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| Specification Section 32 31 00**TYM-HYD BOX FRAME ROLLER GATE SYSTEM WITH HYDRAULIC OPERATOR (ORNAMENTAL)** | Boxframe_Roller_Gate | Tymetal-T-Orange |

1. GENERAL:
	1. SECTION INCLUDES:
		1. The work in this section shall include furnishing all labor, materials, equipment and appliances necessary to complete all Fortress Box Frame Roller Gate and Hydraulic Operator System(s) required for this project in strict accordance with this specification section and drawings.
	2. REFERENCES:
		1. Underwriters Laboratory Gate Operator Requirements (UL 325).
			1. Operators shall be built to UL 325 standards and be listed by a testing laboratory. Complete all electrical work according to local codes and National Electrical code. All fieldwork shall be performed in a neat and professional manner, completed to journeyman standards.
			2. Current safety standards require the use of multiple external sensors to be capable of reversing the gate in either direction upon sensing an obstruction. See 2.02 D.
			3. Pedestrians should never use vehicle gates. Separate pedestrian gates must always be provided when foot traffic is present.
			4. Current safety standards require gate operators to be designed and labeled for specific usage classes. Hydraulic Operator Model TYM-HYD-VF2/3 is compliant in usage Classes III and IV.
		2. ASTM F 2200 Standard Specification for Automated Vehicular Gate Construction. See 2.04 C.
		3. American Welding Society AWS D1.2 Structural Welding Code. See 2.04 D.
		4. ASTM A 123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel.
	3. SUBMITTALS:
		1. Product Data:
			1. Provide manufacturer’s catalog cuts with printed specifications and installation instructions.
			2. Deliver two (2) copies of operation and maintenance data covering the installed products, including name, address and telephone number of the nearest fully equipped service center.
			3. Each operator shall bear a label indicating that the operator mechanism has been tested for full power and pressure of all hydraulic components, full stress tests of all mechanical components and electrical tests of all overload devices.
		2. Shop Drawings:
			1. Supply shop drawings showing the relationship of operating systems with gate components, including details of all major components.
			2. Include complete details of gate construction, gate height and post spacing dimensions.
		3. Each operator shall bear a label indicating that the operator mechanism has been tested for full power and pressure of all hydraulic components, full stress tests of all mechanical components and electrical tests of all overload devices.
		4. Certifications:
			1. The aluminum welders and welding process for gate manufacture must be certified per section 2.04 D.
			2. Operator Manufacturer: A company specializing in the manufacture of hydraulic gate operators of the type specified, with a minimum of ten years experience.
			3. Installer: A minimum of three years experience installing similar equipment.
2. PRODUCTS:
	1. HYDRAULIC GATE OPERATORS:
		1. Hydraulic Gate Operator TYM-HYD-VF2/3 with controller to be supplied by Tymetal Corp., 678 Wilbur Avenue, Greenwich, NY 12834 – (800)-328-4283.
	2. OPERATION:
		1. Operation shall be by means of a metal rail passing between a pair of reinforced composite wheels with polyurethane treads. Operator motors shall be hydraulic, geroller type, and system shall not include belts, gears, pulleys, roller chains or sprockets to transfer power from operator to gate panel. The operator shall generate a minimum horizontal pull of 300 lb without the drive wheels slipping and without distortion of supporting arms. Operator shall be capable of handling gates weighing up to 5,000. The operator shall be speed controlled by an electronic Variable Frequency Drive (VFD) which will accelerate and decelerate the gate gradually to prevent shock loads to the gate and operator assembly. The maximum gate velocity of the TYM-HYD-VF2/3 operator shall be selectable between 2.2 ft/second and 3 ft/second. The operator shall contain an Emergency Fast Operation (EFO) mode wherein a separate continuous input allows the operator to override all safety inputs and run at the EFO speed. The gate velocity during Emergency Fast Operation (EFO) shall not be less than 3 ft/second. Upon starting, the VFD will gradually accelerate the gate to its maximum speed and when stopping, gradually reduce gate velocity to less than 1 ft/s, whereupon a limit switch will stop the electric motor. Two adjustable hydraulic brake valves (one for each direction) assist in slowing the gate to a precise stop.
		2. Standard mechanical components shall include as a minimum:
			1. Supporting arms: Cast aluminum channel. Arms shall incorporate a fully bushed, 1 1/2" (38 mm) bronze bearing surface, acting on arm pivot pins. (item 2 below)
			2. Arm pivot pins: 3/4" (19 mm) diameter, stainless steel, with integral tabs for ease of removal.
			3. Tension spring: 2 1/2" (63 mm) heavy duty, 800 lb (363 kg) capacity.
			4. Tension adjustment: Finger tightened nut, not requiring the use of tools.
			5. Drive release: Must instantly release tension on both drive wheels, and disengage them from contact with drive rail in a single motion, for manual operation.
			6. Limit switches: Fully adjustable, toggle types, with plug connection to control panel.
			7. Chassis: 1/4" (6 mm) steel base plate and 12 Ga. (3 mm) sides and back welded and ground smooth.
			8. Cover: 10 Ga. zinc plated steel with textured TGIC gray polyester powder coat finish. All joints welded, filled and ground smooth. Finished corners square and true with no visible joints.
3. The cover shall have a detention quality mogul lock.
	* + 1. Finish: Zinc plated steel with textured TGIC polyester powder coat finish, proven to withstand 1,000 hour salt spray test.
			2. Drive wheels: Two 8" diam (203 mm) AdvanceDrive wheels. High-strength composite hub with polyurethane over mold.
			3. Drive rail: Shall be extruded 6061 T6, not less than 1/8" (3.175 mm) thick. Drive rail shall incorporate alignment pins for ease of replacement or splicing. Pins shall enable a perfect butt splice.
			4. Hydraulic hose: Shall be 1/4" (6 mm) synthetic, rated to 3,000 psi (20.6 MPa).
			5. Hydraulic valves: Shall be individually replaceable cartridge type, in an integrated hydraulic manifold.
			6. Hose fittings: At manifold shall be quick-disconnect type, others shall be swivel type.
			7. Hydraulic fluid: High performance type with a viscosity index greater than 375 and temperature range -40° F to 158° F (-40° C to 70° C).
			8. A zero to 2,000 psi (13.7 MPa) pressure gauge, mounted on the manifold for diagnostics, shall be a standard component.
			9. The hydraulic fluid reservoir shall be formed from a single piece of metal, non-welded, and shall be powder painted on the inside and the outside, to prevent fluid contamination.
		1. Minimum standard electrical components:
			1. Pump motor: 2 hp, 3450 RPM, 56C, TEFC, three phase. (Note, the VFD converts single phase input power to drive a three phase motor)
			2. All components shall have overload protection.
			3. Electrical enclosure: Type 1, metal, with hinged lid gasketed for protection from intrusion of foreign objects.
			4. Controls: Smart Touch Controller Board containing:
4. inherent entrapment sensor;
5. built in audible “warn before operate” system;
6. built in timer to close;
7. 32 character OLED display for reporting of functions and codes;
8. multiple programmable user relay output options;
9. anti-tailgate mode;
10. built-in power surge/lightning strike protection;
11. menu configuration, event logging and system diagnostics easily accessible with a PC and HySecurity’s free Smart Touch Analyze and Retrieve Tool;
12. RS-232 port for connection to laptop or other computer peripheral and RS-485 connection for network interface.
13. Dual gate communication connection for bi-parting, sally port, or sequenced gates.
14. Electromechanical and solid state relays.
15. Radio option outputs.
16. 21 inputs for site specific configurations.
	* + 1. Transformer: 75 VA, non-jumpered taps, for all common voltages.
			2. Control circuit: 24 VDC.
			3. Provide a terminal strip for connection of external interlocks.
		1. Required external sensors: See 1.02 A2. Specify photo eyes or gate edges or a combination thereof to be installed such that the gate is capable of reversing in either direction upon sensing an obstruction.
		2. Optional control devices: (consider one or more of the following: card reader, key-switch, radio control, pushbuttons, vehicle detectors, keypads or seven day timers).
		3. 208/230 VAC single phase and 208/230/460 VAC three phase available. 115 is not available. (50 Hertz is available specify voltage.)
	1. FACTORY TESTING:
		1. Fully assemble and test, at the factory, each gate operator to assure smooth operation, sequencing and electrical connection integrity. Apply physical loads to the operator to simulate field conditions. Tests shall simulate physical and electrical loads equal to the fully rated capacity of the operator components.
		2. Check all operator mechanical connections for tightness and alignment. Check all welds for completeness and continuity. Check welded corners and edges to assure they are square and straight.
		3. Inspect operator painted finish for completeness and gloss. Touch up imperfections prior to shipment.
		4. Check all hydraulic hoses and electrical wires to assure that chafing cannot occur during shipping or operation.
	2. BOX FRAME ROLLER GATES:
		1. Tymetal Corp., 678 Wilbur Avenue, Greenwich, NY 12834 – (800) 328-4283, shall manufacture the Box Frame Roller Gate(s).
		2. Approved Substitution: All other systems must be submitted to the design team in accordance with substitution requirements as set forth in the general provisions of the specification manual for approval prior to the bid date. Products submitted after the bid date will not be approved.
		3. Gate manufacturer shall certify gate is manufactured in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction and the operators are UL 325 listed. See 1.02 B and 1.02 A.
		4. Gate manufacturer shall provide independent certification as to the use of a documented Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 welding code. Upon request, Individual Certificates of Welder Qualification documenting successful completion of the requirements of the AWS D1.2 code shall also be provided. See 1.02 C.
	3. GATE CONSTRUCTION DETAILS:
		1. Gate Frame:
			1. All welds on the gate frame shall conform to Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 Structural Welding Code. All individual welders shall be certified to AWS D1.2 welding code. See 1.02 C.
			2. The gate frames shall be fabricated from 6063-T6 aluminum alloy extrusions. The primary members (top and bottom) shall be "P" shaped in cross section with no less than 2" on a side and weighing not less than 1.6 lb/lf. The vertical members at the ends of each panel section shall be 2"x2" in cross section weighing not less than 1.1 lb/ft. Intermediate vertical members shall alternate between 1"x2" and 1”x1” in cross section weighing not less than 0.82 lb/lf and 0.52 lb/lf, respectively. They shall be spaced at a distance not to exceed the overall height of the box frame. The gate shall be constructed in "box" form with the width between the frames measuring 24" from outside to outside. Between these frames there shall be a continuous series of 1"x1" diagonal and horizontal bracing with the diagonals welded at approximately 45 degrees to the frames.
			3. Box Frame trolley assemblies shall be bolted to the box frame at intervals as specified on the bid drawings. Each assembly shall consist of a galvanized steel carriage to which two (2) wheel assemblies are secured. Each wheel shall be rated for a minimum load capacity of 2,000 lb.
			4. Safety guides of 3/8” x 3” galvanized steel bar with attached guide wheels shall be provided at a maximum of 10’-0” on center along the entire gate length.
			5. Wheel assemblies shall be covered by a single 11 gauge galvanized steel cover at each location.
		2. Gate Track:
			1. The gate shall roll on two parallel tracks, which are embedded in concrete so that the top of the track is level with the ground surface. The track shall consist of two (2) parallel W4 x 13 A36 steel beams (may be provided by others). The tracks shall be hot dipped galvanized and set so as to vary no more than 1/4" in width between tracks with the maximum width as shown in the bid drawings (i.e.: +/- 1/8" for each track).
		3. Diagonal Bracing:
			1. Diagonal "X" bracing of 3/16" or 1/4” diameter stainless or galvanized steel cable shall be installed throughout the gate to brace the gate panels and to provide a ready means for vertical adjustment.
		4. Gate Filler:

### Ornamental Picket: Picket sizes shall be 1” square. Pickets may extend through only the clear opening portion or through the entire length of the gate as required. If a motorized gate operator is to be applied to the gate and the specified picket spacing allows for openings in the gate frame that exceed 2¼” (57mm), a secondary gate filler shall be secured at each end of the gate frame and tied at each 2” x 2” (51mm x 51mm) vertical member. The secondary gate filler shall extend to a minimum height of 72” (1.2m) above grade and shall be sized to prevent a 2¼” (57mm) diameter sphere from passing through openings anywhere along the length of the gate frame, and in that portion of the adjacent fence that the gate covers in the open position.

* + 1. Finish:

### Gate to be mill finish aluminum or color coated with polyester powder as specified. If powder coated, the gate (including track member) and all accessories shall be pretreated chemically by sand blasting or other acceptable method to ensure proper coating adherence. Gate posts (to be supplied by others) shall be galvanized or coated as specified by the design team.

* + 1. Gate Lock:

### (Optional) Gate system shall be furnished with an electro-mechanical lock. Lock shall be supplied with status indication and with a six tumbler mechanical lock. All gates shall be keyed alike. Lock requires additional 115V power supplied by others.

1. EXECUTION:
	1. SITE INSPECTION:
		1. Final grades and installation conditions shall be examined. Installation shall not begin until all unsatisfactory conditions are corrected.
		2. Locate concrete mounting pad in accordance with approved shop drawings.
		3. Make sure that gate is level and operating smoothly under manual conditions before installation of gate operators. Do not proceed until gate panel is aligned and operates without binding.
	2. INSTALLATION:
		1. Equipment in this section shall be installed in strict accordance with the company’s printed instructions unless otherwise shown on the contract drawings.
		2. The gate and installation shall conform to:
			1. ASTM F 2200 standard specification for automated vehicular gate construction.
			2. UL 325 standards.
		3. Installer shall insure that the electric service to the operator is at least 20 AMPS. Operator wattage is 2400.
		4. The installing contractor shall be responsible to ensure that appropriate external primary entrapment safety devices be installed for the specific site conditions to protect against all potential entrapment zones. Proper operation of these safety devices shall be verified and training as to the operation and maintenance of these devices for the users and owners shall be documented.
	3. SYSTEM VALIDATION:
		1. The complete system shall be adjusted to assure it is performing properly. Test gate operator through a minimum of ten full cycles and adjust to ensure operation without binding, scraping or uneven motion. Test limit switches for proper “at rest” gate position.
		2. All anchor bolts shall be fully concealed in the finished installation.
		3. For operated gate systems - test and explain safety features:

### Each system feature and device is a separate component of the gate system.

### Read and follow all instructions for each component.

### Ensure that all instructions for mechanical components, safety devices and the gate operator are available for everyone who will be using the gate system.

### The warning signs shipped with the gate operator must be installed in prominent position on both sides of the gate.

* + 1. Ensure the owner is clear with regard to the safety points concerning the basic operational guidelines of the safety features of the gate operator system. These safety points are listed in the gate operator manual and must be read prior to system use.

**Note: Tymetal Corp. reserves the right to modify and/or make changes as deemed necessary without previous notice.**