1. GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

1.2. INTENT

1.2.1. Provide for the proper and complete installation of all roofing and flashings as required to prevent entry of moisture into the insulation and structure below the roofing and flashing.

1.3. QUALIFICATIONS

1.3.1. Work shall be executed by an applicator who has adequate plant, equipment and skilled tradesmen to perform this work expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years. Likewise applicator must be a member of the C.R.C.A. and a member in good standing with the appropriate provincial roofing contractors association.

1.3.2. Applicator must be approved by the Consultant, Owner and the roofing material manufacturers.

1.3.3. Applicator shall provide a list of a least five (5) projects available for inspection employing same roofing system within 200km. radius of the project.

1.3.4. The intent is to have a complete roofing system provided by one manufacturer. The following manufacturers are considered to have equivalent systems/products suitable for use on this project; Siplast, Garland, Tremco, Soprema, IKO, Bakor.

1.4. PREQUALIFIED ROOFING CONTRACTORS

Flynn Canada Ltd.
6435 Northwest Drive
Mississauga, ON L4V 1K2
905-671-3971

H & N Roofing & Sheet Metal Ltd.
29 Bayview Crt.
London, ON N5W 5W5
519-453-1720

Nedlaw Roofing Limited
232-B Woolwich St. S.
Breslau, ON. N0B 1M0
519-648-2218

Smith-Peat Roofing & Sheet Metal Ltd.
152 Thames Road West
Exeter, ON N0M 1S3
519-235-2802

Solar Roofing & Sheet Metal Ltd.
3 Miller Street
Toronto, ON M6N 2Z6
416-658-6045

Specified Roofing Contractors Inc.
99 Englehard Drive
Aurora, ON L4G 3V1
905-727-0079

Trio Roofing
243 Advance Blvd.
Brampton, ON L6T 4J2
905-456-1688

Triumph Roofing
1 Connie St.
Toronto, ON M6L 2H8
416-534-8877

Semple Gooder Rfg Corp.
1365 Martin Grove Rd.
Toronto, ON M9W 4X7
416-743-5370

Dean Chandler Roofing
275 Comstock Rd.
Scarborough, ON M1L 2H2
416-751-7840

Bothwell Accurate Co.
6675 Rexwood Rd.
Mississauga, ON L4V 1V1
905-673-0615

Schrieber Bros Roofing
50 Hockley Dr.
Hamilton, ON L8E 3P1
905-561-7780

Atlas Apex Rfg.
65 Disco Road
Toronto, ON M9W 1M2
416-421-6244

Provincial Industrial Rfg.

166 Bowes Rd.
Concord, ON L4K 1J6
905-669-2569

Topline Rfg.
1325 Fewster Dr.
Mississauga, ON L4W 1A2
905-602-0760

BML Roofing Systems Inc.
15 Ryan Place
Brantford, ON N3S 7S1
519-751-0953

1.5. REFERENCES

1.5.1. CSA - Canadian Standards Association

1.5.2. CGSB - Canadian General Standards Board

1.5.3. ULC - Underwriters Laboratories of Canada

1.5.4. FM - Factory Mutual Engineering Corporation

1.5.5. CRCA - Canadian Roofing Contractors Association

1.5.6. Canadian Construction Documents Committee (CCDC), CCDC 2-2020 Stipulated Price Contract.

1.5.7. ASTM – Standards Test Methods for Sampling and Testing Bitumen Saturated Felts and Woven Fabrics for Roofing and Waterproofing.

1.6. ADMINISTRATIVE

1.6.1. Submit to the Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

1.6.2. Work affected by submittal shall not proceed until review is complete.

1.6.3. Present shop drawings, product data, samples and mock-ups in SI Metric units.

1.6.4. Where items or information is not produced in SI Metric units converted values are acceptable.

1.6.5. Review submittals prior to submission to the Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and

coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.

1.6.6. Notify the Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

1.6.7. Contractor is responsible to verify field measurements and all site conditions including adjacent properties and roof areas.

1.6.8. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.

1.6.9. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Consultant's review.

1.6.10. Keep one reviewed copy of each submission on site.

1.7. SHOP DRAWINGS & PRODUCT DATA

1.7.1. The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.

1.7.2. Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

1.7.3. Allow 7 days for Consultant's review of each submission.

1.7.4. Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Consultant prior to proceeding with Work.

1.7.5. Make changes in shop drawings as the Consultant may require, consistent with Contract Documents. When resubmitting, notify the Consultant in writing of any revisions other than those requested.

1.7.6. Accompany submissions within containing:
1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Identification and quantity of each shop drawing, product data and sample.
5. Other pertinent data.

Submissions shall include:

1. Date and revision dates.
2. Project title and number.
3. Name and address of:
4. Subcontractor.
5. Supplier.
6. Manufacturer.
7. Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
8. Details of appropriate portions of Work as applicable:
9. Fabrication.
10. Layout, showing dimensions, including identified field dimensions, and clearances.
11. Setting or erection details.
12. Capacities.
13. Performance characteristics.
14. Standards.
15. Operating weight.
16. Wiring diagrams.
17. Single line and schematic diagrams.
18. Relationship to adjacent work.

1.7.7. After Consultant's review, distribute copies.

1.7.8. Submit 3 prints of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

1.7.9. Submit 3 copies of product data sheets or brochures for requirements requested in Specification. Sections and as requested by the Consultant where shop drawings will not be prepared due to standardized manufacture of product.

1.7.10. Delete information not applicable to project.

1.7.11. Supplement standard information to provide details applicable to project.

1.7.12. If, upon review by the Consultant no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.7.13. The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept. This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of

foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.8. HANDLING & STORAGE OF MATERIALS

1.8.1. Handle and store materials carefully to prevent damage. Manufacturer's labels, seals and identification shall remain intact. Store containers upright and roll materials on end to prevent flattening. Protect materials from moisture at all times.

1.8.2. Deliver materials in sufficient quantities to allow for continuity of work.

1.8.3. Co-ordinate delivery with Owner.

1.8.4. Store materials marked "keep from freezing" in areas where temperatures will remain above 4ºC (40ºF).

1.8.5. Contractor shall assume responsibility for the protection and safekeeping of products stored on the job site.

1.8.6. Provide a continuous fence at grade level around all machinery, material and equipment 7'6" in height with welded mesh and welded tubing that includes a gate/door with locking gate to meet or exceed manufacturer's recommendations.

1.8.7. The Contractor's materials and equipment shall be kept orderly and shall not encumber operations of facilities. Job site shall be maintained free of marketing signage.

1.9. INSPECTION & TESTING

1.9.1. Roofing shall be completed in strict accordance with specifications, conforming to best trade practice and to the satisfaction of the Owner or his authorized representative. Afford facilities and access for inspecting the work as required and immediately act upon instructions given.

1.9.2. Notify inspection authority minimum two working days in advance of commencing work and provide further notification as required due to temporary postponement of work, etc.

1.9.3. Make and repair all cut tests for testing purposes at locations requested. Cut tests will be made during progress of work or on completion of work. Wherever possible, tests will be made before workmen have left the site, all at no additional cost to the contract.

1.9.4. Samples of roof membrane from cut tests and samples of material taken from containers may be kept by the Consultant. These samples may be submitted to an independent laboratory for testing purposes. Cut test

locations should be reinstated with material and installation as specified immediately after cut tests have been provided.

1.9.5. Should test results prove that a material is not functionally equal to specified material:

Contractor shall pay for all testing. Roofing installed and found not to comply with the specifications shall be removed and replaced at no change in the contract price.

1.9.6. Membrane manufacturer to inspect installation to ensure compliance with product application requirements. It is the Contractor's responsibility to arrange with the manufacturer's representative to provide inspections. The manufacturer's representative shall visit the project during the course of roofing work often enough to ensure that the work is being undertaken in accordance with the manufacturer's written recommendations. The Consultant shall be notified of all such visits in writing.

1.9.7. When all work is substantially completed the Roofing Contractor shall arrange for an inspection. At this time the Roofing Contractor's superintendent and foreman should be present. The Roofing Contractor should also arrange for the manufacturer's representative of the roof membrane to be in attendance.

1.9.8. If work is deemed incomplete or discrepancies are found by the Consultant, complete the outstanding items and rearrange for a further inspection.

1.9.9. The Roofing Contractor shall correct all deficiencies before a date agreed upon by the Consultant and Owner.

1.9.10. The inspection and testing service does not relieve the Contractor's responsibility for quality control of production and for errors made the Contractor.

1.10. REJECTED WORK

1.10.1. Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

1.10.2. Make good other Contractor's work damaged by such removals or replacements promptly.

1.10.3. If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be

determined by Consultant.

1.11. EXAMINATION

1.11.1. Prior to commencement of work, examine surfaces and ensure that defects of level or construction are corrected before proceeding with work. Commencement of work shall imply acceptance of surfaces.

1.12. WORK RESTRICTIONS

1.12.1. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed Structural Engineer engaged by the Contractor.

1.13. CO-ORDINATION

1.13.1. Co-ordinate work with other trades and ensure all openings, drains pipes, sleepers, etc., are installed and flashed at the appropriate time.

1.13.2. Co-ordinate progress of the work, progress schedules, submittals, use of site temporary utilities and construction facilities.

1.13.3. The Contractor shall have a competent foreperson or superintendent on the job site at all times during the execution of the contract when work is in progress. This foreperson shall not be changed without permission unless the Consultant deems that this foreperson is unsatisfactory to carry out the work, or if the foreperson's employment is terminated. This foreperson shall represent the Contractor for each specific phase and any minor direction given this foreperson will be held as being given to the Contractor.

1.13.4. It shall be the responsibility of the Contractor's foreperson to inform General Contractor which areas are to be worked upon and to determine what measures may be necessary to limit disruption of the building activities to a minimum.

1.14. PROTECTION

1.14.1. Protect the building and work of other trades from soiling and other damage. Damage to the building as a result of this work shall be repaired as instructed, all at no extra cost to the contract. Protect the interior of the building as required and directed.

1.14.2. Contractor shall be responsible for protection of property during course of work. Lawns, shrubbery, paved areas and building including interior shall be protected from damage. Repair damage at no extra cost to contract.

1.14.3. Roof installation shall be scheduled in such a manner that traffic over new roofing is eliminated. Wherever traffic cannot be avoided, adequately protect roof areas with plywood sheathing, etc. Damage to roofing shall be repaired as instructed by the Owner or authorized representative at no

extra cost to the contract.

1.14.4. Arrange work sequence to avoid using newly constructed roofing for storage, walking surface or equipment movement.

1.14.5. Protect building surfaces at set-up areas with tarpaulin and secure tarpaulin. Spilled or scattered debris shall be cleaned-up immediately. Removed material to be disposed from roof as it accumulates.

1.15. PROJECT MEETINGS

1.15.1. The Consultant will call an initial project meeting. The Roofing Contractor must invite the superintendent and foreman to fully participate in this initial briefing meeting.

1.15.2. The agenda of the briefing meeting will include:
1. Introduction all key personnel participating in the project.
2. Establishing limits on work hours, access, movements on site, etc.
3. Reviewing the approved work schedule.
4. Establishing all administrative and procedural matters.
5. Providing all procedural forms and communication routing.
6. Establishing regular periodic project meetings throughout the progress of work.
7. Provide physical space and make arrangements for meetings.
8. Chair the meeting and record the minutes. Include significant proceedings and decisions. Identify actions by parties.
9. Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participant, affective parties not in attendance, the Consultant and Owner.

1.16. CONSTRUCTION SAFETY MEASURES

1.16.1. Observe construction safety measures of Provincial Government, Workers'/Workmen's Compensation Board and municipal authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.

1.16.2. In event of conflict between any provisions of above authorities the most stringent provision will apply.

1.16.3. The Contractor shall comply with the safety regulations presently in effect in this Province and shall provide such supervision and apparatus necessary for the safety of all concerned.

1.16.4. All application, material handling, and associated equipment shall conform to and be operated in conformance with the guidelines as outlined by the "Workplace Hazardous Materials Information System" (WHMIS), the Ministry of Labour, the Occupational Health and Safety Act (OS) and the "Foreman's Safe Roofing Guidelines".

1.16.5. The Contractor must follow the Ministry of Labour's guidelines and

recommendations. The Consultant is to receive a copy of this document.

1.16.6. Comply with federal, provincial, local and Owner's fire and safety requirements.

1.16.7. Maintain fire extinguisher equipment in sufficient quantity and size as per Provincial Health and Safety Regulations and within easy access whenever power tools, roofing kettles and torches are being used.

1.16.8. Ensure that no part of the building is subject to a load, which will endanger its safety or cause permanent deformation.

1.16.9. The Contractor will adequately train and instruct workers in accordance with WHMIS requirements and will provide the Owner with detailed information with respect to the training provided to workers, the language in which instructions are given and a copy of training manuals used.

1.16.10. The Contractor will consult with the Consultant and if required further consult with Ministry of Labour co-ordinator regarding the physical set up of the job site and comply with any orders of the co-ordinator in that regard.

1.16.11. The Contractor will supply the Consultant with a list of hazardous materials to be used and "Material Safety Data Sheets" for them to be kept, in a readily accessible location for the duration of the project.

1.16.12. The Contractor will not bring any controlled products onto the Owner's property that are not labelled in accordance with WHMIS requirements.

1.16.13. The Ministry of Labour co-ordinator is permitted to inspect the work site at any time and to speak to workers to determine the adequacy of their safety knowledge if they consider it necessary. Any violation of Ministry of Labour requirements may result in work being stopped until they are rectified. Repeated or serious violations may result in cancellation of the contract.

1.16.14. The Contractor will indemnify the Owner for any costs the Owner incurs as a result of his failure to comply with Occupational Health and Safety Act.

1.16.15. Provide and maintain protection and warning signs at all areas, which may be dangerous to the occupants or the public.

1.16.16. Remove all ladders from the building at the end of each working day to prevent unauthorized access to the building and cause possible damage.

1.16.17. Disconnect propane burners from bottles at the end of each working

day. Store propane bottles in protected area away from ignition source and building.

1.16.18. Contractor's workers shall be properly protected and use all required protective clothing including face masks, goggles and gloves, etc.

1.16.19. Assume complete responsibility for construction strength, packing, anchoring and operation of derricks, cranes, hoists and other mechanical contrivances used for work; and ensure that loads carried thereon can be safely supported and be free from accidents to all persons.

1.16.20. Have hoist capacities, with regard to anticipate loads, verified by a Professional Engineer registered in this province.

1.17. ENVIRONMENTAL

1.17.1. Apply only dry materials and apply only during weather that will not introduce moisture into roofing system. Do not apply material during inclement weather or over damp, frozen or unsuitable substrate.

1.17.2. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 4°C (40°F).

1.17.3. Do not perform masonry work below 2°C (35°F). Make proper provisions to protect work from freezing forty-eight (48) hours after layer if work is performed between 2°C (35°F) and 7°C (45°F).

1.17.4. Store solvent-soaked cleaning rags in approved containers in a location to prevent a threat to fire safety or health of the building occupants or workmen. Dispose from site daily.

1.18. MATERIALS SOURCE SEPARATION PROGRAM

1.18.1. Separate building materials for recycling that are to be removed from site.

1.18.2. Provide containers to deposit reusable and/or recyclable materials.

1.18.3. Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

1.18.4. Locate separated materials in areas which minimize material damage.

1.18.5. Collect, handle, and transport off-site, salvaged materials in separate condition. Transport to an appropriate recycling facility

1.19. WORKFORCE

1.19.1. Once roofing commences, work shall not be postponed for any reason other than weather. Roofing crew shall consist of qualified and

experienced personnel and/or more if required due to size and/or schedule of completion. The workforce shall not be changed without written permission from the Consultant.

1.20. GUARANTEE / WARRANTY

1.20.1. The Contractor represents that the Contractor has the special qualifications for doing the Work and that the plans and specifications are, in the Contractor's opinion, appropriate and adequate for the construction and/or renovations set out therein.

1.20.2. The Contractor and Subcontractor hereby jointly and severally warrant the work of this section, including roof membrane, vapour retarder, insulation and sheet metal work against any actual leakage for a period of two [2] years from the date of substantial performance, and agree to make good promptly any defects which occur or become apparent within the warranty period, such defects to include but not be restricted to leaking, failure to stay in place, undue expansion, lifting, deformation, loosening or splitting of seams, joint declaration, failure to adhere, deterioration, blisters, etc.

1.20.3. The Contractor shall furnish the guarantee/warranty in writing, on a form satisfactory to the Owner or the authorized representative signed.

1.20.4. The guarantee/warranty period shall commence from the day of substantial performance.

1.20.5. The specified roofing membrane system shall carry a manufacturer's extended limited warranty. The length of the warranty period shall be for a period of ten [10] to thirty [30] years from the date of substantial performance for materials, including labour, to repair leaking membrane and maintain the roofing membrane in a watertight condition.

1.20.6. The Contractor's guarantee and the manufacturer's extended warranty are to exclude: normal wear and tear, damage caused by neglect, carelessness of vandalism caused by the installation or removal of any equipment and or material built into or part of the roofing membrane system, damage caused by excessive traffic over the roofing membrane, or use of the roof area for the purpose that is was not intended, or damage structure building components and finishes or building contents.

1.20.7. The shipment of and arrival on the site of the manufacturer's materials will constitute the manufacturer's agreement to warrant the roof in accordance with the conditions as outlined above.

1.20.8. The Owner's representatives are to conduct an inspection of the project 60 days prior to the expiration of the two [2] year roofing guarantee. The Contractor will be contacted at the time if any deficiencies related to the guarantee and/or long-term warranty are evident and will require

attention. The Contractor will correct the deficiencies before the expiration of the Contractor's guarantee or make arrangements for the correction.

1.21. COMPLETION

1.21.1. Clean-up and remove all debris, surplus materials, tools and equipment, etc., upon completion of work to the satisfaction of the Consultant.

1.22. WORKMANSHIP

1.22.1. Workmanship shall be of the highest quality. Use competent trades people and execute work in accordance with contract documents.

1.22.2. Regard manufacturer's printed recommendations and latest literature as the minimum requirement for materials, method and procedures.

1.22.3. Notify the Consultant should the specifications conflict with the manufacturer's recommendations, otherwise it will be assumed that the Contractor and manufacturer are in agreement with procedure outline.

1.22.4. Advise the Consultant of adjustments to specified roofing procedures recommended by manufacturers caused by weather and site conditions. Make adjustments to specified procedure only after review with the Consultant, and receive approval in writing.

1.22.5. When roofing operations require open torch operation advise Roofing Consultant of nature of work. In such cases higher safety and insurance limits may be imposed. Any additional cost to meet these requirements will be at the Contractor's expense.

1.22.6. Unsuitable or damaged materials shall immediately be removed from the site.

1.22.7. Wherever two or more plies of membrane are applied, the second ply, etc., shall extend minimum 6" (150mm) beyond the termination of the previous ply of membrane.

1.22.8. Roof curb and sleeper heights shall be minimum 12" (300mm) measured from the surface of the completed roof system to the top. This applies to prefabricated curbs and sleepers as well as those provided by the carpenters.

1.22.9. Inspect the underside of the deck to ensure fasteners will not be visible or damage the structure, interior surfaces or affect electrical and mechanical services. Investigate the location of all hidden services which include mechanical, electrical, cable, security, fire alarms which may be installed under the deck.

1.23. INSPECTION & DECLARATION

1.23.1. Contractor's Inspection: Contractor and all Subcontractors shall conduct

an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Notify the Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Request Consultant's Inspection.

1.23.2. Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

1.23.3. Completion: submit written certificate that following have been performed: Work has been completed and inspected for compliance with Contract Documents. Defects have been corrected and deficiencies have been completed. Equipment and systems have been tested, adjusted and balanced and are fully operational. Operation of systems have been demonstrated to Owner's personnel. Work is complete and ready for Final Inspection.

1.23.4. Final Inspection: when items noted above are completed, request final inspection of Work by Consultant, and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

1.24. SHEET METAL WORK

1.24.1. Sheet metal work shall be of the highest quality installed in accordance with best trade practice and to the following requirements.

1.24.2. Apply two coats of bituminous back paint to all surfaces of metal in contact with masonry, concrete or dissimilar metals.

1.24.3. Seams shall be of the "slip lock type" that permit adequate movement without resulting in deformation or loosening of metal flashings. Lapped joints or exposed raw edges will not be accepted. Exposed edges shall be "doubled back" at least 1/2" (12.5mm). At eaves, parapets, etc., metal shall be hooked over continuous starter strips minimum one gauge thicker than the metal used for flashing. Secure starter strips at 12" (300mm) on centre or closer as required.

1.24.4. Fabricate all possible work in shop in maximum 8' (2450mm) lengths by brake forming, bench cutting, drilling and shaping. On vertical sections or horizontal planes greater than 30" (750mm) install metal in 4' (1200mm) section unless otherwise specified or shown.

1.24.5. Space joints evenly where exposed. When flashing is being installed in more than one piece, offset joints in adjacent flashings by approximately 50%.

1.24.6. Form inside and outside corners by means of standing seams.

1.24.7. Slope all metal to interior to maintain minimum 8% slope. Do not form metal in a manner where water will pond on top of metal flashing.

1.24.8. Where metal terminates under fascia boards, secure metal at 24" (600mm) on centre using specified fasteners. At curbs to openings or at sleepers, etc., provide locked or standing seams at corners.

1.24.9. Where metal flashings enter reglets, ensure reglet is minimum 3/4" (18.75mm) deep and minimum 3/8" (9.37mm) wide. Metal flashing portion that enters reglet shall extend the full depth and be complete with a 3/8" (9.37mm) return upstand to permit proper securement in the reglet. Secure metal flashings in reglets at 24" (600mm) centres and further secure metal to vertical surface at locks.

1.24.10. At reglets wider than 3/8" (10mm) and deeper than 3/4" (19mm) provide polyethylene rod, 25% wider than joint width.

1.24.11. All flashings shall be installed in perfectly straight lines. Irregular or badly fitted work will not be accepted. Exposed fastenings will only be permitted where concealed fastening is impossible. Provide neoprene washers at exposed fastenings.

1.24.12. Where sheet metal counter-flashings are the only form of waterproofing, provide waterproofing underlayment prior to installing metal. Overlaps of underlayment shall be minimum 2" (50mm) and end laps minimum of 6" (150mm).

1.25. SAMPLES OF SHEET METAL FLASHINGS

1.25.1. Install mockup samples of metal flashings indicating method of joints, fastening, seams, expansion joints and stiffeners for approval by Consultant or Owner prior to fabrication.

1.25.2. Commencement of metal flashing installations implies that this Contractor has accepted the surfaces as satisfactory and accepted responsibility for appearance of completed work.

1.26. SCOPE OF WORK

1.26.1. Unless specified otherwise supply and install sheet metal counter-flashings at perimeters, walls, parapets and curbs, etc., as required and directed.

1.26.2. Unless specified otherwise supply and install wood sleepers, to support equipment at locations directed, complete with wood blockings and cant strips minimum 12" (300mm) high measured from surface of completed roof. Sleepers shall be covered with membrane flashings and metal counter flashings. Construct sleepers using continuous 2 x 6 (50mm x 150mm) wood blockings.

1.26.3. Unless specified otherwise supply and install "stack jacks" specified. Trim

height of existing pipes as required and/or extend existing pipes as required and directed. Maintain a minimum height of 12" (300mm) above the completed roof surface.

1.26.4. Unless specified otherwise supply and install spun aluminum chimney stack base flashing complete with aluminum collars, etc., minimum 12" (300mm) in height.

1.26.5. Unless specified otherwise install roof drains supplied and specified by Division 22 – Mechanical.

1.26.6. Install Torch Safe strips at junction of vertical surfaces.

1.26.7. All conduits, piping, etc., that pass through sleeves and curbs to roof openings, etc., shall be installed by using products specified.

1.26.8. Parapet shall be totally covered with membrane flashings and sheet metal counter-flashings.

1.26.9. Unless specified otherwise supply and install gasline supports as specified. Provide 1/4" (6.25mm) space between the gasline clamp and the pipe itself. Gasline piping not in use shall be removed. All work relating to gaslines is to be completed by a licensed gas fitter. All gaslines are to be cleaned and painted.

1.26.10. Unless specified otherwise provide MERS-800A duct supports supplied by Thaler Metal Industries Ltd.

1.26.11. Unless specified otherwise install specialty supports for outside lighting supplied and specified by Division 16 – Electrical.

1.26.12. Where ductwork passes through the top of roof curbs provide tapered wood blockings surfaced with 1/2" plywood covered with membrane flashings extending minimum 12" up the vertical surface of the ductwork.

1.26.13. Where ductwork passes through walls extend modified membrane onto ductwork approximately 12" and ensure tapered insulation of ductwork slopes away from wall.

1.26.14. Where several pipes pass through the top of a large roof curb provide metal base flashings including metal cover and provide tapered wood blockings surfaced with 1/2" plywood completely covered with membrane flashings.

1.26.15. Where gaslines pass through the top of a roof curb, the roof curb is to be extended in height minimum 6" above gaslines where the gaslines will pass through the side of the curb.

1.26.16. Install all patio slabs for walkways as specified.

1.26.17. Supply and install scupper drains.

1.26.18. Supply and install fully tapered 2% polyisocyanurate insulation specified and provide additional slope if required to achieve positive drainage. Roofing Contractor is responsible to ensure positive drainage.

1.26.19. Unless specified otherwise where rigid electrical conduits pass through roof supply and install electrical outpost supplied by Lexcor; where flexible conduits pass through the roof provide wire outlet post supplied by Lexcor.

1.26.20. Small mechanical units are to be supported on top of patio slabs as specified work walkways.

1.26.21. Configure roof curbs to suit cover of the exhaust fan units.

1.26.22. Provide high temp caulking sealant where hot pipes pass through top of curbs and base flashings and around collars.

1.26.23. Coordinate with requirements for installation of skylight, by Section 08452, and / or install tubular daylighting devices provided by Section 08625.

2. PRODUCTS

2.1. Products shall conform to the requirements of jurisdictional authorities, to C.S.A and C.G.S.B. specification number named including all revisions to date.

2.2. Products substituted without prior written approval shall be removed from the site and areas disturbed shall receive specified products.

2.3. Compatibility of roof system components is essential and this shall be confirmed by the applicator.

2.4. Product data sheets and material data sheets shall be issued to the Consultant prior to ordering materials.

2.5. Submit sample of products prior to ordering and do not order products or start work before receiving Owner's written approval.

2.6. Asphalt primer – PA-917 LS primer conforming to C.G.S.B. specification #37-GP-9A.

2.7. Adhesive – Parafast or Millenium Adhesive supplied by Siplast.

2.8. Steel deck overlayment – 5/8" (16mm) prime glass-faced gypsum roof board (Dens-Deck prime), supplied by Georgia-Pacific Corporation.

2.9. Vapour retarder and reinforcement - applicable to steel deck overlayment – Paradiene 20 TG, 2.32mm modified membrane conforming to CGSB 37-G-56M supplied by Siplast.

2.10. Vapour retarder and reinforcement - applicable to cementitious deck - Paradiene 20 TG, 2.32mm modified membrane conforming to CGSB 37-G-56M supplied by Siplast.

2.11. Roof Board Insulation – R-35 (All Zones), three layers bi-directional (no joints to line up, to be staggered) Paratherm closed cell polyisocyanurate roof insulation integrally laminated to organic/inorganic facers in conformance with Environment Canada Ozone-Depleting Substance regulations and conforming to CAN/ULC S704/ S770 Type II, Class 1 Grade 2 with 1/4" Protectoboard supplied by Siplast.
There will be no extra monies allotted for the wrong insulation thickness carried / provided by the roof bidder / Contractor.

2.12. Tapered insulation – 2% polyisocyanurate insulation sloped to achieve positive drainage supplied by Siplast or Accu-Plane Enterprises.

2.13. Roof membrane composition - modified bituminous base sheet membrane 2.32mm Paradiene 20 TG EG surfaced with a modified cap sheet membrane 3.94mm Paradiene 30 TG Bright White (BW)with publish SRI 90 granular cap supplied by Siplast.

2.14. Membrane Flashings - modified bituminous base sheet membrane 2.32mm Paradiene 20 SA surfaced with a modified cap sheet membrane 4.14mm Parafor 30 TG (BW) with published SRI 90 granular cap supplied by Siplast. Colour to be selected by Owner and Consultant from manufacturer's full range of colours.

2.15. Waterproofing Underlayment – Paradiene 20 SA 98mls (2.55mm) thickness 3.28ft (1.00m) 33.5ft (10.21m) length self-adhesive modified bitumen membrane consisting of light weight random fibrous glass mat impregnated and coated with high quality styrene butadiene-styrene (SBS) modified bitumen with TA 325 self adhesive primer . Supplied by Siplast.

2.16. Cant strips - 3" x 3" (75mm x 75mm) torch safe cant strips supplied by Siplast.

2.17. Stack Jacks (pipe flashing) - SJ-41A 12" in height pre-insulated aluminum "stack jacks" supplied by Thaler Metal Industries Inc.

2.18. Miscellaneous Flashings (for protrusions through roof) – Provide ChemLink . Para Pro 123 Flashing System as supplied by Siplast

2.19. Gasline and other pipe supports as specified by Division 23 – Mechanical.

2.20. Sheet Metal for Flashing - 26 ga. pre-painted galvanized steel series 8000 supplied by Stelco - colour to be selected by Owner and Consultant prior to prefabrication from manufacturer's full range of colours.

2.21. Miscellaneous Metal for Flashing - for "hook-on" strips, fastening strips, metal bellows, etc., same metal as specified for sheet metal flashing but thickness shall be 1 ga. thicker.

2.22. Back paint for metal - asphalt primer (two coats) conforming to C.G.S.B. specification #37-GP-9.

2.23. Nails, bolts, screws and other fastenings - compatible with metal specified. Size of fasteners and type shall suit applicable conditions and must be approved by Owner or his authorized representative prior to use.

2.24. Roof drains – specified by Division 22 – Mechanical.

2.25. Plastic cement – PA-1021 plastic conforming to ASTM D 4586 Type II forasbestos free, asphalt base roof cement supplied by Siplast.

2.26. Caulking Sealant – PS 209 elastomeric sealant colour gray meeting CAN-19-13M82. Supplied by Siplast.

3. EXECUTION

3.1. PREPARATION

3.1.1. Remove all dust, dirt and debris from substrate and ensure same is smooth and free of all foreign matter. Perform only as much roof that can be completed each day or before showers commence. Take whatever action is necessary to prevent moisture from entering during roofing installations. Vacuum roof deck surfaces if necessary.

3.1.2. Inspect roof deck to determine if additional work is required before proceeding.

3.1.3. Any sharp projections, that in the opinion of the Consultant may penetrate the vapour retarder, shall be grounded smooth and flush.

3.2. ASPHALT PRIMING

3.2.1. Apply primer at the rate of 1 gal. (4.5L) per 100 sq. ft. (9m2) by brush or spray method. Work primer into surface by brooming and allow sufficient time for primer to penetrate and ensure same does not run into the building or stain aesthetic surfaces. Limit quantity of primer at deck openings and at points of termination to prevent damage to the building's interior.

3.2.2. Apply primer to vertical surfaces commencing at the top of cant strips and terminate primer 1" (25mm) below reglets and/or highest possible point.

3.2.3. Apply asphalt primer over all cementitious decks.

3.3. STEEL DECK OVERLAYMENT

3.3.1. Apply adhesive to the steel deck in ribbon form by mechanical means at

the recommend rate parallel to flutes and centred on high sections of deck. On 8" (200mm) modular decks apply 2 ribbons of adhesive. Immediately place dens-deck with the long sides at right angles to the run of the deck. All joints must be staggered and no pieces less than 1/3 of the full size sheet will be accepted. Apply vapour retarder over the surface of the dens-deck. Conform to "rated system" requirements.

3.4. VAPOUR RETARDER

3.4.1. Apply vapour retarder in straight lines, smooth, free from air pockets, wrinkles, fishmouths, open laps or tears, etc. Reinforce and extend vapour retarder minimum 12" (300mm) at perimeter, vertical walls, pipes and other abutments. Continuously secure and laminate reinforcement to vapour retarder. Envelope insulation with vapour retarder and reinforcement by minimum 6" (150mm), all continuously secured to insulation.

3.4.2. Applicable to steel deck overlayment and cementitious deck – install Paradiene 20 TG membrane torch installed over dens-deck. Overlaps shall be minimum 4" (100mm) on side laps and all end laps shall be minimum 3" (75mm).

3.5. ROOF BOARD INSULATION

3.5.1. Place Paratherm polyisocyanurate roof insulation with all joints staggered over the vapour retarder membrane with the longest side parallel to the perimeter where work is commencing. Where cutting and fitting is required, minimum width of insulation must be 12" (300mm). Do not force insulation into place. Cut neatly at protrusions and points of termination. Replace all broken, damaged or misfit boards as work progresses. Protect insulation from moisture during all phases of the application progresses. Paratherm is to be set in Parafast by Siplast a highly elastomeric, two components, one step, all purpose, foamable adhesive that contains no solvents and sets in minutes. Apply adhesive to vapour retarder with specified adhesive applied in 2 cm. wide bands every 33 cm using the manufacturer's recommended applicator. Protect insulation from moisture during all phase of application process. Remove any temporary waterproof cut off prior to continuing with further work.

3.5.2. Subsequent layers of Paratherm polyisocyanurate insulation shall be applied with specified adhesives at the same application rate and bead spacing as the previous layer. Ensure all layers of Paratherm polyisocyanurate roof insulation are offset at joints of each layer by minimum 12" (300mm). Tapered polyisocyanurate insulation is to be positioned on top of the flat stock polyisocyanurate and below the cover board.

3.5.3. Tapered insulation shall be installed on top of the polyisocyanurate insulation prior to installing the insulation cover board. Tapered insulation to be set Parafast adhesive and at the same bead spacing and application rate as previous layer.

3.5.4. Reduce insulation thickness by 1/2" (12.5mm) at all drainage locations for a distance of 36" (900mm) from the centre of the drain opening and an additional 1/2" (12.5mm) for a distance of 12" (300mm) from the centre of the roof drain opening. Totally fill flutes of steel decks with insulation at drain openings to provide continuous support for drain.

3.6. INSULATION COVER BOARD

3.6.1. Cover board shall be installed with specified adhesives at the same application rate and bead spacing as the previous layer(s) of insulation. Ensure cover board is offset at joints by minimum 12" (300mm). Walk cover-board in to place to ensure good contact.

3.7. INSTALLATION OF TORCH SAFE CANT STRIPS

3.7.1. Apply a single continuous and uniform bead OF Parafast adhesive in 2 cm. wide bands every 33 cm using the manufacturer's recommended applicator to the surface of the cover board and embed the cant strips in place.

3.8. ROOF MEMBRANE BASE SHEET

3.8.1. Initially apply base sheet over cover board terminating 2" (50mm) above top of cant strips. Membrane shall be torched into place. Side laps shall be minimum 3" (75mm) and end laps minimum 6" (150mm) all continuously torched into place.

3.8.2. Starting at low points of each roof area apply modified bituminous membrane base sheet torched into place.

3.8.3. Rolls must first be unrolled to align each course then rerolled before torching commences.

3.8.4. Base sheet membrane not to be left exposed longer than ten days before cap sheet is applied. It is recommended the cap sheet application be completed immediately after base sheet has been installed.

3.8.5. At the end of each working day all insulation and cover board must be covered with a minimum of base sheet membrane.

3.9. ROOF MEMBRANE BASE SHEET FLASHING

3.9.1. Extend base sheet from a point 4" (100mm) on the flat roof surface terminating at the highest possible points and at eaves, parapets, copings the flashing membrane shall extend across the top and down the fascia to a point 1/2" (12.5mm) above the lowest terminating point of metal flashing at fascia.

3.9.2. Width of base sheet 1m wide, with lengths to fit, are to be cut from across the width of the rolls and torched or self adhere into place with no voids and with all laps sealed and mitres neatly cut and well sealed.

3.9.3. At sloping roofs base sheet membrane is to terminate 3ft up the sloping roof.

3.10. ROOF MEMBRANE CAP SHEET

3.10.1. Over the surface of the base sheet place the 4mm cap sheet into place and simultaneously heat the surface of the base sheet and underside of cap sheet to a point where the bitumen flows at a sufficient temperature to form homogeneous mass consisting of the base and cap sheet. Slowly roll membrane into the continuous bead of hot melted bitumen overlaps of the cap sheet shall not coincide with the base membrane but be offset by minimum 12" (300mm). Side laps shall be 3" (75mm) (follow selvage edge lines and end laps shall be 6" (150mm). The cap sheet shall terminate at the base of all cant strips.

3.10.2. The rolls must first be unrolled to align each course and then rerolled prior to torching the membrane into place.

3.10.3. All end laps of adjacent sheets are to be degranulated before the cap sheet membrane sheets are bonded together.

3.10.4. Liquid modified bitumen must flow in front of the cap sheet as it is being rolled onto the base sheet to ensure proper and complete adhesion. A bead of bitumen must flow out at the side lap onto the adjacent surface to seal the side laps.

3.10.5. Bleed outs of bitumen onto adjacent surfaces must be covered with additional loose granules the same colour as the cap sheet.

3.10.6. All end laps are to be neatly cut, the underlying selvage edge corners mitred and the cap sheet is to be neatly cut and fitted around all openings, sleeves, drains and curbing.

3.10.7. Care is to be taken not to walk on the freshly applied cap sheet and any marring or damaging of the cap sheet surface must be repaired either with additional granules broadcast into melted bitumen or with an additional ply of cap sheet. Contractors shall have a wet sponge on site at all time when applying the cap sheet membrane.

3.10.8. If a piece of cap sheet for repair is needed then this piece is to be at least 18" long and is to extend from the side lap of the repaired sheet over to butt against the side lap of the adjacent cap sheet course (The selvage strip is to be removed from the piece of repair material).

3.11. ROOF CAP SHEET FLASHING MEMBRANE

3.11.1. Apply one ply 4mm granular cap sheet as previously specified extending

from a point 6" (150mm) on the flat roof surface terminating at highest possible point and at eaves, parapets and copings the flashing membrane shall extend across the top and down the fascia to a point 1/2" (12.5mm) above the lowest terminating point of metal flashing at fascia.

3.11.2. Width of the cap sheet 1m wide with lengths to fit, are to be cut from across the width of the rolls and torched into place with no voids and with all laps sealed and mitres neatly cut and well sealed.

3.11.3. All laps at mitres at adjacent sheets and the underlying cap sheet membrane surfaces are to be degranulated before the cap sheet membrane is torched into place

3.11.4. At parapets with a metal upstand to terminate membrane flashings a bead of sealant is to be applied and covered with granular

3.11.5. Mechanical fastening at curbs shall consist of nailing at the top at 6" (150mm) oc. Wherever reglets occur and at vertical surfaces apply a bead of Parafast(PS-304 Sealant) where membrane terminates and secure 1" (25mm) below with a continuous metal fastening strip at 12" (300mm) oc.

3.11.6. "Strip-in" flanges of "stack jacks" and other flashing flanges with the flashing membrane basically as previously specified. Ensure flanges are primed and set into (PA-828 Flashing Cement) a bed of hot asphalt set in over the base sheet. The prime membrane shall be torched to the flange all as specified and directed. Around the base of the stack jack provide Parafast adhesive (PS-304 Sealant) and granular to match the colour of the membrane.

3.12. EXPANSION JOINTS

3.12.1. Supply and install metal bellows and insert expansion joint filler of sufficient height to extend 3/4" (18.75mm) above the top of cant strips. Terminate roof membrane at the base of expansion joint filler and immediately install fibre cant strips.

3.12.2. Commencing with the base sheet membrane extending 4" (100mm) on top of the previously applied system and extending up and over the expansion joint extending 4" (100mm) onto the previously applied system on the opposite side of the expansion joint. Once the base sheet membrane has been completed the cap sheet shall be torched into place extending 6" (150mm) onto the previously applied system and extending up and over the expansion joint extending 6" (150mm) on the opposite side of the expansion joint. Prior to installing the membrane degranulate the previously installed membrane as required. Flashing system at the junction of eaves must extend up and over eave and be secured at lowest point. Referring to walls and parapets, membrane shall extend 8" (200mm) up vertical surface and be mechanically secured.

3.13. WALL EXPANSION JOINTS

3.13.1. Supply and install metal bellows and insert expansion joint filler of sufficient

height to extend 1 1/2" (37.5mm) above the top of cant strip. Terminate roof membrane at base of expansion joint filler and install fibre cant strip.

3.13.2. Provide the base sheet membrane commencing 4" (100mm) onto previously applied system extending up and over the cant strip, insulation and extending 17" up the vertical wall. Commencing 6" onto the previously applied system torch the modified membrane cap sheet into place over top of the entire base sheet membrane and extending 18" up the vertical wall. Apply mastic sealant where membrane terminates and provide continuous metal fastening strip 1" (25mm) below termination of the membrane flashing.

3.14. ROOF DRAINS

3.14.1. Temporarily block drain pipe during installation and ensure insulation thickness has been reduced.

3.14.2. Copper drains shall be set into a bed of Mastic. Ensure flashing flange is primed and strip-in flange with base sheet and cap sheet membrane.

3.14.3. Referring to scupper drains, ensure that same are prefabricated, complete with gravel stop, and flanges are primed. Extend base membrane through the scupper opening and turn the membrane down the face. Set scupper into a bed of Mastic, secure and strip-in flanges with cap sheet membrane.

3.15. CAULKING

3.15.1. Apply caulking sealant into all reglets and at points deemed necessary by the Owner or his authorized representative following installation of metal flashing. Caulking sealant shall be applied in strict accordance with the manufacturer's literature. Ensure caulking is tooled to provide and even finish. Colour of caulking shall match sheet metal counter-flashings or other adjacent material confirmed by the Consultant.

3.15.2. Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

3.15.3. Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.

3.15.4. 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.

3.15.5. Ensure joint surfaces are dry.

3.15.6. Prepare surfaces in accordance with manufacturer's directions.

3.15.7. Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

3.15.8. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.15.9. Apply bond breaker tape where required to manufacturer's instructions.

3.15.10. Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.15.11. Apply sealant in accordance with manufacturer's written instructions.

3.15.12. Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

3.15.13. Apply sealant in continuous beads.

3.15.14. Apply sealant using gun with proper size nozzle.

3.15.15. Use sufficient pressure to fill voids and joints solid.

3.15.16. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

3.15.17. Tool exposed surfaces before skinning begins to give slightly concave shape.

3.15.18. Remove excess compound promptly as work progresses and upon completion.

3.15.19. Cure sealants in accordance with sealant manufacturer's instructions.

3.15.20. Do not cover up sealants until proper curing has taken place.

3.16. CLEANUP

3.16.1. Clean adjacent surfaces immediately and leave work neat and clean.

3.16.2. Remove excess and droppings, using recommended cleaners as work progresses.

3.16.3. Remove masking tape after initial set of sealant.

3.17. VENT AND OTHER PIPES PROTRUDING THROUGH DECK

3.17.1. Install stack jacks, etc., including all accessories, specified and supplied by Division 15 and / or Division 16. Ensure flanges are primed and set in a continuous bed of asphalt. "Strip-in" flanges with 3-ply flashing membrane. Extend first ply 6" (150mm), second ply 9" (225m) and the third ply 12" (300mm) beyond the flange.

END OF SECTION