

## **DIVISION 35 – WATERWAY & MARINE CONSTRUCTION**

### **SECTION 59 – MARINE SPECIALTIES**

#### **PART 1 GENERAL**

##### 1.01 SUMMARY

- A. Section includes furnishing and the installation of the following equipment:
  - 1. De-icers.

##### 1.02 REFERENCES

- A. Reference Standards:
  - 1. ETL – Edison Testing Laboratories (Intertek).
  - 2. UL – Underwriters Laboratory.
  - 3. CSA – Canadian Standards Association.
  - 4. NEC – National Electrical Code.
  - 5. NEMA – National Electrical Manufacturer’s Association.

##### 1.03 SUBMITTALS

- A. Shop Drawings and Product Data: Submit detailed specifications, drawings, unit anchorage details, thrust results, and data covering all materials, parts, devices, equipment, and other accessories forming part of the equipment for the complete operational system. Mark each submittal to show which products and options are applicable to the project.
- B. Include the following information, as applicable:
  - 1. Manufacturer catalog cut sheets.
  - 2. Installation, start-up, operation, and maintenance manuals/instructions from the equipment manufacturer.
  - 3. Notation of coordination requirements.
  - 4. Availability and delivery time information.
- C. Manufacturer’s Instructions: Furnish manufacturer’s printed instruction for delivery, handling, storage, assembly, installation, start-up, wiring diagrams, and factory-recommended maintenance schedule, as appropriate.
- D. Operations and Maintenance Data: Submit data on all parts, devices, equipment, and other accessories furnished forming the complete operational system.

##### 1.04 QUALITY ASSURANCE

- A. The equipment manufacturer must have at least 50 continuous years’ experience in the design, application and manufacture of mechanical agitation, mixing, and de-icing assemblies of similar size and capacity. All material and equipment shall be new and of the highest quality.

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- B. Manufacture must have a dedicated engineering team including design, mechanical, quality, and electrical qualifications.
- C. Manufacturer must have documented quality requirements and procedures which include component sampling and testing, build instructions, Hi Pot and pressure decay testing, as well as bench rotation verification.
- D. Manufacturer must have dedicated service and repair department in house.
- E. Manufacturer must have dedicated customer service team with at least 4 employees.
- F. De-icers, complete with motor, power cable, anchoring lines, optional float or mount, and optional control panel shall be furnished by the de-icer manufacturer to ensure compatibility and integrity of the individual components and provide the specified warranty for all components.
- G. In order to assure uniform quality, ease of maintenance, and minimal parts storage, it is the intent of these specifications that all circulator assemblies and accessories called for under this section shall be supplied by a single manufacturer or authorized sales representative. The authorized sales representative shall, in addition to the Contractor, assume the responsibility for proper installation and functioning of the equipment if contracted for the installation and maintenance of the aerators.

#### 1.05 FACTORY TESTING

- A. Each de-icer shall be tested and pass a Hi Pot test, pressure decay test, and direction of rotation check prior to shipment.

#### 1.06 THIRD PARTY TESTING

- A. De-icers shall be third party tested by an accredited testing facility such as ETL, ETL-C, CSA, or UL, as a complete package assembly. Individual component testing only is not allowed.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivered materials shall be stockpiled and stored at locations approved by the Owner until required for installation. Materials shall be stored in accordance with manufacturer's instructions.
- B. Contractor shall inspect materials upon delivery for loss or damage in transit. Contractor shall be responsible for the replacement of damaged materials. All damaged materials shall be removed from the Site.
- C. Delivery and start-up shall be supplied by a factory trained and authorized equipment distributor representative.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURER**

- A. Approved Manufacturers:
  - 1. Kasco Marine, Inc. of Prescott, Wisconsin (Contact factory at 715-262-4488).
  - 2. Or be a pre-approved equivalent by the Engineer. To offer equipment as a pre-approved equivalent, a written application from the alternative supplier shall be submitted to the Engineer a minimum of TEN (10) days prior to the scheduled bid opening. Provide a list of at least five (5) installations of the proposed equipment in a similar application for review by the Engineer. The list shall include the contact name and phone number for each installation. Alternates must meet or exceed the oxygen transfer.

**2.02 PERFORMANCE**

- A. De-Icer units shall be designed for the following operating, performance, and design requirements:

Quantity	Model Number	Horsepower	Voltage/ Phase/ Frequency	Power Cord Length	Optional Control Panel	Optional Float or Mount

**2.03 GENERAL**

- A. Each de-icer unit shall be complete with a close-coupled, high-efficiency, submersible electric motor.
- B. Each de-icer shall be saltwater compatible and shall be protected by a sacrificial zinc anode installed on the 316 series stainless steel motor shaft.
- C. Provide each de-icer complete with all accessories, optional controls, and appurtenances, as required, for a complete operational system.
- D. The power source for the aerator shall be 120VAC or 208/240VAC single phase or 240VAC or 460VAC 3 phase (3 phase only available in 2HP) grid power to allow the unit to operate continuously, (24 hours per day, 7 days per week, 365 days per year), where necessary.

**2.04 CONSTRUCTION**

- A. Stainless Steel Construction. Metallic parts of the aerator shall be constructed of Series 300 stainless steel.

- B. The non-metallic propeller shall be protected by a cage or ring.
- C. The motor housing shall be 300 Series stainless steel and oil-filled with a non-detergent, low weight, turbine oil (optional food grade mineral oil available). The motor top shall be sealed with an O-ring and the shaft area shall be sealed with a two piece, carbon-ceramic seal. All fasteners exposed to the pumped liquids shall be Series 300 stainless steel.
- D. The pump and motor shall be designed so that they will operate in a fully-submerged condition in the water. Each motor shall be capable of and rated for continuous operation duty without exceeding temperature rise limits for the motor insulation system. Unit shall be designed to withstand 20 psi external pressure.
- E. A thermal overload shall be attached to the motor winding and shall stop the motor if motor winding temperature reaches 140 degrees C (applies only to single phase motors). Thermal overload shall reset automatically when motor cools.
- F. Stainless steel motor top upgrade shall be offered and include a double o-ring seal and both internal and external, two-piece, carbon-ceramic mechanical seals.

## 2.05 FEATURES

Each de-icer system shall consist of the following components regardless of the power source selected:

- A. De-Icer:
  1. The de-icer(s) shall push water to move warmer, bottom water to the surface to create and maintain an open water area. The de-icer units provided under this section shall be suitable for the following service conditions:
    - a. Maximum liquid temperature: 90 degrees F.
  2. Motors shall be 1750 RPM, single speed, oil cooled, Class B insulated, continuous duty rated, with built-in thermal overload protection.
  3. Propellers shall be custom, non-metallic, and designed to maximize the unit's water moving performance and operate through considerable aquatic vegetation without increasing the amp draw.
  4. De-icers shall be self-contained units that can be suspended from ropes below a boat, pier, or other structure, attached by rigid mounts to a pier, pipe, or bulk head, or attached to a float at the surface. Two 25' mooring lines will be included with each unit.
  5. Units shall be easily installed and maintained by one person.
  6. Provide power cords and mooring lines suitable for the intended application.
- B. Horizontal Float (Optional):
  1. Float shall be molded thermoplastic and sufficient to hold the unit weight, including thrust while operating.
  2. Float shall have 300 series stainless steel bracketing and hardware. Bracketing shall allow for 5 angling positions.
  3. Float shall include three, 50' mooring lines.

- C. Universal Dock Mount – UDM- (optional):
  - 1. UDM shall be made of 300 series stainless steel bracketing and hardware for the underwater components that attach to the circulator motor.
  - 2. UDM shall allow for 5 angling positions.
  - 3. UDM shall allow for up to a 10' long, 1" O.D. galvanized or stainless steel pipe which is supplied by the Other.
  - 4. UDM shall have stainless steel out-of-water parts that allow for mounting to a dock, pier, piling, bulk head, or similar.
- D. Industrial Dock Mount – IDM- (optional):
  - 1. IDM shall be made of 300 series stainless steel bracketing and hardware for the underwater components that attach to the circulator motor.
  - 2. IDM shall allow for 5 angling positions.
  - 3. IDM shall allow for up to a 10' long, up to 1.5" O.D. galvanized or stainless steel pipe which is supplied by the Other.
  - 4. IDM shall have stainless steel out-of-water parts that allow for mounting to a dock, pier, piling, bulk head, or similar.
- E. Underwater Power Cable:
  - 1. The power cable shall be UL, CSA, and NEC approved underwater rated, 3 conductor (4 conductor for 3 phase) cable with open wires for hard wiring (120V single phase shall have 5-15 molded plug)
  - 2. The power cable shall be available in either 50, 100, 150, or 200 feet cord lengths for 120V units and up to 500 feet cord lengths for 208-240V units, as well as 3 phase.
  - 3. An underwater approved, potted, O-ring sealed quick disconnect shall be available on all cables with 12 gauge or larger cables approximately 30 inches from the motor housing. The quick disconnect shall be a UL and CSA recognized and IP68 rated connector.
- F. Control Panel: (*Optional*)  
 Each 120VAC or 208/240VAC or 240VAC or 460VAC 3 phase control panel shall be built to the following specifications:
  - 1. Each de-icer shall be provided with a control panel capable of disconnecting power to the circulator unit(s).
  - 2. Enclosure shall include a pad-lockable enclosure door.
  - 3. Control panel shall be UL Listed per UL 508 standard.
  - 4. Time and Temperature controller shall include a 24-hour built-in mechanical timer and adjustable thermostat.
  - 5. Thermostat only controller shall include an adjustable thermostat to control the unit.
  - 6. Enclosure shall be UL type rated 3R and NEMA 3R rated.
  - 7. Matching warranty to unit selected.
  - 8. Enclosure shall be provided with integral mounting tabs. Enclosure door shall have integral sealing gasket.
  - 9. Power source required shall be supplied by others.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION AND PREPARATION**

- A. Contractor shall inspect all equipment immediately upon receipt.
- B. The equipment shall not be installed, if damaged, until repairs have been made in accordance with the manufacturer's written instructions.

### 3.02 INSTALLATION

- A. Contractor shall furnish the unit(s) and install per manufacturer's recommendations. Coordinate work with the Electrical Contractor for all wiring and controls work to make a complete and operational system. Installation, start-up, and on-site water testing of all equipment shall be per the manufacturer's recommendations. Contractor shall:
  - 1. Ensure proper machine spatial placement in the reservoir.
  - 2. Ensure proper intake depth setting.
  - 3. De-icer system shall be installed complete with all necessary connections.
- B. Coordinate locations of each de-icer with Owner and Engineer prior to installation.
- C. The de-icing system shall be installed in accordance with manufacturer's procedures, unless otherwise approved in writing from the manufacturer.
- D. Systems shall be installed complete with all necessary floats, mounts, mooring, cords, cables, controllers, and anchors for the intended application.
- E. Contractor shall be responsible for providing and installing a complete and functional system.

### 3.03 FIELD SERVICE

- A. Contractor (or a representative of the manufacturer) shall check and inspect the de-icer unit(s) after installation, place the de-icing unit(s) in operation, and make necessary adjustments.
- B. The de-icer unit manufacturer (or their representative) shall instruct designated Owner personnel in the safe and proper operation of the de-icing system. This training shall reference the operations manual provided and demonstrate proper function of the equipment.

### 3.04 SPARE PARTS

- A. Contractor shall provide spare parts as recommended or supplied with this de-icer assembly by the equipment manufacturer.

### 3.05 WARRANTY REQUIREMENTS

- A. Warranty: A written manufacturer's warranty shall be provided for the equipment

specified in this Section. The Product shall be warranted to be substantially free from defects in material and workmanship for: two (2) years for 1 Hp and smaller de-icers (three (3) years for 2 Hp and larger de-icers), from the date of delivery. This equipment warranty shall be directly from the manufacturer of the equipment to the Owner. Such warranty shall cover all defects or failures of materials or workmanship that occur as the result of normal operation and service. Optional Extended warranties up to 5 total years shall be available on 2HP and larger units.

END OF SECTION