|  |  |
| --- | --- |
| COREARCH | Corearch109 Dupont StreetTel: [416-749-2624](https://www.corearch.ca/)URL: <https://https://www.corearch.ca/>  |

Revision date: Jan 2025

SPEC NOTE: This master specification is written to include SPEC NOTES to assist designers in their decision-making process. SPEC NOTES precede the text to which they apply. This section should serve as a guideline only and should be edited by a knowledgeable person to meet the requirements of each specific Project.

Text indicated in bold and by square brackets is optional. Make appropriate decisions and delete the optional text as well as the brackets in the final copy of the specification. Delete or hide the SPEC NOTES in the final version of the document.

Kasso Mühendislik A.Ş. was founded in 1975 and specializes in custom architectural metal work. Kasso Mühendislik A.Ş. offers custom metal solutions, including expanded mesh metal, perforated panels, and laser-pattern cut panels for exterior building cladding applications. Beyond the standard product range, customized patterns and forms are also available.

Kasso Mühendislik A.Ş. does not practice architecture or engineering. Therefore, the design responsibility remains with the architect, engineer, or Consultant. We hope the information given here will be of 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 Kasso Mühendislik A.Ş can be held legally responsible. Kasso Mühendislik A.Ş does not assume any responsibility for any misinterpretation or assumptions the reader may formulate.

This specification was developed with the assumption that it will be used with a CCDC standard Contract, as amended by any supplementary instructions. As a result, in keeping with CCDC standard definitions, some words have been capitalized. Please change defined terms and capitalization if this Specification will be used with another type of Contract.

1. GENERAL
	1. GENERAL INSTRUCTIONS
		1. Read and conform to: The general provisions of the Contract, including General and Supplementary Conditions; and the requirements of Division 01 Specifications and any additional documents referred to in this Section.
		2. Contractor is solely responsible for dividing the Work among Subcontractors and Suppliers. 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
	2. SUMMARY
		1. Provide labour, materials, Products, equipment and services to complete the custom-fabricated metal panels and screens work specified herein. This includes, but is not necessarily limited, to:

SPEC NOTE: Edit the list below to reflect project requirements.

* + - 1. Perforated metal panels fabricated for use as **[cladding]** **[shade structures]** **[decorative screens]** **[user-defined application]**.
			2. Expanded mesh panels fabricated for use as **[cladding]** **[shade structures]** **[decorative screens]** **[user-defined application]**.
			3. Pattern-cut metal panels fabricated for use as **[cladding]** **[shade structures]** **[decorative screens]** **[user-defined application]**.
			4. Dual-depth 3d surface panels fabricated for use as **[cladding]** **[shade structures]** **[decorative screens]** **[user-defined application]**.
			5. Custom design panels fabricated for use as **[cladding]** **[shade structures]** **[decorative screens]** **[user-defined application]**.
			6. Auxiliary materials required for a complete installation.

SPEC NOTE: Edit the list below to reflect the items affected by this Project. Only include in this Paragraph those sections and documents that directly affect the work of this section. If a reader could reasonably expect to find a product or component specified in this section, but it is specified elsewhere, then list the related section number(s) in the Paragraph below. Do not include Division 00 Documents or Division 01 Sections since it is assumed that technical sections are all related to Division 00 Documents and Division 01 Sections to some degree.

* + 1. Related Requirements: Specifications throughout all Divisions of the Project shall be read as a whole and may be directly applicable to this Section.
			1. Related requirements provided below are for convenience purposes only.
				1. Section 05 12 00 - Structural Steel.
				2. Section 05 50 00 - Metal Fabrications.
				3. Section 05 70 00 - Decorative Metal.
				4. Section 07 21 00 - Thermal Insulation.
				5. Section 07 27 00 - Air Barriers.
				6. Section 07 92 00 - Joint Sealants.
	1. REFERENCES
		1. Reference Standards: Unless otherwise indicated in this Section or the Building Code, the latest published editions of reference standards as of the Project's Bid Closing deadline apply.

SPEC NOTE: Pare down the paragraphs below to only include references which appear in the final version of the Specification.

* + 1. American Architectural Manufacturers Association (AAMA)
			1. AAMA 611: Voluntary Specification for Anodized Architectural Aluminum
			2. AAMA 2604: High Performance Organic Coatings on Aluminum Extrusions and Panels
			3. AAMA 2605: Superior Performing Organic Coatings on Aluminum Extrusions and Panels
		2. ASTM International (ASTM)
			1. ASTM A240/A240M: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
			2. ASTM A588: Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance
			3. ASTM A606: Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
			4. ASTM A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
			5. ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
			6. ASTM B248: Standard Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar
			7. ASTM B36/B36M: Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar
			8. ASTM B370: Standard Specification for Copper Sheet and Strip for Building Construction
			9. ASTM B69: Standard Specification for Rolled Zinc
		3. CSA Group (CSA)
			1. CAN/CSA S136: North American Specification for the Design of Cold-Formed Steel Structural Members
			2. CAN/CSA S16: Design of Steel Structures
			3. CSA W47.1: Certification of Companies for Fusion Welding of Steel
			4. CSA W47.2: Certification of Companies for Fusion Welding of Aluminum
			5. CSA W59: Welded Steel Construction (Metal Arc Welding)
			6. CSA W59.2: Welded Aluminum Construction
		4. Underwriters Laboratories of Canada (ULC)
			1. CAN/ULC S114: Standard Method of Test for Determination of Non-Combustibility in Building Materials
		5. European Committee for Standardization (CEN)
			1. EN 988: Zinc and Zinc Alloys - Specifications for Rolled Flat Products for Building
		6. International Organization for Standardization (ISO)
			1. ISO 9001: Quality Management Systems - Requirements
			2. ISO 14001: Environmental Management Systems - Requirements with Guidance for Use
			3. ISO 14025: Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures
		7. Occupational Health and Safety Assessment Series (OHSAS)
			1. OHSAS 18001: Occupational Health and Safety Management Systems - Requirements
	1. DEFINITIONS
		1. Workmanship (as defined by AMP 555 – Draft Edition) for this Section must be in accordance with one of the following classes:
			1. Class 1:
				1. Exposed surfaces are finished smooth with pits, mill marks, nicks and scratches filled or ground off. Defects are not apparent when painted or polished.
				2. Weld are concealed where possible. Exposed welds are ground to small radius with uniform sized coves unless indicated otherwise.
				3. Distortions are not visible to the naked eyes.
				4. Exposed joints are fitted to a hairline finish.
			2. Class 2:
				1. Exposed surfaces retain mill marks and moderate irregularities, but are generally not visible to the naked eye when viewed at 10 m (30 ft)
				2. Exposed welds are ground to a uniform sized cove.
				3. Exposed joints are fitted to a maximum gap of 1.6 mm (1/16 inch)
			3. Class 3:
				1. Exposed surfaces have no improvement form mill finish except preparation necessary for galvanizing, or priming.
				2. Exposed welds are not ground.
				3. Bolt, when used, may be exposed.

SPEC NOTE: Keep the following for projects involving unique materials, intricate geometries, or highly customized components. Delete if project requirements are simple.

The design-assist process is a collaborative approach involving the contractor, consultant, and manufacturer during the design phase to refine, optimize, and develop detailed solutions for specific project components. The process focuses on leveraging the technical expertise of the manufacturer to align the project’s design intent with constructability, performance, and budgetary goals.

* 1. DESIGN-ASSIST PROCESS
		1. Manufacturer shall engage with Contractor and Consultant in a design-assist role to develop detailed fabrication and installation solutions for cladding solutions specified in this Section.
		2. Design-assist services include, but are not limited to following activities:
			1. Material Optimization: Refine material selection, thicknesses, and finishes to balance design intent, performance, and budget.
			2. Documentation: Develop shop drawings, samples and prototypes for review by the Consultant.
			3. Delegated-Design and Structural Engineering: Final structural design for this portion of the Work, including but not limited to, attachment methods, panel layouts and support requirements.
	2. PREINSTALLATION MEETINGS
		1. General Requirements and Procedures for Project Meetings: in accordance with **[Section 01 31 19, Project Meetings]**.
		2. Pre-installation Meetings: Pre-installation Meetings: Schedule and hold a pre-installation meeting at the Project site at least one week before beginning work on this Section to coordinate activities with related Subcontractors.
			1. Ensure attendance of Subcontractor performing work of this Section, as well as representatives from manufacturers and fabricators involved in or affected by installation. Notify Consultant and Owner of scheduled meeting dates in advance.
			2. Agenda:
				1. Review progress of related construction activities and preparations for activity under consideration.
				2. Make note of required sequencing and coordination with materials and activities that have preceded or will follow.
			3. Record significant discussions, agreements, and disagreements, including required corrective measures and actions.
			4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information not more than 72 hours after meeting.
	3. COORDINATION
		1. Coordination: Coordinate installation of anchorages for screen. Supply setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.
	4. SUBMITTALS
		1. General Requirements and Procedures for Submittals: in accordance with Section **[01 33 00, Submittal Procedures]**.
		2. Product Data: Submit manufacturer’s product characteristics, catalogue cuts, installation instructions and other relevant information for each material and product used for custom-fabricated metal panels and screens work specified in this Section.
		3. Shop Drawings: Submit Shop Drawings indicating material layouts, details of construction, connections, and relationship with adjacent construction. As a minimum indicate following:
			1. Include plans, elevations, sections and details as applicable.
			2. Indicate field-measured dimensions on Shop Drawings.
		4. Delegated Design Submittals:
			1. Engineering design completion of custom-fabricated metal panels and screens work is delegated to Contractor based on structural design criteria indicated in Contract Documents.

SPEC NOTE: Edit the following based on the location of the project.

* + - 1. Submit Shop Drawings for work of this Section that bear the stamp of a Professional Engineer registered in **[Province of Ontario.]** **[Specify Province.]**
			2. Submit copy of structural calculations upon request by Consultant.
		1. Samples:
			1. Initial Selection Samples: Submit initial selection samples for Products requiring colour, texture, or design selection. Submit manufacturer’s list of finishes or colour swatches for Consultant's selection.
			2. Verification Samples: Submit verification samples confirming colour and finish selections for each exposed element in minimum 300 by 300 mm (12 by 12 in.) size. Submit full size samples of accessories as requested by Consultant.
		2. Welding Certificate: Submit certification for welding firms and welders to verify compliance with welding qualifications specified in this section.
	1. CLOSEOUT SUBMITTALS
		1. General Requirements and Procedures for Closeout Submittals: in accordance with Section **[01 78 00, Closeout Submittals]**.
		2. Operating and Maintenance Data: Submit care and maintenance instructions for custom-fabricated metal panels and screens to be included in building's operation and maintenance manual.
		3. Warranty Documentation: Submit copy of extended warranties specified in this Section.
	2. QUALITY ASSURANCE

SPEC NOTE: Kasso is certified under several international standards designed to ensure compliance with quality, safety, and environmental standards.

* + 1. Manufacturer Qualifications: Provide Products for work of this Section by manufacturer with at least 10 years’ experience manufacturing such materials.
			1. Certifications: manufacturer must have following certifications:
				1. Quality Management Systems: to ISO 9001.
				2. Environmental Management Systems: to ISO 14001
				3. Occupational Health and Safety Management Systems: OSHAS 18001.
				4. Submit proof of certification upon request.
		2. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
			1. Steel: to CSA W47.1 and CSA W59
			2. Aluminum: to CSA W47.2 and CSA W59.2
			3. Stainless Steel: to CSA W47.1 (Annex K) and CSA W59
		3. Installer Qualifications: Engage an entity with at least 5 years' experience installing, erecting, or assembling work similar in material, design, and extent to that shown on Drawings and Schedules, and whose work has resulted in construction with a track record of successful in-service performance.

SPEC NOTE: Edit the following based on the location of the project.

* + 1. Professional Engineer’s Qualifications: Employ Professional Engineer licensed to practice in **[Province of Ontario]** who carries minimum of $2,000,000.00 professional liability insurance and has at least five years’ experience providing engineering services of similar kind, scope, and complexity.
			1. Professional Engineer’s Responsibility:
				1. production and review of Shop Drawings,
				2. design and certification of custom-fabricated metal panels and screens, including attachments for building construction, in accordance with applicable codes and regulations,
				3. stamping and signing of each Shop Drawing and associated calculations.
		2. 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.
		3. Mock-Ups: Construct mock-ups to verify selections made under submittals, demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

SPEC NOTE: Specify whether mock-ups are to be built in-situ (i.e., as the first installation in the actual work) or at a designated separate location. If in-situ, ensure the Consultant’s approval process is accounted for to avoid delays.

* + - 1. Location: **[In-situ (i.e. first installation)]** **[specify locations]**, as directed on site by Consultant.
			2. Purpose: To set benchmarks for installation and to judge subsequent work. Maintain Mock-ups during construction in undisturbed condition.

SPEC NOTE: Specify below whether reviewed mock-ups can become part of the completed work or must be removed. This decision will have impacts project costs and waste management.

* + - 1. Reviewed mock-ups: **[may become part of the completed work if undisturbed at the time of Substantial Performance of The work and comply with requirements outlined in Contract Documents.][May not become part of the completed work, demolish and remove from site.]**
	1. DELIVERY, STORAGE AND HANDLING
		1. General Product Requirements: in accordance with Section **[01 61 00, Common Product Requirements]**. Deliver, store and handle custom-fabricated metal panels and screens materials in accordance with manufacturer’s written instructions.
		2. deliver materials to site in original factory packaging, labelled with manufacturer’s name and address.
		3. Store materials in off-ground, in clean, dry, well-ventilated area.
		4. Replace defective or damaged materials with new.
		5. Handling: Handle materials in accordance with material best handling practices and in accordance with manufacturer's written instructions.
	2. FIELD CONDITIONS
		1. Field Measurements: Verify actual dimensions of construction contiguous with custom-fabricated metal panels and screens by field measurements before fabrication.
	3. WARRANTY
		1. Finishes: Submit for Owner’s review and acceptance, manufacturer’s warranty in which manufacturer commits to repair or replace components of custom-fabricated metal panels and screens that fail due to manufacturing defects within specified warranty period. Manufacturer’s extended warranty is in addition to, and does not supersede, any other rights that Owner may have under Contract Documents.
			1. Warranty Period: two (2) years from date of purchase.
			2. Warranty Scope: Materials only.
1. PRODUCTS
	1. MANUFACTURERS
		1. Basis-of-Design: Materials specified in this Section are based on products by Kasso Mühendislik A.Ş. as supplied by Corearch; 109 Dupont Street; Tel: 416-749-2624; URL: <https://https://www.corearch.ca/>

SPEC NOTE: Keep the first option to prohibit substitutions. The second option allows substitutions under specific conditions. Ensure substitution procedures in this section align with the general requirements for substitutions outlined in Division 01 of the specifications.

* + 1. **[Substitution Limitations: No further substitutions are acceptable.]**

OR

* + 1. **[Substitution Limitations: Conforming to requirements of Section 01 25 00, Substitution Procedures and as follows:**
			1. **Consultant will consider requests for substitution if received [10] days before Bid Closing Deadline. Requests received after that time will be rejected. Consultant will consider requests for substitution when following conditions are satisfied:**
				1. **Requests for substitution include a list of at least five similar projects of equivalent size where products have been installed for a minimum of five years.**
				2. **Requested substitution does not require extensive revisions to the Contract Documents.**
				3. **Requested substitution is consistent with the Contract Documents and will produce indicated results.**
				4. **Requested substitution will not adversely affect construction schedule.**
				5. **Requested substitution provides specified warranty.]**
	1. PERFORMANCE / DESIGN CRITERIA
		1. Design Intent: Architectural Drawings and details are diagrammatic and are only intended to show design concept, aesthetics, interfacing requirements, configuration, components and arrangements. They are not intended to identify or solve completely problems of thermal and structural movements, assembly framing, engineering design, fixings and anchorages.
		2. Visual Quality: Provide metals free from imperfections visible on finished units. Metals must be free from scratches, scars, creases, buckles, ripples, chatter marks, and any surface blemishes when exposed to view in the finished Work. Surfaces must be suitable for polishing where required.

Workmanship Classes: Review the descriptions of Class 1, and Class 2 workmanship carefully and determine the applicable class based on the project’s aesthetic and functional requirements.

Class 1: Use this class for areas where appearance is critical, such as public-facing or decorative elements. Ensure you specify this class only if the budget and scope allow for the extra labor and materials required for this level of finish.

Class 2: Use this class for areas where appearance matters but does not require perfection, such as visible but non-decorative components.

Refer to the DEFINITIONS Article at the beginning of this Section.

* + - 1. Metals with pitting, seam marks, roller marks, oil-canning, stains, discolorations, or other imperfections on exposed surfaces are unacceptable.
			2. Unless noted otherwise, all Work of this Section is to be **[Class 1][Class 2]** Workmanship as defined herein.
		1. Material Quality: Select metal materials with smooth, even surfaces. Do not use materials that exhibit visible seams, roller marks, stamped brand names, stains, discoloration, or other visible imperfections.
		2. Structural Design: Design and engineer metal assemblies in accordance with requirements of the **[Ontario Building Code][National Building Code of Canada][Insert provincial building code]**, based on the geographical location of the Project. Account for the reduction in strength of perforated metals and other punched metals. Provide adequate structural supports to resist wind loads and environmental factors, ensuring the stability and durability of the system.
			1. Wind Loads: Ensure metal panel assemblies can withstand wind loads perpendicular to plane of wall, using limit states design principles and based on a 1 in 50-year return period.
			2. Maximum Panel Deflection between supports: ≤ L/180
			3. Maximum Deflection of Individual Panels: ≤ L/60.
			4. Do not exceed the manufacturer’s recommended maximum stress values for the panel skin to avoid permanent deformation.
			5. Sub-Framing Design:
				1. Design cold-formed metal framing used for the work of this Section to CAN/CSA S136.
				2. Design structural steel framing used for the work of this Section to CAN/CSA S16.
		3. Fire Performance: Where required by **[Ontario Building Code]**, ensure cladding systems conforms to CAN/ULC S114.
		4. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
		5. Corrosion Control: Prevent galvanic action and other corrosion types by insulating incompatible metals and materials to avoid direct contact. Use separation techniques, such as isolating washers, gaskets, or non-conductive coatings, as necessary.

SPEC NOTE: Use the paragraph below to specify perforated metal panels. Delete if not required for the project. Perforated metal products are available in various material types, thicknesses, hole shapes, and configurations

* 1. Perforated metal panels

SPEC NOTE: Coordinate the tag below with the Drawings to provide a consistent and unique identifier for this item across the Contract Documents to avoid confusion during procurement and installation.

* + 1. Material Tag: This item is noted as ‘MET-#’ on Drawings and Schedules.
		2. Description: Custom-fabricated **[perforated][embossed][embossed-perforated]** metal panel assemblies fabricated from metal sheets formed into profiles for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for a complete system.

SPEC NOTE: In the paragraphs below, specify the metal and finish type required for the project. Delete non-applicable options.

* + 1. Material and Finish:
			1. Aluminum: ASTM B209 (ASTM B209M), Alloy 1000 & 3000 & 5000 SERIES.
				1. Thickness: Not less than **[1.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Anodized finish up to 25 microns]**, **[Qualicoat Certified Powder-Coat Finish Class 2 equivalent to AAMA 2604]**, **[Qualicoat Certified Powder-Coat Finish Class 3 equivalent to AAMA 2605]**

Colour: **[specify here]**

* + - 1. Galvanized Steel Sheet: ASTM A653/A653M, minimum Z275 (G90) coating.
				1. Thickness: Not less than **[1.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As galvanized][Powder-coated]**.

Colour: **[specify here]**

* + - 1. Weathering Steel (Corten Steel): ASTM A588 or ASTM A606, Grade 2.
				1. Thickness: Not less than **[1.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
			2. Stainless Steel: ASTM A240/A240M, Type **[304][316][316L]**.
				1. Thickness: Not less than **[0.6 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[No. 2B bright finish][No. 4 satin finish][No. 8 mirror finish]**.
			3. Titanium Zinc: EN 988 and ASTM B69 consisting of 99.995% zinc and 0.003% titanium, alloy C28000, C22000 or equivalent.
				1. Thickness: Not less than **[0.7 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Natural patina][Pre-weathered]**.
			4. Copper: ASTM B370, alloy C11000, C12500 or equivalent.
				1. Thickness: Not less than **[0.6 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Bright polished][Oxidized finish]**.
			5. Brass: ASTM B36/B36M or ASTM B248.
				1. Thickness: Not less than **[0.6 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Specify here]**
		1. Perforations and Patterns:

SPEC NOTE: Perforated metal models can be produced in many different combinations, the parameters of permeability, dispersion, diameter and hole spacing can be adapted to the needs of the structure and design, and custom products can be made according to project requirements.

The following are a selection of some of the most popular patterns used in projects. Refer to KASSO’s catalogue for a representation of these patterns. Specify the perforation type required for the project. Delete non-applicable options.

Custom options are also available upon request.

* + - 1. Standard Patterns:
				1. **[YC3.0\_10.4\_10.4 (Ø3.00 mm, Open Area: 7.50%)]**
				2. **[YC5.0\_17.0\_10.0 (Ø5.00 mm, Open Area: 22.50%)]**
				3. **[YC8.0\_20.5\_11.9 (Ø8.00 mm, Open Area: 17.40%)]**
				4. **[YC010\_26.0\_15.0 (Ø10.00 mm, Open Area: 40.00%)]**
				5. **[YC010\_26.0\_26.0 (Ø10.00 mm, Open Area: 14.70%)]**
				6. **[YC010\_22.5\_13.0 (Ø10.00 mm, Open Area: 14.70%)]**
			2. Embossed Patterns:
				1. **[YCK030\_78.0\_37.3 (Ø30.00 mm, Open Area: N/A)]**
				2. **[YK030 (Ø30.00 mm, Open Area: N/A)]**
				3. **[K100-100 (Ø100.00 mm × 100.00 mm, Open Area: N/A)]**.
			3. Embossed/Perforated Patterns:
				1. **[YC3.0\_10.4\_10.4 (Ø3.00 mm, Open Area: 7.50%)]**
				2. **[YC5.0\_17.0\_10.0 (Ø5.00 mm, Open Area: 22.50%)]**
				3. **[YC8.0\_20.5\_11.9 (Ø8.00 mm, Open Area: 17.40%)]**.
			4. Perforated Coil Metal Patterns:
				1. **[RYC3.0\_08.7\_05.0 (Ø3.00 mm, Open Area: 32.40%)]**
				2. **[RYC3.0\_08.7\_08.6 (Ø3.00 mm, Open Area: 10.30%)]**
				3. **[RYC5.0\_13.8\_08.0 (Ø5.00 mm, Open Area: 33.50%)]**
				4. **[RYD5.0\_08.5\_07.9 (Ø5.00 mm, Open Area: 33.50%)]**
				5. **[RYD5.0\_17.0\_17.0 (Ø5.00 mm, Open Area: 6.80%)]**
				6. **[RYD5.0\_13.8\_13.8 (Ø5.00 mm, Open Area: 10.30%)]**.

[SPEC NOTE: Multiperforated metal offers unique patterns and appearances. Using this technique, customized designs can be achieved. This allows any image to be patterned onto the metal sheet. Coordinate with the manufacturer to finalize production parameters indicated below and to confirm the feasibility of the specified graphic, shape, grid, and open area percentage.

It may be necessary to obtain confirmation that custom graphics comply with copyright laws and that appropriate permissions or licenses have been secured for their use.](https://en.kasso.com.tr/perforated-metal)

* + - 1. Multiperforated Metal
				1. Graphic: **[custom graphic as provided by Owner.]** **[specify here]**
				2. Shape: **[Round]** **[Square]** **[Slotted]** **[Hexagonal]**.
				3. Holes: **[Staggered grid][Straight grid]**
				4. Minimum open area: **[ ]** percent.
		1. Equip panels with perimeter metal frames, return edges, borders, mounting holes, attachment brackets, clips and similar elements as indicated on reviewed Shop Drawings for a complete installation.

SPEC NOTE: Use the paragraph below to specify expanded mesh metal panels. Delete if not required for the project. Expanded mesh metal panels are available in sheets and coils and can be produced to standard or custom dimensions. They are offered in various forms, sizes, thicknesses, and levels of transparency to meet specific project requirements. Custom molds and designs can also be developed for unique applications.

* 1. EXPANDED MESH METAL PANELS

SPEC NOTE: Coordinate the tag below with the Drawings to provide a consistent and unique identifier for this item across the Contract Documents to avoid confusion during procurement and installation.

* + 1. Material Tag: This item is noted as ‘MET-#’ on Drawings and Schedules.
		2. Description: custom-fabricated expanded mesh metal panel assemblies produced from selected metal sheets. Panels must be formed into profiles as required for installation. Include all attachment components, stiffeners, and accessories necessary for a complete and functional system.
		3. Material and Finish:

SPEC NOTE: In the paragraphs below, specify the metal and finish type required for the project. Delete non-applicable options.

* + - 1. Aluminum: ASTM B209 (ASTM B209M), Alloy 1000 & 3000 & 5000 SERIES.
				1. Thickness: Not less than **[1.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Anodized finish up to 25 microns]**, **[Qualicoat Certified Powder-Coat Finish Class 2 equivalent to AAMA 2604]**, **[Qualicoat Certified Powder-Coat Finish Class 3 equivalent to AAMA 2605]**

Colour: **[specify here]**

* + - 1. Galvanized Steel Sheet: ASTM A653/A653M, minimum Z275 (G90) coating.
				1. Thickness: Not less than **[1.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As galvanized][Powder-coated]**.

Colour: **[specify here]**

* + - 1. Weathering Steel (Corten Steel): ASTM A588 or ASTM A606, Grade 2.
				1. Thickness: Not less than **[1.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
			2. Stainless Steel: ASTM A240/A240M, Type **[304][316][316L]**.
				1. Thickness: Not less than **[0.6 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[No. 2B bright finish][No. 4 satin finish][No. 8 mirror finish]**.
			3. Titanium Zinc: EN 988 and ASTM B69 consisting of 99.995% zinc and 0.003% titanium, alloy C28000, C22000 or equivalent.
				1. Thickness: Not less than **[0.7 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Natural patina][Pre-weathered]**.
			4. Copper: ASTM B370, alloy C11000, C12500 or equivalent.
				1. Thickness: Not less than **[0.6 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Bright polished][Oxidized finish]**.
			5. Brass: ASTM B36/B36M or ASTM B248.
				1. Thickness: Not less than **[0.6 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Specify here]**
		1. Mesh Parameters: Fabricate expanded mesh products to following parameters:

SPEC NOTE: The following are a selection of some of the most popular patterns used in projects. Refer to KASSO’s catalogue for a representation of these patterns. Delete non-applicable options.

Custom options are also available upon request.

* + - 1. Micromesh Metal:
				1. **[SKY GM126 (12.00 mm × 6.00 mm × 1.50 mm × 2.00 mm, Open Area: 50%)]**
				2. **[FIT GM64 (6.00 mm × 4.00 mm × 1.00 mm × 0.50 mm, Open Area: 50%)]**
				3. **[FEEL GM168 (16.00 mm × 8.00 mm × 2.00 mm × 1.50 mm, Open Area: 50%)]**.
			2. Round Expanded Mesh:
				1. **[GLOBE GM2012 (20.00 mm × 12.00 mm × 3.00 mm × 1.00 mm, Open Area: 68%)]**
				2. **[BIRD EYE GM4025 (40.00 mm × 25.00 mm × 4.00 mm × 2.00 mm, Open Area: 50%)]**
			3. Diamond Expanded Mesh:
				1. **[SMART GM3010 (30.00 mm × 10.00 mm × 3.00 mm × 2.00 mm, Open Area: 50%)]**
				2. **[BASIC GM7525 (75.00 mm × 25.00 mm × 6.00 mm × 2.00 mm, Open Area: 50%)]**
				3. **[STYLE GM11550 (115.00 mm × 50.00 mm × 12.00 mm × 3.00 mm, Open Area: 50%)]**
			4. Hexagonal Expanded Mesh:
				1. **[HONEYCOMB GM4520 (45.00 mm × 20.00 mm × 3.00 mm × 2.00 mm, Open Area: 65%)]**
				2. **[JOINT GM5020 (50.00 mm × 20.00 mm × 3.00 mm × 2.00 mm, Open Area: 70%)]**
				3. **[TREND GM10050 (100.00 mm × 50.00 mm × 12.00 mm × 2.00 mm, Open Area: 45%)]**
			5. Big Expanded Mesh:
				1. **[ARMY GM16060 (160.00 mm × 60.00 mm × 13.00 mm × 3.00 mm, Open Area: 60%)]**
				2. **[XXL GM20080 (200.00 mm × 80.00 mm × 20.00 mm × 3.00 mm, Open Area: 50%)]**
				3. **[GRAND GM250100 (250.00 mm × 100.00 mm × 25.00 mm × 3.00 mm, Open Area: 50%)]**
			6. Specialty Expanded Mesh:
				1. **[SHARP GMS11525 (115.00 mm × 25.00 mm × 11.00 mm × 2.00 mm, Open Area: 37%)]**
				2. **[WAVE GMS10016 (100.00 mm × 16.00 mm × 7.00 mm × 2.00 mm, Open Area: 39%)]**
				3. **[DELICATE GMS7512 (75.00 mm × 12.00 mm × 6.00 mm × 2.00 mm, Open Area: 33%)]**.

SPEC NOTE: Use the following to specify an entirely customized mesh. Engage with the manufacturer early in the process to confirm feasibility and address potential adjustments.

* + - 1. Custom Expanded Metal Mesh:
				1. Pattern Type: **[Round]** **[Diamond]** **[Hexagonal]** **[Specify here]**
				2. Short way of design (SWD): **[specify]**
				3. Long way of design (LWD): **[specify]**
				4. Short way of opening (SWO): **[specify]**
				5. Long way of opening (LWO): **[specify]**
				6. Strand Width (mm): **[specify]**
				7. Strand Thickness (mm): **[specify]**
		1. Ensure uniformity and alignment of mesh across connected panels. Equip panels with perimeter metal frames, return edges, borders, mounting holes, attachment brackets, clips and similar elements as indicated on reviewed Shop Drawings for a complete installation.

SPEC NOTE: Use the paragraph below to specify pattern-cut metal panels. Delete if not required for the project.

Pattern cut metal is available in a variety of laser-cut patterns. Laser-cut metal panels are precision-fabricated metal sheets produced using high-powered laser technology, which allows intricate designs and patterns with exceptional accuracy.

* 1. PATTERN-CUT METAL PANELS

SPEC NOTE: Coordinate the tag below with the Drawings to provide a consistent and unique identifier for this item across the Contract Documents to avoid confusion during procurement and installation.

* + 1. Material Tag: This item is noted as ‘MET-#’ on Drawings and Schedules.
		2. Description: custom-fabricated laser-cut metal panel assemblies produced from selected metal sheets. Panels must be formed into profiles as required for installation. Include all attachment components, stiffeners, and accessories necessary for a complete and functional system.

SPEC NOTE: In the paragraphs below, specify the metal and finish type required for the project. Delete non-applicable options.

* + 1. Material and Finish:
			1. Aluminum: ASTM B209 (ASTM B209M), Alloy 1000 & 3000 & 5000 SERIES.
				1. Thickness: Not less than **[1.0 mm and up to 20.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Anodized finish up to 25 microns]**, **[Qualicoat Certified Powder-Coat Finish Class 2 equivalent to AAMA 2604]**, **[Qualicoat Certified Powder-Coat Finish Class 3 equivalent to AAMA 2605]**

Colour: **[specify here]**

* + - 1. Galvanized Steel Sheet: ASTM A653/A653M, minimum Z275 (G90) coating.
				1. Thickness: Not less than **[1.0 mm and up to 25.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As galvanized][Powder-coated]**.

Colour: **[specify here]**

* + - 1. Weathering Steel (Corten Steel): ASTM A588 or ASTM A606, Grade 2.
				1. Thickness: Not less than **[1.0 mm and up to 25.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
			2. Stainless Steel: ASTM A240/A240M, Type **[304][316][316L]**.
				1. Thickness: Not less than **[1.0 mm and up to 25.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[No. 2B bright finish][No. 4 satin finish][No. 8 mirror finish]**.
			3. Titanium Zinc: EN 988 and ASTM B69 consisting of 99.995% zinc and 0.003% titanium, alloy C28000, C22000 or equivalent.
				1. Thickness: Not less than **[0.7 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Natural patina][Pre-weathered]**.
			4. Copper: ASTM B370, alloy C11000, C12500 or equivalent.
				1. Thickness: Not less than **[0.6 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Bright polished][Oxidized finish]**.
			5. Brass: ASTM B36/B36M or ASTM B248.
				1. Thickness: Not less than **[0.6 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Specify here]**

SPEC NOTE: The following are a selection of some of the most popular patterns used in projects. Refer to KASSO’s catalogue for a representation of these patterns.

Custom options are also available upon request.

* + 1. Pattern Parameters: Fabricate pattern-cut metal products to following parameters:
			1. Pattern: **[Traditional (TRAP01][Traditional (TRAP02][Traditional (TRAP03]** **[Organic (ORG01]** **[Organic (ORG02][Organic (ORG03]** **[Geometric (GEOP02]** **[Geometric (GEOP03]** **[Custom-pattern (specify)]**.
		2. Ensure uniformity and alignment of patterns across connected panels. Equip panels with perimeter metal frames, return edges, borders, mounting holes, attachment brackets, clips and similar elements as indicated on reviewed Shop Drawings for a complete installation.

SPEC NOTE: Use the paragraph below to specify 3D surface panels. Delete if not required for the project.

3D surface panels are metal panels with textured or raised patterns. They use an advanced forming techniques to provide a wide variety of standard or custom patterns to fit project-specific requirements.

* 1. 3D SURFACE PANELS (EMBOSSED)

SPEC NOTE: Coordinate the tag below with the Drawings to provide a consistent and unique identifier for this item across the Contract Documents to avoid confusion during procurement and installation.

* + 1. Material Tag: This item is noted as ‘MET-#’ on Drawings and Schedules.
		2. Description: custom-fabricated metal panels with dual-depth 3D surfaces fabricated using manufacturer’s standard forming methods. Include attachment components and accessories required for installation.
		3. Material and Finish:

SPEC NOTE: In the paragraphs below, specify the metal and finish type required for the project. Delete non-applicable options.

* + - 1. Aluminum: ASTM B209 (ASTM B209M), Alloy 1000 & 3000 & 5000 SERIES.
				1. Thickness: Not less than **[1.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Anodized finish up to 25 microns]**, **[Qualicoat Certified Powder-Coat Finish Class 2 equivalent to AAMA 2604]**, **[Qualicoat Certified Powder-Coat Finish Class 3 equivalent to AAMA 2605]**

Colour: **[specify here]**

* + - 1. Galvanized Steel Sheet: ASTM A653/A653M, minimum Z275 (G90) coating.
				1. Thickness: Not less than **[1.0 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As galvanized][Powder-coated]**.

Colour: **[specify here]**

* + - 1. Weathering Steel (Corten Steel): ASTM A588 or ASTM A606, Grade 2.
				1. Thickness: Not less than **[1.0 mm and up to 2.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
			2. Stainless Steel: ASTM A240/A240M, Type **[304][316][316L]**.
				1. Thickness: Not less than **[0.6 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[No. 2B bright finish][No. 4 satin finish][No. 8 mirror finish]**.
			3. Titanium Zinc: EN 988 and ASTM B69 consisting of 99.995% zinc and 0.003% titanium, alloy C28000, C22000 or equivalent.
				1. Thickness: Not less than **[0.7 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Natural patina][Pre-weathered]**.
			4. Copper: ASTM B370, alloy C11000, C12500 or equivalent.
				1. Thickness: Not less than **[0.6 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Bright polished][Oxidized finish]**.
			5. Brass: ASTM B36/B36M or ASTM B248.
				1. Thickness: Not less than **[0.6 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Specify here]**

SPEC NOTE: The following are a selection of some of the most popular patterns used in projects. Refer to KASSO’s catalogue for a representation of these patterns.

Custom options are also available upon request.

* + 1. Pattern Parameters: Fabricate 3D-surface metal products to following parameters:
			1. Pattern: **[Water Ripple Effect][Bubbles]** **[Anatolian]** **[Archy]** **[Spots]** **[Spots][Custom-pattern (specify)]**.
		2. Ensure uniformity and alignment of patterns across connected panels. Equip panels with perimeter metal frames, return edges, borders, mounting holes, attachment brackets, clips and similar elements as indicated on reviewed Shop Drawings for a complete installation.
	1. FREE SECTION PANELS (TRAPEZOIDAL SHEETS)

SPEC NOTE: Coordinate the tag below with the Drawings to provide a consistent and unique identifier for this item across the Contract Documents to avoid confusion during procurement and installation.

* + 1. Material Tag: This item is noted as ‘MET-#’ on Drawings and Schedules.
		2. Description: custom-fabricated metal panels fabricated using manufacturer’s standard forming and bending methods to produce cross-sectional forms as specified in this Section. Include attachment components and accessories required for installation.
		3. Material and Finish:

SPEC NOTE: In the paragraphs below, specify the metal and finish type required for the project. Delete non-applicable options.

* + - 1. Aluminum: ASTM B209 (ASTM B209M), Alloy 1000 & 3000 & 5000 SERIES.
				1. Thickness: Not less than **[1.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. **[Anodized finish up to 25 microns]**, **[Qualicoat Certified Powder-Coat Finish Class 2 equivalent to AAMA 2604]**, **[Qualicoat Certified Powder-Coat Finish Class 3 equivalent to AAMA 2605]**
			2. Galvanized Steel Sheet: ASTM A653/A653M, minimum Z275 (G90) coating.
				1. Thickness: Not less than **[1.0 mm and up to 2.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As galvanized][Powder-coated]**.

Colour: **[specify here]**

* + - 1. Weathering Steel (Corten Steel): ASTM A588 or ASTM A606, Grade 2.
				1. Thickness: Not less than **[1.0 mm and up to 2.0 mm]** mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
			2. Stainless Steel: ASTM A240/A240M, Type **[304][316][316L]**.
				1. Thickness: Not less than **[0.6 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[No. 2B bright finish][No. 4 satin finish][No. 8 mirror finish]**.
			3. Titanium Zinc: EN 988 and ASTM B69 consisting of 99.995% zinc and 0.003% titanium, alloy C28000, C22000 or equivalent.
				1. Thickness: Not less than **[0.7 mm and up to 2.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Natural patina][Pre-weathered]**.
			4. Copper: ASTM B370, alloy C11000, C12500 or equivalent.
				1. Thickness: Not less than **[0.6 mm and up to 3.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Bright polished][Oxidized finish]**.
			5. Brass: ASTM B36/B36M or ASTM B248.
				1. Thickness: Not less than **[0.6 mm and up to 3.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Specify here]**
		1. Pattern Parameters: Fabricate trapezoidal metal products to following parameters:
		2. Panel Shape: **[Square][Square-Versatile]** **[Louvre]** **[Omega]** **[Sinus]** **[Triangle]**.
		3. Panel Type: **[solid][perforated][expanded mesh]**

SPEC NOTE: Keep the following for perforated panels. Delete if not applicable.

* + - 1. Perforations:
				1. Shape: **[Round]** **[Square]** **[Slotted]** **[Hexagonal]**.
				2. Holes: **[Staggered grid][Straight grid]**
				3. Minimum open area: **[ ]** percent.

SPEC NOTE: Keep the following for expanded mesh panels. Delete if not applicable.

* + - 1. Mesh Parameters: Fabricate expanded mesh products to following parameters:
				1. Expanded Metal Mesh:

Pattern Type: **[Round]** **[Diamond]** **[Hexagonal]** **[Specify here]**

Short way of design (SWD): **[specify]**

Long way of design (LWD): **[specify]**

Short way of opening (SWO): **[specify]**

Long way of opening (LWO): **[specify]**

Strand Width (mm): **[specify]**

Strand Thickness (mm): **[specify]**

* + 1. Ensure uniformity and alignment of patterns across connected panels. Equip panels with perimeter metal frames, return edges, borders, mounting holes, attachment brackets, clips and similar elements as indicated on reviewed Shop Drawings for a complete installation.

SPEC NOTE: Use the following to specify an entirely custom panel. Engage with the manufacturer early in the process to confirm feasibility and address potential adjustments. For custom designs or patterns, ensure all intellectual property rights and copyright clearances are obtained before fabrication.

* 1. CUSTOM DESIGN PANELS

SPEC NOTE: Coordinate the tag below with the Drawings to provide a consistent and unique identifier for this item across the Contract Documents to avoid confusion during procurement and installation.

* + 1. Material Tag: This item is noted as ‘MET-#’ on Drawings and Schedules.
		2. Description: Custom-designed metal panels tailored to meet project requirements.
		3. Material and Finish:

SPEC NOTE: In the paragraphs below, specify the metal and finish type required for the project. Delete non-applicable options.

* + - 1. Aluminum: ASTM B209 (ASTM B209M), Alloy 1000 & 3000 & 5000 SERIES..
				1. Thickness: Not less than **[1.0 mm and up to 25.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Anodized finish up to 25 microns]**, **[Qualicoat Certified Powder-Coat Finish Class 2 equivalent to AAMA 2604]**, **[Qualicoat Certified Powder-Coat Finish Class 3 equivalent to AAMA 2605]**
			2. Galvanized Steel Sheet: ASTM A653/A653M, minimum Z275 (G90) coating.
				1. Thickness: Not less than **[1.0 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As galvanized][Powder-coated]**.

Colour: **[specify here]**

* + - 1. Weathering Steel (Corten Steel): ASTM A588 or ASTM A606, Grade 2.
				1. Thickness: Not less than **[1.0 mm thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.**
			2. **Stainless Steel: ASTM A240/A240M, Type [304][316][316L]**.
				1. Thickness: Not less than **[0.60 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[No. 2B bright finish][No. 4 satin finish][No. 8 mirror finish]**.
			3. Titanium Zinc: EN 988 and ASTM B69 consisting of 99.995% zinc and 0.003% titanium, alloy C28000, C22000 or equivalent.
				1. Thickness: Not less than **[0.7 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[Natural patina][Pre-weathered]**.
			4. Copper: ASTM B370, alloy C11000, C12500 or equivalent.
				1. Thickness: Not less than **[0.6 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Bright polished][Oxidized finish]**.
			5. Brass: ASTM B36/B36M or ASTM B248.
				1. Thickness: Not less than **[0.6 mm]** thick. Ensure perforated metal panels meet required thickness and strength for specific applications based on engineering design.
				2. Finish: **[As fabricated, mill finish][Specify here]**
		1. Panel Parameters:
			1. Perforation/Pattern: **[specify]**
			2. Mesh Parameters: **[specify]**
			3. Surface Texture: **[specify]**
			4. Edge Treatment: **[specify]**
		2. Ensure uniformity and alignment of patterns across connected panels. Equip panels with perimeter metal frames, return edges, borders, mounting holes, attachment brackets, clips and similar elements as indicated on reviewed Shop Drawings for a complete installation.
	1. SUBSTRUCTURE
		1. Provide manufacturer’s standard substructure designed and engineered to provide stable and secure support for metal panels under anticipated loading conditions. Substructure design to accommodate panel weight, live loads, wind loads, and other applicable loads using load combinations required by Ontario Building Code without exceeding allowable deflection limits specified in this Section.
		2. Ensure substructure materials and coatings provide adequate corrosion protection for intended service life panel system based on environmental conditions at project site.
		3. Ensure substructure is designed to ensure proper panel alignment, spacing, and secure attachment. Allow for expansion and contraction of panels under specified atmospheric conditions without causing excessive stress or permanent distortion.
	2. AUXILIARY MATERIALS
		1. Fastener Materials: Unless otherwise indicated, Provide stainless steel fasteners and rivets as recommended by manufacturer. Provide fasteners of type, grade, and class required to produce connections suitable for anchoring custom-fabricated metal panels and screens to other types of construction indicated.
		2. Welding Rods and Bare Electrodes: Select according to CSA Specifications for metal alloy welded.
		3. Sealants: As specified in Section 07 92 00.
		4. Flashings: Prefinished steel as specified in Section 07 62 00. Provide flashings at edges, top and bottom of panel system as indicated on Drawings.
		5. Dielectric Separator: Provide best grade, quick drying non-staining alkali resistant bituminous paint or epoxy resin solution or membrane type to acceptance of Consultant to protect dissimilar metals from each other and from non-compatible products.
	3. FABRICATION
		1. Fabricate metal panel products to dimensions and tolerances indicated on Drawings. Include provisions for mounting, supports and anchoring systems.

SPEC NOTE: The following tolerances are derived from the Metal Construction Association’s (MCA) “Preformed Metal Wall Fabrication/Installation Tolerances” white paper available here: <https://www.metalconstruction.org/index.php/online-education/preformed-metal-wall-fabricationinstallation-tolerances> Edit if different tolerances are required for the project.

* + 1. Fabrication Tolerances:
			1. Panel Length: ±10mm (±3/8 inch)
			2. Panel End Squareness
				1. Viewed from panel front, measured across sheet width: 0.5% of panel width, and not exceeding 3 mm (1/8 inch) at one end.
				2. Viewed from panel side, measured across panel depth: 2% of panel depth, and not exceeding 1.5 mm (1/16 inch)
			3. Maximum camber: 5 mm (3/16 inch) per 3 m (10 feet) of panel length
		2. Ensure pattern alignment and uniformity across metal sheets for multi-panel installations.
		3. Fabrication processes must minimize risk of damage to panel finish. Provide temporary protective coverings applied and maintained during fabrication and handling to prevent scratches, dents, or other surface imperfections.
		4. Panels must be clearly and permanently labelled to facilitate proper identification and installation in accordance with reviewed Shop Drawings.
		5. Coordination with adjoining construction: Coordinate dimensions and attachment methods of custom-fabricated metal panels and screens with adjoining construction.
			1. Provide assemblies with closely fitting joints and aligned edges and surfaces. Form items to fit tightly to adjoining construction.
		6. Cutouts and openings: Coordinate size, location of cutouts, and method of attachment to adjoining construction. Drill and tap holes needed for securing items to other surfaces.
		7. Metal forming: Form metal to specified profiles in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends.
		8. Metal reinforcement: Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both to provide surface flatness equivalent to stretcher-levelled standard and sufficient strength for the intended use.
		9. Support framing and accessories: Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install custom-fabricated metal panels and screens.
	1. finishes
		1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Protect finishes by applying a strippable, temporary protective covering before shipping.
		2. Finish components after assembly.
		3. Appearance Requirements: Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable provide they are within the range of reviewed samples and assembled to minimize contrast.
1. EXECUTION
	1. EXAMINATION
		1. Verify actual site conditions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.
	2. INSTALLATION
		1. General Requirements: Install work of this Section in strict accordance with manufacturer's written installation instructions and reviewed Shop Drawings. Supplement manufacturer's installation instructions with additional installation requirements specified in this Section to produce specified work results.
		2. Install components in plumb, level and square. Maintain dimensional tolerances and alignment with surrounding construction.
		3. Secure custom-fabricated metal panels and screens to in-place construction using appropriate anchorage devices and fasteners.
		4. Ensure accurate placement in location, alignment, and elevation using established lines and levels. Perform cutting, drilling, and fitting as required for proper installation of custom-fabricated metal panels and screens.
		5. Form tight, hairline joints or uniform reveals and spaces for sealants and joint fillers when fitting exposed connections together. Restore finishes to eliminate evidence of cutting, welding, and grinding work.
		6. Do not cut or abrade finishes that cannot be fully restored in the field. Instead, return items with such finishes to shop for necessary alterations and complete refinishing, or Provide new units as required.
		7. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

SPEC NOTE: The following tolerances are derived from the Metal Construction Association’s (MCA) “Preformed Metal Wall Fabrication/Installation Tolerances” white paper available here: <https://www.metalconstruction.org/index.php/online-education/preformed-metal-wall-fabricationinstallation-tolerances> Edit if different tolerances are required for the project.

* 1. TOLERANCES
		1. Install panels progressively to distribute alignment or tolerance variations across multiple panels. Do not concentrate misalignment in a single panel.
		2. Panel Plumbness (In-plane of wall): 19 mm (3/4 inch) over 6 m (20 feet).
		3. Trim Plumbness: 13 mm (1/2 inch) over 6 m (20 feet).
		4. Panel Adjustments - Fanning of panels to restore line or create module:
			1. Fluted Panels: Fanning must be uniformly distributed across the panel.
			2. Flat Panels with Butt Seams: Larger of:
				1. 1% of panel width,
				2. 6 mm (1/4 inch) total, or
				3. 3 mm (1/8 inch) per seam.
		5. Differential Panel Coverage: 6 mm (1/4 inch) per panel.
		6. Panel Alignment
			1. Base accumulation of fabrication and installation tolerances:
				1. Maximum offset: 5 mm (3/16 inch) at panel base.
				2. Overlap up to 12 m (40 feet): 6 mm (1/4 inch).
				3. Overlap exceeding 12 m (40 feet): 13 mm (1/2 inch).
		7. Base Flashing Alignment (measured at the brake point)
			1. Tolerance: 13 mm (1/2 inch) over 3.6 m (12 feet).
		8. Exposed Fastener Alignment: Variance across panels or spacing along a panel or trim:
			1. Across a bay: 13 mm (1/2 inch).
			2. Along the panel: ± 25 mm (± 1 inch).
	2. PROTECTION
		1. Protect custom-fabricated metal panels and screens from damage, soiling and contaminating substances resulting from construction activities or caused by work of other trades.
		2. Where soiling or spills have occurred, remove spills and soiling from adjacent surfaces using cleaning procedures recommended in writing by affected material’s manufacturer. Do not use materials or process that can damage finishes, surfaces, or construction.
		3. Promptly replace custom-fabricated metal panels and screens work damaged during construction that cannot be satisfactorily repaired.
	3. PROTECTION
		1. Protect custom-fabricated metal panels and screens from damage, soiling and contaminating substances resulting from construction activities or caused by work of other trades.
		2. Where soiling or spills have occurred, remove spills and soiling from adjacent surfaces using cleaning procedures recommended in writing by affected material’s manufacturer. Do not use materials or process that can damage finishes, surfaces, or construction.
		3. Promptly replace custom-fabricated metal panels and screens work damaged during construction that cannot be satisfactorily repaired.
	4. CLEANING AND WASTE MANAGEMENT
		1. General Requirements for Cleaning and Waste Management: in accordance with Section **[01 74 00, Cleaning]** and Section **[01 74 19, Waste Management and Disposal]**.
		2. Cleaning: Maintain clean construction area at the end of each day. When activities of this Section are complete, remove materials, tools, equipment and rubbish.
		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.

END OF SECTION