

**Specifications:**

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## **1 General**

### **1.1 RELATED SECTIONS**

- .1 Read and be governed by conditions of the contract and sections of Division 1.

### **1.2 REFERENCES**

- .1 Canadian Standards Association (CSA)
  - .1 CSA A23.1-09, Construction Materials and Methods of Concrete Construction.
  - .2 CSA-A371-94 (R2014), Masonry Construction for Buildings.

### **1.3 DEFINITIONS**

- .1 Raking: the removal of loose/deteriorated mortar until sound mortar is reached.
- .2 Repointing: filling and finishing of masonry joints from which mortar is missing, has been raked out or has been omitted.
- .3 Tooling: finishing of masonry joints using tool to provide final contour.

### **1.4 QUALIFICATIONS**

- .1 Contractor-Mason:  
Use single Contractor-mason for all masonry work.

### **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Store cementitious materials and aggregates in accordance with CSA A23.1.
- .2 Store lime putty in plastic lined sealed drums.
- .3 Keep material dry. Protect from weather, freezing and contamination.
- .4 Ensure that manufacturer's labels and seals are intact upon delivery.
- .5 Remove rejected or contaminated material from site.

### **1.7 STORAGE AND PROTECTION**

- .1 At end of each working day, cover unprotected work with waterproof membranes. Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
- .2 Protect adjacent finished work against damage which may be caused by on-going work.

### **1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 When temperature is 10°C or less:
  - .1 Store cements and sands for immediate use within heated enclosure. Allow these materials to reach minimum temperature of 10°C (that is equilibrium with air temperature in enclosure).
  - .2 Heat water to minimum of 20°C and maximum of 30°C:
    - .1 At time of use temperature of mortar to be minimum of 15°C and maximum of 30°C.
    - .2 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30°C.

## **2 Products**

### **2.1 MATERIALS**

- .1 Sand: to CSA A82.56. Passing a 1.18 mm sieve.
  - .1 Acceptable materials:
    - .1 Grandmaitre mortar sand.
  - .2 Alternative materials: approved by addendum in accordance with Instructions to Tenderers.
- .2 Water: potable or from approved non potable supply.
- .3 Hydrated Lime: with integrated air entrainment agent, to ASTM C207.
  - .1 Acceptable materials:
    - .1 Bondcrete Type SA.
  - .2 Alternative materials: approved by addendum in accordance with Instructions to Tenderers.
- .4 White cement: non-staining white Normal Type 10.
- .5 Coloured mortar: use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match existing.

### **2.2 MORTAR**

- .1 Proportion mortar by volume: 1:2:7 (cement: hydrated lime: sand) plus colouring agent as required to match existing mortar colour.
- .2 Repointing: new mortar to be used in repointing to match existing mortar in colour, texture, and hardness.
- .3 Time limit: discard mix not used and placed within 3 hours.
- .4 Colouring material agent: colour pigments to be metallic oxide composition not exceeding 15% of weight of binder materials.

## **3 Execution**

### **3.1 GENERAL**

- .1 Perform work in accordance with CSA-A371.
- .2 Use manual raking tool to remove deteriorated mortar and ensure that no stone masonry units are chipped/alterd/damaged by work to remove mortar or masonry unit.
- .3 Tool and compact using jointing tool to force mortar into joint.
- .4 Finish joints to match existing joints, except where specified otherwise.
- .5 Use suitable approved jointing tool to form compacted tooled joints to match existing.

### **3.2 REPOINTING**

- .1 Raking joints:
  - .1 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.
  - .2 Clean joints to full depth of deteriorated mortar but in no case to less than 50 mm. Clean out voids and cavities encountered.
  - .3 Clean by compressed air, surfaces of joints without damaging texture of exposed joints.

- .4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
- .5 Leave no standing water.
- .3 Repointing:
  - .1 Dampen joints and completely fill with mortar. If surface of masonry units/ stone has worn rounded edges keep pointing back from surface to keep same width of joint. Avoid feather edges. Pack mortar solidly into voids and joints.
  - .2 Keep masonry damp while pointing is being performed.
  - .3 Do no pointing in freezing weather.
  - .4 Build-up pointing in layers not exceeding 12 mm in depth. Allow bottom layers to set before applying subsequent layers. Maintain joint width.
  - .5 Tool joints behind masonry face with identical tools used for weathered joints. Match weathered joint.
  - .6 Remove excess mortar from masonry face before it sets. Finish jointing neatly as specified.

### **3.3 RESETTING**

- .1 Fix dislodged stone masonry units in correct location with water soaked softwood wedges.
- .2 Insert and compress firm mortar to within 50 mm of pointing surface. Allow mortar to set 24 hours.
- .3 Pull out wood wedges when dried and shrunken.
- .4 Point to surface in two layers.

### **3.4 GROUTING**

- .1 Clean out void with water until water runs clear.
- .2 Fill joints and cracks with mortar set back 50 mm from final mortar surface.
- .3 Pour cement or epoxy grout through tube or mortar cup until void is full.
- .4 Point as rest of work.

### **3.5 CLEANING**

- .1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses.
- .2 Do further cleaning after mortar has set and cured.
- .3 Clean masonry with stiff natural bristle brushes and plain water only.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1            Read and be governed by conditions of the contract and sections of Division 1.

**1.2            REFERENCES**

- .1            ASTM International
  - .1            ASTM A123/A123M- 09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2            ASTM A653/A653M- 09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealloyed) by the Hot-Dip Process.
  - .3            ASTM C1396/C1396M-09a, Standard Specification for Gypsum Board.
  - .4            ASTM D1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
  - .5            ASTM D5456-10, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .2            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.
  - .2            CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .3            CSA International
  - .1            CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .2            CSA O112 Series-M1977(R2006), CSA Standards for Wood Adhesives.
  - .3            CSA O121-08, Douglas Fir Plywood.
  - .4            CSA O141-05(R2009), Softwood Lumber.
  - .5            CSA O151-09, Canadian Softwood Plywood.
  - .6            CSA O153-M1980(R2008), Poplar Plywood.
  - .7            CSA O325-07, Construction Sheathing.
  - .8            CSA O437 Series-93(R2006), Standards on OSB and Waferboard.
- .4            Forest Stewardship Council (FSC)
  - .1            FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
  - .2            FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
  - .3            FSC Accredited Certified Bodies.
- .5            National Lumber Grades Authority (NLGA)
  - .1            Standard Grading Rules for Canadian Lumber 2007.
- .6            South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1            SCAQMD Rule 1113-A2007, Architectural Coatings.
  - .2            SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

**1.4 QUALITY CONTROL**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .3 Sustainable Standards Certification:
  - .1 Certified Wood: submit listing of wood products and materials used in accordance with FSC-STD-01-001.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan related to Work of this Section.

**Part 2 Products**

**2.1 FRAMING STRUCTURAL AND PANEL MATERIALS**

- .1 Description:
  - .1 Sustainability Characteristics:
    - .1 Lumber, SCL, FSC Certified.
    - .2 Plywood, particleboard, OSB, urea-formaldehyde free, FSC Certified.
- .2 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
  - .1 CSA O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 Structural Composite Lumber (SCL) in accordance with ASTM D5456.
- .4 Framing and board lumber: in accordance with NBC.
- .5 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:



- .1 S2S is acceptable for concealed locations.
- .2 Board sizes: "Standard" or better grade.
- .3 Dimension sizes: "Standard" light framing or better grade.
- .4 Post and timbers sizes: "Standard" or better grade.
- .6 Plywood, OSB and wood based composite panels: to CSA O325.
- .7 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .8 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .9 Poplar plywood (PP): to CSA O153, standard construction.

## **2.2 ACCESSORIES**

- .1 Exterior wall sheathing paper: to CAN/CGSB-51.32
- .2 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.
- .3 Air seal: closed cell polyurethane or polyethylene.
- .4 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
  - .1 Sealants: VOC limit 250 g/L maximum to SCAQMD Rule 1168.
- .5 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.
  - .1 Adhesives: VOC limit 120 g/L maximum to SCAQMD Rule 1168.
- .6 General purpose adhesive: to CSA O112 Series.
  - .1 VOC limit 70 g/L maximum to SCAQMD Rule 1168.
- .7 Nails, spikes and staples: to CSA B111.
- .8 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .9 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
- .10 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.
- .11 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.
- .12 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, type approved by NCC Engineer.
- .13 Fastener Finishes:
  - .1 Galvanizing: to ASTM A123/A123M, use galvanized fasteners for exterior work, interior highly humid areas, pressure-preservative treated lumber.
- .14 Wood Preservative:
  - .1 Preservative: in accordance with manufacturer's recommendations for surface conditions:
    - .1 Preservative: VOC limit 350 g/L maximum to SCAQMD Rule 1113.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of NCC Representative.
  - .2 Inform NCC Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

**3.2 PREPARATION**

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material as follows:
  - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
  - .2 Wood furring and framing at exterior masonry and concrete walls.
  - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

**3.3 MATERIAL USAGE**

- .1 Roof sheathing:
  - .1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T&G edge, 16 mm thick.
- .2 Subflooring:
  - .1 Plywood, DFP or CSP sheathing grade, T&G edge, 16 mm thick.
- .3 Underlay:
  - .1 PP, square edge 6 mm thick.

**3.4 INSTALLATION**

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members with "crown-edge" up.
- .4 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .5 Install subflooring with panel end-joints located on solid bearing, staggered at least 800 mm.
  - .1 In addition to mechanical fasteners, floor panels secure floor subflooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with

manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.

- .6 Install roof sheathing in accordance with requirements of NBC.
- .7 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, electrical equipment mounting boards, and other work as required.
- .8 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .9 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .10 Install sleepers as indicated.
- .11 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.
- .12 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .13 Countersink bolts where necessary to provide clearance for other work.
- .14 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.6 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by rough carpentry installation.

**END OF SECTION**



**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Read and be governed by conditions of the contract and sections of Division 1.

**1.2 REFERENCES**

- .1 ASTM International Inc.
  - .1 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  - .2 ASTM D312-00(2006), Standard Specification for Asphalt Used in Roofing.
  - .3 ASTM D2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
  - .4 ASTM D6162-00a (2008), Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
  - .5 ASTM D6163-00(2008), Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
  - .6 ASTM D6164M-11, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
  - .7 ASTM D6222M-11 Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.
  - .8 ASTM D6223-02(2009), Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.
  - .9 ASTM D6509M-09, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
  - .2 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
  - .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .3 Canadian Roofing Contractors Association (CRCA)
  - .1 CRCA Roofing Specifications Manual-2011.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA A123.21-10, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
  - .2 CSA-A123.3-05 (R2010), Asphalt Saturated Organic Roofing Felt.
  - .3 CSA-A123.4-04 (R2013), Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
  - .4 CSA O121-08 (R2013), Douglas Fir Plywood.
  - .5 CSA O151-04, Canadian Softwood Plywood.

- .5 Factory Mutual (FM Global)
  - .1 FM Approvals - Roofing Products.
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .7 Underwriters Laboratories' of Canada (ULC)
  - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .2 CAN/ULC-S702-09-AM1, Standard for Mineral Fibre Thermal Insulation for Buildings.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Convene pre-installation meeting two weeks prior to beginning waterproofing Work, with roofing contractor's representative and NCC Representative to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building subtrades.
  - .4 Review manufacturer's installation instructions and warranty requirements.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 45 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and indicate VOC content for:
    - .1 Primers.
    - .2 Asphalt.
    - .3 Sealers.
- .3 Provide shop drawings:
  - .1 Indicate flashing, tapered insulation details.
  - .2 Provide layout for tapered insulation.
- .4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .5 Test and Evaluation Reports: submit laboratory test reports certifying compliance of membrane with specification requirements.
- .6 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .7 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

**1.5 QUALITY CONTROL**

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems with 5 years experience approved by manufacturer.

**1.6 FIRE PROTECTION**

- .1 Fire Extinguishers:
  - .1 Maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle,
  - .2 ULC labelled for A, B and C class protection.
  - .3 Size 14 kg on roof per torch applicator, within 6 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's roofing operations cease.
- .3 Contractor shall be extremely cautious during torching applications, in particular in the vicinity of existing wood or decking.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
  - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
  - .2 Provide and maintain dry, off-ground weatherproof storage.
  - .3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.
  - .4 Remove only in quantities required for same day use.
  - .5 Place plywood runways over completed Work to enable movement of material and other traffic.
  - .6 Store sealants at +5 degrees C minimum.
  - .7 Store insulation protected from daylight and weather, and deleterious materials.

**1.8 FIELD CONDITIONS**

- .1 Ambient Conditions
  - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or to manufacturers' recommendations for mop application.
  - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

**1.9 WARRANTY**

- .1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing, 12 months warranty period is extended to 24 months.

**Part 2 Products**

**2.1 PERFORMANCE CRITERIA**

- .1 Compatibility between components of roofing system is essential. Provide written declaration to NCC Representative stating that materials and components, as assembled in system, meet this requirement.
- .2 Roofing System: to CSA A123.21 for wind uplift resistance.
- .3 All materials must meet requirements of Underwriters Laboratories classified Building Material Index and Fire Resistance Index, ULC 360R 13.

**2.2 MATERIALS**

- .1 Procure all roofing materials from one manufacturer certified by him as compatible with each other.

**2.3 DECK PRIMER**

- .1 Asphalt primer: to CGSB 37-GP-9Ma.

**2.4 VAPOUR RETARDER**

- .1 Self-adhesive vapour retarder: 0.8mm thick SBS-modified bitumen sheet 1.14 meters wide, top surface covered with a high-density polyethylene grid between two layers of polyethylene film.
  - .1 Standard of acceptance Soprapap'r by Soprema or equivalent..

**2.5 MEMBRANE**

- .1 Base sheet: to CGSB 37-GP-56M.
  - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, polyester reinforcement, having nominal weight of 180 g/m<sup>2</sup>.
  - .2 Type 2, fully adhered.
  - .3 Class C - plain surfaced.
  - .4 Grade 2 - heavy duty service.
  - .5 Top and bottom surfaces:
    - .1 Polyethylene / polyethylene.
- .2 Cap sheet membrane: to CGSB 37-GP-56M.
  - .1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer, prefabricated sheet, polyester reinforcement, having nominal weight of 250 g/m<sup>2</sup>.
  - .2 Type 1, fully adhered.
  - .3 Class A-granule surfaced.
    - .1 Colour for granular surface: gray.
  - .4 Grade 2 - heavy duty service.
  - .5 Bottom surface polyethylene.



## **2.6 ADHESIVE**

- .1 Adhesive for securing overlay board and insulation: asphalt extended vulcanized adhesive, two component unit, consisting of two liquids mixed on site to produce pourable adhesive.
- .2 Synthetic rubber based adhesive: fire resistive, fluid, rapid setting, for membranes on vertical surfaces and parapets.
- .3 Non-hygroscopic adhesive: water and fire resistive, fluid, rapid setting. Use as required for cold application of membrane.

## **2.7 OVERLAY BOARD**

- .1 Overlay Board: 6 mm thick asphalt based recovery board with non-woven glass facers, as recommended by the membrane manufacturer.
  - .1 Install over insulation to provide torch safe surface.

## **2.8 BITUMEN**

- .1 Asphalt: to CAN/CSA A123.4, Type 2.

## **2.9 SEALERS**

- .1 Plastic cement: asphalt.
- .2 Sealing compound: rubber asphalt type.
- .3 Sealants: to CAN/CGSB-19.21

## **Part 3 Execution**

### **3.1 QUALITY OF WORK**

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual, particularly for fire safety precautions.
- .2 Do priming in accordance with manufacturers written recommendations.
- .3 The interface of the walls and roof assemblies will be fitted with durable rigid material sheet metal providing connection point for continuity of air barrier.
- .4 Assembly, component and material connections will be made in consideration of appropriate design loads.

### **3.2 EXAMINATION OF ROOF DECKS**

- .1 Verification of Conditions:
  - .1 Inspect with NCC Representative deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.

- .2 Evaluation and Assessment:
  - .1 Prior to beginning of work ensure:
    - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
    - .2 Curbs have been built.
    - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
    - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

### **3.3 EQUIPMENT**

- .1 Maintain all equipment and tools in good working order.
- .2 Use torch types recommended by the manufacturer of the elastomeric asphalt membranes.
- .3 Maintain functioning fire fighting equipment on roof during torching of membrane operation within 2 m of torching workplace.
- .4 Maintain functioning fire fighting and lighting equipment with an operator on guard inside the roof space during the torching operation on the outside and two hours afterwards.

### **3.4 PROTECTION OF IN-PLACE CONDITIONS**

- .1 Cover walls, walks, sloped roofs and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of Work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage. Comply with precautions deemed necessary by NCC Representative.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

### **3.5 VAPOUR RETARDER (CONCRETE/GYPSUM BOARD/PLYWOOD DECK)**

- .1 Apply self-adhesive modified bituminous vapour retarder sheet to primed substrate in accordance with manufacturer's instructions.

### **3.6 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION**

- .1 Insulation: fully adhered, adhesive application:
  - .1 Adhere insulation to laminated vapour barrier using solvent-based adhesive.

- .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
- .3 Cut end pieces to suit.
- .4 Apply adhesive in continuous ribbons at 300 mm on centre.
- .5 Separate the membrane and insulation with a drainage layer or slipsheet.
- .2 Overlay Board: adhesive application:
  - .1 Adhere overlay board to insulation with vulcanized adhesive at the rate of one litre per m<sup>2</sup>.
  - .2 Place boards in parallel rows with end joints staggered. Cap joints approximately 25 mm.
  - .3 Cut ends to suit and apply adhesive in continuous ribbons at 300 mm on centre.
- .3 Base sheet application:
  - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
  - .2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m<sup>2</sup>, at 230 degrees C.
  - .3 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.
  - .4 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
  - .5 Application to be free of blisters, wrinkles and fishmouths.
- .4 Cap sheet application:
  - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
  - .2 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 1.2 kg/m<sup>2</sup>, EVT at point of contact.
  - .3 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
  - .4 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
  - .5 Application to be free of blisters, fishmouths and wrinkles.
  - .6 Do membrane application in accordance with manufacturer's recommendations.
- .5 Flashings:
  - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
  - .2 Torch base and cap sheet onto substrate in 1 metre wide strips.
  - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
  - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
  - .5 Provide 75 mm minimum side lap and seal.
  - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
- .6 Roof penetrations:

- .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

**3.7 CANTS**

- .1 Install prefabricated fibre or mineral wool fibre cants over rigid insulation.
- .2 Apply hot bitumen to receiving surface and embed cant firmly by hand.
- .3 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90 degrees.

**3.8 FIELD QUALITY CONTROL**

- .1 Inspections:
  - .1 Inspection and testing of roofing application will be carried out by testing laboratory designated by NCC Representative.

**3.9 CLEANING**

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Read and be governed by conditions of the contract and sections of Division 1.
- .2    Section 07 92 00 – Joint Sealant

**1.2            REFERENCES**

- .1    American Society of Testing Materials (ASTM)
  - .1    ASTM B32 – 08, Specification for solder metal.
  - .2    ASTM B370-12, Copper Sheet and Strip for Building Construction.
- .2    Canadian Standards Association (CSA)
  - .1    CSA A 123.3-M 1979, Asphalt or Tar Saturated Roofing Felt.
  - .2    CSA B111-197 Wire Nails, Spikes and Staples.
- .3    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
  - .2    CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
  - .3    CAN/CGSB-51.32-M77 Sheathing, Membrane, Breather Type.
  - .4    Canadian Roofing Contractors Association (CRCA)

**1.3            SHOP DRAWINGS**

- .1    Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2    Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.
- .3    Submit Technical Data sheets.
- .4    Submit 300mm x 300mm samples of sheet copper with finish.

**1.4            DESIGN CRITERIA**

- .1    Provide for thermal movement. Fabricate and install copper roofing to provide expansion and contraction of component materials. Design and install clips to resist rotation and to avoid shear stress when roofing material expands and contracts.
- .2    Provide uplift resistance. Fabricate and install roofing material to resist design negative pressure of 90 pounds. Clips, fasteners and clip spacing shall correspond to design negative pressure and have a minimum design factor of safety of 3.
- .3    Fabricate and install roofing material so that no water penetration is allowed. Laps of metal flashing and connections of roof panels shall be installed to allow moisture to run over and off roofing material.

- .4 General design of the batten pattern is to match the existing copper roof.

## **1.5 PROTECTION**

- .1 Protect installed copper roofing form damage while remaining work proceeds.

## **1.6 COMPATIBILITY**

- .1 Compatibility between components of system is essential. Provide written declaration to NCC Representative stating that materials and components, as assembled in system, meet this requirement.

## **1.7 QUALITY CONTROL**

- .1 Applicator must have a minimum of 5 years experience in application of similar types of copper roofing systems.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Copper Roofing Sheets: Cold-rolled copper sheet complying with ASTM B 370 temper for roofing. Weight: 20 oz. per square foot unless noted otherwise.
- .2 Flashings: Copper sheet to ASTM B 370, 1602 Copper, cold rolled sheet cornice temper for formed flashings, roof temper where float.
- .3 Miscellaneous materials: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants and accessory items as recommended by the sheet manufacturer and fabricator for copper roofing work.
- .4 Paper Slip Sheet: Minimum 4 pound rosin-sized building paper.
- .5 Underlayment: Self adhering Elastophene 180 Flam stick composed of glass mat reinforcement and SBS modified Bitumen with silicone release paper covering the underface and thermofusible plastic film covering the face.
- .6 Roofing Nails: COPPER to CSA B111, ring thread, flat head, round shank, diamond point, thickness and lengths to suit application.
- .7 Flashing Nails: COPPER, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.
- .8 Moulding and finishing nails: wire nails to CSA B111, STAINLESS STEEL, brad head, dimpled or plain, round-shank, diamond point, lengths as required.
- .9 Screws and Bolts: Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .10 Solder: To ASTM B32, alloy composition as recommended by sheet metal manufacturer.

- .11 Plumbing vent and exhaust enclosures: copper, pre-manufactured units formed to fit existing vents protruding through roof.
- .12 Isolation coating: alkali resistant bituminous paint. Plastic cement: to CAN/CGSB-37.5 Sealants: see Section 07900 Sealants.
- .13 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.
- .14 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .15 Solder: to ASTM B32, alloy composition as recommended by sheet metal manufacturer.
- .16 Flux: rosin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.

## **2.2 SHOP FABRICATED UNITS**

- .1 General Metal Fabrications: Shop fabricate work to the greatest possible extent. Comply with details shown and with applicable standards. Fabricate for waterproof and weather resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrate. Comply with material manufacturer's instructions and recommendations for forming material.
- .2 Form exposed copper work without excessive oil-canning, buckling, and tool marks. True to line and levels indicated, with exposed edges folded back to form hems.
- .3 Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooded flanges, not less than 25mm deep, filled with mastic sealant concealed within joints.

## **Part 3 Execution**

### **3.1 COORDINATION**

- .1 Coordinate copper roofing with rain drainage work, flashing, trim and other adjoining work to provide a permanently leakproof, secure and non-corrosive installation.

### **3.2 PREPARATION/EXAMINATION**

- .1 Examine roof deck for conditions that would prevent proper application of roofing. Immediately notify NCC Representative of defects; do not proceed with roofing until defects are corrected.
- .2 Clean surfaces that are to receive copper roofing. Substrate to be smooth and free of defects. Drive all projecting nails and fasteners flush with substrate.

- .3 Before fabricating copper roofing, field verify shapes and dimensions of surfaces to be covered.

### **3.3 INSTALLATION**

- .1 METAL ROOFING INSTALLATION – GENERAL
  - .1 Use concealed fastenings except where approved by NCC Representative before installation.
  - .2 Provide underlay under sheet metal roofing. Secure in place and lap joints 100mm minimum.
  - .3 Apply slip sheet over asphalt felt underlay to prevent bonding between sheet metal and felt. Secure with minimum anchorage and lap joints 50 mm minimum in direction of water flow.
  - .4 Stagger transverse seams in adjacent panels.
  - .5 Flash roof penetrations with material matching roof panels, and make watertight by soldering.
  - .6 Perform soldering with well heated coppers, heat seam thoroughly and sweat solder through its full width.
  - .7 Clean and flux metals before soldering.
  - .8 Follow sheet metal manufacturer's recommendations for soldering procedures.
  - .9 As work progresses, neutralize excess flux with 5% to 10% washing soda solution, and thoroughly rinse. Leave work clean and free of stains.

### **3.4 CLEANING**

- .1 Remove protective film, if any, from exposed surfaces of copper roofing promptly upon installation. Strip with care to avoid damage to finishes.
- .2 Clean exposed metal surfaces to substances that would interfere with uniform weathering and oxidation.

### **3.5 PROTECTION**

- .1 Provide final protection in a manner that is acceptable to NCC Representative and Installer that ensures that copper roofing is without damage or deterioration at time of substantial completion.
- .2 Surfaces where membrane is to be applied shall receive an asphalt primer coating at the rate of 0.25L/m<sup>2</sup>.

**END OF SECTION**



**Part 1            General**

**1.1            SECTION INCLUDES**

- .1        Materials, preparation and application for caulking and sealants.
- .2        Text to complete other various Sections containing sealant or caulking specifications.

**1.2            RELATED SECTIONS**

- .1        Read and be governed by conditions of the contract and sections of Division 1.

**1.3            REFERENCES**

- .1        Canadian General Standards Board (CGSB)
  - .1        CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2        CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3        CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4        CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
  - .5        CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .2        Department of Justice Canada (Jus)
  - .1        Canadian Environmental Protection Act, 1999 (CEPA).
- .3        Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).

**1.4            SUBMITTALS**

- .1        Submit product data in accordance with Section 01 45 00 - Quality Control
- .2        Manufacturer's product data to describe.
  - .1        Caulking compound.
  - .2        Primers.
  - .3        Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3        Submit samples in accordance with Section 01 33 00 – Submittal Procedures
- .4        Submit duplicate samples of each type of material and colour.
- .5        Cured samples of exposed sealants for each color where required to match adjacent material.
- .6        Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

- .1 Instructions to include installation instructions for each product used.

## **1.5 PROJECT CONDITIONS**

- .1 Environmental Limitations:
  - .1 Do not proceed with installation of joint sealants under following conditions:
    - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
    - .2 When joint substrates are wet.
  - .2 Joint-Width Conditions:
    - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
  - .3 Joint-Substrate Conditions:
    - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

## **1.6 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

## **Part 2 Products**

### **2.1 SEALANT MATERIALS**

- .1 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
- .2 Where sealants are qualified with primers use only these primers.

### **2.2 SEALANT MATERIAL DESIGNATIONS**

- .1 Urethanes One Part. (Type 1).
  - .1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25, colour to be selected from manufacturer's standard range.
- .2 Acrylic Latex One Part. (Type 2).
  - .1 To CAN/CGSB-19.17.

**2.3 SEALANT SELECTION**

- .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. concrete, block, cementitious stucco, masonry): Sealant type: 1.
- .2 Perimeters of interior frames, as detailed and itemized: Sealant type: 2.
- .3 Joints at tops of non-load bearing masonry walls at the underside of poured concrete: Sealant type: 1.

**2.4 JOINT CLEANER**

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

**Part 3 Execution**

**3.1 PROTECTION**

- .1 Protect installed Work of other trades from staining or contamination.

**3.2 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

**3.3 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

**3.4 BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

**3.5 MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

**3.6 APPLICATION**

- .1 Sealant.
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
  - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Read and be governed by conditions of the contract and sections of Division 1.

**1.2                REFERENCES**

- .1            ASTM International
  - .1            ASTM C475/C475M-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .2            ASTM C557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - .3            ASTM C840-11, Standard Specification for Application and Finishing of Gypsum Board.
  - .4            ASTM C954-11, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
  - .5            ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .6            ASTM C1047-10a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .7            ASTM C1178/C1178M-11, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
  - .8            ASTM C1396/C1396M-11, Standard Specification for Gypsum Wallboard.
- .2            Association of the Wall and Ceilings Industries International (AWCI)
  - .1            AWCI Levels of Gypsum Board Finish-97.
- .3            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2            CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .4            Green Seal Environmental Standards (GS)
  - .1            GS-11-2008, 2nd Edition, Paints and Coatings.
- .5            South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1            SCAQMD Rule 1113-A2007, Architectural Coatings.
  - .2            SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .6            Underwriters' Laboratories of Canada (ULC)
  - .1            CAN/ULC-S102.2-10, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store gypsum board assemblies materials level off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
  - .3 Protect from weather, elements and damage from construction operations.
  - .4 Handle gypsum boards to prevent damage to edges, ends or surfaces.
  - .5 Replace defective or damaged materials with new.

**1.4 AMBIENT CONDITIONS**

- .1 Maintain temperature 10 degrees C minimum, 21 degrees C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Standard board: to ASTM C1396/C1396M regular, 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.
- .2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .3 Resilient clips drywall furring : 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .4 Steel drill screws: to ASTM C1002.
- .5 Laminating compound: as recommended by manufacturer, asbestos-free.
- .6 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by electrolytic process 0.5 mm base thickness, perforated flanges, one piece length per location.
- .7 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
  - .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.

- .2 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .8 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .9 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .10 Joint compound: to ASTM C475, asbestos-free.

## **2.2 FINISHES**

- .1 Primer: VOC limit 200 g/L maximum to GS-11.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions.
  - .1 Inform NCC Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 ERECTION**

- .1 Do application and finishing of gypsum board to ASTM C840 except where specified otherwise.
- .2 Do application of gypsum sheathing to ASTM C1280.
- .3 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C840 except where specified otherwise.
- .4 Install work level to tolerance of 1:1200.
- .5 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .6 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .7 Install wall furring for gypsum board wall finishes to ASTM C840, except where specified otherwise.
- .8 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .9 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .10 Erect drywall resilient furring transversely across studs between the layers of gypsum board, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

- .11 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

### **3.3 APPLICATION**

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .2 Apply single or double layer gypsum board to wood or metal furring or framing as indicated using screw fasteners for first layer, laminating adhesive for second layer. Maximum spacing of screws 300 mm on centre.
- .3 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .4 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .5 Install gypsum board with face side out.
- .6 Do not install damaged or damp boards.
- .7 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

### **3.4 INSTALLATION**

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Splice corners and intersections together and secure to each member with 3 screws.
- .6 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .7 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .8 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
  - .1 Levels of finish:
    - .1 Level 2 – locations to receive tile finish: embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound



over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.

- .2 Level 4 – all other areas: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
- .9 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .10 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .11 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .12 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .13 Mix joint compound slightly thinner than for joint taping.
- .14 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
- .15 Allow skim coat to dry completely.
- .16 Remove ridges by light sanding or wiping with damp cloth.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.6 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by gypsum board assemblies installation.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1            Read and be governed by conditions of the contract and sections of Division 1.

**1.2            REFERENCES**

- .1            Green Seal Environmental Standards (GS)
  - .1            GS-11-2008, 2nd Edition, Paints and Coatings.
- .2            Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1            Material Safety Data Sheets (MSDS).
- .3            The Master Painters Institute (MPI)
  - .1            Architectural Painting Specification Manual - current edition.
- .4            South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1            SCAQMD Rule 1113-A2007, Architectural Coatings.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00 – Submittal Procedures
- .2            Product Data:
  - .1            Submit manufacturer's instructions, printed product literature and data sheets for paint and coating products and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2            Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety
- .3            Samples:
  - .1            Submit for review and acceptance of each unit.
  - .2            Submit duplicate 200 x 300 mm sample panels of each paint finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.
- .4            Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.4            DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2            Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3            Storage and Handling Requirements:
  - .1            Provide and maintain dry, temperature controlled, secure storage.
  - .2            Store painting materials and supplies away from heat generating devices.

- .3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.
- .4 Fire Safety Requirements:
  - .1 Supply 1 9 kg Type ABC fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

## **1.5 SITE CONDITIONS**

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces.
  - .2 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.
  - .2 Test concrete, masonry and plaster surfaces for alkalinity as required.
  - .3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.
- .3 Additional application requirements:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Supply paint materials for paint systems from single manufacturer.
- .2 Conform to latest MPI requirements for painting work including preparation and priming.
- .3 Materials in accordance with MPI - Architectural Painting Specification Manual "Approved Product" listing.
  - .1 Use MPI listed materials having E2 rating where indoor air quality requirements exist.
  - .2 Primer: VOC limit 100 g/L maximum to GS-11.
  - .3 Paint: VOC limit 100 g/L maximum to GS-11.
- .4 Colours:
  - .1 Submit proposed Colour Schedule to NCC Representative for review.
  - .2 Base colour schedule on selection of 5 base colours and 3 accent colours.
- .5 Mixing and tinting:

- .1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written recommendations. Obtain written approval from NCC Representative for tinting of painting materials.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations.
  - .1 Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's written recommendations.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.
- .6 Gloss/sheen ratings:
  - .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

<b>Gloss Level-Category</b>	<b>Gloss @ 60 degrees</b>	<b>Sheen @ 85 degrees</b>
Gloss Level 1 - Matte Finish	Max. 5	Max. 10
Gloss Level 2 - Velvet	Max.10	10 to 35
Gloss Level 3 - Eggshell	10 to 25	10 to 35
Gloss Level 4 - Satin	20 to 35	min. 35
Gloss Level 5 - Semi-Gloss	35 to 70	
Gloss Level 6 - Gloss	70 to 85	
Gloss Level 7 - High Gloss	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated.
- .7 Exterior painting:
  - .1 Dressed Lumber: doors, door and window frames, casings, battens, smooth facias, etc.
    - .1 EXT 6.3B - Alkyd G5 finish.
- .8 Interior painting:
  - .1 Dressed Lumber: doors, door and window frames, casings, mouldings, etc.:
    - .1 INT 6.3A - Latex G5 finish.
  - .2 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock" type material, etc.
    - .1 INT 9.2A - Latex G3 finish (over latex sealer).
  - .3 Wood panelling and Casework
    - .1 INT 64J – Polyurethane Varnish G5 Finish
  - .4 Canvas and Cotton Coatings
    - .1 INT 10.1A – Latex, G5 Finish.

**Part 3 Execution**

**3.1 GENERAL**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- .2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual except where specified otherwise.

**3.2 EXAMINATION**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to NCC Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

**3.3 PREPARATION**

- .1 Protection of in-place conditions:
  - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by NCC Representative.
  - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
  - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
  - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
  - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
  - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of NCC Representative
  - .4 Clean and prepare existing exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
    - .1 Remove dust, dirt, and surface debris by brushing, wiping with dry, clean cloths, or compressed air.
    - .2 Wash surfaces with a biodegradable detergent (and bleach where applicable) and clean warm water using a stiff bristle brush to remove dirt, oil and surface contaminants.
    - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
    - .4 Use trigger operated spray nozzles for water hoses.

- .5 Allow surfaces to drain completely and to dry thoroughly.
- .6 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
- .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or such organic solvents to clean up water-based paints.
- .5 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual specific requirements and coating manufacturer's recommendations.
- .6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .7 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
  - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
  - .2 Apply wood filler to nail holes and cracks.
  - .3 Tint filler to match stains for stained woodwork.
- .8 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .9 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
- .10 Touch up of shop primers with primer as specified.

**3.4 EXISTING CONDITIONS**

- .1 Prior to commencing work, examine site conditions and existing exterior substrates to be repainted and report in writing to NCC Representative damages, defects, unsatisfactory or unfavourable conditions of surfaces that will adversely affect this work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to NCC Representative. Maximum moisture content not to exceed specified limits.
- .3 No repainting work to commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to Painting Subcontractor and Inspection Agency.
- .4 Degree of surface deterioration (DSD) to be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition	Description
DSD-0	Sound Surface ( includes visual (aesthetic) defects that do not affect film's protective properties).

Condition	Description
DSD-1	Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes and scratches).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, and staining).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
DSD-4	Substrate Damage (repair or replacement of surface required).

**3.5 APPLICATION**

- .1 Paint only after prepared surfaces have been accepted by NCC Representative.
- .2 Use method of application approved by NCC Representative.
  - .1 Conform to manufacturer's application recommendations.
- .3 Apply coats of paint in continuous film of uniform thickness.
  - .1 Repaint thin spots or bare areas before next coat of paint is applied.
- .4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .5 Sand and dust between coats to remove visible defects.
- .6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .7 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .8 Finish closets and alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- .10 Mechanical/Electrical Equipment:
  - .1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.
  - .2 Do not paint over nameplates.
  - .3 Keep sprinkler heads free of paint.
  - .4 Paint both sides and edges of backboards for telephone and electrical equipment before installation.
    - .1 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
  - .5 Paint canvas and cotton coverings on insulated pipes.
- .11 Standard of Acceptance:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.



- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .12 Apply one primer coat of paint and two finish coats of paint on all new surfaces.

**3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

