as selected. Dow Corning 795 or approved equivalent in accordance with B.7.

2.2.3.2. ASTM C 920, Type S, Grade NS, Class 100/50, Use NT, G, M, A, and O; single component, neutral curing, non-staining, non-bleeding, colour as selected. Dow Corning 790 or approved equivalent in accordance with B.7.

2.2.4. Butyl Sealants

2.2.4.1. ASTM C-919; single component, non-curing, non-staining, non-bleeding, colour as selected. Pecora BA-98 or approved equivalent in accordance with B.7.

2.3. PERFORMANCE / DESIGN CRITERIA

2.3.1. Colours

2.3.1.1. Colours of exposed sealants to match the colour of the adjacent materials; sealant colours to be approved by Contract Administrator.

2.4. ACCESSORIES

2.4.1. Joint Sealant Backing

2.4.1.1. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2.4.1.2. Cylindrical Sealant Backings: ASTM C 1330, type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Diameter must be 25% greater than the width of the joint opening.

2.4.1.3. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4.2. Miscellaneous Materials

2.4.2.1. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates.

2.4.2.2. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

2.4.2.3. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

3. EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions

3.1.1.1. Inspect the substrate for any visible defects. Verify joint surfaces are clean and dry. Ensure concrete surfaces are fully cured.

3.1.2. Pre-installation Testing

3.1.2.1. Install test materials prior to installation. Allow the sealant to cure in accordance with the manufacturer's instructions. Install test materials to allow for one test for every substrate and joint type. Manufacturer's representative must perform the pre-installation testing.

3.1.2.2. Test Method

3.1.2.2.1. Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.

3.1.2.2.2. When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

3.2. PREPARATION

3.2.1. Protection of In-Place Conditions

3.2.1.1. Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2.2. Surface Preparation

3.2.2.1. Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

3.2.2.1.1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

3.2.2.1.2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

3.2.2.1.3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

3.2.3. Joint Priming

3.2.3.1. Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primer to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3. INSTALLATION / APPLICATION

3.3.1. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

3.3.2. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability:

3.3.2.1. Do not leave gaps between ends of sealant backings.

3.3.2.2. Do not stretch, twist, puncture, or tear sealant backings.

3.3.2.3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

3.3.2.4. Install joint backing to maintain the following joint ratios:

3.3.2.4.1. Joints up to 1/2 inch (13 mm) Wide: 1:1 width to depth ratio.

3.3.2.4.2. Joints Greater than 1/2 inch (13 mm) Wide: 2:1 width to depth ratio; maximum 1/2-inch joint depth.

3.3.3. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

3.3.3.1. Place sealants so they directly contact and fully wet joint substrates.

3.3.3.2. Completely fill recesses in each joint configuration.

3.3.3.3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

3.3.3.4. Tool joints to a concave shape unless otherwise noted.

3.4. SITE QUALITY CONTROL

3.4.1. Non-Conforming Work

3.4.1.1. Non-conforming Work must be removed and new materials installed in accordance with these specifications.

3.5. CLEANING

3.5.1. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6. PROTECTION

3.6.1. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7. SCHEDULE

Application	Sealant Type

Control and expansion joints in cast-in-place concrete	ASTM C 920, Type S, Grade NS, Class 50, Uses NT, G, A, O; single component, neutral curing, nonstaining, non-bleeding, colour as selected. Dow Corning 795 or approved equivalent in accordance with B.7.
Joints between precast concrete units	
Control and expansion joints in unit masonry	
Control and expansion joints in stone masonry	
Butt joints between metal panels	ASTM C 920, Type S, Grade NS, Class 50, Uses NT, G, A, O; single component, neutral curing, nonstaining, non-bleeding, colour as selected. Dow Corning 795 or approved equivalent in accordance with B.7.
Joints between different materials listed above	
Control and expansion joints in soffits and overhead surfaces	ASTM C 920, Type S, Grade NS, Class 50, Uses NT, G, A, O; single component, neutral curing, nonstaining, non-bleeding, colour as selected. Dow Corning 795 or approved equivalent in accordance with B.7.
Other exterior joints in vertical surfaces and non-traffic horizontal surfaces for which no other sealant is specified	
Bedding and lap joints between sheet metal flashing and other materials not listed below.	ASTM C 920, Type S, Grade NS, Class 25, Uses NT, M, A, O; single component, moisture curing, nonstaining, non-bleeding, colour as selected. BASF NP-1 or approved equivalent in accordance with B.7.
Bedding and lap joints in gutters, downspouts, drains and scuppers	ASTM C-919; single component, non-curing, non-staining, non-bleeding, colour as selected. Pecora BA-98 or approved equivalent in accordance with B.7.

END OF SECTION

PLUMBING
SECTION 22 00 00

1. GENERAL

1.1. SUMMARY

1.1.1. Includes furnishing and installing new roof drains, storm drainage piping and vent pipe extensions.

1.2. RELATED SECTIONS

1.2.1. Section 06 10 00 Rough Carpentry

1.2.2. Section 07 52 00 SBS Modified Bitumen Membrane Roofing

1.2.3. Section 07 92 00 Joint Sealants

1.3. SUBMITTALS

1.3.1. Submit a technical data sheet from the manufacturer for the drains indicated all the required components.

1.3.2. Submit a shop drawing of the proposed layout for all new drainage piping. Shop drawing should indicated pipe size, slope and layout.

1.4. DELIVERY, STORAGE, AND HANDLING

1.4.1. Delivery and Acceptance Requirements

1.4.1.1. All materials shall be delivered in manufacturer's original packaging. The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5. WARRANTY

1.5.1. Manufacturer Warranty

1.5.1.1. Materials shall be free of defects in material for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

1.5.2. Include all work performed under this section in the warranty in D22.

2. PRODUCTS

2.1. Metal Roof Drains

2.1.1. ASME A112.6.4; Cast iron, large sump (nominal 14 inch (356 mm)), bottom outlet, general purpose roof drain with underdeck clamp, sump receiver plate and vandal proof cast iron dome. Furnish and install an adjustable extension assembly as required for site conditions.

2.1.1.1. RD-4 Series Drain by Thaler.

2.1.1.2. Z-100 by Zurn.

2.1.1.3. RD100 by Ancon Watts.

2.1.1.4. Series 3000 by Wade Drains.

2.1.1.5. Or approved equivalent in accordance with B.7.

2.2. Overflow Metal Wall Drains

2.2.1. ASME A112.6.4; Through wall overflow application, aluminum clamping ring with stainless steel fasteners, 3 inch (76 mm) diameter with 2-3/4 inch (70 mm) pipe.

2.2.1.1. Clamp-Tite Overflow Scupper Drain by Menzies Metal Products.

2.2.1.2. Or approved equivalent in accordance with B.7.

2.3. Drainage Pipe & Fittings

2.3.1. General

2.3.1.1. Piping shall bear label, stamp, or other markings for identification. Components and installation shall be capable of withstanding a minimum working pressure of 10-foot head of water (30 kPa). Meet current code requirements and ensure compatibility with materials piping may come into contact with.

2.4. Conductor Nozzles

2.4.1. Nickel-bronze body with no-hub inlet, wall flange with mounting holes, removable stainless steel screen; sized to fit the connected conductor.

2.5. Transition Couplings

2.5.1. General

2.5.1.1. Fitting for joining piping with small differences in outside diameters or of different materials.

2.5.1.2. Elastomeric or rubber sleeve-type, reducing or transitioning pattern. Include shear ring and stainless steel metal tension band and tightening mechanism (band clamp) on each end.

3. EXECUTION

3.1. PREPARATION

3.1.1. Refer to the drawings for the drain locations. Verify all dimensions.

3.1.2. Inspect all existing roof drainage systems and plumbing vents to ensure they are open and working properly and all connections and supports are in good condition before commencing the work. Confirm the Rain Water Leader (RWL) dimensions on-site for both new and replacement drains to be installed in each facility. Notify the Contract Administrator prior to doing any work, of any drainage systems or plumbing vent found to be plugged, damaged or inoperative.

3.1.3. Remove and replace existing ceilings as required to perform the work. Demolition of walls is not required. Install an access panel in all ceilings that have to be cut open to access the roof drains and rain water leaders. Paint to match the existing ceiling. Include all labour and materials required for the installation of the plumbing and repair to the interior finishes.

3.2. INSTALLATION / APPLICATION

3.2.1. General

3.2.1.1. New plumbing shall be water tight.

3.2.2. Metal Roof Drains

3.2.2.1. Existing Drains

3.2.2.1.1. All existing roof drains on roof sections in contract are to be replaced with new cast iron vandal proof drains to the rain water leader. Install in accordance with the manufacturer's instructions.

3.2.2.1.2. If the existing drain is installed in a masonry wall or otherwise inaccessible from below, furnish and install new retrofit drains at these locations. Notify the Contract Administrator of the existing conditions and obtain approval in writing prior to ordering and installing retrofit drains.

3.2.3. Drainage Piping

3.2.3.1. Existing Drainage Piping

3.2.3.1.1. Replace all damaged or deteriorated existing drainage piping connected to drains included in contract.

3.2.3.1.2. Furnish and install new drainage piping as required to connect the new drain to the existing drainage piping.

3.2.3.1.3. Install in accordance with manufacturer's instructions, industry standards and these specifications.

3.2.3.2. Hanger and Support Installation for Drainage Piping

3.2.3.2.1. Support horizontal piping within 12 inches (305 mm) of each fitting and coupling.

3.2.3.2.2. Support vertical piping at the base, at each floor, and at 12 foot (3.6 meters) on center.

3.2.3.2.3. Install hangers for piping 48 inches (1219 mm) on center for 4-inch (102 mm) diameter pipe and smaller; install 5/8-inch (16 mm) rod for pipe up to 4-inch (102 mm) diameter and 3/4-inch (19 mm) rod for pipe up to 8-inch (203 mm) diameter.

3.3. SITE QUALITY CONTROL

3.3.1. Non-Conforming Work

3.3.1.1. Non-conforming Work must be removed and new materials installed in accordance with these specifications.

END OF SECTION