SECTION 10 74 40

EMERGENCY TUNNEL EVACUATION CART

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Standard Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: the fabrication and testing of **(*insert number of carts*)** Emergency Tunnel Evacuation Carts (ETEC).

B. Related Requirements:

1. 05 12 00 – Structural Steel Framing
2. 05 50 00 - Metal Fabrications
3. 05 53 13 – Bar Gratings
4. 09 91 23 – Interior Painting
5. 09 91 99 – Field Painting

1.03 REFERENCES

A. Reference Standards:

1. ASTM A36/A36M – Standard Specification for Carbon Structural
2. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
3. ASTM A240/A240M REV A – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
4. ASTM A242/A242M – Standard Specification for High-Strength Low-Alloy Structural Steel
5. ASTM A276/A276M REV A – Standard Specification for Stainless Steel Bars and Shapes
6. ASTM A283/A283M – Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
7. ASTM A307 – Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
8. ASTM A500/A500M – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
9. ASTM A501/A501M – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
10. ASTM A563 – Standard Specification for Carbon and Alloy Steel Nuts

11. ASTM A653/A653M – Standard specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the hot-Dip Process
12. ASTM A666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
13. ASTM A793 – Standard Specification for Rolled Floor Plate, Stainless Steel
14. ASTM A1008/A1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved formability, Solution Hardened, and Bake Hardenable
15. ASTM B26/B26M – Standard Specification for Aluminum-Alloy Sand Castings
16. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
17. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
18. ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
19. ASTM F593 REV A – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
20. ASTM F594 – Standard Specification for Stainless Steel Nuts
21. ASTM F1941/F1941M – Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric
22. AWS D1.1/D1.1M – Structural Welding Code – Steel
23. AWS D1.2/D1.2M – Structural Welding Code – Aluminum
24. AWS D1.6/D1.6M – Structural Welding Code – Stainless Steel

1.04 SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Parts Catalogue: provide one copy of a parts listing in catalogue format, detailing part number and vendor information.

B. LEED Submittals:

1. Product Certificates for Credit MR 5.1[**and Credit MR 5.2**]: For products and materials required to comply with requirements for regionally manufactured [**and regionally extracted and manufactured**] materials. Include statement indicating cost for each regionally manufactured material.

C. Shop Drawings:

1. Include plans, elevations, sections, and [**mounting**] [**attachment**] details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

D. Samples:

1. One sample of the Instruction Plate delivered to the Engineer as directed. The Contractor shall pay shipping charges on the sample.
   a. Each sample shall be identified as follows:

1) Name of project and contract number
2) Name of contractor
3) Description of sample
4) Place of origin
5) Name of producer and brand name, if any

b. Approved samples will be maintained by the Engineer and used as basis of determining the acceptability of completed products. Samples which are not approved will be disposed of, unless the Contractor requests at time of submittal, that they be returned to him at his expense.

E. Coordination Drawings: <*Insert description of drawing type*> [**and other details**], drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. <*Insert requirements*>.

F. Product Certificates:

1. Prior to shipment of each ETEC, submit certification that the ETEC complies with the requirements of this specification.

1.05 QUALITY CONTROL

A. Contractor Quality Control Plan:

1. The contractor shall develop and submit for approval a Contractors Quality Control Plan as follows:
   a. The plan shall describe and establish the methods, inspection techniques and testing procedures required to insure conformance to the specifications and drawings with respect to materials, workmanship, fabrication and functional performance, with emphasis on tests and submittals. The plan shall specifically provide for the following items:
      1) Controls over the key activities detailed in the Manufacturing Plan. Any proposed deviation from the production procedures shall be detailed.
      2) Vendor surveillance
      3) Shop drawing control
      4) Document control
      5) Dimensional verification
      6) Inspection procedures - in process and final
      7) Production Quality Control test requirements
      8) Disposition of defective material and products rejected by the Engineer
      9) Material and process control in plant identifying critical control points
      10) Work procedures and instructions
      11) Records of tests and inspections
   b. The Engineer will have the right to monitor the methods, procedures, and processes used during production. The Engineer shall at all times during normal working hours have access to areas in which work for this contract is being performed. The Contractor shall furnish every reasonable facility to enable the Engineer to ascertain that materials and workmanship are in compliance with these specifications.
2. The Contractor shall perform welding in accordance with AWS D1.2 structural welding Code for Aluminum.
   a. Qualifications of Welders: Submit welding procedures and welder certifications in compliance with AWS D1.2 to the Engineer for approval.
3. Inspection will cover the fit up, operation of the Break System, dimensional verification, cart operation and workmanship. Submit certification of inspection.
4. Submit certification attesting that the material furnished conforms to specified requirements. However, a better material than specified may be offered for the Authority's consideration along with justification and any cost/operator impact (IE. weight consideration) this will have.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver products undamaged

B. Storage and Handling Requirements:

1. Store products so as to prevent rust
2. Handle products so as to prevent damage

1.07 WARRANTY

A. [**Manufacturer's**] [**Special**] Warranty: [**Manufacturer agrees**] [**Installer agrees**] [**Manufacturer and Installer agree**] to repair or replace [**components of**] <*Insert product*> that fail(s) in materials or workmanship within specified warranty period.

1. Warranty Period: <*Insert number*> year(s) from date of Substantial Completion.

B. Extended Correction Period:

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements:

B. Basis-of-Design Product: Subject to compliance with requirements, provide [**product indicated on Drawings**] <*Insert manufacturer's name; product name or designation*> or comparable product by one of the following:

1. Contractor may elect to purchase ETEC carts from the Authorities preferred vendor in lieu of fabrication: Goyal Industries of Mansfield Ohio.

2.02 MATERIALS

A. Aluminum: Alloy 6061-T6 and 6063-T52

B. Steel Shapes: Rings, nuts, bolts and washers ASTM A36

C. Fasteners: Steel, cadmium plated

D. Springs:

1. End Types: Square End Ground or machine hook

E. Brake cables, snap rings, wheel and bearing materials

F. Finishes: Unless otherwise indicated all steel parts shall be cadmium plated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. The Contractor shall develop and fabricate jigs and templates to be used in the production Emergency Tunnel Evacuation Carts (ETEC).

1. The jigs and templates shall be made and used so as to assure that the geometry of the cart components are precise, uniform and will afford interchangeability for typical components. They will be used to accomplish, as a minimum the following:
   a. Locate and align holes
   b. Permit cutting components of proper length and shape
   c. Permit proper bending of components where necessary and to the cure configuration shown.
   d. Provide proper alignment of members and components that are to be welded

2. Jigs and templates are to be submitted to the Engineer for inspection and approval.
   a. Contractor shall fabricate for approval by the Engineer two prototype/ first article carts to demonstrate compliance with the drawings and specifications and to demonstrate interchangeability of parts.
   b. Contractor shall not proceed with ETEC production until the two prototype/ first article carts, jigs and templates have been approved.
   c. If accepted the two prototype/ first article carts, shall be included as part of the total production lot.

C. Grind all welds smooth and free from burrs

1. Cart wheels shall be machined to a tolerance of +/- 1/32 -inch.

D. Welding: Components shall be welded using gas metal arc welding with Alloy 4043 filler wire and gas Tungsten arc welding per AWS D1.2.

3.02 CART ASSEMBLY TESTING

A. General:

1. Prior to assembly, lubricate wheel bearings with molybdenum disulfide.

2. Adjust breaking system so that the cart will not move when loaded with a 1,000 pound load on a five percent (5 %) grade with the breaks engaged.

3. Test each cart in accordance with the following:
   a. Raise and lock the upper deck, assuring that it operates smoothly without binding and locks securely.
   b. On a corner of the upper deck place a concentrated load of 200 pounds on an area of approximately on square foot (1 Sq. Ft) . Observe and record and signs of distress or permanent deformation. Repeat the procedure for each corner.
   c. On a level track, load the cart with 835 pounds, distributed over both decks.
      1) Verify that the pulling force required to initiate movement is 60 pounds +/- 6 pounds.
      2) Verify that the pulling force required to sustain movement is 50 pounds +/- 5 pounds.
      3) Push the cart at walking speed, engage breaks and verify that the stopping distance is less than seven feet (7').
   d. Load the cart with a 1,000 pound total load, distributed over both decks, and verify that the breaks will hold the cart on a five percent (5 %) grade with the breaks engaged.
   e. Remove the 1,000 pound total load, and record and signs of distress or permanent deformation.

f. Weigh each cart, verifying that the total weigh is not more than 165 pounds, minor variations may be approved by the Engineer.

3.03 FIELD QUALITY CONTROL

A. Certify successful compliance with test procedures.

B. Use electrodes and comply with special methods recommended by the manufacture of the alloys to be used. Make welds of size type and spacing shown on the approved shop drawings. Perform welding behind finished surfaces in a manner that minimizes distortion and ensures no discoloration on the finished side. Remove weld splatter and welding oxides on finished surfaces by descaling and grinding.

3.04 ACCEPTANCE

A. Prior to final acceptance, demonstrate, from a sampling of two carts chosen at random by the Engineer and not including the two prototype/ first article carts:

1. The interchangeability of cart components.
2. Uniformity of cart construction; appearance and function of all carts shall be identical.

B. Upon completion of the work and acceptance of the carts, the Contractor/vendor shall transfer ownership and turn over to the Authority all jigs, templates and related shop drawings, if requested by the Engineer.

3.05 DEMONSTRATION

A. [**Engage a factory-authorized service representative to train**] [**Train**] Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION