GAF PREFACE SPEC NOTE: This Product Master Specification Section includes GAF SPEC NOTES for information purposes and to assist the editor in making appropriate decisions. GAF SPEC NOTES are colour-coded, identifying type and responsibility/action requirements, and always immediately precede the text to which it is referring.

GAF PREFACE SPEC NOTE: Optional text is indicated by square brackets [ ]; Delete the optional text including the brackets in the final copy of the Specification. Delete all GAF SPEC NOTES in the final copy of the Specification, prior to Project Tendering/Pricing. The Section content serves as a guideline only and should be edited (by additions, deletions, and modifications) to meet specific project requirements.

GAF PREFACE SPEC NOTE: This Specification Section follows the recommendations of the Construction Specifications Canada (CSC), Manual of Practice including MasterFormat names and numbers, SectionFormat layout guidelines, and PageFormat paragraph numbering.

GAF PREFACE SPEC NOTE: GAF manufactures and sells roofing products. GAF does not practice architecture or engineering. Therefore, the design responsibility remains with the architect or engineer. We hope the information given here will be of some assistance. It is based upon data considered to be true and accurate and is offered solely for the user's consideration, investigation and verification. Nothing contained herein is representative of a warranty or guarantee for which GAF can be held legally responsible. GAF does not assume any responsibility for any misinterpretation or assumptions the reader may formulate.

GAF PREFACE SPEC NOTE: This Specification specifies induction-welded TPO roofing membranes “EverGuard TPO”.

GAF PREFACE SPEC NOTE: TPO (thermoplastic polyolefin) roofing is a type of single-ply thermoplastic roofing membrane with TPO as the principal polymer.

GAF PREFACE SPEC NOTE: Induction welded TPO roofing is an innovative method for installing single-ply roofing membranes that offers several advantages over traditional attachment techniques. This system uses electromagnetic induction to create a strong, non-penetrating bond between the TPO membrane and specially coated metal plates fastened to the roof deck.

GAF PREFACE SPEC NOTE: By eliminating membrane penetrations, induction-welding reduces potential leak points while offering high wind uplift resistance.

GAF ENVIRO SPEC NOTE: This Section specifies environmentally responsible material choices. The inclusion of recycled content provides efficient use of natural resources and diverts materials from the waste system.

GAF ENVIRO SPEC NOTE: GAF’s products may offer contributions toward sustainable rating systems including, but not limited to, LEED, WELL, Living Building Challenge, Green Globes, IGCC/ASHRAE, and CALGreen. Contributions include heat island reduction, embodied carbon reduction, material transparency, responsible sourcing, and low-emitting materials. Coordinate certification strategies with the design team to ensure alignment with project objectives.

1. General
	1. general requirements
		1. The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division 1 General Requirements shall be read in conjunction with and govern this section.

GAF SPEC NOTE: Edit the following paragraph to select either Contractor or Construction Manager, and Subcontractor or Trade Contractor, depending on the Contract Type used on the Project.

GAF SPEC NOTE: When Tendering this Section to a Contractor, select both Contractor and Subcontractor. When issuing this Section for Pricing, Select both Construction Manager and Trade Contractor. Delete the title references not required on the Project.

* + 1. The Specification shall be read in its entirety by all parties concerned. Each Section may contain more or less than the complete work of any trade. The [Contractor][Construction Manager] is solely responsible to make clear to the [Subcontractor][Trade Contractor] the extent of their work.
		2. The Consultant and Owner assume no responsibility to act as arbiters or to establish subcontract limits between Sections or Divisions of the Work. Any references to related work items contained in this Section are provided for convenience only.
	1. summary
		1. Provide labour, materials, Products, equipment and services to complete the induction-welded TPO roofing work specified herein. This includes, but is not necessarily limited, to:
			1. Conventional roof assembly system consisting of TPO single-ply roofing membrane, TPO flashings, TPO accessories, insulation, cover boards, substrate boards, and vapour retarders.
			2. Auxiliary materials required for a complete installation.
	2. REFERENCE Standards

*GAF* SPEC NOTE: Edit the following paragraph to reflect reference standards for this Project.

* + 1. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
		2. All reference amendments adopted prior to the bid closing date of this Project shall be applicable to this Project.
		3. All materials, installation and workmanship shall comply with all applicable requirements and standards.
		4. American Society for Testing and Materials (ASTM):
			1. ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
			2. ASTM C1177: Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
			3. ASTM C1278: Standard Specification for Fiber-Reinforced Gypsum Panel
			4. ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
			5. ASTM D1079: Standard Terminology Relating to Roofing and Waterproofing
			6. ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
			7. ASTM D1475: [Standard Test Method for Density of Liquid Coatings, Inks, and Related Products](https://www.astm.org/d1475-13r20.html)
			8. ASTM D1644: [Standard Test Methods for Nonvolatile Content of Varnishes](https://www.astm.org/d1644-01r23.html)
			9. ASTM D2196: [Standard Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational Viscometer](https://www.astm.org/d2196-20.html)
			10. ASTM D6878: Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing
			11. ASTM E1980: Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
		5. Canadian Roofing Contractors Association (CRCA)
			1. CRCA Roofing Specifications Manual.
		6. CSA Group (CSA)
			1. CSA A123.21: Standard Test Method for The Dynamic Wind Uplift Resistance Of Membrane-Roofing Systems
		7. FM Approvals
			1. FM Approvals 4470: Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction
		8. International Organization for Standardization (ISO)
			1. ISO 14025: Environmental labels and declarations — Type III environmental declarations — Principles and procedures
		9. Underwriters Laboratories of Canada (CAN/ULC)
			1. CAN/ULC S704: Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
			2. CAN/ULC S770: Standard Test Method for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams
	1. definitions
		1. Roofing Terminology: Refer to CRCA Specifications Manuals and ASTM D1079 for the definition of terms related to roofing work in this Section.
	2. ADMINISTRATIve REQUIREMENTS
		1. Coordination: Coordinate site dimensions affecting work of other Sections and provide data, dimensions and components installed by other Sections in sufficient time for installation of products specified in this Section.
			1. Coordinate sizes and locations of framing, blocking, furring, and reinforcements provided by work that is specified in other Sections, ensuring their completeness before starting work of this Section.

*GAF* SPEC NOTE: Edit the following paragraph to make the required selections and remove square brackets indicated below.

* + 1. Pre-Construction Meeting: Arrange a preconstruction meeting in accordance with
		[Division 01][Section 01 31 19 Project Meetings].
		2. Notification: Notify Consultant and Owner of scheduled meeting dates in advance; minimum 72 hour notice required.
		3. Attendees: Attended by [Contractor][Construction Manager], Consultant, and the roofing [Subcontractor][Trade Contractor] to discuss the following:
			1. Establishing procedures to maintain optimum working conditions and to coordinate Work of this Section with related and adjacent work.
			2. Review project scheduling and coordination.
			3. Discuss roofing installation procedures.
			4. Verify site conditions, roof deck support, and penetrations.
			5. Review flashing, details, and penetrations.
			6. Address temporary protection of roofing system.
		4. Reporting: Record significant discussions, agreements, and disagreements, including required corrective measures and actions.
		5. Distribution: Distribute minutes of the meeting to each party present and to other parties requiring information not more than 72 hours after meeting.
	1. INFORMATIONAL SUBMITTALS

*GAF* SPEC NOTE: Edit the following paragraph to make the required selections and remove square brackets indicated below.

* + 1. Provide submittals as indicated in [Division 01][Section 01 33 00 Submittal Procedures].
		2. Action Submittals: Provide the following submittals before starting work of this Section:
			1. Product Data: Submit manufacturer’s product characteristics, catalogue cuts, installation instructions and other relevant information for each material and product used for the induction-welded TPO roofing membrane roofing work specified in this Section.

GAF ENVIRO SPEC NOTE: Keep the following paragraph when specifying membranes with high SRI values to document compliance with heat island effect reduction requirements.

* + - * 1. Ensure product data indicates SRI values for roofing materials (initial and 3-year aged).
			1. Shop Drawings: Submit Shop Drawings consisting of manufacturer’s standard details and shop drawings for roof system specified. Indicate the following:
				1. Material layouts, details of construction, connections, and relationship with adjacent construction.
				2. Tapered insulation, including slopes.
				3. Crickets, saddles, and tapered edge strips, including slopes.
				4. Fastening patterns.
		1. Information Submittals:
			1. Manufacturer's Certificate:
				1. Submit letter signed by manufacturer certifying that products meet or exceed specified requirements. Submit evidence of meeting performance requirements by submitting additional test and evaluation reports as well as conformance to applicable listings.
				2. Compatibility: Compatibility between components of roofing system is essential. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.
			2. Warranties: Submit copies of warranties specified in this Section for Consultant’s review.

*GAF* SPEC NOTE: Edit this SPEC NOTE to include a link to the CSA listed systems.

* + - 1. System Test Reports: Submit reports substantiating conformance with requirements of CSA A123.21 based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
	1. sustainable design submittals

GAF SPEC NOTE: GAF has a product-specific EPD for its roof membrane available at: <https://info.nsf.org/Certified/Sustain/ProdCert/EPD10289.pdf>

GAF SPEC NOTE: Delete when not required on the Project.

* + 1. Embodied Carbon / Environmental Product Declarations (EPDs): Submit product-specific EPD for roofing membrane conforming to ISO 14025 or other recognized environmental Product declaration framework meeting following criteria:
			1. EPD Scope: must cover Cradle-to-Gate (A1 to A3) as a minimum.
			2. EPD Impact Categories: must report Global Warming Potential (GWP) in form of unit of kgCO2e/declared unit as a minimum.
			3. Product Options: Give preference to Products with compliant documentation when choice is at Contractor’s option.

GAF ENVIRO SPEC NOTE: GAF has various material transparency documentation for its product offerings available at <https://transparencycatalog.com/company/gaf> Delete when not required on the Project.

* + 1. Material Ingredient Disclosure: Submit documentation disclosing chemical inventory of materials to at least 0.1% (1000ppm) meeting following criteria:
			1. Standard: Health Product Declaration (HPD) Open Standard, Cradle to Cradle v2 (Basic level) or Cradle to Cradle v3 (Bronze level), International Living Future Institute (ILFI) Declare, or other approved material ingredient declaration framework.
			2. Product Options: Give preference to Products with compliant documentation when choice is at Contractor’s option.

GAF ENVIRO SPEC NOTE: Most sustainable building rating systems include credits for recycled content in materials calculated on the basis of pre-consumer and post-consumer percentage content. Edit the text below to reflect the specific requirements of the sustainable building rating system used. Delete when not required on the Project.

* + 1. Recycled Content:
			1. Indicate recycled content, including percentages of pre-consumer and post-consumer recycled content for each product.
			2. Indicate the relative dollar value of products with recycled content compared to the total dollar value of products included in the project.

GAF ENVIRO SPEC NOTE: Most sustainable building rating systems include credits for the use local or regional materials as defined by the rating system. Specifying local materials may help minimize transportation impacts; however it may not have a significant impact on reducing the overall embodied energy of a building material because of efficiencies of scale in some modes of transportation.

* + 1. Local/Regional Materials:
			1. Sourcing Locations: Provide extraction, harvesting, and recovery locations, and indicate distances from these locations to the project site.
			2. Manufacturing Locations: Indicate the location of the manufacturing facility and the distance from the facility to the project site.
			3. Product Value: Provide the dollar value of products containing local or regional materials, based on material costs only.
			4. Product Component Values: For products with components sourced or manufactured at separate locations, provide the location details for each component. Indicate the percentage by weight of each component per unit of product.

GAF ENVIRO SPEC NOTE: All GAF’s EnergyGuard™ polyisocyanurate insulation have Greenguard Gold certification. Delete when not required on the Project.

* + 1. Emissions testing documentation for insulation: For polyisocyanurate insulation used as part of roofing system, submit certifications from third-party organizations indicating compliance with following:
			1. VOC Emissions: California Department of Public Health (CDPH) Standard Method v1.2–2017, using applicable exposure scenario.
		2. VOC Content for adhesives and sealants: Submit manufacturer’s product data for adhesives. Indicate VOC limits of the product. Submit SDS highlighting VOC limits.
	1. closeout submittals

*GAF* SPEC NOTE: Edit the following paragraph to make the required selections and remove square brackets indicated below.

* + 1. Closeout Submittals, generally: In accordance with [Division 01][[Section 01 78 00].
		2. Operating and Maintenance Data: Submit care and maintenance instructions for induction-welded TPO membrane roofing to be included in building operation and maintenance manual.
		3. Warranty Documentation: Submit copy of extended warranties specified in this Section.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Provide Products for work of this Section by manufacturer with at least 10 years’ experience manufacturing such materials.
		2. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to obtain manufacturer's extended warranty specified in this Section.
			1. Installer must have received training in the use of induction-welding equipment.
		3. Single Source Responsibility: Obtain primary materials for this Section from a single source by a single manufacturer, and secondary materials from sources recommended by manufacturers of primary materials.
			1. Mixing Products across from various manufacturers without manufacturer’s written permission is not permitted.

*GAF* SPEC NOTE: Mockups are used to verify the quality of materials, workmanship, and installation methods prior to full-scale installation. They provide a reference for the Contractor and the Consultant to ensure that the final installation meets specified expectations. Delete the paragraph below if the scope of the work does not justify the installation of a mock-up.

* 1. Mock-Up:
		1. Mock-Ups / First Installation Review: Construct mock-ups to verify selections made under submittals, demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
			1. Location: In-situ (i.e. first installation), as directed on site by Consultant.
			2. Construct mock-up 10 m² (100 sq ft.) minimum size showing typical lap joint, one inside corner and one outside corner.
			3. Purpose: To set benchmarks for installation and to judge subsequent work. Maintain Mock-ups during construction in undisturbed condition.
			4. Reviewed mock-ups: may become part of the completed work if undisturbed at the time of Substantial Performance of The work, provided they are undisturbed, and comply with requirements outlined in Contract Documents.
		2. Provide and document modifications to construction details and interfaces between components and systems required to properly sequence the Work, or to pass performance testing requirements.
			1. Obtain Consultant’s approval for all modifications prior to proceeding with work.

*GAF* SPEC NOTE: If Mock-ups are required on the Project, keep the following subparagraphs.

* + 1. Mock-up Review Meeting:
			1. Schedule mock-up review meeting, attended by [Contractor][Construction Manager], [Subcontractor][Trade Contractor], Roofing Manufacturer’s Representative and Consultant.
			2. Review mock-up for quality of workmanship, detailing and fastening, adjacent materials tie-in, and accessories installation. Do not proceed with remaining work until workmanship is approved by the manufacturer’s representative and Consultant.
			3. Retain approved mock-ups constructed in place as part of the Work. Seamlessly incorporate approved mock-ups into remaining Work.
	1. DELIVERY, STORAGE, HANDLING and protection

GAF SPEC NOTE: Edit the following paragraph to make the required selections and remove square brackets indicated below.

* + 1. Follow packaging, shipping and product handling requirements recommended by the manufacturer, and as indicated in [Division 01][Section 01 45 43].
		2. Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location. Do not load any area beyond the design limits.
		3. Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
		4. Deliver, store and handle induction-welded TPO membrane roofing materials in accordance with manufacturer’s written instructions.
		5. Deliver roofing materials in sealed, original containers. Labels must include manufacturer's name, product brand, type, date of manufacture, storage and mixing instructions, and markings or approval from listing agency.
		6. Store liquid materials in undamaged, original containers in a clean, dry, and protected area, within the manufacturer's specified temperature range. Protect from direct sunlight.
		7. Store pail goods in original containers in clean, dry conditions.
		8. Do not permit exposure of materials to moisture during transport, storage, or installation. Materials showing moisture exposure are to be rejected.
		9. Remove plastic covers supplied by manufacturer and replace with breathable covers, such as canvas tarpaulins, to allow proper ventilation.
		10. Cover materials at the end of each workday; remove covers only immediately before installation.
		11. Protect roof insulation from physical damage, sunlight, moisture, and other environmental hazards.
		12. Store materials above 12.6°C (55°F) for at least 24 hours before application.
	1. FIELD CONDITIONS
		1. Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
		2. Do not install roofing system during inclement weather that may affect adhesion, curing or sealing of membranes or components.
		3. Ensure ambient temperatures are above 7.2°C (45°F) when applying hot asphalt or water-based adhesives.
	2. WARRANTY

GAF SPEC NOTE: Edit the following paragraph to make the required selections and remove square brackets indicated below.

GAF SPEC NOTE: Ensure warranty requirements are discussed and verified with GAF and the Owner before specifying in Contract Documents. Elements like wind uplift resistance and warranty extension requires strict adherence to manufacturer’s installation requirements and maintenance guidelines. For complete warranty terms, consult with GAF Design Services who can be reached at designservices@gaf.com.

* + 1. Provide extended guarantees in accordance with [Division 01][Section 01 78 36].

The paragraph below specifies GAF’s standard NDL Guarantee without wind coverage.

* + 1. Manufacturer’s Standard NDL Guarantee: Submit for Owner’s review and acceptance, manufacturer’s standard EverGuard® Diamond Pledge™ Guarantee, offering single-source edge-to-edge coverage with no monetary limitation. The manufacturer is responsible for repairing or replacing components of the roofing system that result in leaks due to material failure or workmanship defects.
			1. Components Covered: TPO roofing membrane, liquid-applied membrane or coating, base flashing, high wall waterproofing flashing, insulation, expansion joint covers, preflashed accessories, and metal flashings used by the contractor of record that were designed and installed in accordance with an appropriate ES-1 certified edge detail (the "GAF Roofing Materials").
			2. Exclusions: Leaks caused by materials not supplied by roofing manufacturer such as roof deck, existing materials, or insulation not supplied by roof manufacturer are excluded from coverage.

GAF SPEC NOTE: Keep the wind uplift resistance option below if wind performance is a critical project requirement. Wind resistance options may affect material selection and fastening patterns. Ensure warranties specified do not exceed roof’s design calculations specified in Part 2 of this Section.

* + - 1. Warranty Period: Not less than [5][10][15][20][25][30] years from date of [Substantial Performance of The work][Ready-for-Takeover].

GAF SPEC NOTE: The paragraph below specifies GAF’s standard NDL Guarantee with Wind, Hail, and/or Accidental Puncture Coverage. Edit the text below to reflect the requirements of your project.

* + 1. Manufacturer’s Standard NDL Guarantee with the following additional coverage: [Wind,] [Hail,] [and] [Accidental Puncture]:
			1. Submit for Owner’s review and acceptance, manufacturer’s standard EverGuard® Diamond Pledge™ Guarantee, offering single-source edge-to-edge coverage with no monetary limitation. The manufacturer is responsible for repairing or replacing components of the roofing system that result in leaks due to material failure or workmanship defects.
			2. Components Covered: PVC roofing membrane, liquid-applied membrane or coating, base flashing, high wall waterproofing flashing insulation, expansion joint covers, preflashed accessories, and metal flashings used by the contractor of record that were designed installed in accordance with an appropriate ES-1 certified edge detail (the "GAF Roofing Materials").
			3. Exclusions: Leaks caused by materials not supplied by roofing manufacturer such as roof deck, existing materials, or insulation not supplied by roof manufacturer are excluded from coverage.

GAF SPEC NOTE: Keep the wind uplift resistance option below if wind performance is a critical project requirement. Wind resistance options may affect material selection and fastening patterns. Ensure warranties specified do not exceed roof’s design calculations specified in Part 2 of this Section.

GAF SPEC NOTE: GAF’s standard guarantees provide coverage for leaks resulting from wind speeds up to 55 mph. Coverage in excess of the 55 mph limit is available for purchase for select systems and requires advance written approval from GAF. Coverage of 100 mph or greater requires the use of an approved GAF Perimeter Edge Metal. Contact GAF for additional information and requirements. Keep the text below if you wish to include this additional protection.

* + - 1. Wind Protection: Provide manufacturer’s standard wind addendum guarantee for speeds up to [145 kph (90 mph)] [160 kph (100 mph)] based on installation in accordance with manufacturer’s guidelines.

GAF SPEC NOTE: GAF’s standard guarantees do not provide coverage for hail. Coverage for hail is available for purchase for select systems only and requires advance written approval from GAF. Contact GAF for additional information and requirements. See specimen copy of EverGuard® Diamond Pledge™ NDL Roof Guarantee (Hail Coverage), available at www.gaf.com, for complete coverage and restrictions. Contact GAF for additional information and requirements. Keep the text below if you wish to include this additional protection.

* + - 1. Hail Coverage Protection: Provide manufacturer’s standard hail coverage guarantee protection against hail impact up to [25 mm (1in)] [50 mm (2in)] [75 mm (3in)] in diameter in accordance with manufacturer’s standard terms and conditions.

GAF SPEC NOTE: GAF’s guarantees do not provide coverage for punctures. Coverage for accidental punctures is available for purchase for select systems only and requires advance written approval from GAF. Contact GAF for additional information and requirements. Keep the text below if you wish to include this additional protection.

* + - 1. Accidental Puncture Coverage Protection: Provide manufacturer’s standard accidental puncture coverage protection in which manufacturer agrees to repair punctures up to 50 mm (2 in) in diameter and tears up to 150 mm (6 in) in length caused by accidental impact damage in accordance with manufacturer’s standard terms and conditions.
			2. Warranty Period: Not less than [5][10][15][20][25][30] years from date of [Substantial Performance of The work][Ready-for-Takeover].

The paragraph below specifies GAF’s standard NDL Guarantee with Wind, Hail, Accidental Puncture, and the WELL ROOF™ Guarantee Extension (maintenance program):

* + 1. Manufacturer’s Standard NDL Guarantee and Maintenance Program with the following additional coverage: [Wind,] [Hail,] [and] [Accidental Puncture]:
			1. Submit for Owner’s review and acceptance, manufacturer’s standard EverGuard® Diamond Pledge™ Guarantee with the WELL ROOF™ Guarantee Extension Program, offering single-source edge-to-edge coverage with no monetary limitation. The manufacturer is responsible for repairing or replacing components of the roofing system that result in leaks due to material failure or workmanship defects. Warranty must include option for additional guarantee extension through an approved maintenance program.
				1. Components Covered: PVC roofing membrane, liquid-applied membrane or coating, base flashing, high wall waterproofing flashing insulation, expansion joint covers, preflashed accessories, and metal flashings used by the contractor of record that were designed installed in accordance with an appropriate ES-1 certified edge detail (the "GAF Roofing Materials").
				2. Exclusions: Leaks caused by materials not supplied by roofing manufacturer such as roof deck, existing materials, or insulation not supplied by roof manufacturer are excluded from coverage.

GAF SPEC NOTE: The maintenance program encourages regular roof inspections to extend the guarantee period. Only GAF Chairman’s Circle and Platinum Elite Certified Contractors are eligible to provide this service. Contact GAF for specific requirements.

* + 1. Guarantee Extension through Maintenance Program: Manufacturer shall extend the original warranty period by 25%, provide roof is inspected and maintained in compliance with manufacturer’s standard maintenance requirements.
			1. Approved Contractors: Maintenance services must be performed by a GAF Chairman’s Circle or Platinum Elite Certified Contractor.
			2. Maximum Guarantee Duration: In no event shall the cumulative warranty period, including the extension through the maintenance program, exceed 35 years.

GAF SPEC NOTE: Keep the wind uplift resistance option below if wind performance is a critical project requirement. Wind resistance options may affect material selection and fastening patterns. Ensure warranties specified do not exceed roof’s design calculations specified in Part 2 of this Section.

GAF SPEC NOTE: GAF’s standard guarantees provide coverage for leaks resulting from wind speeds up to 55 mph. Coverage in excess of the 55 mph limit is available for purchase for select systems and requires advance written approval from GAF. Coverage of 100 mph or greater requires the use of an approved GAF Perimeter Edge Metal. Contact GAF for additional information and requirements. Keep the text below if you wish to include this additional protection.

* + - 1. Wind Protection: Provide manufacturer’s standard wind addendum guarantee for speeds up to [145 kph (90 mph)] [160 kph (100 mph)] based on installation in accordance with manufacturer’s guidelines.

GAF SPEC NOTE: GAF’s standard guarantees do not provide coverage for hail. Coverage for hail is available for purchase for select systems only and requires advance written approval from GAF. Contact GAF for additional information and requirements. See specimen copy of EverGuard® Diamond Pledge™ NDL Roof Guarantee (Hail Coverage), available at www.gaf.com, for complete coverage and restrictions. Contact GAF for additional information and requirements. Keep the text below if you wish to include this additional protection.

* + - 1. Hail Coverage Protection: Provide manufacturer’s standard hail coverage guarantee protection against hail impact up to [25 mm (1in)] [50 mm (2in)] [75 mm (3in)] in diameter in accordance with manufacturer’s standard terms and conditions.

GAF SPEC NOTE: GAF’s guarantees do not provide coverage for punctures. Coverage for accidental punctures is available for purchase for select systems only and requires advance written approval from GAF. Contact GAF for additional information and requirements. Keep the text below if you wish to include this additional protection.

* + - 1. Accidental Puncture Coverage Protection: Provide manufacturer’s standard accidental puncture coverage protection in which manufacturer agrees to repair punctures up to 50 mm (2 in) in diameter and tears up to 150 mm (6 in) in length caused by accidental impact damage in accordance with manufacturer’s standard terms and conditions.
			2. Warranty Period: Not less than [5][10][15][20][25][30] years from date of [Substantial Performance of The work][Ready-for-Takeover].

GAF SPEC NOTE: The Canadian Roofing Contractors Association (CRCA) offers a warranty program that provides assurance to clients for roofing projects completed by its members. This warranty is known as the CRCA "Standard Form of Warranty". It is important to note that some provincial roofing organizations such as the RCABC offer warranty programs that differ from the CRCA warranty. Edit the paragraph below to reflect the requirements of the project.

* + 1. Installer Warranty: Submit CRCA "Standard Form of Warranty" covering costs associated with repairing or replacing damaged components in induction-welded TPO membrane roofing system that result from failures due to materials or workmanship in the Work of this Section.
			1. Warranty Period: Two years from date of Substantial Performance of the Work.
1. Products
	1. MANUFACTURER

GAF SPEC NOTE: Edit the following paragraph to make the required selections and remove square brackets indicated below.

* + 1. Basis-of-Design Products: Products named in this Section were used as the basis-of-design for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products, and provided they submit requests for substitution in accordance with [Division 01][Section 01 33 00 Submittal Procedures].
		2. Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:
			1. GAF, Commercial Roofing Products Division
			1 Campus Drive; Parsippany, NJ 07054;
			Toll Free Tel: 877-423-7663 (option 4, then option 2);
			Email: designservices@gaf.com;
			Web: [www.gaf.com](http://www.gaf.com)

GAF SPEC NOTE: Edit the paragraph below based on whether or not Contractor-proposed substitutions are permitted.

* + 1. Substitution Limitations: [No further substitutions are acceptable.] [In accordance with requirements of Section 01 25 00.]
	1. performance / design criteria
		1. General Performance:
			1. Provide installed membrane roofing and flashing system that:
				1. Remains watertight.
				2. Withstands specified uplift pressures, thermal movement, and weather exposure.
				3. Performs without failure due to defects in manufacture, fabrication, installation, or construction.
			2. Material Compatibility: Ensure compatibility between roofing system components and interfacing materials. Roof system must not adversely affect adjacent materials.

GAF SPEC NOTE: In accordance with NBC 5.2.2.2. Determination of Wind Load, the wind uplift resistance of membrane roofing assemblies must be determined according to CAN/CSA A123.21.

GAF SPEC NOTE: However, membrane roofing assemblies with proven past performance for the expected wind loads may be exempt from complying with this requirement. Verify the NBC and determine whether the paragraph below should remain in the specification.

GAF SPEC NOTE: If retaining the paragraph below, obtain the values below from the project’s structural engineer or from the NRC’s Wind Uplift calculator (Wind RCI): <https://nrc.canada.ca/en/research-development/products-services/software-applications/wind-roof-calculators-internet-wind-rci>

* + 1. Dynamic Wind Uplift Design: Roofing system must have undergone testing by a qualified testing and inspection agency to resist dynamic wind uplift pressure based on [National Building of Canada] [insert provincial code here] requirements and testing to CAN/CSA A123.21 for the following pressures:
			1. Corner Uplift Pressure: [insert pressure] kPA.
			2. Perimeter Uplift Pressure: [insert pressure] kPA.
			3. Field-of-Roof Uplift Pressure: [insert pressure] kPA.

GAF SPEC NOTE: FM (Factory Mutual) is a third-party testing organization that evaluates complete roofing systems for hazards such as fire, wind, and hail.

GAF SPEC NOTE: FM Approvals Listings are always required on FM insured buildings. Delete the following if the project does not require FM Approvals Listings. It is worth noting that RoofNav numbers only apply to new construction, tear-offs and recovers. There are no RoofNav assemblies for assemblies over Plywood or OSB decks, or for Partial Tear Offs.

* + 1. FM Approvals Listing: Provide roofing systems listed in FM Approvals' "RoofNav" and complying with requirements of FM Approvals 4450 and FM Approvals 4470 as follows:
			1. RoofNav Number: [Insert Roof Nav Number]
			2. Fire/Windstorm Classification: [Class 1-60][Class 1-75][Class 1-90]
			3. Hail Resistance Rating: [MH][SH].
		2. Roof Fire Covering Classification: Conforming to CAN/ULC S107 with [Class A][Class B][ Class C] classification.
	1. SUSTAINABILITY CHARACTERISTICS

GAF ENVIRO SPEC NOTE: The following requirements meet LEED’s specifications for the heat island reduction credit. Greenglobe’s requirements are less stringent than LEED. Delete when not required on the project.

* + 1. Heat Island Reduction:
			1. Low-sloped roofs (≤ 2:12) shall have a minimum initial SRI of 82 or 3-year aged SRI of 64 when calculated in accordance with ASTM E1980.
			2. Steep-sloped roofs (> 2:12) shall have a minimum initial SRI of 39 or 3-year aged SRI of 32 when calculated in accordance with ASTM E1980.
		2. Material Ingredient Requirements:

GAF ENVIRO SPEC NOTE: Keep the following paragraph to support Credit X01 from the WELL v2 rating system. Delete when not required on the project.

* + - 1. All Products used for the Work of this Section shall not contain asbestos, mercury, and lead.

GAF ENVIRO SPEC NOTE: Keep the following paragraph to support Credit I13 - Red List Compliance from the Living Building Challenge system. Delete when not required on the project.

* + - 1. Insulation Products shall be [LBC Red List approved] [LBC Red List free].

GAF ENVIRO SPEC NOTE: All GAF’s EnergyGuard™ polyisocyanurate insulation have Greenguard Gold certification. Delete when not required on the Project.

* + - 1. Insulation Products shall comply with CDPH Standard Method v1.2–2017, using applicable exposure scenario.

GAF SPEC NOTE: GAF offers a “BuilYourRoof” tool designed to help professionals in selecting products and accessories to go into their roof system. The current specification Refer to the following link: <https://www.gaf.com/en-us/for-pros/commercial-build-your-roof>. We encourage you to review this online tool to assist and enhance your specification.

* 1. tpo roof membrane

GAF SPEC NOTE: "Smooth Minimum Thickness Membranes" are manufactured to ensure a consistent minimum thickness of throughout. This guarantees that no point in the membrane will be thinner than the specified thickness.

GAF SPEC NOTE: "Smooth Membranes," on the other hand, are produced to a nominal thickness. As such, slight variations may occur, which leads to some areas being slightly thicker or thinner, as long as the overall average thickness meets the specified nominal value.

* + 1. Smooth TPO Roofing Membrane:
			1. Description: ASTM D6878/D6878M, scrim-reinforced TPO membrane designed for use in single-ply roofing applications.
			2. Thickness: [45 mils] [60 mils] [80 mils]
			3. Colour: White
			4. Basis-of-Design Product:

GAF SPEC NOTE: Membrane thickness selection will affect the product’s eligibility for warranty coverage. Generally, all thicknesses are eligible for warranty coverage up to 20 years. For additional warranty coverage, various restrictions apply.

GAF SPEC NOTE: Refer to GAF’s Commercial Guarantee Coverage for Single Ply Systems available here: [https://documents.gaf.com/warranties,-guarantees-&-addendums/single-ply-guarantee-coverage-matrix-comeg858.pdf](https://documents.gaf.com/warranties%2C-guarantees-%26-addendums/single-ply-guarantee-coverage-matrix-comeg858.pdf)

* + - * 1. [“EverGuard® TPO 45 mil Membrane” by GAF]
				2. [“EverGuard® TPO 60 mil Membrane” by GAF]
				3. [“EverGuard® TPO 80 mil Membrane” by GAF]

GAF SPEC NOTE: The paragraphs below specify Everguard® TPO Extreme. This product has a better heat aging package and is well suited for high heat and solar applications.

* + - * 1. [EverGuard® TPO 50-mil Extreme Smooth Membranes]
				2. [EverGuard® TPO 60-mil Extreme Smooth Membranes]
				3. [EverGuard® TPO 70-mil Extreme Smooth Membranes]
				4. [EverGuard® TPO 80-mil Extreme Smooth Membranes]

GAF SPEC NOTE: Roof cover boards are thin, durable panels installed above the roof insulation and beneath the roof membrane. These boards provide a stable surface, improve puncture resistance, and enhance the durability of the roofing system.

GAF SPEC NOTE: Roof cover boards are particularly well-suited for roofs requiring foot traffic or heavy equipment loads. Delete the following paragraphs if your project does not require a substrate board.

* 1. COVER BOARDS
		1. Manufacturer’s standard type designed to provide firm substrate for roof system installation.

GAF SPEC NOTE: Select one of the following roof board types below based on project requirements. Delete the ones that don’t apply.

* + 1. Polyisocyanurate Cover Board:
			1. Description: Rigid polyisocyanurate cover board with polymer-bonded glass fiber mat facers on both major surfaces. Conforms to or exceeds ASTM C1289, Type II, Class 4, Grade 1 or equivalent to CAN/ULC S704.
			2. Board Thickness: 12.7 mm (1/2 in)
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Compressive Strength: Minimum 552 kPa (80 psi)
			5. Thermal Resistance (LTTR value): R2.5
			6. Basis-of-Design Product: "EnergyGuard™ HD Polyiso Cover Board" by GAF.
		2. Gypsum Roof Board (Water-Resistant):
			1. Description: Water-resistant gypsum core with glass fiber facers embedded on both sides to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Basis-of-Design Product: "GP Dens-Deck® Roof Board" by Georgia-Pacific, distributed by GAF
		3. Gypsum Roof Board (Pre-Primed):
			1. Description: Water-resistant gypsum core with glass fiber facers, pre-primed on one side to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Basis-of-Design Product: "GP Dens-Deck® Prime Roof Board" by Georgia-Pacific, distributed by GAF.
		4. Gypsum Fiber Roof Board:
			1. Description: Fiber-reinforced gypsum panel with integral water-resistant core to ASTM C1278/C1278M
			2. Board Thickness: [6.35 mm (1/4 in)] [9.5 mm (3/8 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Basis-of-Design Product: "Securock® Gypsum Fiber Roof Board" by USG.
		5. Ultralight Glass Mat Roof Board:
			1. Description: Fiber-reinforced gypsum panel with integral water-resistant core to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: 1.22 m x 2.44 m (4 ft x 8 ft)
			4. Basis-of-Design Product: "Securock® Brand Ultralight Glass Mat Roof Board" by USG.
		6. Glass Mat Roof Board:
			1. Description: Gypsum panel with coated fiberglass facers and a moisture and mold-resistant gypsum core to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: 1.22 m x 2.44 m (4 ft x 8 ft)
			4. Basis-of-Design Product: "DEXcell® Glass Mat Roof Board" by National Gypsum.
		7. Heavy Duty Glass Mat Roof Board:
			1. Description: Gypsum panel with coated fiberglass facers and a heavy-duty, moisture and mold-resistant gypsum core to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: 1.22 m x 2.44 m (4 ft x 8 ft)
			4. Basis-of-Design Product: "DEXcell® FA Glass Mat Roof Board" by National Gypsum.
	1. roof insulation

GAF SPEC NOTE: Select one of the following insulation types below based on project requirements. Delete the ones that don’t apply

* + 1. Polyisocyanurate Insulation Board
			1. Description: Rigid polyisocyanurate insulation board with a glass-reinforced cellulosic felt facer conforming to or exceeding ASTM C1289, Type II, Class 1, Grade 2 or equivalent to CAN/ULC S704.
			2. Board Thickness: [Specify thickness] [As indicated on Drawings.]
			3. LTTR value: 1.0 per 25 mm (5.7 per 1 in) based on LTTR testing per CAN/ULC S770.
			4. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			5. Compressive Strength: 138 kPa (20 psi)
			6. Basis-of-Design Product: "EnergyGuard™ Polyiso Insulation" by GAF
		2. Tapered Polyisocyanurate Insulation Board
			1. Description: Rigid, tapered polyisocyanurate insulation board with a glass-reinforced cellulosic felt facer conforming to or exceeding ASTM C1289, Type II, Class 1, Grade 2 or equivalent to CAN/ULC S704.
			2. Board Thickness: [Specify thickness] [As indicated on Drawings.]
			3. Board Size: 1.22 m x 1.22 m (4 ft x 4 ft)
			4. Compressive Strength: 138 kPa (20 psi)
			5. Basis-of-Design Product: "EnergyGuard™ Tapered Polyiso Insulation" by GAF
	1. roof vapour retarder
		1. Description: A self-adhering vapor-inhibiting membrane for use in approved roofing membrane assemblies; composed of a tri-laminated woven polyethylene facer and high-tack adhesive.

GAF SPEC NOTE: GAF SA Vapor Retarder XL is GAF’s standard offering. When applied over a steel deck in 31 mil thickness, GAF SA Vapor Retarder XL obtains an FM Class 1 internal fire rating.

GAF SPEC NOTE: GAF SA Vapor Retarder XL 40 is a heavier / thicker product available

* + 1. Basis-of-Design Product: ["GAF SA Vapor Retarder XL"][ "GAF SA Vapor Retarder XL 40"] by GAF.

GAF SPEC NOTE: Roof substrate boards are durable panels installed directly above steel roof deck. These boards are optional but serve many functions including, but not limited to, providing a thermal barrier (where required by building codes), providing a stable surface to perform subsequent roof operations, and enhancing the overall durability of the roofing system.

GAF SPEC NOTE: These products are generally not required when the installation substrate is a concrete deck. Delete the following paragraphs if your project does not require a substrate board.

* 1. SUBSTRATE boards

GAF SPEC NOTE: Select one of the following roof board types below based on project requirements. Delete the ones that don’t apply.

GAF SPEC NOTE: Select the appropriate board thickness and board size within each roof board type required and remove the options not required on the Project. Remove all square brackets.

* + 1. Manufacturer’s standard type designed to provide firm substrate for roof system installation.
		2. Gypsum Roof Board (Water-Resistant):
			1. Description: Water-resistant gypsum core with glass fiber facers embedded on both sides to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Basis-of-Design Product: "GP Dens-Deck® Roof Board" by Georgia-Pacific, distributed by GAF
		3. Gypsum Roof Board (Pre-Primed):
			1. Description: Water-resistant gypsum core with glass fiber facers, pre-primed on one side to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Basis-of-Design Product: "GP Dens-Deck® Prime Roof Board" by Georgia-Pacific, distributed by GAF.
		4. Gypsum Fiber Roof Board:
			1. Description: Fiber-reinforced gypsum panel with integral water-resistant core to ASTM C1278/C1278M
			2. Board Thickness: [6.35 mm (1/4 in)] [9.5 mm (3/8 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: [1.22 m x 1.22 m (4 ft x 4 ft)] [1.22 m x 2.44 m (4 ft x 8 ft)]
			4. Basis-of-Design Product: "Securock® Gypsum Fiber Roof Board" by USG.
		5. Ultralight Glass Mat Roof Board:
			1. Description: Fiber-reinforced gypsum panel with integral water-resistant core to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: 1.22 m x 2.44 m (4 ft x 8 ft)
			4. Basis-of-Design Product: "Securock® Brand Ultralight Glass Mat Roof Board" by USG.
		6. Glass Mat Roof Board:
			1. Description: Gypsum panel with coated fiberglass facers and a moisture and mold-resistant gypsum core to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: 1.22 m x 2.44 m (4 ft x 8 ft)
			4. Basis-of-Design Product: "DEXcell® Glass Mat Roof Board" by National Gypsum.
		7. Heavy Duty Glass Mat Roof Board:
			1. Description: Gypsum panel with coated fiberglass facers and a heavy-duty, moisture and mold-resistant gypsum core to ASTM C1177/ASTM C1177M.
			2. Board Thickness: [6.35 mm (1/4 in)] [12.7 mm (1/2 in)] [15.9 mm (5/8 in)]
			3. Board Size: 1.22 m x 2.44 m (4 ft x 8 ft)
			4. Basis-of-Design Product: "DEXcell® FA Glass Mat Roof Board" by National Gypsum.
	1. AUXILIARY COMPONENTS
		1. Provide auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
		2. Provide pourable sealers, preformed cone/vent sheet flashings, moulded pipe boot flashings, preformed corner sheet flashings, reinforced TPO securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other elements required for a complete installation.
	2. FASTENERS AND PLATES
		1. Induction welded system: mechanically fastened membrane roofing system using induction welding tool to bond TPO membrane to specially coated fastening plates; and approved by roofing system manufacturer.
		2. Plates must be compatible with TPO membrane material.
		3. Ensure fasteners must be selected based on substrate type and minimum pull-out values required for wind uplift criteria specified.
		4. Induction Welding Tool: Manufacturer’s standard induction welding tool compatible with roofing membrane.
		5. Basis-of-Design: Drill-Tec™ by GAF.
	3. flashing and accessories

GAF SPEC NOTE: For welding different-colored TPO membranes with white membranes or flashings, contact GAF Design Services at designservices@gaf.com, as colored TPO membranes may exhibit different welding characteristics.

GAF SPEC NOTE: In paragraphs below, keep the first option (Everguard) for standard warranties up to 20 years, and the second option (Everguard Extreme) for if you’re specifying a 25 or 30-year system.

GAF SPEC NOTE: Select the appropriate system to match the roofing membrane selected above, and delete the option not required on the project.

* + 1. Curb/Wall Flashing Membrane: Membrane flashing to match roof membrane in type and thickness.
		2. Standard Flashing Accessories:
			1. Flashing/reinforcing material for penetrations and corners:
				1. Description: Smooth, unreinforced thermoplastic polyolefin (TPO) membrane for flashing/reinforcing penetrations and corners.
				2. Thickness: 1.4 mm (0.055 in).
				3. Sheet size: 610 mm x 15.24 m (24 in x 50 ft).
				4. Colour: Standard white.
				5. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO UN-55 Detailing Membrane by GAF.
			2. Utility Flashing Membrane for Reinforced Applications
				1. Description: Smooth, polyester scrim-reinforced TPO membrane strip for covering coated metal and for stripping-in metal flanges and general repairs.
				2. Thickness: 1.14 mm (0.045 in).
				3. Roll size: 203 mm x 30.48 m (8 in x 100 ft).
				4. Colour: Standard white.
				5. Basis-of-Design: [EverGuard®][EverGuard Extreme®] Utility Flashing Membrane by GAF.
			3. TPO Coated Metal
				1. Description: 24-gauge steel with 0.635 mm (0.025 in) thick TPO-based film for metal gravel stop, drip edge profiles, base/curb flashings, sealant pans, and scupper sleeves.
				2. Sheet size: 1.2 m x 3.05 m (4 ft x 10 ft).
				3. Sheet weight: 21.3 kg (47 lbs).
				4. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Coated Metal by GAF.
			4. Termination Bar
				1. Description: Extruded aluminum termination bar with angled lip caulk receiver and lower leg bulb stiffener.
				2. Pre-punched slotted holes: [152 mm (6 in)][203 mm (8 in)] on center.
				3. Size: 19 mm x 3.05 m (3/4 in x 10 ft).
				4. Cross-section thickness: 2.29 mm (0.090 in).
				5. Basis-of-Design: DRILL-TEC™ Termination Bar by GAF.
			5. T-Joint Patches for Membranes
				1. Description: Smooth, unreinforced TPO membrane for sealing T-joints in 60 and 80 mil membrane applications.
				2. Thickness: 1.4 mm (0.055 in).
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO T-Joint Patches by GAF.
			6. Expansion Joint Covers
				1. Description: Field-fabricated expansion joint covers for bridging roof structure expansion joint openings, fabricated from 1.52 mm (0.060 in) reinforced TPO membrane.
				2. Standard sizes: Design to accommodate roof-to-wall and roof-to-roof applications for openings up to 203 mm (8 in) wide.
		3. Roof Edge Accessories
			1. Heat-Weld Cover Tape
				1. Description: 152 mm (6 in) wide, smooth, heat-weldable polyester scrim-reinforced TPO membrane strip for covering non-coated metal edges and flanges.
				2. Roll length: 30.48 m (100 ft).
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Heat-Weld Cover Tape by GAF.
			2. Cover Tape
				1. Description: 152 mm (6 in) wide, polyester scrim-reinforced TPO membrane strip with factory-laminated butyl tape.
				2. Basis-of-Design: EverGuard® TPO Cover Tape by GAF.
			3. Roof Sealant
				1. Description: Commercial-grade roofing sealant suitable for sealing termination bars, penetrations, and clamping rings. Meets ASTM D412, ASTM D2196, ASTM D1475, and ASTM D1644 performance criteria.
				2. Basis-of-Design: FlexSeal™ Roof Sealant by GAF.
		4. Wall and Curb Accessories
			1. RTA (Roof Transition Anchor) Strip
				1. Description: 1.14 mm (0.045 in) reinforced TPO membrane with pressure-sensitive adhesive, installed on horizontal surfaces with plates and fasteners as a base attachment in fully adhered systems.
				2. Size: 152 mm x 30.48 m (6 in x 100 ft).
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] RTA Strip™ by GAF.
			2. Preformed Scuppers
				1. Description: 1.4 mm (0.055 in) thick TPO membrane and 24-gauge coated metal prefabricated scuppers.
				2. Sizes: [102 mm x 152 mm (4 in x 6 in)][ 203 mm x 254 mm (8 in x 10 in)].
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Scupper by GAF.
			3. Corner Curb Wraps
				1. Description: [1.14 mm (0.045 in)] [1.52 mm (0.060 in)] thick reinforced TPO membrane fabricated corners for curb flashings.
				2. Basis-of-Design: [EverGuard®][EverGuard Extreme®] Corner Curb Wraps by GAF.
			4. Universal Corners
				1. Description: 1.52 mm (0.060 in) molded TPO membrane outside corners for base and curb flashing.
				2. Size: 102 mm x 102 mm (4 in x 4 in) with a 152 mm (6 in) flange.
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Universal Corners by GAF.
			5. Preformed Corners
				1. Description: 1.4 mm (0.055 in) thick molded TPO membrane inside corners for base and curb flashing.
				2. Size: 152 mm x 152 mm x 140 mm (6 in x 6 in x 5.5 in).
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Preformed Corners by GAF.
			6. Fluted Corners
				1. Description: 203 mm (8 in) diameter vacuum-formed, unreinforced TPO membrane for flashing outside corners.
				2. Basis-of-Design: EverGuard® TPO Fluted Corner by GAF.
		5. Penetration Accessories
			1. Preformed Vent Boots
				1. Description: 1.9 mm (0.075 in) thick molded TPO membrane for pipes and conduits from 25 mm to 152 mm (1 in to 6 in) diameter.
				2. Components: Stainless steel clamping rings included.
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Preformed Vent Boots by GAF.
			2. Split Pipe Boots
				1. Description: 1.14 mm (0.045 in) thick molded TPO membrane split boots for pipes and conduits where closed boots cannot be used.
				2. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Split Pipe Boots by GAF.
			3. Square Tube Wraps
				1. Description: 1.14 mm (0.045 in) thick reinforced TPO membrane for wrapping around square and rectangular penetrations.
				2. Components: Stainless steel clamping rings included.
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Square Tube Wrap by GAF.
			4. Pourable Sealer Pocket
				1. Description: 1.78 mm (0.070 in) thick molded penetration pocket for pourable sealant applications.
				2. Size: 229 mm x 152 mm x 102 mm (9 in x 6 in x 4 in).
				3. Basis-of-Design: [EverGuard®][EverGuard Extreme®] TPO Pourable Sealer Pocket by GAF.
			5. TPO Drain
				1. Description: Spun aluminum drain preflashed with 1.4 mm (0.055 in) thick unreinforced TPO membrane.
				2. Sizes: Available in a wide range of options for various roofing drain sizes.
				3. Basis-of-Design: EverGuard® TPO Drain by GAF.
			6. TPO Coated Metal Drain
				1. Description: Aluminum drain unit coated with weldable TPO compound. Fitted with a BlueSeal® mechanical drain seal.
				2. Sizes: Standard sizes 76 mm (3 in) and 102 mm (4 in).
				3. Basis-of-Design: EverGuard® TPO Coated Metal Drain by GAF.
		6. Walkways
			1. TPO Walkway Rolls
				1. Description: 3.18 mm (1/8 in) thick extruded and embossed TPO walkway roll.
				2. Size: 870 mm x 15.24 m (34.25 in x 50 ft).
				3. Colour: [gray][safety yellow.]
				4. Basis-of-Design: EverGuard® TPO Walkway Rolls by GAF.
		7. Field Fabricated Edge Metal Flashing:

GAF SPEC NOTE: Choose one of the two following options below. Field-fabricated edge metal flashings are generally not covered by GAF’s Standard NDL Guarantee unless they are designed and installed in accordance with an ANSI/SPRI/FM 4435/ES-1 certified edge detail.

* + - 1. Refer to Section 07 62 00.

OR

GAF SPEC NOTE: Prefabricated edge metal flashings are covered by GAF’s Standard NDL Guarantee. They are also mandatory for projects requiring an extended guarantee period of 30 or 35 years and for projects requiring a standard wind addendum guarantee for speeds equal to or exceeding 100 mph.

* + - 1. Description: Pre-engineered perimeter edge metal system for roof edge applications with concealed splice plate design to prevent material migration and allow for thermal movement. System includes 22-ga. galvanized steel continuous cleat with pre-punched slotted holes at 305 mm (12 in.) and is supplied in standard 3.66 m (12 ft.) lengths.
			2. Performance Requirements:
				1. Tested in compliance with ANSI/SPRI/FM 4435/ES-1 Standard for wind resistance.

GAF SPEC NOTE: Keep the following for FM insured projects.

* + - * 1. Tested for compliance with FM-approved assemblies for wind uplift protection in accordance with RoofNav requirements.
			1. Material: [22 ga. Galvanized steel] [24 ga. Galvanized steel] [1.02 mm (040 in) aluminum][1.27 mm (050 in) aluminum] [1.27 mm (050 in) aluminum][1.60 mm (063 in) aluminum].
			2. Face height: As noted on Drawings.

GAF SPEC NOTE: Select one of the following finish types and colours from the list below and delete the options not required on the projects.

* + - * 1. Factory-applied finishes: [Pre-finished Kynar 500® coating] [Post-finished Kynar 500®][Pre-finished clear anodized aluminum][Pre-finished bronze anodized aluminum][Pre-finished black anodized aluminum] [Mill aluminum finish.]
			1. Colour: [Almond], [Medium Bronze], [Bone White], [Sandstone], [Cityscape], [Sierra Tan], [Clear Anodized], [Slate Gray], [Dark Bronze], [Stone White] [Specify custom colour].
			2. Basis-of-Design: EverGuard® Drip Edge by GAF.
	1. primers, adhesives and sealants

GAF SPEC NOTE: Select primers, adhesives and sealants from the options below based on the manufacturer’s requirements and approved installation details.

GAF SPEC NOTE: The following option is the preferred method of attaching wall flashings if adhesive is required.

* + 1. Sprayable Solvent-Based Adhesive
			1. Description: Solvent-based, sprayable, contact adhesive for bonding TPO membranes. One canister covers 10 squares.
			2. Basis-of-Design Product: EverGuard® TPO Quick Spray Adhesive by GAF.

GAF SPEC NOTE: Use the following option for projects with stringent VOC limits on adhesives, coatings and sealants.

* + 1. Low VOC Sprayable Solvent-Based Adhesive
			1. Description: Low VOC solvent-based, sprayable, contact adhesive for bonding smooth EverGuard® and EverGuard® Extreme® TPO membranes. One canister covers 10 squares.
			2. Basis-of-Design Product: EverGuard® TPO Quick Spray Adhesive LV50 by GAF.

GAF SPEC NOTE: The following options are available based on specific site requirements. Review the associated SPEC NOTES above each option below to determine if another option beyond the preferred method is better suited for the application.

GAF SPEC NOTE: The following options below for solvent-based rubberized adhesives.

* + 1. Solvent-Based Bonding Adhesive
			1. Description: Solvent-based rubberized adhesive for use with TPO membranes.
			2. Basis-of-Design Product: EverGuard® 1121 Bonding Adhesive by GAF.

**OR** use the “Low VOC” Option for projects with stringent VOC limits on adhesives, coatings and sealants.

* + 1. Low VOC Solvent-Based Bonding Adhesive
			1. Description: Low VOC solvent-based rubberized adhesive for use with EverGuard® TPO membranes. Available in 3 square or 6 square coverage rates.
			2. Basis-of-Design Product: EverGuard® Low VOC Bonding Adhesive by GAF.

GAF SPEC NOTE: Use either of the following options below for preparing surfaces to receive tapes. Delete the option not required.

* + 1. Solvent-Based Primer
			1. Description: Solvent-based primer for preparing surfaces to receive butyl-based adhesive tapes.
			2. Basis-of-Design Product: EverGuard® TPO Primer by GAF.

**OR** use the “Low VOC” Option for projects with stringent VOC limits on adhesives, coatings and sealants.

* + 1. Low VOC Solvent-Based Primer
			1. Description: Low VOC solvent-based primer for preparing surfaces to receive butyl-based adhesive tapes.
			2. Basis-of-Design Product: EverGuard® TPO Low VOC Primer by GAF.

GAF SPEC NOTE: Use either of the following options below to clean exposed or contaminated seams prior to heat welding. Delete the option not required.

* + 1. Solvent-Based Seam Cleaner
			1. Description: Solvent-based cleaner used to clean exposed or contaminated seams prior to heat welding.
			2. Basis-of-Design Product: EverGuard® TPO Seam Cleaner by GAF.

**OR** use the “Low VOC” Option for projects with stringent VOC limits on adhesives, coatings and sealants.

* + 1. Low VOC Seam Cleaner
			1. Description: Low VOC cleaner designed to clean exposed or contaminated seams prior to heat welding. Contains only 50 g/L of VOC and formulated with primarily VOC-exempt ingredients to comply with air quality regulations for single-ply roofing products.
			2. Basis-of-Design Product: EverGuard® TPO CleanWeld® Conditioner by GAF.
		2. Solvent-Based Trowel Grade Sealant
			1. Description: Solvent-based, trowel-grade, synthetic elastomeric sealant. Durable and UV-resistant, suitable for caulk applications. Available in 10 oz. tubes.
			2. Basis-of-Design Product: FlexSeal™ Caulk Grade Roof Sealant by GAF.
		3. Commercial-Grade Roofing Sealant
			1. Description: Commercial-grade roofing sealant suitable for sealing termination bars, penetrations, and clamping rings. Meets ASTM D412, ASTM D2196, ASTM D1475, and ASTM D1644 performance criteria.
			2. Basis-of-Design Product: FlexSeal™ Roof Sealant by GAF.
		4. Butyl-Based High Viscosity Sealant
			1. Description: One-part butyl-based high-viscosity sealant for sealing between flashing membranes and substrate surfaces behind exposed termination bars and between roofing membranes and drain flanges.
			2. Basis-of-Design Product: EverGuard® Water Block by GAF.
		5. One-Part Moisture-Cure Sealant
			1. Description: One-part, moisture-cure, self-leveling sealant designed for use in pitch pans on single-ply roofing systems.
			2. Basis-of-Design Product: EverGuard® One-Part Pourable Sealant by GAF.
1. Execution
	1. EXAMINATION
		1. Verify actual site conditions and location of adjacent materials prior to commencing work.
			1. Structural Verification: Verify that building structure can support weight of roofing system.
			2. Slope and Drainage: Confirm that roofing system provides positive slope to drain. Provide drainage points or adjust roof pitch as required to prevent ponding.
		2. Notify Consultant in writing of any conditions which would be detrimental to the installation.
		3. Commencement of work implies acceptance of previously completed work.
	2. PREPARATION
		1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
		2. Perform additional preparation procedures as required by manufacturer's instructions.
		3. Substrate Preparation:
			1. Ensure substrate surfaces are thoroughly prepared before applying roofing materials. Substrates must be smooth, clean, dry, and structurally sound to prevent future deterioration or failure.
			2. Ensure roof deck defects or substrate defects are corrected by responsible parties before starting roofing work. Ensure deck surface is dry, smooth, clean, and free from depressions, waves, or projections.
		4. Protect building surfaces from damage or contamination during roofing activities.
		5. Prevent materials from entering and clogging roof drains and conductors.
	3. nailers
		1. Install solid wood blocking, #2 Grade or better, nominally 30 mm x 102 mm (1-1/4 in x 4 in) with a minimum thickness of 89 mm (3-1/2 in).
		2. Secure nailers to structural deck with substrate-approved fasteners with minimum thread embedment of 25 mm (1 in).
		3. Wood nailers attached to concrete or gypsum decks must be fastened 305 mm (12 in) on center with substrate-approved fasteners.
		4. Metal Blocking: Provide 20-gauge galvanized steel with pre-punched holes. Install using provided corrosion-resistant fasteners.
	4. INSTALLATION - generally
		1. Installation Compliance: Install roofing membrane system in accordance with roofing system manufacturer's written instructions, reviewed Shop Drawings and applicable recommendations in CRCA’s Roofing Specification Manual.
		2. Supplement manufacturer's installation instructions with additional installation requirements specified in this Section to produce specified work results.
		3. Begin membrane application at low points or drains. Ensure water flows over – and not against – laps.

GAF SPEC NOTE: Delete the following if the vapour retarder is designed to go directly over the steel deck.

* 1. SUBSTRATE BOARD INSTALLATION
		1. Install roof sheathing board with long joints in continuous straight lines, perpendicular to roof slopes and with end joints staggered between rows.
		2. Tightly butt roof sheathing boards together.
		3. Align panels without significant height differences. Mechanically fasten boards using patterns as indicated in roof assembly’s wind uplift test report.
	2. Self-Adhering Sheet Vapour Retarder INSTALLATION
		1. Direct Installation over Metal Decks: Roll out vapor retarder over clean, dry deck surfaces; ensure alignment with top of flute. Allow membrane to relax before positioning.
			1. End Laps at Metal Decks: Install 152 mm x 1.07 m (6 in x 4 in) metal plate at end laps on metal decks between flutes to ensure support and complete end lap seal. Maintain minimum 152 mm (6 in) overlap.
		2. Overlap longitudinal laps by 76 mm (3 in) and end laps by 152 mm (6 in).
		3. Apply pressure across the entire surface using a weighted roller.

GAF SPEC NOTE: GAF SA Vapor Retarder XL and XL40 are UV resistant for up to 180 days based on standardized testing to ensure resistance to degradation.

GAF SPEC NOTE: After 180 days, UV exposure may compromise the integrity of the vapor retarder.

* + 1. Ensure the vapor retarder is promptly covered with the primary roof system to prevent water damage. Seal all joints and transitions to avoid leaks.
		2. Seal all perimeter edges and penetrations using closed-cell foam sealant. Integrate the vapor retarder into the building’s air/vapor retarder system with compatible bitumen materials.
	1. INSULATION INSTALLATION
		1. Follow manufacturer's instructions for insulation installation. Do not install insulation boards that are wet, damaged, or warped.
		2. Install only as much insulation each day as can be completely covered and waterproofed by the end of the day.
		3. Install insulation using staggered layers to minimize thermal bridging. Install insulation with long joints in a continuous straight line. Ensure all edges are supported by high flutes, with no more than a 6 mm (1/4 in) gap between adjoining boards.
		4. Stagger end joints between rows; except for first layer.
		5. Trim surface of insulation as needed at roof drains. Ensure completed surface is flush and does not impede flow of water.
		6. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
		7. Tapered Insulation: When installing induction-welded plates over tapered insulation, ensure that plates are installed flat and flush with insulation surface to allow proper welding of membrane to plates. Install cover board over tapered insulation as required.

GAF SPEC NOTE: Delete the following paragraph if the design requires a cover board. Keep the following paragraph if cover board is not required on the Project.

* + 1. Seam and Plate Alignment: Do not align insulation board seams with rows of induction-welding plates to prevent step-downs that could cause incomplete welds of plates to membrane.

GAF SPEC NOTE: Delete the following paragraph if Cover Boards are not required on the Project.

* 1. COVER BOARD INSTALLATION
		1. Install insulation cover boards in accordance with manufacturer's written requirements, and as follows:
			1. Firmly set the cover boards with long joints continuous and short joints staggered. Cover boards must be evenly and tightly butted together, with cover board joints offset from primary insulation joints.
			2. Apply only as many cover boards as can be covered and waterproofed in the same day.
			3. Seam and Plate Alignment: Do not align cover board seams with rows of induction-welding plates to prevent step-downs that could cause incomplete welds of plates to membrane.
			4. Use manufactures recommended induction weld plate and fasteners for installing cover boards to deck, using patterns as indicated in roof assembly’s wind uplift test report.
	2. fasteners and plates installation

GAF SPEC NOTE: Select one of the following options below and delete the option not required on the Project.

* + 1. Plate Installation over [Insulation][cover board] Joints: Do not place plates directly over joints to prevent incomplete welds.
		2. Fastener Requirements: Use appropriate fasteners for structural deck based on manufacturer’s standard attachment table. Ensure the correct types and colors of plates are used.

GAF SPEC NOTE: Select one of the following options below and delete the option not required on the Project.

* + - 1. Fastening: Mechanically attach [insulation][cover boards] to structural deck in accordance with the induction-welding attachment table or applicable code requirements. Use chalk lines to mark a consistent grid pattern for accurate plate placement.
			2. Fastener Depth: Ensure fasteners are properly installed—tight enough that the induction-welding plate does not turn or rock.
			3. Fastener Corrections: Remove and discard over-driven fasteners that distort the plate.
				1. Reinstall a new plate and fastener next to the original location, avoiding the same hole.
				2. Under-driven fasteners must be re-driven to the proper depth.
			4. Surface Cleaning: Once fastener and plate installation is complete, clean the area of all debris to prevent punctures or weld impairments when the membrane is installed over the plates.
	1. ROOFING MEMBRANE INSTALLATION
		1. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions.
		2. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
		3. Install membrane without wrinkles or buckles. Any wrinkles or buckles must be eliminated prior to final securement.
		4. Install full-width membrane rolls in both field and perimeter areas of the roof.
		5. Overlap membrane sheets by a minimum of 76 mm (3 in) for side and end laps. Orient laps, when possible, across the slope and towards drainage points.
		6. Round all exposed sheet corners to a minimum radius of 25 mm (1 in).
		7. Weld the TPO membrane to induction-welded plates using the induction-welding portable bonding tool. Place weighted cooling magnets over bonded areas for at least 45 seconds to ensure proper bonding.
		8. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
			1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
			2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
			3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
		9. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
	2. MEMBRANE FLASHING INSTALLATION
		1. Install membrane flashing at all roof penetrations, walls, and intersections in accordance with the manufacturer’s instructions.
		2. Flash all corners, posts, curbs and pre-formed flashings in strict accordance with manufacturer’s flashing instructions and details.
		3. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
		4. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
		5. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
		6. Terminate and seal top of sheet flashings.
		7. Penetration Clearance: Ensure all penetrations are located at least 610 mm (24 in) from curbs, walls, and roof edges to provide sufficient space for proper flashing installation.
		8. Flashing Conditions: Flash all perimeters, curbs, and penetrations using coated metal, membrane flashing, and appropriate flashing accessories tailored to site-specific conditions.
		9. Corner Reinforcement: Reinforce all coated metal and membrane flashing corners with preformed corners or non-reinforced membrane to ensure durability.
		10. Welding Requirements: Use hot-air welding for all flashing membranes, accessories, and coated metal. Hand welds must be a minimum of 50 mm (2 in) wide, while automatic machine welds must be at least 38 mm (1-1/2 in) wide.
		11. Non-Coated Metal Edges: Install non-coated metal edge details according to manufacturer’s current construction guidelines and requirements.

GAF SPEC NOTE: Keep the following paragraph if you’re specifying a 20-year EverGuard® system.

* + 1. Coated Metal: Use coated metal edges where applicable. The use of bonding adhesive or cover tape is not permitted.

GAF SPEC NOTE: GAF SPEC NOTE: Keep the following if specifying the prefabricated edge metal system in Part 2.

* + 1. Prefabricated Edge Metal Flashing Installation:
			1. Install prefabricated edge metal flashing in accordance with manufacturer’s instructions and reviewed Shop Drawings.
			2. Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates.
			3. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners. Ensure cleats are aligned and securely fastened to roof nailers.
			4. Attach covers using pre-punched slotted fastening holes in accordance with manufacturer’s instructions. Provide splice plates at all joints. Align and secure splice plates to ensure thermal movement and a weather-tight seal.
	1. WALKWAY INSTALLATION
		1. Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.
	2. FIELD QUALITY CONTROL
		1. Roof Inspection: Contractor must have roof system manufacturer's technical personnel to inspect roofing during installation and on completion to confirm substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to supply reports to Consultant.
		2. Final Inspection: Manufacturer’s representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.
	3. PROTECTION
		1. Protect induction-welded TPO membrane roofing from damage, soiling and contaminating substances resulting from construction activities or caused by work of other trades.
		2. Promptly replace induction-welded TPO membrane roofing work damaged during construction that cannot be satisfactorily repaired.
	4. CLEANING AND WASTE MANAGEMENT
		1. Cleaning: Maintain clean construction area at the end of each day. When activities of this Section are complete, remove materials, tools, equipment and rubbish.
		2. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
		3. Waste Management and Disposal: sort waste for reuse, recycling, or disposal, as specified. Remove recycling bins and containers from site and dispose of contents at the appropriate waste disposal facilities.
	5. PROTECTION
		1. Protect installed products until completion of project.
		2. Clean all exposed surfaces and touch-up, repair or replace damaged products before Substantial Completion. Do not use abrasive cleaners.

END OF SECTION