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**Part 1            General**

**1.1               SCOPE OF WORKS**

- .1       The list of works listed in this section is indicative and non-limitative. It does not exclude works described in other sections of the specifications, shown on drawings or necessary for a complete execution of the works in the spirit of the plans.
- .2       The works described in the present section address the fabrication and installation of the new principal pinnacle crest on the roof of the central building of 1885.

**1.2               RELATED REQUIREMENTS**

- .1       Section 07 61 00 - Sheet Metal Roofing.
- .2       Section 07 62 00 - Sheet Metal Flashing and Trim.

**1.3               REFERENCES**

- .1       CSA International
  - .1       CSA W59-03, Welded Steel Construction (Metal Arc Welding).
  - .2       CAN3-S157-FM83 (C2000), Cast iron units mechanical strength calculations
  - .3       CSA W47.2-FM1987 (C1998) : Certification of companies of fusion welding.
  - .4       CSA W47.2-[FM1987 (C1998)], Certification of companies of fusion welding of aluminum.
  - .5       CAN3-S157/S157.1-05, Mechanical strength calculations of aluminum elements / Commentaries on CSA-S157 - Mechanical strength calculations of aluminum elements .
  - .6       CSA-W59.2-M1991(C2008), Welded aluminium Construction
- .2       American Society for Testing and Materials (ASTM) :
  - .1       ASTM B209-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - .2       ASTM B221-08, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
  - .3       ASTM A276-08a, Standard Specification for Stainless Steel Bars and Shapes.
  - .4       ASTM B32-08, Standard Specification for Solder Metal.
  - .5       ASTM B370-09, Standard Specification for Copper Sheet and Strip for Building Construction.
- .3       Aluminum Association, Inc. (AA)
  - .1       AA-DAF-45-2003, Designation System for Aluminum Finishes.
  - .2       AA Aluminum Standards and Data – 2006
- .4       Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1       Material Safety Data Sheets (MSDS).

- .5 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - 2004. (Named « MPI manual» in the present section.)
  - .2 Master Painters Institute (MPI)
    - .1 MPI Architectural Painting Specifications Manual, 2007.
    - .2 MPI - Maintenance Repainting Manual, 2004.
- .6 American Architectural Manufacturers Association (for anodisation of aluminum):
  - .1 Anodisation clear finish aluminum Class no.1 according to Specification no. 611-98
  - .2 Anodized aluminum finish - AA-M12-C22-A41
- .7 Copper Development Association (CDA):
  - .1 Copper in Architecture Handbook, latest edition.

#### **1.4 FABRICATION REQUIREMENTS**

- .1 Calculations criteria: the ornaments and structures of the crest as well as all assemblies must be conceived to resist to dynamic loads (ex: win loads) to which they may be submitted in the vertical and horizontal directions.

#### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements for abrasive media, oil, grease, paint stripper, primers, paints and coatings.
- .3 Provide to Departmental Representative at end of Work all patterns, decorative motives and moulds used to reproduce the ornamental components of the new pinnacle crest.
- .4 Documents/elements to submit at end of works
  - .1 Plans conforming to execution: indicate with precision location of equipments distant or concealed, of services and of conduits, lightning rod cable.
  - .2 Data on use and maintenance.
  - .3 Tools, spare parts and extra materials required for maintenance.
- .5 Documents to submit for quality assurance:
  - .1 Qualifications: for the engineer.
  - .2 Welding Certificates.
  - .3 Furnish certificates signed by manufacturer stating that materials have the specified physical properties and performance characteristics.

#### **1.6 COORDINATION**

- .1 Coordinate work before and during the project to ensure that all components of the pinnacle crest are approved by the Departmental Representative, before painting and installation of the crest.

- .2 Any potential or actual conflict between the accurate reinstallation of the pinnacle crest and roofing must be brought to the attention of the Departmental Representative.
- .3 Provide wood structure framers and roofers with accurate templates of principal supports of the principal pinnacle crest to allow precise location and preparation of anchor points of main posts and secondary posts of the pinnacle crest and their fixation to the roof.

## **1.7 QUALITY ASSURANCE**

- .1 It is formally forbidden to undertake the following stages without approval of Departmental Representative:
  - .1 Fabrication of mock-up of works before having submitted shop drawings and received approval of Departmental Representative.
  - .2 Fabrication of principal pinnacle crest without having submitted mock-up of works for approval by Departmental Representative.
  - .3 Anodization of cast aluminum ornaments without having previously inspected the elements.
  - .4 Application of paint without having previously inspected components to paint.
  - .5 The Departmental Representative must obligatorily inspect each of the modules (5 per section), all sections (9 in all), main posts (10 in all) and secondary posts of the principal pinnacle crest BEFORE transporting them to site.
  - .6 Inspect protection of sections before transport to site.
  - .7 Installation of principal pinnacle crest.
- .2 Adjust techniques as directed by Departmental Representative until desired results are achieved. Steps or processes approved by Departmental Representative serve as the standard for subsequent work.
- .3 The structural elements and certain rods of the pinnacle crest are in stainless steel, ornaments are mainly in cast aluminium and certain are made in copper. The collars are in cast aluminum.
- .4 Do welding work in accordance with CSA-W59, unless otherwise specified.
- .5 Workers must possess all the knowledge and experience required for the execution of the works of new historic ornamental metal works as described in the present section
  - .1 Metal ornaments on a large scale.
  - .2 Metal ornaments having complex geometry
  - .3 Historic reconstitution of ornamental metals to the identical with steel and/or cast aluminum.
- .6 They must have all licenses, permits and/or competency cards required for the execution of works in the province of Québec.
- .7 At the request of Departmental Representative, ornamental metals contractor will have to present a document showing achievements of all his workers assigned to the project in work categories 1.1 to 1.3. In the event where achievements of one or several of the workers do not demonstrate that he or they have the necessary knowledge and/or experience for the execution of the works, Departmental Representative may order the contractor to replace the worker or workers.

At the request of Departmental Representative, the worker whose achievements demonstrates that he has the necessary experience and knowledge for the execution of the works, must make a work sample in one or several of the categories of the works stated at point .1.1 to .1.3 and this, in presence of Departmental Representative, in a manner to demonstrate that work processes and techniques are well controlled while meeting drawings and specifications requirements. In the event where performed samples do not demonstrate that he controls work processes and techniques necessary for the execution of the works, Departmental Representative may order the contractor to replace the worker or workers.

- .8 At any moment before or during the execution of the works, in case of unsatisfactory performance from a worker assigned to execution of the works, Departmental Representative may order contractor to replace the worker or workers who do not demonstrate a level of adequate competency for the execution of the works.

## **1.8 SHOP DRAWINGS**

- .1 Submit required shop drawings, including shaping and mounting documents, that is conception and assembling details, shaping, mounting diagrams and instructions as well lists of equipment and materials in accordance with section 01 33 00 - submittals
- .2 Contractor must furnish shop drawings made digitally (no hand sketches) of all components and elements of principal pinnacle crest:
  - .1 Indicate clearly materials, finishes, connections, joints, and anchor methods, number of anchors, supports, reinforcements, ornaments, profiles, details and accessories of pinnacle crest on the shop drawings.
  - .2 Submitted drawings must show sections, assemblies, piercings, threaded fixation devices, rivets, weldings and other required elements.
  - .3 Contractor must furnish shop drawings made digitally (no hand sketches) of all details for anchoring and reinstallation of principal pinnacle crest on the roof. Submit documents describing work methods, sequence of mounting of elements and types of equipment which will be used.

## **1.9 SAMPLES AND MOCK UPS**

- .1 The principal pinnacle crest is composed of 9 large sections which are themselves composed of 5 identical modules (see drawing sheet A465). Contractor must make the following work mock up for approval by Departmental Representative:
  - .1 Do and submit for approval of Departmental Representative a sample of EACH of typical ornamental components with finish (ex: anodisation of ornaments in cast aluminium) of the crest SEPARATELY (flowers, collars, maple leaf, lily flower, small collar, large collar, buttons, copper balls, ribbons, bent stems, flag, etc..).
  - .2 Once all samples of ornamental works have been separately approved by Departmental Representative, provide a sample of complete module according to approved shop drawings by the Departmental Representative.
  - .3 Once the sample of module has been approved by Departmental Representative, provide a sample of complete main post and in two stages according to approved

shop drawings by the Departmental Representative. The first stage of approval is that of all the structure of the post without copper covering cuivre. The second stage of approval is that of the copper covering as well as all the ornaments, including the pivoting flag.

- .4 Once the sample of module and main post have been accepted , provide a sample of a complete section (5 modules with two main posts)for approval by the Departmental Representative.
  - .5 Install 1 main post at the pinnacle of the roof on the site for approval by the Departmental Representative and according to approved shop drawings.
  - .6 Install 1 module at the pinnacle of the roof on the site for approval by the Departmental Representative and according to approved shop drawings.
  - .7 Provide a sample of all anchors, screws, tie rod and other fastening devices.
- .2 Accepted samples and mock-ups will become the standard of acceptance for the works of the present section.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Identify hazardous and related materials which are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Provincial Ministries of Environment and Regional Levels of Government.
- .2 Safely store materials defined as hazardous or toxic waste, including emptied containers and application apparatus, in containers or areas designated for hazardous waste and dispose of contaminants in an approved legal manner.
- .3 Remove from site all packaging materials and transport them to appropriate recycling facilities.
- .4 Recupérate and sort all packaging materials, paper, plastic, polystyrene and undulated cardboard and place them in appropriate bins installed on site for recycling, according to waste management plan.
- .5 Transport unused metal elements to metal recycling facility approved by Departmental Representative.

#### **1.11 PROTECTION AND TRANSPORT OF PINNACLE CREST**

- .1 Construct 19mm plywood boxes large enough to insert the main posts and the 9 sections of the pinnacle crest individually. The sections of the pinnacle crest must be padded and the plywood boxes must be covered with rigid insulation inside on all sides. Put the sections in the boxes and fill all voids in the box with balls of expanded rigid insulation. Mark the number of the section on the box.
- .2 Do not pile components in the boxes.
- .3 Never slide or drag sections if metal touches metal.
- .4 Tie up sections in place by tightening with nylon straps where elements are supported by spacers.
- .5 Construct a test box for approval of Departmental Representative before producing all the plywood transport boxes. The Departmental Representative must inspect all the sections

in the plywood boxes before their closure and transport. This requirement applies also for the transport from the shop to the site.

- .6 All damages caused to sections of pinnacle crest due to handling and/or transport, must be repaired at the expense of the contractor and to satisfaction of Departmental Representative.

## **1.12 INSTALLATION PLAN OF MAIN PINNACLE CREST**

- .1 Prepare and submit for approval to Departmental Representative a plan of assembling which describes the methodology and sequence of installation of the pinnacle crest. No installation works must be undertaken before approval of the contractor's assembling plan.

## **1.13 COORDINATION MEETINGS WITH CONTRACTOR AND SPECIALIZED SUBCONTRACTORS**

- .1 The following meetings with the Departmental Representative, the Contractor and his specialized Subcontractor are obligatory:
  - .1 Start off meeting before the beginning of the works described in this section;
  - .2 Meetings and inspection visits to workshop of specialized Subcontractor.
  - .3 Coordination meeting before installation of principal pinnacle crest.

## **1.14 PERFORMANCE REQUIREMENTS**

- .1 Do periodical inspections of current works in workshops and on the site.
- .2 Conceive, develop and calculate the studs and assemblies which have not been elaborated in detail.
- .3 Conceive, develop and calculate assemblies in a manner that they do not encroach on the lines of architectural clearances, the plans or the finishes.
- .4 Make weldings of stainless steel elements in accordance with code AWS D1.6, with standard CSA W59, and by welders authorized by the American Welding Society.
- .5 Thermal movements : plan the exterior metal works to resist to thermal movement caused by the maximum following variations in ambient and surface temperatures in the aim of preventing deformations, opening of joints, overload of elements, a failure of assemblies and other nuisances. Engineering calculations must be based on surface temperatures of materials resulting from contribution of solar radiation as well as thermal loss occurring during the night.
- .6 Tolerances :
  - .1 Factory tolerances: conforming to ASTM A6.
  - .2 Assemblies must resist to their dead load and overloads and to mechanical forces without having de permanent deformation, with a maximum of L/360, inside the following construction tolerances:
    - .1 Maximum difference of verticality is of 3, 2 mm for 3 m.
    - .2 Maximum difference of horizontality is of 3, 2 mm for 9 m.

- .3 Maximum difference from straight plan is of 3, 2 mm for 3 m under a straight edge of 3 m.
- .4 Maximum difference from indicated angle is 10 seconds.
- .5 Tolerances are not cumulative.

## **1.15 ACCEPTABLE PRODUCTS AND MATERIALS**

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Materials to be used in conservation process shall be intact and unaltered by previous work.
- .2 Stainless steel, cast aluminum and copper must be of the best quality.
- .3 Natural finish copper 20 ounces and 16 ounces
- .4 Cast aluminum clear anodized and painted cast aluminum. Aluminum ingots, such as 356, 413 and 713 alloys, submit chemical analysis of ingots
- .5 Penetrating oil.
- .6 All new machine screws are to be stainless steel mortised heads, round or flat as appropriate.
- .7 White lithium grease.
- .8 Nylon head sleeve.
- .9 Stainless steel bolts: according to standard ASTM F 593.
- .10 Screws, bolts, nuts etc. Stainless steel type 304.
- .11 Welding materials: according to CSA-W59.2 for aluminum welded construction. Aluminum welding rods: conforming to standard A5.10/A5.10M
- .12 Ultra High Molecular Weight polyethylene pads
- .13 Methylene-chloride based paint stripper.
- .14 Paint Systems (the informations in this paragraph have precedence – for the metal ornaments - on the other sections of the specifications concerning paint). The general Contractor is responsible to transmit the following information to his appropriate subcontractor:
  - .1 EXT 5.1G, pigmented polyurethane based product (on primer based on epoxy resin with high zinc content and epoxy resin with high garnishing power), of superior quality, including :
    - .1 1 coat of MPI no 20, primer; epoxy resin rich in zinc.
    - .2 2 coats of MPI no 108, epoxy covering with high garnishing power, low gloss finish.

- .3 2 coats of MPI no 72, 2 components polyurethane, and pigmented black, high gloss finish.
- .2 Paint materials for the paint system must be the products of only one same manufacturer.

## **2.2 ACCESSORIES**

- .1 Welding materials: of type required according to materials to be welded.
- .2 Electrodes to weld: they must conform to standard CSA W48.
- .3 Fasteners:
  - .1 Unless otherwise indicated, provide stainless steel type 316 fasteners for exterior use.
  - .2 Typical fasteners: must be stainless steel type 316.
  - .3 Bolts and anchor bolts: must conform to standard ASTM A307
  - .4 When bolts are exposed, assure a finish matching adjacent surfaces according to instructions of Departmental Representative.
  - .5 Fasteners with neoprene washer to use between stainless steel and cast aluminum and between copper and stainless steel to prevent galvanic reaction between various metals.

## **2.3 FABRICATION**

- .1 Fabrication works of the principal pinnacle crest:
  - .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
  - .2 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
  - .3 Elements must be shaped in conformity to standard CAN3-S157 and according to indications of the shop drawings.
  - .4 Apparent surfaces of elements of cast metals must be finished as the finishes described in the present section.
  - .5 Fabricate the metal works with machinery and tools conceived specifically for the planned fabrication processes and have the works executed by qualified workers.
  - .6 Use self-tapping and self-locking screws on elements which must be assembled with screws or as indicated.
  - .7 Ensure that the metal works are exempt of warping, wrinkling, distortion, permanent or not, and that no opening is present in joints or junctions.
  - .8 Construct elements which are part of a horizontal structure in a manner that they resist to the same overloads than those imposed to adjacent structures.
  - .9 Pierce drainage holes in the principal posts of the structure of the pinnacle Crest to allow water evacuation at the bottom of the posts. Indicate drainage holes on the shop drawings, including contact spots with waterproof materials or adjacent, roof if necessary.



- .10 Cut, manufacture and adjust with precision joints, corners, against-profile assembly pieces and tabs so that junctions between elements are done perfectly and square.
- .11 Use non apparent fixation methods unless otherwise indicated.
- .12 Use bolts only when it is not possible to proceed by welding and cut the bolts so that they are at the same level as the nuts. Countersink bolt heads and plan a method to prevent nuts from loosening. Countersink holes pierced for fasteners.
- .13 Allow a differential movement inside assemblies and at junctions of these with adjacent works.
- .14 Plan holes and links necessary for works which will be installed by others. The finishing of apparent edges of materials including holes must be clean and smooth.
- .15 Provide closures to open extremities of apparent sections, for example pipes, U profiles, angles and other similar elements.
- .16 Machine or grind horizontal sets or load bearing surfaces so that support elements are on level.

## **2.4 WELDING**

- .1 Weld assemblies unless otherwise indicated on approved shop drawings. Locations of weldings on the pinnacle crest must be clearly indicated on the shop drawings.
- .2 Weld corners and joints in a continuous manner to respect the following requirements:
  - .1 Surfaces must be clean and exempt of rust, de paint and of all impurities.
  - .2 Use materials and methods which reduce deformation and which allow to reinforce the base metals and to increase their corrosion resistance.
  - .3 Space and alternate the welds, by applying clamps if necessary to prevent a deformation or a decentering.
  - .4 Merge metals without cutoffs and without overlappings.
  - .5 Remove immediately the welding flux.
  - .6 At places where joints are visible, make sure that surfaces and apparent welds are smooth and homogeneous in order to show no roughness once the works completed, and that the outline of the welded surface corresponds to that of the adjacent surface.
- .3 Ensure that apparent welds of each joint are continuous. File or grind apparent welds to level them out and make them uniform.
- .4 Grind visible joints to make them uniform. Grind the welds in a manner to make them smooth and fill joints up to the surface with compatible filler which matches the finish covering in order to meet NOMMA type 2 appearance requirements for circulation areas which do not require a superior ornamental quality.

## **2.5 EQUIPMENT AND FACILITIES**

- .1 Provide indoor facilities off-site (workshops) for all aspects of this work including but not limited to layout, surface preparation and all blacksmithing work.

- .2 Provide machine shops, paint booths, and all other facilities required to perform the work, off-site.
- .3 Equip the workshop with the following tools and equipment:
  - .1 Screwdrivers accurately sized for the fastener.
    - .1 Gunsmith screwdrivers with hollow-ground blades and fixed or interchangeable bits.
  - .2 Component labels: sheet brass tag with hole at one end, punched with required information and secured with 300 Series stainless steel wire.
  - .3 Cable pulls: nylon, various lengths.
  - .4 Straps/slides: nylon, nominal 75 mm wide.
  - .5 Padding: ethafoam sheet, mover's blankets.

## **2.6 FINISHES OF COMPONENTS OF THE PRINCIPAL PINNACLE CREST**

- .1 Cast aluminum: Certain ornaments such as the flowers, the buttons, the flags, the lily flowers, the maple leaves, the ribbons, the collars, etc. (See drawing sheet A465) will be finished with clear anodization.
- .2 Cast aluminum: The flags are partially covered of bronzine in their central part as indicated on sheet A-465.
- .3 Cast aluminum: the other cast aluminum components, such as stems and floral ornaments of main posts are painted. See sheet A-465.
- .4 The ornaments (balls) and the copper covering of main posts are of natural copper 16 ounces for the ornaments and of copper 20 ounces for the covering and dressing of main posts.
- .5 The stainless steel components (posts, crest structure, transversal bars, etc...) are painted.

## **Part 3 Execution**

### **3.1 CONSTRUCTION AND ASSEMBLY**

- .1 The structure of the principal pinnacle crest is composed of posts, flat bars, stalks, supports and stainless steel (316) fixing brackets painted black. These structural components are welded one to each other. The only stainless steel junctions which are not welded are the fixing brackets of sections to main posts. The brackets must have slotted holes and be mechanically fixed to allow thermal movement between sections and posts. The construction of structure of main posts with it's supports is also of stainless steel and these elements must be painted as indicated in the present specification section. See sheet A465.
- .2 The copper, the cast aluminum and the stainless steel must never be in direct contact and must be separated by neoprene pads in order to prevent galvanic reactions between the metals.
- .3 The lily flowers are in full cast aluminum without any hollow core in the ornament. The maple leaves and the ribbons are of cast aluminum 3mm thick and these elements are

welded to stems of cast aluminum. There are maple leafs on both sides of the pinnacle crest (north and south).

- .4 The bouquets of stems and the pivoting flag over them are of cast aluminum. A recuperated model of bouquet of stems and flag will be handed over to contractor so that he may reproduce it with precision with the aid of precise mold based on recuperated elements.

### **3.2 FASTENERS**

- .1 All anchors must be stainless steel, flat head slotted machine screws.
- .2 Sandblast the stainless heads to give a physical profile to the surface to increase paint adhesion.
- .3 Use a nylon headed sleeve on each fastener to provide electrical insulation; seal the joint; reduce fastener vibration; eliminate electrolytic action.
- .4 Coat the threads with white lithium grease immediately prior to installing the new fasteners, taking extreme care not to contaminate with grease any exposed surface that will be painted in the future.
- .5 Take care not to over tighten.
- .6 Prime and paint the screw heads after installation.

### **3.3 CAST ALUMINUM COLLARS**

- .1 Design new 2-piece collars at locations indicated on drawings. The collar is to be 2 halves joined by stainless nuts and bolts at half lap intersections on the castings.
- .2 Drawings of the proposed replacement will be submitted for approval. Once the pattern is made and a collar is cast, it too will be submitted for approval.
- .3 Machine, fettle and dress the new castings as required to produce clean castings.
- .4 Because of the possibility of delays at the foundry, the Contractor shall arrange to have this portion of work done as one of the first items of work attempted, in order that the components shall be ready on time for painting and re-assembly.
- .5 The Departmental Representative shall examine for casting defects (porosities, cold-shuts, etc.), as well as accuracy of machining and accuracy of casting. The components must fit neatly together. If the parts do not fit properly, they must be made to do so, either by adjusting the pattern or by machining of the finished castings, as directed by the Departmental Representative.
- .6 On acceptance by Departmental Representative, the prototypes become the quality standard against which the rest of the castings shall be measured.
- .7 Proceed with casting and machining the balance of required units as directed by Departmental Representative.
- .8 Have Departmental Representative make final inspection of entire lot of castings before applying the primer. Any castings not to the satisfaction of Departmental Representative must be re-cast and re-machined.

### **3.4 INSTALLATION-GENERAL**

- .1 Install the sections on the roof in a manner that all bearing and support points make contact.
- .2 Coordinate works with roofers, carpenters and other trades as required during the reinstallation process for the localization of piercings at the pinnacle.
- .3 Apply Ultra High Molecular Weight polyethylene, 1.6 mm, pads between all steel to copper contact points.
- .4 Lag bolt holes should have a bead of thermoplastic caulk applied around them on the copper roof before the plastic pads, ironwork and lag bolts are installed. The lag bolts are to be driven tight before this caulk cures.
- .5 Stainless steel lag bolts into the roof structure are to have nylon headed sleeves installed on them.
- .6 Touch up paint as required or as directed by Departmental Representative

### **3.5 INSTALLATION-SEQUENCE**

- .1 Once the piercings on the roof have been coordinated and at right locations, Contractor must proceed to installation of first extremity principal post.
- .2 Once the first post installed proceed with installation of section no.1 (which contains 5 modules). Once section no.1 is installed, proceed with installation of principal post no.2 and afterward of section no.2 until the entire pinnacle crest is installed. A tight coordination is required between carpenters, the metal contractor and the tinsmiths while following strictly the anchor details of the structural engineers.
- .3 The copper dressings of the principal posts must obligatorily be installed on the site (and not in workshop), once the crest is installed at the summit of the roof.
- .4 The installation of the areal ground terminals of start-up and lightning protection devices are installed on the two extremity posts once the pinnacle crest is entirely installed.

### **3.6 PAINT WORKS- PRODUCTS**

- .1 Paint System (the information in this paragraph has precedence – for the metal ornaments - on other sections of the specification concerning paint). The general contractor is responsible to transmit the following information to his appropriate sub-contractor:
  - .1 EXT 5.1G, pigmented polyurethane based product (on primer based on epoxy resin with high zinc content and epoxy resin with high garnishing power), of superior quality, including :
    - .1 1 coat of MPI no 20, primer; epoxy resin rich in zinc.
    - .2 2 coats of MPI no 108, epoxy covering with high garnishing power, low gloss finish.
    - .3 2 coats of MPI no 72, 2 components polyurethane, and pigmented black, high gloss finish.
  - .2 Paint materials for the paint system must be the products of only one same manufacturer.

- .2 Only products appearing on MPI Approved Products List (APL) may be used for the present works.
- .3 All paint materials for the paint system must be the products of only one same manufacturer.
- .4 Only products officially recognized having obtained the mention Environmental choice E3 can be used for the present works.
- .5 Conform to current requirements of MPI relating to paint coverings, including those regarding surface preparation and application of primers or impression paint.
- .6 Products used inside the building, namely primers or impression products, paints, coatings, varnishes, tinting, lacquers, filling products, thinners, solvents and others, must be in conformity to the « Approved Product Listing » (APL) of MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual.
- .7 For the interior of the building, provide paint products having the mention « Environmental choice E3 » founded on VOC content (according to EPA 24 method).

### **3.7 PAINT WORKS- PREPARATORY WORK**

- .1 Protection
  - .1 Protect the surfaces of the building and neighboring structures which must not be covered with paint or coating against speckles, marks and other damages with non dirtying coverage or masking elements. If surfaces involved are damaged, clean them and restore them according to instructions of Departmental Representative.
  - .2 Protect materials and components covered by a factory finish.
- .2 Preparation of surfaces
  - .1 The surfaces to paint must be exempt of oil, dust, dirt and must be dry.
  - .3 Clean and prepare surfaces in conformity with requirements listed in MPI Architectural Painting Specification Manual and MPI Maintenance Repainting Manual and to recommendations of paint manufacturer.
  - .4 Before application of primer or impression coat and between subsequent coats, prevent cleaned surfaces from being contaminated by salts, acids, alkalis, corrosive chemical products, grease, oil and solvents. Apply primer or impression product, paint or any other prerequisite treatment product as soon as possible after cleaning, before surface is contaminated again.
  - .5 As possible, apply a coat on concealed surfaces of new wood works before putting them in place. Use to do this, the products prescribed for the apparent surfaces.
  - .6 Clean metallic elements (surfaces) to paint by removing from them rust traces, laminated scaling, welding stains, dirt, oil, grease and other alien material in conformity with MPI requirements.
  - .7 Touch-up surfaces covered with a factory applied primer, according to indications.
  - .8 Do not apply paint on prepared surfaces before their acceptance by Departmental representative.

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**3.8 PAINT WORKS- APPLICATION**

- .1 The application method used must be approved by Departmental Representative. Unless otherwise indicated, apply the product according to manufacturer's instructions.
- .2 Apply each coat of paint in a manner to obtain a continuous coat, of uniform thickness. Rework bare or with a too thin coat surfaces before applying the following coat.
- .3 Allow surfaces to dry and harden adequately après after cleaning and between each successive coat, by waiting the minimum time recommended by the manufacturer.
- .4 Sand and clean dust of surfaces between each coat to eliminate apparent defects.
- .5 Finish surfaces which are located over and under lines of sight in conformity with applicable prescriptions to neighboring surfaces, including tops of cupboards and interior cabinets and projecting edges.

**END OF SECTION**