

**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 1 has an approximate area of 1,650 ft² (153 m²). The existing roof structure and roof system are as described below.

1. Wood Deck
2. Kraft Paper
3. 2 Ply Vapour Barrier
4. 1 inch (25 mm) Fiberglass Insulation – 2 Layers
5. 4 Ply BUR Membrane
6. Aggregate

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 1:

1.1.1.1.1. Remove and store the existing satellite dish.

1.1.1.1.2. Remove and store for reuse the existing roof top HVAC units, exhaust fans, and other roof top equipment. Test and document operability prior to removal. Properly terminate all connections.

1.1.1.1.3. Remove and discard the existing conduit and wiring.

1.1.1.1.4. Remove and discard the existing downspouts.

1.1.1.1.5. Remove and discard the existing scuppers.

1.1.1.1.6. Remove and discard the existing equipment/duct support curbs.

1.1.1.1.7. Remove and discard the existing decommissioned curbs, pipe penetrations and other abandoned equipment.

1.1.1.1.8. Remove and discard the existing roof vents.

1.1.1.1.9. Remove and discard the existing guardrails

1.1.1.1.10. Remove and store for reuse the existing roof access ladder.

1.1.1.1.11. Remove and discard the existing conduit supports.

1.1.1.1.12. Remove and discard the existing aggregate/ballast.

1.1.1.1.13. Remove and discard the existing roof membrane, insulation, and vapour barrier down to the deck.

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

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

1.1.1.1.16. Remove and discard the existing windows.

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

1.1.1.1.18. Remove and discard the existing sealant and accessories.

- 1.1.1.1.19. Inspect the deck, walls and curbs for damage or other issues. Ensure the deck is dry before installation of new materials.
- 1.1.1.1.20. Infill holes and openings in the deck left from the removal of abandoned equipment and penetrations.
- 1.1.1.1.21. Extend all pipe penetrations.
- 1.1.1.1.22. Furnish and install new nailers and blocking.
- 1.1.1.1.23. Furnish and install new wood framed curbs, walls and prefabricated curb support nailers.
- 1.1.1.1.24. Furnish and install new vapour barrier support panels.
- 1.1.1.1.25. Furnish and install new asphaltic core board on all parapets, curbs and walls.
- 1.1.1.1.26. Furnish and install new vapour barrier.
- 1.1.1.1.27. Furnish and install new tapered EPS insulation.
- 1.1.1.1.28. Furnish and install new polyisocyanurate insulation.
- 1.1.1.1.29. Furnish and install new SBS base sheet composite panel.
- 1.1.1.1.30. Furnish and install new SBS cap sheet membrane.
- 1.1.1.1.31. Furnish and install new prefabricated scuppers.
- 1.1.1.1.32. Furnish and install new SBS base flashings on all parapets, walls and curbs.
- 1.1.1.1.33. Furnish and install new waterproofing membrane and metal wall panels where indicated on the drawings.
- 1.1.1.1.34. Furnish and install new windows.
- 1.1.1.1.35. Furnish and install new conduit supports.
- 1.1.1.1.36. Furnish and install new sheet metal flashings and trim.
- 1.1.1.1.37. Furnish and install new pipe penetration flashings.
- 1.1.1.1.38. Reinstall the existing roof top HVAC equipment.
- 1.1.1.1.39. Install new electrical, plumbing and coolant lines through new curbs with metal hoods. Furnish and install new insulation on the pipes and lines.
- 1.1.1.1.40. Test and document equipment operability.
- 1.1.1.1.41. Furnish and install new weather tight stainless steel fasteners to secure the roof top fans, vents and other equipment to the curbs.
- 1.1.1.1.42. Furnish and install new conduit and wiring.

1.1.1.1.43. Furnish and install new downspouts.

1.1.1.1.44. Furnish and install new concrete splash blocks below all scuppers and downspouts on the roof and on the ground.

1.1.1.1.45. Furnish and install new ballasted, non-permanent guardrails.

1.1.1.1.46. Furnish and install new rubber protection pads under the guardrail bases.

1.1.1.1.47. Reinstall the existing roof access ladder.

1.1.1.1.48. Reinstall the existing satellite dish.

1.1.1.1.49. 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 Client.

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 Administrator. 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 Administrator approval. Make application 7 calendar days prior to such work to allow arrangements to be made by the Contract Administrator 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 Administrator may approve work outside regular hours.

1.2.2.2. The Contract Administrator 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 Administrator, 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 Client 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 Administrator, 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 Administrator 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 Administrator'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 Administrator shall be deemed to be an acceptance with the Contract, nor shall it be deemed a waiver by Contract Administrator or any of Contract Administrator'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 Administrator 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 Administrator 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 Administrator.

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 Administrator'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 Administrator.

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 06 10 00 Rough Carpentry

1.2.2. Section 07 52 00 SBS Modified Bitumen Membrane Roofing

1.2.3. Section 07 62 00 Sheet Metal Flashing and Trim

1.2.4. 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 Client, and must not interfere with the normal operations of the facility, unless written permission otherwise is provided by the Client.

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

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 materials in an orderly fashion. Unless otherwise noted, remove all of the existing roof surfacing, membrane, insulation, vapour barrier and support panels 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.

3.3.5.1.1. If the existing vapour barrier is applied directly to the deck, remove those sections that are not adhered or damaged. Sections that are fully adhered and in good condition may remain in place at the Contract Administrator's discretion.

3.3.5.2. Remove and discard all abandoned curbs and penetrations.

3.3.5.3. Remove and discard all metal flashings.

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

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

3.3.5.6. Remove and discard all base flashings.

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

3.3.5.8. 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 Repair/Replacement

3.3.6.1. Furnish and install new deck material in all locations that have been previously removed or deteriorated. The deck material must be of equal or better quality than 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 it to be exposed when inspected from below the deck will not be accepted.

3.3.6.3. The replaced decking must be fastened to a minimum of 3 structural members.

3.3.6.4. The deck 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. PRICE AND PAYMENT PROCEDURES

1.3.1. Work of this Section is included in the Contract Sum, unless otherwise noted.

1.3.2. Measurement and Payment

1.3.2.1. Work of this section will be measured and paid as a percentage of the total work performed unless otherwise noted.

1.4. REFERENCES

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

1.4.2. CSA-O121-08 - Douglas Fir Plywood

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

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

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

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

1.4.7. NPA A208.1-2009 - Particleboard.

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

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

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

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

1.5. WARRANTY

1.5.1. Installer's Warranty

1.5.1.1. 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. 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.

2.2. 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. Cavity Insulation

2.2.2.1. CAN/ULC-S702; ASTM C665, or mineral wool fibre, in batt form; friction fit, with thermal resistance: R-25 (RSI-4.4), min.

2.2.2.1.1. Comfort Batt by Roxul

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

2.2.3. Nails

2.2.3.1. 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.

2.2.4. Wood Screws

2.2.4.1. 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.

2.2.5. Other Fasteners

2.2.5.1. 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.

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-incident 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.

3.2.1.4. Nailers/Blocking

3.2.1.4.1. Furnish and install new lumber where required by the project documents. Install nailers/blocking by stacking dimensional lumber and plywood to achieve the required height. Stack the lumber so that the shortest dimension (thickness) is vertical unless otherwise noted.

3.2.1.4.2. Secure the first layer to the deck with appropriate fasteners 6 inches (152 mm) on center maximum staggered unless otherwise noted through the vapour barrier support panel. Set the first layer in a bed of compatible cement or sealant.

3.2.1.4.3. Secure subsequent layers of lumber to the layer below with wood screws 12 inches (305 mm) on center staggered maximum unless otherwise noted, or with nails 6 inches (152 mm) on center staggered maximum unless otherwise noted. Fastener must penetrate the layer below 1 inch (25 mm) minimum.

3.2.1.4.4. Stagger the butt joints in the lumber from the preceding layer 12 inches (305 mm) min. Install a fastener through the lumber on both sides of the joint.

3.2.1.5. Walls

3.2.1.5.1. Furnish and install new walls where required by the project documents. Frame new walls with 6 inch (140 mm) wide nominal lumber unless otherwise noted. Select studs for straightness and set plumb, true, and in alignment. Secure the studs to the top and bottom plate with 2 framing nails each. Secure the bottom plate to the deck with appropriate fasteners 6 inches (152 mm) on center maximum unless otherwise noted through the vapour barrier support panel. Set the bottom plate in a continuous bed of compatible cement or sealant.

3.2.1.5.2. Install mineral wool batt insulation between the studs, completely filling the space. Install 1/2-inch (13 mm) plywood on both sides of the wall. Secure the plywood to the studs and plates with framing nails 12 inches (305 mm) on center maximum around the perimeter and 16 inches (406 mm) on center in each direction maximum in the field. Walls over 16 inches (406 mm) in height shall have a row of fasteners at mid-height 16 inches (406 mm) on center. Stagger the joints in the top plate, the bottom plate and the plywood 12 inches (305 mm) minimum. Joints must not align or form a hinge in the wall. Joints must occur at a stud. Slope the top of the walls to the interior of the roof. Walls must be true and level.

3.2.1.5.3. Walls that are prefabricated and on site, or installed on the roof must be protected and covered. Walls that are wet or otherwise damaged shall be marked, removed and replaced.

3.2.1.5.4. Non-Load Bearing Walls

3.2.1.5.4.1. Frame walls with a single bottom plate and a single top plate. Butt joints in the single top plate shall occur at a double stud pack. Space studs 16 inches (406 mm) on center maximum unless otherwise noted.

3.2.1.5.5. Load Bearing Walls

3.2.1.5.5.1. Frame walls with a single bottom plate and a double top plate. Stagger butt joints in the top plate 12 inches (305 mm) minimum. Space studs 12 inches (305 mm) maximum unless otherwise noted. A wall shall be considered load bearing when the load exceeds 50 lbs. (23 kg) unless otherwise noted.

3.2.2. Vapour Barrier Support Panel

3.2.2.1. Below all new curbs, parapets, area dividers and other vertical framed structures, Install a continuous strip of plywood directly on the deck equal in thickness to the vapour barrier support panel. Width of plywood should be sufficient to extend onto the roof deck on either side of the

framing 4 inches (102 mm) min. On steel decks, the edge of the plywood must be fully supported by the top rib.

3.2.3. Perimeter Nailers

3.2.3.1. Furnish and install new nailers around the perimeter of the roof where required by the project documents. Finished height of the perimeter nailers must match the adjacent height of the new roof insulation. Width of the perimeter nailer to be nominal 6 inches (152 mm) minimum.

3.2.4. Parapets

3.2.4.1. Parapets shall be 6 inches (152 mm) above finished roof level unless otherwise noted. Parapets shall be consistent in height, true and plumb. Top of the parapet shall have a 1:12 slope minimum to the interior of the roof.

3.2.4.2. Furnish and install new walls around the perimeter of the roof where required by the project documents.

3.2.4.3. Modify the existing parapets where required by the project documents. Furnish and install new nailers on top of the existing parapets.

3.2.4.4. Furnish and install new plywood on the interior of the existing parapets.

3.2.5. Equipment Support Curbs

3.2.5.1. Furnish and install new 4-walled curbs where required by the project documents. Curb walls may be framed with 4 inch (89 mm) wide nominal lumber on curbs 2 foot by 2 foot (610 mm by 610 mm) or less, or where a 6 inch (140 mm) wide nominal curb would interfere with the ducting or other penetration through the roof. Interior of the curb must be fully insulated.

3.2.6. Flat Top Curbs

3.2.6.1. Curbs 2 foot by 2 foot (610 mm by 610 mm) and under:

3.2.6.1.1. Furnish and install new 4-walled curbs where required by the project documents. Frame with 4 inch (89 mm) wide nominal lumber. Fully insulate the interior and install new plywood over the top of the curb.

3.2.6.2. Curbs over 2 foot by 2 foot (610 mm by 610 mm):

3.2.6.2.1. Furnish and install new 4-walled curbs where required by the project documents. Frame with 6 inch (140 mm) wide nominal lumber. Fully insulate the interior and install new 2 inch by 6 inch nominal joists (38 mm by 140 mm) 24 inches (610 mm) on center and plywood over the top of the curb.

3.2.7. Scupper Support Blocking

3.2.7.1. For supports less than 9 inches (299 mm) high:

3.2.7.1.1. Furnish and install new blocking on the inside of all primary scuppers. Finished height of the blocking must match the adjacent height of the new roof insulation. Blocking shall extend beyond the flange of the scupper 4 inches (102 mm) min.

3.2.7.2. For supports greater than 9 inches (229 mm) high:

3.2.7.2.1. Furnish and install new walls on the inside of all primary scuppers. Finished height of the walls must match the adjacent height of the new roof insulation. Walls shall extend beyond the flange of the scupper 4 inches (102 mm) min.

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 1
Parapet	New
Curbs	New
Scupper Supports	New

END OF SECTION

METAL WALL PANELS SECTION 07 42 13

1. GENERAL

1.1. SUMMARY

1.1.1. Wall panels, underlayment, flashing, fasteners, sealants and accessories which result in a watertight installation when assembled.

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 62 00 Sheet Metal Flashing and Trim

1.2.4. Section 07 92 00 Joint Sealants

1.3. REFERENCES

1.3.1. Reference Standards

1.3.2. All Reference Standards shall be the latest edition.

1.3.2.1. Low Rise Building Systems Manual - Metal Building Manufacturers Association, Inc.

1.3.2.2. Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design, American Institute of Steel Construction, Chicago, IL.

1.3.2.3. AISI SG03-3 - Cold Formed Steel Design Manual Set.

1.3.2.4. ASTM A1008 – Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardened.

1.3.2.5. ASTM A653 – Standard Specification for Steel Sheet, Zinc coated or Zinc-Iron Alloy Coated by the Hot Dip Process.

1.3.2.6. ASTM D1654 – Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

1.3.2.7. ASTM D2247 – Testing Water Resistance of Coatings in 100% Humidity.

1.3.2.8. ASTM D4214 – Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films.

1.3.2.9. ASTM E1592 – Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

1.3.2.10. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3.2.11. ASTM E283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

1.3.2.12. ASTM E331 – Water penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

1.3.2.13. ASTM A792a - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process, American Society for Testing and Materials.

1.3.2.14. SMACNA 1793 – Architectural Sheet Metal Manual.

1.4. DESIGN REQUIREMENTS

1.4.1. The system shall be designed and provided as a complete system.

1.4.2. The system shall be designed to resist positive and negative loads as required by all applicable codes and standards.

1.4.2.1. Thermal Movement

1.4.2.1.1. System shall be capable of withstanding thermal movement based on the anticipated normal temperature ranges of the site.

1.4.3. Air leakage must conform to the limits through the wall assembly area when tested according to ASTM E283.

1.4.4. No water penetration when tested according to ASTM E331.

1.5. DELIVERY, STORAGE, AND HANDLING

1.5.1. Delivery and Acceptance Requirements

1.5.1.1. Provide adequate packaging to protect materials during shipment. Crated materials shall not be uncrated until ready for use, except for inspection. Immediately upon arrival of materials at the jobsite, inspect materials for damage, dampness, and staining. Damaged or permanently stained materials that cannot be restored to like-new condition shall be replaced with satisfactory material. If materials are wet, remove the moisture and re-stack and protect the panels until used.

1.5.2. Storage and Handling Requirements

1.5.2.1. Stack materials on platforms or pallets and cover with tarpaulins or other suitable weathertight covering which prevents water trapping or condensation. Store materials so that water which might have accumulated during transit or storage will drain off. Do not store the panels in contact with materials that might cause staining, such as mud, lime, cement, fresh concrete or chemicals. Protect stored panels from wind damage.

1.5.2.2. Handle material carefully to avoid damage to surfaces, edges and ends, and prevent bending, warping and twisting.

1.6. WARRANTY

1.6.1. Installer Warranty

1.6.1.1. The wall system installer must provide the 2-year warranty directly to the Contract Administrator. Warranty must be for a period of two years that the wall system, as installed, is free from defects in installation workmanship, to include the wall panels, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight wall system assembly. Write the warranty directly to the Contract Administrator. The wall system installer is responsible for correction of defective workmanship and replacement of damaged or affected materials. The wall system installer is responsible for all costs associated with the repair or replacement work.

2. PRODUCTS

2.1. MATERIALS

2.1.1. Wall Panels

2.1.1.1. Panels shall be continuous lengths, with no joints or seams, except where indicated or specified. Ribs of adjoining sheets shall be in continuous contact for their entire length.

2.1.1.2. Panels shall have interlocking ribs for securing adjacent sheets. System for securing the wall covering to the wall structure shall be weather tight fasteners in all locations allowed by the Contract Administrator. Width of sheets shall provide not less than 12 inches (305 mm) of coverage in place. Finished rib height shall be 1-1/2 inches (38 mm). Make provisions for expansion and contraction, consistent with the type of system to be used.

2.1.1.3. Material

2.1.1.3.1. Zinc-coated steel conforming to ASTM A653/A653M, Z275 G90 coating designation or aluminum-zinc alloy coated steel conforming to ASTM A792/A792M, AZ 165 AZ 55 coating. Minimum thickness to be 24 gauge.

2.1.1.4. Profile

2.1.1.4.1. To be selected by the Contract Administrator.

2.1.1.5. Texture

2.1.1.5.1. Smooth.

2.1.1.6. Factory Colour Finish

2.1.1.6.1. Provide factory applied, thermally cured coating to exterior and interior of metal wall panels and metal accessories.

2.1.2. Waterproof Membrane

2.1.2.1. 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.

2.1.2.1.1. Sopraseal Stick 1100 T by Soprema

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

2.1.3. Z-Closure

2.1.3.1. Form new Z-closure where required by the specifications and drawings. Thickness of closure must match thickness of insulation. Each flange of the closure must be ½ inch and must match the height of the seam. Seal both flanges with butyl tape.

2.2. ACCESSORIES

2.2.1. Closures

2.2.1.1. Rib Closures

2.2.1.1.1. Corrosion resisting steel, closed-cell or solid-cell synthetic rubber, neoprene or polyvinyl chloride pre-molded to match configuration of rib opening. Material for closures shall not absorb water.

2.2.2. Fasteners

2.2.2.1. Stainless steel, type and size specified below or as otherwise approved for the applicable requirements. Design the fastening system to withstand the design loads specified. Exposed fasteners shall be gasketed or have gasketed washers on the exterior side of the covering to waterproof the penetration. Washer material shall be compatible with the covering; have a minimum diameter of 3/8 inch (10 mm) for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch (3 mm) thick.

2.2.2.2. There shall be no exposed or penetrating fasteners except where shown on approved shop drawings. Fasteners into steel shall be stainless steel screws.

2.2.3. Rivets

2.2.3.1. Blind rivets shall be stainless steel with 1/8 inch (3 mm) nominal diameter shank. Rivets shall be threaded stem type if used for other than the fastening of trim. Rivets with hollow stems shall have closed ends.

2.2.4. Sealants

2.2.4.1. Elastomeric type containing no oil or asphalt. Exposed sealant shall cure to a rubberlike consistency. Concealed sealant shall be the non-hardening type. Seam sealant shall be factory-applied, non-skinning, non-drying, and shall conform to the roofing manufacturer's recommendations. Silicone-based sealants shall not be used in contact with finished metal panels and components unless approved otherwise by the Contract Administrator.

2.2.4.2. All tape sealant is to be a pressure sensitive, 100 percent solid, sealing tape with a release paper backing. Provide permanently elastic, non-sagging, non-toxic, non-staining tape sealant approved by the System Manufacturer.

3. EXECUTION

3.1. EXAMINATION

3.1.1. Examine surfaces to receive metal wall cladding and flashing. Ensure that surfaces are plumb and true, clean, even, smooth, as dry and free from defects and projections which might affect the installation.

3.1.2. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

3.2. PREPARATION

3.2.1. Surface Preparation

3.2.1.1. Correct defects and inaccuracies in wall and remove all existing fasteners and abandoned penetrations.

3.2.2. Membrane Preparation

3.2.2.1. In cold weather, adhere to membrane manufacturer's additional recommendations for pre-installation membrane handling and preparation.

3.2.2.2. Inspect for damage, pinholes, particles of foreign matter, non-dispersed raw material, factory splices, or other conditions that might affect serviceability. Edges of seams must be straight and flat so that they may be seamed to one another without forming fish mouths or wrinkles. Discard damaged or defective materials.

3.3. INSTALLATION / APPLICATION

3.3.1. Waterproofing Membrane

3.3.1.1. Primer must be flashed off to the manufacturer's requirements prior to the installation of the membrane. Install membrane in direct contact with substrate.

3.3.1.2. Membrane shall be laid free of wrinkles, buckles, creases or fishmouths. If membrane is not properly aligned, do not adjust. Cut the roll and start again with proper alignment, lapping the previous sheet 6 inches (152 mm). All laps must be completely sealed.

3.3.1.3. Cuts, tears, holes or other damage in the membrane must be repaired with a patch consisting of the same number of plies as were damaged, using the same method of installation. Extend patch 4 inches (102 mm) beyond the area of damage in all directions.

3.3.1.4. Remove one end of the silicone release film and adhere this part of the membrane to the substrate. Remove the remaining release film at a 45° angle to avoid wrinkles in the membrane. Overlap adjacent rolls of 3 inches (76 mm). End laps must be 6 inches (152 mm). Space end laps by at least 12 inches (305 mm). Press out air bubbles to obtain complete adhesion between surfaces. Roll the membrane with a hand roller.

3.3.1.5. Furnish and install membrane stripping around all wall penetrations. Ensure all stripping is installed to shedding water.

3.3.2. Wall Panels

3.3.2.1. Secure the wall panels to the substrate with appropriate fasteners 24 inches (610 mm) on center vertically.

3.3.2.2. Install metal wall panels in accordance with the approved manufacturer's erection instructions. Where prefinished panels are cut in the field, or where any of the factory applied coverings or coatings are abraded or damaged in handling or installation, they shall, after necessary repairs have been made with material of the same colour as the weather coating, be approved before being installed. Seal completely openings through panels.

3.3.2.3. Correct defects or errors in the materials. Replace materials which cannot be corrected in an approved manner with non-defective materials. Provide molded closure strips where indicated and where necessary to provide weathertight construction. Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened.

3.3.2.4. Apply wall panels with the seams vertical with the wall. Provide wall panels in longest practical lengths, with no transverse joints except at the junction of penetrations. Locate panel end laps such that fasteners do not engage supports or otherwise restrain the longitudinal thermal movement of panels.

3.3.3. Sealants

3.3.3.1. Apply new continuous sealant or sealant tape in all laps between panels and between panels and flashings.

3.3.4. Flashing

3.3.4.1. Provide flashing, related closures and accessories as indicated and as necessary to provide a weathertight installation. Place closure strips, flashing, and sealing material in an approved manner that will assure complete weathertightness. Details of installation which are not indicated shall be in accordance with the SMACNA 1973, panel manufacturer's approved printed instructions and details, or the approved shop drawings. Allow for expansion and contraction of flashing.

3.3.4.2. Flashing Fasteners

3.3.4.2.1. Fastener spacings shall be in accordance with the panel manufacturer's recommendations and as necessary to withstand the design loads indicated. Install fasteners in straight lines within a tolerance of 1/2 inch (13 mm) in the length of a bay. Drive exposed penetrating type fasteners normal to the surface and to a uniform depth to seat gasketed washers properly and drive so as not to damage factory applied coating. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove panels deformed or otherwise damaged by over-torqued fastenings, and provide new panels.

3.3.5. Rib and Closure Strips

3.3.5.1. Set closure strips in joint sealant material and apply sealant to mating surfaces prior to adding panel.

3.4. SITE QUALITY CONTROL

3.4.1. Completed Work

3.4.1.1. Completed work shall be plumb and true without oil canning, dents, ripples, abrasion, rust, staining, or other damage detrimental to the performance or aesthetics of the completed roof assembly.

3.4.2. Non-Conforming Work

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

3.5. CLEANING

3.5.1. Clean exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from roofs. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, solder or weld marks and damage to the finish coating.

3.6. SCHEDULE

	Roof Section 1
Waterproofing Membrane	self-sealing SBS membrane with a laminated cross woven polyethylene film facer
Wall Panels	24 gauge galvanized with a factory applied coating

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. Masonry or Concrete Walls and Vertical Surfaces

2.2.5.2.1. Use hardened steel nails or screws with flat heads, diamond shaped points, and mechanically deformed shanks not less than 1 inch (25 mm) long for securing felts, modified bitumen sheets, metal items, and accessories to masonry or concrete walls and vertical surfaces.

2.2.5.3. Metal Plates

2.2.5.3.1. 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. Vapour Barrier Support Panel

2.2.6.1. Gypsum Roof Board

2.2.6.1.1. ASTM C 1177 or ASTM C1278, 5 Flame Spread and 0 Smoke developed when tested in accordance with ASTM E 84, 500 psi (3447 kPa), Class A, non-combustible, and coated with a non-asphaltic coating. Max 4 by 8 feet (1.2 m by 2.4 m) board size.

2.2.6.1.1.1. DensDeck Prime Roof Board by Georgia Pacific

2.2.6.1.1.2. Securock Gypsum Fiber Roof Board by US Gypsum

2.2.6.1.1.3. or approved equivalent in accordance with B.7

2.2.7. Vapour Barrier

2.2.7.1. Self-Adhering SBS membrane Vapour Barrier

2.2.7.1.1. CAN/CGSB-37.56-M; SBS modified bitumen membrane with a high strength glass mat reinforcement; Minimum thickness 90 mils (2.2 mm) with a release film on the adhesive side. Top surface must be sanded if adhesive is to be applied.

2.2.7.1.1.1. SopraSeal Stick 130 by Soprema

2.2.7.1.1.2. Armourbond Flash Sand by IKO

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

2.2.7.1.2. Self-sealing 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.

2.2.7.1.2.1. Sopraseal Stick 1100 T by Soprema

2.2.7.1.2.2. Aquabarrier AVB by IKO

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

2.2.8. Insulation

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

2.2.8.1.1. Fiberglass Faced Polyisocyanurate Board

2.2.8.1.1.1. 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)).

2.2.8.1.1.1.1. Sopra-Iso Plus by Soprema

2.2.8.1.1.1.2. IKOtherm III by IKO

2.2.8.1.1.1.3. H-Shield CG by Hunter

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

2.2.8.1.2. Expanded Polystyrene Board (EPS)

2.2.8.1.2.1. CAN/ULC-S701; ASTM C 578, Type II, IV, or X. Min density shall be 1.0 lbs./ft³ (16 kg/m³). Min 1/2-inch (13 mm) thickness; Min R-3.85 per inch (RSI-0.68 per 25 mm).

2.2.8.1.2.1.1. EPS by Plasti-fab

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

2.2.9. Roof Cover Board

2.2.9.1. Factory Laminated Cover Board/Membrane Composite Panels

2.2.9.1.1. Bituminous Core Board/Base Sheet Composite Panels

2.2.9.1.1.1. 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.

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

2.2.9.1.1.3. Bituminous Core Board

2.2.9.1.1.3.1. 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.

2.2.9.1.1.3.1.1. Soprasmart Board 180 by Soprema

2.2.9.1.1.3.1.2. Protectobase 180 by IKO

2.2.9.1.1.3.1.3. Or approved equivalent in accordance with B.7

2.2.10. Parapet and Curb Cover Board

2.2.10.1. Bituminous Core Board

2.2.10.1.1. 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).

2.2.10.1.1.1. SopraBoard by Soprema

2.2.10.1.1.2. ProtectoBoard by IKO

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

2.2.11. Roofing Membranes

2.2.11.1. Modified Bitumen Field Sheets

2.2.11.1.1. 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.

2.2.11.2. Torch Applied Membrane:

2.2.11.2.1. 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.

2.2.11.2.1.1. Sopralene Flam 180 by Soprema

2.2.11.2.1.2. Torchflex TP-180-FF by IKO

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

2.2.11.2.2. 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.

2.2.11.2.2.1. Sopralene Flam 250 GR by Soprema

2.2.11.2.2.2. Torchflex TP-250- Cap by IKO

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

2.2.11.4. Flashing Membrane

2.2.11.4.1. 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.

2.2.11.5. End Lap Cover Strip

2.2.11.5.1. 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.

2.2.11.5.1.1. Sopralap by Soprema

2.2.11.5.1.2. Torch Tape by IKO

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

2.2.12. Modified Bitumen Roof Cement

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

2.2.12.1.1. Sopramastic and Sopramastic ALU by Soprema

2.2.12.1.2. AquaBarrier Mastic by IKO

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

2.2.13. Liquid Flashing

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

2.2.13.1.1. Alsan Flashing and Flashing Reinforcement by Soprema

2.2.13.1.2. IKO MS Detail and Reinforcement by IKO

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

2.2.14. Pitch Pocket Filler

2.2.14.1. Polyester pre-fabricated pitch pocket system, in various size, with compounds that bond together, with solvent less mastic and with one component elastomeric sealant.

2.2.14.1.1. Sopramastic Block System by Soprema.

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

2.2.15. Pre-manufactured Accessories

2.2.15.1. Pre-manufactured accessories must be manufacturer's standard for intended purpose, comply with applicable specification section, compatible with the membrane roof system and approved for use by the modified bitumen membrane manufacturer.

2.2.16. Prefabricated Plumbing Vent Flashings

2.2.16.1. A metal flashing sleeve with integrated flange, premolded urethane insulation liner, metal cap flashing and EPDM base seal. Flange must extend onto the deck 4 inches (102 mm) min, and the top of the sleeve to be min 18 inches (457 mm) above the finished roof.

2.2.16.1.1. SJ-27 Removable Cap Stack Jack Flashings by Thaler Metal Industries

2.2.16.1.2. 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. Mechanically Fastened Installation

3.4.2.1. Mechanical Fasteners on Wood Deck

3.4.2.1.1. Secure the insulation board to the underlying material using plates and fasteners approved by the roof system manufacturer. Engage fasteners by driving them through the underlying material into the wood deck. Drive fasteners so they penetrate 3/4-inch (19 mm) min into the deck. Ensure fasteners do not penetrate through the roof deck into the interior of the facility.

3.4.3. Vapour Barrier Support Panel Installation

3.4.3.1. Cut panels as required so edges rest on center of upper ribs. Cut straight lines with adequate tools.

3.4.3.2. Where slopes change, boards will be cleanly cut to acquire deck shape. Place boards perpendicular to deck ribs for continuous support at extremities.

3.4.3.3. Board joints will be staggered and perfectly butted.

3.4.3.3.1. Refer to Detail 1 on Drawing No. A 4.01 for support panel staggering requirements.

3.4.3.4. Mechanically Attached Installation

3.4.3.4.1. Refer to Detail 2 on Drawing No. A 4.01 for the Mechanically Attached Installation Details.

3.4.3.4.2. Mechanically attach the vapour barrier support panels in accordance with the Mechanically Fastened Installation procedure in subsection 3.4.2. of Section 07 52 00, SBS Modified Bituminous Membrane Roofing.

3.4.3.5. Primer Installation

3.4.3.5.1. Prime all surfaces to be in contact with adhered membrane materials as required by the manufacturer. Apply primer at the rate of 0.75 gallon per 100 sq. ft. (2.8 litres per 9 sq. m.) or as recommended by roof membrane manufacturer's printed instructions to promote adhesion of membrane materials. Allow primer to flash prior to application of membrane materials to primed surface. Avoid flammable primer material conditions in torch applied membrane base flashing applications.

3.4.4. Vapour Barrier Installation

3.4.4.1. Primer must be dry prior to installation of the vapour barrier membrane.

3.4.4.2. Unroll membrane onto the substrate for alignment parallel to roof edge.

3.4.4.3. Apply membrane straight and smooth and avoid wrinkles, fishmouths or trapped air bubbles in the finished installation.

3.4.4.4. Install vapour barrier membrane to all vertical surfaces to allow for a sealed connection with the base sheet membrane.

3.4.5. Fire Protection Tape Installation

3.4.5.1. 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.

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

3.4.6. Parapet and Curb Cover Board Installation

3.4.6.1. 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.

3.4.7. Insulation Installation

3.4.7.1. General

3.4.7.1.1. Refer to Detail 4 on Drawing No. A 4.02 for Insulation Staggering Requirements.

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

3.4.7.1.3. 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.

3.4.7.1.4. 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.

3.4.7.1.5. 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.

3.4.7.1.6. Adhesively Attached

3.4.7.1.6.1. Refer to Drawing No. A 4.02 for Insulation Adhesive Installation Details.

3.4.7.1.6.2. 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.

3.4.7.3. Tapered Insulation

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

3.4.7.3.2. Install tapered insulation with a minimum slope of 1% and an average R value of 17 (RSI – 2.99). For tapered insulation with an exposed minimum edge thickness of 1/2 inch (13 mm), shave the edge down for a smooth transition.

3.4.7.3.3. 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.

3.4.7.4. Scupper Sumps

3.4.7.4.1. Refer to Detail 1 on Drawing No. A 5.08 for Scupper Sump Details.

3.4.7.4.2. Form sumps at scuppers 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 scupper, 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.

3.4.8. Factory Laminated Cover Board/Membrane Composite Panel Installation

3.4.8.1. Adhesively Attached

3.4.8.1.1. Refer to Drawing No. A 4.03 for Adhesive Installation Details.

3.4.8.1.2. 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.

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

3.4.9. SBS Membrane Installation

3.4.9.3. General

3.4.9.3.1. 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.

3.4.9.3.2. 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.

3.4.9.3.3. 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.

3.4.9.4. Base Sheet Installation

3.4.9.4.1. 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.

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

3.4.9.5. Phased Membrane Construction

3.4.9.5.1. 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.

3.4.9.6. Cap Sheet Installation

3.4.9.6.1. 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.

3.4.9.7. Membrane Base Flashing

3.4.9.7.1. 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.

3.4.9.7.2. 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).

3.4.9.7.3. 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).

3.4.9.7.4. 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.

3.4.9.7.5. Termination of Base Flashing

3.4.9.7.5.1. 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.

3.4.10. Prefabricated Pipe Flashings

3.4.10.1. Install prefabricated pipe flashings around all pipe penetrations in the roof. Set flange in a bed of compatible cement. Flash in flange with two overlapping layers of membrane as described in the paragraph *Membrane Strip Flashing* and seal the edge with compatible roof cement. Do not overheat EPDM Base Seal.

3.4.11. Membrane Strip Flashing

3.4.11.1. 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.

3.4.12. Membrane Flashing at Scuppers

3.4.12.1. Install the base sheet through the scupper opening in the outside wall and turn onto the outside wall 3 inches (76 mm) minimum. Set the prefabricated scupper in the opening in a bed of compatible cement. Strip in the scupper with base sheet stripping. Extend the base sheet stripping onto the base flashing of the interior wall past the edges of the interior flange 4 inches (102 mm) minimum. Extend the base sheet stripping into the scupper to a point 2 inches (51 mm) from the edge of the outside wall.

3.4.12.2. Install cap sheet base flashing over the assembly. Strip in the inside of the scupper with the cap sheet 2 inches (51 mm) past the base sheet stripping.

3.4.13. Set-On Accessories

3.4.13.1. 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	1	On Walls, Curbs and Combustible Substrates	Behind Cladding or Sheet Metal Or on Top of Through Wall Flashing
Vapour Barrier Support Panel	Densdeck Prime	N/A	N/A
Application Method	Mechanically		
Vapour Barrier	Glass or polyester-reinforced SBS	Glass or polyester-reinforced SBS smooth	self-sealing SBS with a laminated woven polyethylene film facer
Application Method	Self-adhered	Self-adhered	Self-adhered
1 st Insulation Layer	1% Sloped EPS	N/A	N/A
Application Method	Adhesive		
2 nd Insulation Layer	2 inch (51 mm) PolyISO		
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.

2380 Pegasus Road N.E., Calgary, Alberta T2E 8G8 • Telephone (403) 250-7055 Calgary Exchange
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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.

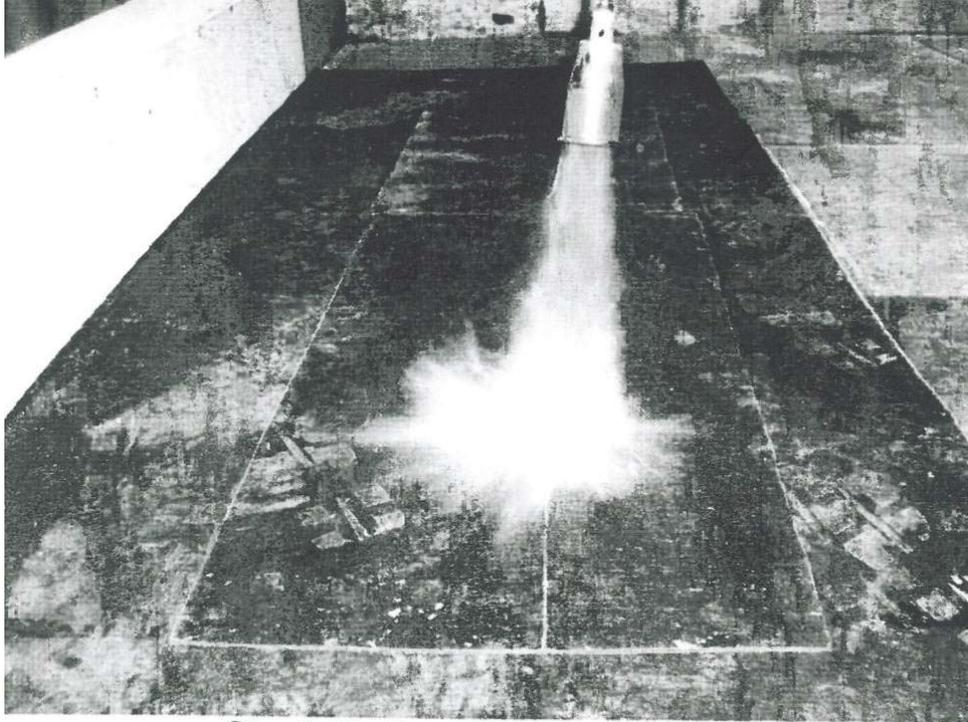
Away from any combustible surfaces, heat the back of the prepared coreboard panel in the area to be bent. Place the heated panel against the vertically up-stand and bend it horizontally until it conforms tightly to the parapet's profile. Heat form additional coreboard panels in a similar manner to completely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



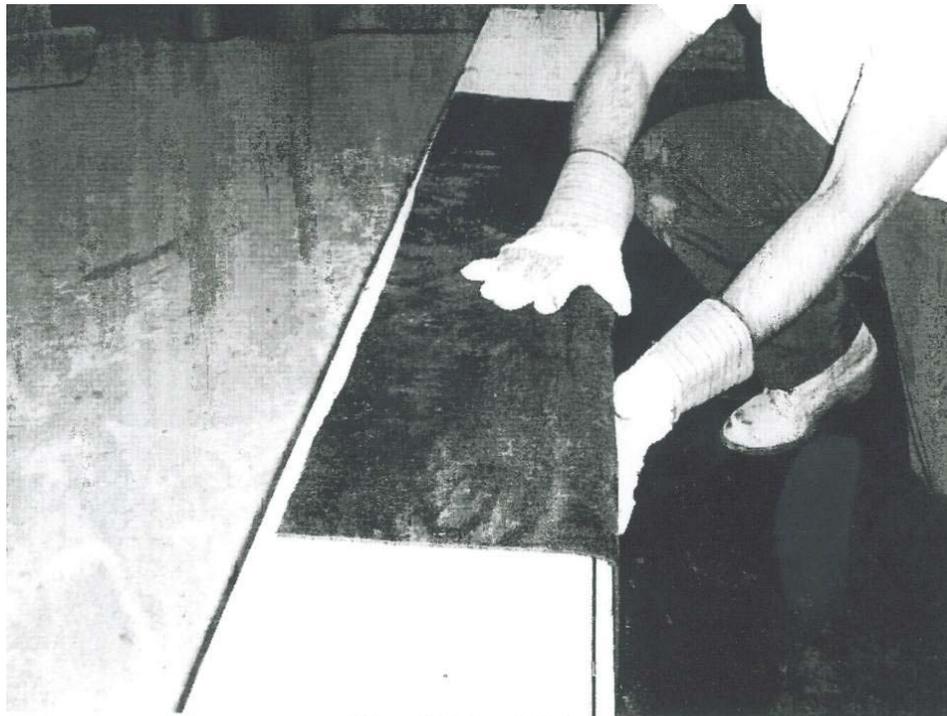
Step 1: Heating of the area to be bent.



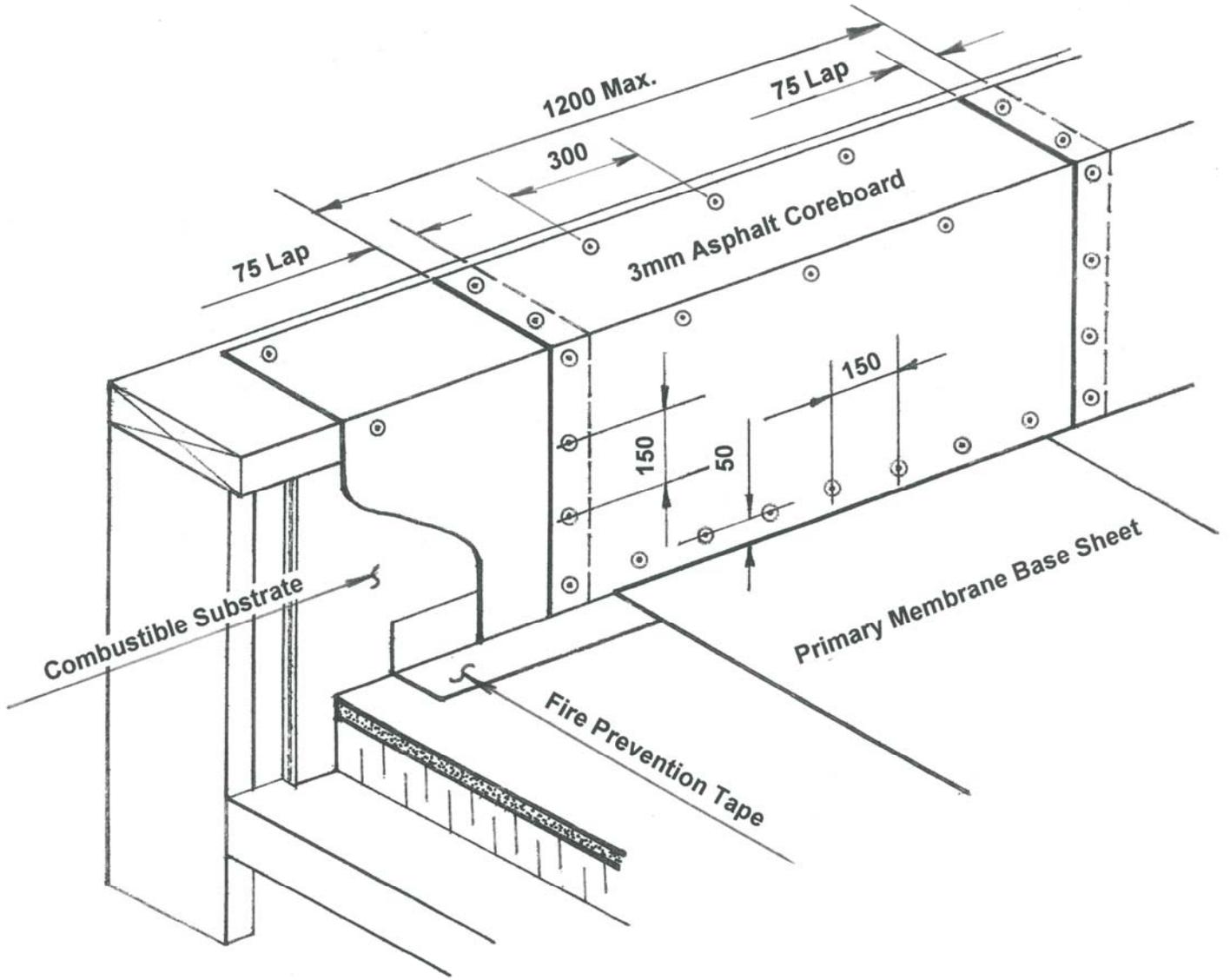
Step 2: Installation on the parapet.



Step 3: Bending the board.



Step 3: Final fitting.



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 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

1.6.1. Installer's Warranty

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

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.

2.2.5. Splash Pads

2.2.5.1. Large precast concrete splash pad. Splash pad shall be 1 foot wide by 4 feet (305 mm by 1219 mm) long and sloped to promote drainage.

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 Contract Administrator 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 4 on Drawing No. A 5.13 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. Refer to Detail 2 on Drawing No. A 5.13 for Cap Flashing End Closure Details.

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

3.2.2.2.3. Lap and solder all seams.

3.2.2.2.4. 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.

3.2.2.2.5. 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. Curb Cover

3.2.2.3.1. Refer to Detail 6 on Drawing No. A 5.12 for Curb Cover Details.

3.2.2.3.2. Prefabricate from a single sheet of metal. Size the cover to fit the curb with less than 1/2-inch (13 mm) clearance on all sides once completed. Corners shall be lapped and soldered, or lapped, sealed and riveted. Vertical legs of the cover shall be 4 inches (102 mm) minimum and have a drip edge at the bottom.

3.2.2.3.3. Secure the vertical legs of the curb cover with appropriate watertight screws through slightly oversized holes at 24 inches (610 mm) OC max.

3.2.2.4. Continuous Cleat

3.2.2.4.1. Refer to Detail 1 on Drawing No. A 5.12 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 5.12 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).

3.2.2.5.9. Counter Flashing with a Reglet

3.2.2.5.9.1. Refer to Detail 1 on Drawing No. A 5.05 for Counter Flashing with a Reglet Detail.

3.2.2.5.9.2. Create reglet slots in the wall 5/8-inch (16 mm) deep and 3/8-inch (5 mm) wide min. Form the reglet flashing so that it is spring-locked once inserted onto the reglet slot. Partially fill the slot with sealant. Insert the flashing the full depth of the slot. When the flashing has been inserted the full depth, fill the slot with sealant.

3.2.2.5.9.3. Form counter flashing as described in this section.

3.2.2.6. Rain Collar Flashings

3.2.2.6.1. Refer to Detail 1 on Drawing No. A 5.07 for Rain Collar Flashing Detail.

3.2.2.6.2. Form new rain collar flashings over pipes and other penetrations that cannot be capped. Rain collar should extend past the pipe flashing 2 inches (51 mm) min and have a clearance above the pipe of 1/4-inch (6 mm) max. Secure the rain collar to the pipe with a metal draw band. Fill the cove with a non-shrink caulk. Lap the rain collar flashing a min of 1 inch (25 mm) and solder; or lap, seal and rivet.

3.2.2.7. Square to Round (Chimney) Flashing

3.2.2.7.1. Form new square to round flashing for pipe, chimney and other round penetrations through curbs.

3.2.2.7.2. Lap and solder all seams.

3.2.2.7.3. Flashing must extend down the sides of the curb 4 inches (102 mm) min. Secure the flashing to the curb with weather tight fasteners 24 inches (610 mm) OC.

3.2.2.7.4. Apply a bead of sealant between the flashing and the penetration. Secure the top of the flashing to the penetration with a band clamp.

3.2.2.7.5. Install a rain collar flashing over the top of the flashing.

3.2.3. Drainage Flashings and Trim

3.2.3.1. Downspouts

3.2.3.1.1. Refer to Drawing No. A 5.11 for Downspout Detail.

3.2.3.1.2. Install the downspouts at the locations shown on the approved shop drawings.

3.2.3.1.3. Downspouts shall be 4 inch by 5-inch min (102 mm by 127 mm).

3.2.3.1.4. Lap sections a minimum of 3 inches (76 mm) and secure sections with a minimum of 4 fasteners.

3.2.3.1.5. Form 45° elbow where water discharges onto the roof or ground.

3.2.3.1.6. Install new concrete splash blocks and support angles below all downspouts. Secure to the ground and support angle.

3.2.3.1.7. Provide transition pieces where new downspout sections tie into the new vandal proof HSS downspouts. Lap the section a min of 3 inches (76 mm).

3.2.3.1.8. Form downspout straps from the same material as downspouts using material not less than 2 gauges heavier than downspouts. Secure downspouts to wall with straps spaced not more than 4 feet (1219 mm) on center. Install a strap no more than 6 inches (152 mm) below the bottom of the gutter, and no more than 6 inches (152 mm) above the bottom of the downspout. Colour shall match the downspouts.

3.2.3.2. HSS Vandal Proof Downspouts

3.2.3.2.1. Furnish and install new HSS vandal proof downspouts at all new downspout locations and where existing downspouts are not vandal proof.

3.2.3.3. Scuppers

3.2.3.3.1. Refer to Detail 1 on Drawing No. A 5.08 for Scupper Details.

3.2.3.3.2. Scupper must be prefabricated.

3.2.3.3.3. Set the interior flange over the roofing felts or base layer of base flashing on the wall in a bed of compatible roof cement.

3.2.3.3.4. Set the exterior flange against the wall in a bead of sealant. Secure the exterior flange to the wall with a row of fasteners located approximately 1 inch (25 mm) from the edge, at 6 inches (152 mm) OC max.

3.2.3.3.5. When completed, scupper assembly shall fully encapsulate the wall.

3.2.3.3.6. Install a closure flashing over the exterior of the scupper.

3.2.3.4. Conductors/Scupper Boxes

3.2.3.4.1. Refer to Detail 1 on Drawing No. A 5.09 for Conductor Details.

3.2.3.4.2. Furnish and install new conductors at all primary scupper locations. Fabricate the conductor with overflow openings.

3.2.3.4.3. Size the conductor in accordance with the following requirements:

3.2.3.4.3.1. Face Width: 2 times downspout width

3.2.3.4.3.2. Face Depth: 2 times downspout width

3.2.3.4.3.3. Height: 2 times downspout width

3.2.3.4.4. Install conductor so that scupper passes through the back. Outside edges of the scupper shall be turned out onto the back of the conductor a minimum of 1 inch (25 mm). Lock and solder conductor to the scupper with a flat lock seam.

3.2.3.4.5. Secure the conductor to the wall with a minimum of 4 appropriate fasteners near the top.

3.2.3.4.6. The outlet tube shall be fabricated so as to extend into the downspout a minimum of 4 inches (102 mm).

3.2.4. Sheet Metal Flashing and Trim for Low Slope Roofing

3.2.4.1. Perimeter Restraint Metal

3.2.4.1.1. Form new continuous perimeter restraint metal 4 inches high by 4 inches wide (102 mm high by 102 mm wide).

3.2.4.1.2. Furnish and install the perimeter restraint metal at all horizontal to vertical transitions.

3.2.4.1.3. Secure the metal to the vertical surface with fasteners and plates 24 inches (610 mm) on center max.

3.2.4.1.4. For insulation less than 6 inches (152 mm) thick, secure the metal to the deck through the insulation with plates and fasteners 24 inches (610 mm) OC.

3.2.4.1.5. For insulation more than 6 inches (152 mm) thick, install plates and fasteners through the horizontal flange 24 inches (610 mm) OC that extend into the insulation 5 inches (127 mm) min.

3.2.4.2. Pitch Pan Installation

3.2.4.2.1. Size pitch pan to provide a minimum of 1-1/2-inch (38 mm) clearance between the flashed penetration and all sides of the pitch pan. In the event that multiple penetrations pass through the same pan, maintain 1-1/2-inch (38 mm) clearance between the individual penetrations.

3.2.4.2.2. The pitch pan shall be formed so that the top is in the horizontal plane to ensure that pourable sealer does not flow out.

3.2.4.2.3. Seam and solder all joints.

3.2.4.2.4. Height of pitch pan shall be a min of 4 inches (102 mm) above finished roof level. Extend horizontal flange onto the roof a min of 6 inches (152 mm).

3.2.4.2.5. Set the flange on top of the roof membrane in a solid application of compatible roofing cement. Mechanically attach the pitch box to the deck.

3.2.4.2.6. Seal the opening in the deck around the roof penetration to prevent leakage of material into the building interior.

3.2.4.2.7. Fill the bottom of the pitch pan to a depth of approximately 1 inch (25 mm) from the top of the pan with cement mortar mix.

3.2.4.2.8. Fill pan to the top with a pourable sealer. Insure that sealer fills all voids around penetrations.

3.2.4.2.9. Where possible, furnish and install a rain collar flashing over the pitch pan.

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
Curb Cover	N/A	24	Factory applied coating
Cleat	N/A	24	Factory applied coating/galvanized
Counter Flashings	N/A	24	Factory applied coating
Reglets	0.025	24	Factory applied coating
Rain Collar Flashing	0.015	24	Galvanized
Square to Round (Chimney) Flashing	N/A	24	Galvanized
Downspouts and Leaders	N/A	24	Factory applied coating
Downspout Straps	N/A	22	Factory applied coating
Vandal Proof Downspouts	4"x6"x3/16" HSS (102 mm x 152 mm x 5 mm) HSS		Field applied coating
Scuppers	N/A	24	Field applied coating
Conductor Heads/Scupper Boxes	0.015	24	Factory applied coating
Perimeter Restraint	N/A	22	Factory applied coating
Pitch Pan	0.015	N/A	N/A

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 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 D.22.

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 Consultant. 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
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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

ALUMINUM WINDOWS

SECTION 08 51 13

1. GENERAL

1.1. SUMMARY

Furnish and install new aluminum frame windows where required by the project documents. Assembly shall be a fixed unit that consists of a thermally broken aluminum frame and insulating glass unit.

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 62 00 Sheet Metal Flashing and Trim
- 1.2.4. Section 07 92 00 Joint Sealants

1.3. REFERENCES

- 1.3.1. CAN3-S157-Strength and design in Aluminum
- 1.3.2. CAN/CSA-A440 – Window, Door and Skylight Installation

1.4. SUBMITTALS

1.4.1. Products

1.4.1.1. Submit to the Contract Administrator the samples and manufacture data sheets of products to be used in this section including, but not limited to construction details, material descriptions, profiles and finishes of components (glazing, pressure plates, pressure plate caps, sealants, gaskets, etc).

1.4.2. Colour Charts

1.4.2.1. Submit to the Contract Administrator the manufacturer's colour charts showing the full range of colours available for factory-finished aluminum.

1.4.3. Manufacturer's Certificate

1.4.3.1. Submit to the Contract Administrator the certificate that the products are suitable for the intended use and that they meet or exceed the specified requirements.

1.5. PERFORMANCE REQUIREMENTS

1.5.1. The manufacturer shall be responsible for the configuration and fabrication of the complete window system.

1.5.2. Window system shall have less than 0.045 cfm/ft² [0.25 m³/h m⁻¹] at 1.57 psf [0.075 kPa] air leakage by CAN/CSA-A440 rating.

1.5.3. Window system shall have no water penetration by CAN/CSA-A440 B7 rating at 14.6 psf [0.7 kPa].

1.5.4. Window shall meet the structural requirements based on CAN3-S157. Deflection of the systems under live loading shall not exceed 1/175th of the span under positive and negative loads.

1.5.5. The window thermal transmittance (U-Factor) shall be 0.39 BTU /hr·ft² ·°F [.2 W/m² ·°C] when tested in accordance with AAMA 1503.1 and CAN/CSA-A440.2.

1.5.6. System shall be capable of handling the loads in accordance with the National Building Code of Canada.

1.6. DELIVERY, STORAGE, AND HANDLING

1.6.1. Delivery and Acceptance Requirements

1.6.1.1. 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:

1.6.1.1.1. Name of manufacturer

1.6.1.1.2. Type

1.6.1.1.3. Brand designation

1.6.2. Storage and Handling Requirements

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

1.6.2.2. Completely cover materials stored outdoors, on and off roof, with waterproof tarpaulin 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.

1.7. FIELD OR SITE CONDITIONS

1.7.1. Existing Conditions

1.7.1.1. Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.7.1.2. 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.

1.8. WARRANTY

1.8.1. Manufacturer Warranty

1.8.1.1. Provide the Manufacturer's 10 year weatherization and weather tightness warranty. 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. Include the work of this section in the warranty in D.22..

2. PRODUCTS

2.1. MANUFACTURERS

2.1.1. Kawneer

2.2. MATERIALS

2.2.1. General

2.2.1.1. The glazing panels, gaskets, integral fasteners and sealants should all be provided by or approved by a single manufacturer.

2.2.1.1.1. Series 516 Thermal Windows by Kawneer

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

2.2.2. Glazing Panels

2.2.3. The glazing panels, gaskets, integral fasteners and sealants should all be provided by or approved by a single manufacturer.

2.2.3.1. Window Sealed Units:

2.2.3.1.1. Conform to Design Criteria performance standards.

2.2.3.1.2. Low-E coating.

2.2.3.1.3. Argon gas filled between glazing units

2.2.3.1.4. Warm Edge Spacers: warm edge design, thermally broken;

2.2.3.1.5. 5 year warranty on sealed units

2.2.3.1.6. Total thickness of 1 inch (25 mm) thermally broken sealed units

2.2.3.1.6.1. Exterior glazing: 1/4 inch (6mm), Tempered glass.

2.2.3.1.6.2. Insulating gap: 1/2 inch (13 mm), argon gas filled.

2.2.3.1.6.3. Interior glazing: 1/4 inch (6 mm), Tempered glass.

2.2.3.2. Glazing method shall be a wet/dry type in accordance with manufacturer's standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.

2.2.4. Framing System

2.2.4.1. Aluminum window framing fabricated with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact. Allow for erection tolerances and provide for

movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units

2.2.4.2. All glazing pockets shall be vented, pressure equalized and drained to the exterior.

2.2.4.3. Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners with silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

2.2.4.4. Aluminum Finish

2.2.4.4.1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.2.4.4.2. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer colour topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.

2.2.4.4.3. Colour and Gloss: As selected by the Contract Administrator from manufacturer's standard range.

2.2.5. Gaskets

2.2.5.1. As furnished by the manufacturer.

2.2.6. Joint Sealant

2.2.6.1. Silicone sealants compatible with glazing as recommended by manufacturer.

2.2.7. Field-Applied Sealant

2.2.7.1. Approved by window system manufacturer.

2.2.8. Field Fasteners

2.2.8.1. Stainless steel anchors (by installer). Size, location and quantity as calculated by the manufacturer. Comply with window manufacturer's instructions for fastener types, quantities, and usage.

3. EXECUTION

3.1. EXAMINATION

3.1.1. Site confirm conditions and dimensions prior to fabrication.

3.1.2. Examine areas to receive new materials and ensure locations are clean; dry and prepared as required by the manufacturer. Notify the Contract Administrator of conditions that would adversely affect installation or subsequent utilization of daylighting. Do not proceed with installation until unsatisfactory conditions are corrected.

3.1.3. Review condition of onsite materials, verify quantities, and review installation process.

3.2. PREPARATION

3.2.1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

3.2.2. Where aluminum will contact concrete, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

3.3. INSTALLATION / APPLICATION

3.3.1. General

3.3.1.1. Accommodate thermal and mechanical movements.

3.3.1.2. Install joint sealants at perimeter joints and within the panel system in accordance with the manufacturer's installation instructions and section 07 92 00, Joint Sealants.

3.3.2. Install window in accordance with the manufacturer's installation recommendations and approved shop drawings.

3.3.3. Anchor component parts securely in place by permanent mechanical attachment system.

3.3.4. Accommodate thermal and mechanical movements.

3.3.5. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.

3.3.6. Install joint sealants at perimeter joints and within the window in accordance with manufacturer's installation instructions.

3.4. SITE QUALITY CONTROL

3.4.1. Install window, sealants, underlayment, and flashing in accordance with manufacturer's installation instructions.

3.4.2. Non-Conforming Work

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

3.5. CLEANING

3.5.1. Clean exposed window according to manufacturer's written instructions. Touch up damage to metal coatings and finishes.

3.5.2. Remove excess sealants, dirt, and other substances.

3.5.3. Remove and replace glazing that has been broken, chipped, cracked, abraded or damaged during the construction process.

3.5.4. During the construction process, protect the skylight surfaces from contact with contaminants.

3.5.5. Clean inside and outside of the skylight immediately after installation and after joint sealants have cured.

3.5.6. Remove temporary protective coverings at time of installation (interior) and after installation is complete (exterior).

3.5.7. Do not use harsh cleaning materials or methods that would damage metal finish or glazing. See Care and maintenance manual for proper cleaning products and method.

END OF SECTION

FACILITY FALL PROTECTION SECTION 11 24 29

1. GENERAL

1.1. SUMMARY

1.1.1. Includes the installation of new guardrails.

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. CAN/CSA Z91-02 Health and Safety Code for Suspended Equipment Operations

1.3.1.2. CAN/CSA-G40.21M-300W Structural Quality Steels

1.3.1.3. CAN/CSA – S16.1 Limit States Design of Steel Structures

1.3.1.4. CSA W59 Welded Steel Construction (Metal Arc Welding)

1.3.1.5. CSA-W47.1 Certification of Companies for Fusion Welding of Steel Structures

1.3.1.6. ASTM A52 Standard Pipe Sections

1.3.1.7. ASTM A325 High Strength Bolts for Structural Steel

1.4. SUBMITTALS

1.4.1. Shop Drawings

1.4.1.1. Submit to the Contract Administrator the Shop Drawings for the installation of the guardrails.

1.4.2. Technical Data Sheet

1.4.2.1. Submit to the Contract Administrator the Technical Data Sheet for the control zone system. Technical Data Sheet should include general description of the system and identify the manufacturer and materials at a minimum.

1.4.2.2. Submit to the Contract Administrator the manufacturer specific installation instructions.

1.5. DELIVERY, STORAGE, AND HANDLING

1.5.1. Delivery and Acceptance Requirements

1.5.1.1. 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.

1.5.2. Storage and Handling Requirements

1.5.2.1. Store materials in a dry, protected, well-vented area.

1.6. FIELD OR SITE CONDITIONS

1.6.1. Existing Conditions

1.6.1.1. 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.

2. PRODUCTS

2.1. MANUFACTURERS

2.1.1. Pre-approved Guardrail manufacturers are:

2.1.1.1. Bluewater Manufacturing

2.1.1.2. Liftsafe Fall Protection Inc.

2.1.1.3. Skyline Group

2.2. MATERIALS

2.2.1. Guardrails

2.2.1.1. Freestanding pedestrian egress barrier system including pipe railings, uprights, bases and fittings. Guardrails shall have a galvanized finish.

2.2.1.1.1. SafetyRail by Bluewater Manufacturing

2.2.1.1.2. Roof Guard by Liftsafe Fall Protection Inc.

2.2.1.1.3. RoofBarrier 5000 Series Modular Guardrail System by Skyline Group

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

3. EXECUTION

3.1. EXAMINATION

3.1.1. Existing dimensions, elevations, access and clearances shall be site verified by the Contractor prior to commencement of construction and fabrication of any materials. Co-ordinate existing dimensions and elevations with new construction shown on the detail drawings. Notify the Contract Administrator immediately if existing site dimensions and elevations conflict with those indicated on the drawings.

3.1.2. Unless otherwise stated, all work shall meet or exceed minimum requirement of the current edition of the National Building Code of Canada, associated standards referenced in that code, and local standards and bylaws as applicable. Comply with the CAN/CSA Z91 Standard.

3.1.3. Do not scale drawings.

3.1.4. Provide new structural support framing for fall arrest roof anchors as shown on the drawings. Design and detailing of fall arrest roof anchors and connection assemblies to new or existing structure as detailed on drawings, is the responsibility of the roof anchor manufacturer.

3.2. INSTALLATION / APPLICATION

3.2.1. General

3.2.1.1. Guardrails

3.2.1.1.1. Supply and install the required non-penetrating guardrails in the locations as shown on the drawings by RMIS.

3.3. SITE QUALITY CONTROL

3.3.1. Inspections

3.3.1.1. Notify the Contract Administrator 48 hours' min before enclosing the anchors from view. All fall arrest equipment attachments to the structure must be inspected and approved by the Contract Administrator.

3.3.2. Non-Conforming Work

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

END OF SECTION

**PLUMBING
SECTION 22 00 00**

1. GENERAL

1.1. SUMMARY

1.1.1. Includes furnishing and installing new 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. DELIVERY, STORAGE, AND HANDLING

1.3.1. Delivery and Acceptance Requirements

1.3.1.1. 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.

1.4. WARRANTY

1.4.1. Manufacturer Warranty

1.4.1.1. 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.

1.4.2. Include the work of this section in the warranty in D.22..

2. PRODUCTS

2.1. Vent Pipe Extensions

2.1.1. Vent Pipe

2.1.1.1. Match existing material and diameter.

2.1.1.2. ASTM D 2661 Schedule 40 Solid Wall ABS Pipe, matching the existing pipe diameter.

2.1.2. Vent Pipe Metal Flashings

2.1.2.1. Metal Flashings are required for all vent pipe penetrations. Refer to Section 07 52 00, SBS Membrane Roofing.

2.2. Transition Couplings

2.2.1. General

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

2.2.1.2. 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 scupper 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. 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. 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. Pipe Extensions

3.2.2.1. Prior to the installation of any new roofing materials, extend all existing soil pipe vents through the roof to a minimum height of 18 inches (457 mm) (or as required by local plumbing codes) above the finished roof surface. Modifications shall be performed as follows:

3.2.2.1.1. Cut off pipe at a point below the deck in a neat manner. Use a transition coupling to secure the new pipe to the existing.

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

April 2018

HEATING, VENTILATING AND AIR CONDITIONING DIVISION 23

1. GENERAL

1.1. SUMMARY

1.1.1. This Section includes labour, materials, equipment and related services to install new HVAC piping, ducting, conduit and supports.

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 62 00 Sheet Metal Flashing and Trim
- 1.2.4. Section 07 92 00 Joint Sealants

1.3. REFERENCES

- 1.3.1. SMACNA 1966

1.4. DELIVERY, STORAGE, AND HANDLING

- 1.4.1. Store and handle materials in accordance with manufacturer's instructions.
- 1.4.2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
- 1.4.3. Store materials in clean, dry area.
- 1.4.4. Protect materials during storage, handling, and installation to prevent damage.

1.5. FIELD OR SITE CONDITIONS

- 1.5.1. Existing Conditions

1.5.1.1. 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

- 1.6.1. Installer Warranty

1.6.1.1. During the one year warranty or guarantee period all defective material, improper material or workmanship shall be made good without expense to the Contract Administrator.

2. PRODUCTS

April 2018

2.1. MATERIALS

2.1.1. Conduit

2.1.1.1. New conduit shall match the existing in size and type.

2.1.2. Supports

2.1.2.1. Supports shall be pre-manufactured, non-penetrating and capable of supporting the anticipated loads. Supports shall be manufactured from materials that are UV stable, and shall have a service life to match that of the specified roof system. Supports shall allow for movement of the pipes with damaging the roof system. Wood blocking is not acceptable.

2.1.2.1.1. C-Port roof blocks

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

3. EXECUTION

3.1. INSTALLATION / APPLICATION

3.1.1. Conduit

3.1.1.1. Furnish and install new conduit and wiring to replace the existing.

3.1.2. Existing Roof Top Units

3.1.2.1. Reinstall the existing roof top units. Test the units for operability and balance the system. Check for overheating motors, belt adjustments, alignment, et cetera. Provide a copy of Balance Report to the Contract Administrator. Balancing shall be done when system is fully installed and operational.

3.2. SITE QUALITY CONTROL

3.2.1. Non-Conforming Work

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

END OF SECTION