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| Specification Section 32 31 00**TYM-2000 STRUCTURAL CANTILEVER SLIDE GATE SYSTEM** | 1100-Heavy Duty | 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 TYM-2000 Structural Gate System(s) required for this project in strict accordance with this specification section and drawings. The gate and operator shall be specifically designed to complement each other as a system and be provided by a single manufacturer. Components (operator from one source and gate panel from another) assembled at the job site to form a system will not be approved.
	2. REFERENCES:
		1. UL 325 Gate Operator Requirements. See 2.01 D.
			1. Automated / operated vehicular gates are not to be used for pedestrian traffic. Separate pedestrian gates must always be provided if pedestrian traffic is expected.
		2. ASTM F 2200 – Standard Specification for Automated Vehicular Gate Construction. See 2.01 D.
		3. ASTM F 1184 – Standard Specification for Industrial and Commercial Horizontal Slide Gates, Type II, Class 2. See 3.02 B.
		4. American Welding Society AWS D1.2 Structural Welding Code. See 2.01 C.
	3. SUBMITTAL:
		1. Product Data:
			1. Provide manufacturer’s catalog cuts with printed specifications and installation instructions.
			2. Deliver two copies of operation and maintenance data covering the installed products. Manual to include parts list showing manufacturer’s names and part numbers for the gate operator.
		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. Certification of Performance Criteria:
			1. Manufacturer of gate system shall provide certification stating the gate system includes the following material components that provide superior performance and longevity. Alternate designs built to minimum standards that do not include these additional structural features shall not be accepted.
				1. Gate track system shall be keyed to interlock into gate frame member (providing 200% additional strength when compared to weld only keyless systems). When interlocked with and welded to the "keyed" frame top member, gate track forms a composite structure.
				2. Gate shall have a minimum counterbalance length of 50% opening width which provides a 36% increase in lateral resistance (when compared to ASTM minimum of 40% counterbalance). If gate is ever to be automated, counterbalance section shall be filled with fabric or other specified material.
				3. To provide superior structural integrity, intermediate vertical members shall be used - with spacing between verticals to be less than 50% of the gate frame height.
				4. Entire gate frame (including counterbalance section) shall include 2 adjustable stainless or galvanized steel cables (minimum 3/16”) per bay to allow complete gate frame adjustment (maintaining strongest structural square and level orientation).
				5. Gate truck assemblies shall be tested for continuous duty and shall have precision ground and hardened components. Bearings shall be pre-lubricated and contain shock resistant outer races and captured seals.
				6. Gate truck assemblies shall be supported by a minimum 5/8” plated steel bolt with self aligning capability, rated to support a 2,000 # reaction load.
				7. Hanger brackets shall be hot dipped galvanized steel with a minimum 3/8” thickness that is also gusseted for additional strength.
				8. Gate top track and supporting hangar bracket assemblies shall be certified by a licensed professional engineer to withstand a 2,000 lb. vertical reaction load without exceeding allowable stresses.
				9. Gate is to be designed to meet specified ASCE-7 wind load requirements with the gate in the closed and latched condition only. Typical gate design is expected to operate satisfactorily in winds up to 30 MPH. Depending on gate panel infill, winds higher than 30 MPH may cause gate operational problems (operator entrapment may trigger; gate panel may not engage receiver). For sites with higher operational, non-typical, or specified wind loadings, manufacturer should be advised of the site conditions and a specifically engineered design will be offered.
		4. Certifications:
			1. Gate in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction per section 2.01 C.
			2. If operated gate system, gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator.
			3. The aluminum welders and welding process must be certified per section 2.03 E.
			4. Manufacturer shall supply gate design performance certification as per section 1.03 C.
2. PRODUCTS:
	1. Cantilever slide gate system MANUFACTURERS:
		1. The cantilever sliding gate system shall be manufactured by Tymetal Corp., 678 Wilbure Avenue, Greenwich, NY 12834 ‑ (800) 328 ‑ 4283.
		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 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 D.
		4. 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 compliant. See 1.03 C.1.
	2. VEHICULAR SLIDE GATE OPERATOR TYM-2000:
		1. The slide gate operator as provided by Tymetal Corp. shall open and close cantilever, overhead, or track gates, to provide convenience and security. This model is adapted to function with most accessories including: radio controls, electro-mechanical locks, single and three button control stations, digital keypads, coded cards, sensing loops, telephone entry systems, and revenue control equipment. The operator utilizes 230 Volt AC single phase power. Control voltage in each case is 5 Volt DC.
		2. The gate operator includes an APeX Controller with integrated radio receiver, plug-in loop detector capability, surge protection, and easy to read labeling standard.
		3. Capacity:
			1. The gate operator shall be rated to operate a gate weighing up to 2000 lbs.
		4. The gate operator shall be UL 325 compliant for Class I, II, III, and IV.
		5. Design Criteria:
			1. Operation shall be by means of a 1 horsepower single phase instant reversing motor, transferring power to a four inch diameter pulley, to a right angle oil bath gear reducer using another four inch diameter pulley and V-belt. Power is then transferred through a sliding collar disconnect system to the output drive shaft equipped with a #40 drive sprocket and roller chain which attaches to the gate with heavy-duty gate attachment brackets. Intermediate chain supports with anti-catch design shall also be supplied.
			2. The operator shall open the gate at a rate of approximately 11 inches per second.
			3. The #40 chain shall be coated with “Armor Coat” corrosive resistant chain coating. Corrosive resistance exceeds nickel plating.
		6. Components:
			1. Standard mechanical components shall include as a minimum.
				1. 3/16 inch thick, weather resistant UV-stabilized polyethylene one piece cover which is fully removable and lockable.
				2. Heavy-duty, plated frame with mounting legs for pad mounting standard.
				3. Pedestal to raise operator from ground level and protect from high water.
				4. 20:1 right-angle oil bath gear reducer.
				5. Arctic package with immersion heater.
				6. One inch solid steel output drive shaft.
				7. Spring loaded manual disconnect.
				8. Steel “critter” plate to prevent entry of ground pests.
			2. Standard electrical components shall include as a minimum:
				1. 1 HP motor with thermal overload protection in 230 VAC single phase.
				2. Solid state logic controls featuring 15 diagnostic L.E.D. indicators and auto-close timer (1 second to 9 minutes).
				3. Inherent, fully adjustable motor over-current sensing to detect obstructions via precision 24 turn potentiometer, with separate adjustments for opening and closing directions.
				4. Controller housed in zinc plated control box with separate box provided for connection of field power.
				5. Power On/Off switch.
				6. Contacts for opening, closing and reversing accessories, as well as contact and non-contact obstruction sensing devices. 24 VAC and 24 VDC available on terminal strip to power accessory devices, provided by non-circuit board mounted transformer with minimum 40VA rating.
				7. Four adjustable limits with precision snap-action type limit switches to control gate position, mounted inside a separate four switch limit box.
				8. Master/slave or stand alone capable with dip switch selection. Three wire twisted pair shielded cable required.
			3. Optional accessories, contact, non-contact, and control devices:
				1. Control devices include pushbuttons, radio controls, keypads, card readers, key switches, telephone entry systems, and revenue control equipment.
				2. Contact and non-contact devices include photoelectric sensors, vehicle detectors, proximity sensors, and contact edges.
				3. Accessories include flashing strobe lights, cycle counters, and intercom systems.
		7. Factory Inspection and Testing
			1. Manufacturer shall test each operator at factory to assure smooth, quiet operation.
			2. Manufacturer shall test all control inputs to ensure proper function.
			3. Manufacturer shall certify that operator has been tested as part of a complete gate system in excess of 50,000 cycles.
	3. CANTILEVER SLIDE GATE:
		1. Gate Width:
			1. Structural Gate may be used for clear openings up to 40’ wide. For clear openings greater than 40’ – contact Tymetal Corp.
		2. Structural Gate Frame:
			1. The gate frame shall be fabricated from 6063-T6 aluminum alloy extrusions. The top member shall be a 3" x 5" aluminum structural channel/tube extrusion weighing not less than 3.0 lb/lf (4.4kg/m). To maintain structural integrity this frame member shall be "keyed" to interlock with the "keyed" track member. If fabricated as a single horizontal piece, the bottom member shall be a 2" x 5" aluminum structural tube weighing not less than 2.0 lb/lf. If fabricated in two horizontal pieces, the bottom member shall be a 5" aluminum structural channel weighing not less than 2.65 lb/lf, and the two horizontal pieces or sections shall be spliced in the field (the gate frame shall be fabricated in one or multiple sections depending on size requirements or project constraints).
			2. Vertical Members:
				1. The vertical members at the ends of the opening portion of the frame shall be "P" shaped in cross section with a nominal base dimension of no less than 2” x 2” (51mm x 51mm) and weighing not less than 1.6 lb/lf (2.3kg/m). The intermediate vertical members shall alternate between 2” x 2” (51mm x 51mm) and 1” x 2” (25mm x 51mm) in cross section weighing not less than 1.1 lb/lf (1.6kg/m) and 0.82 lb/lf (1.2kg/m) respectively.
				2. Intermediate 1” x 2” (25mm x 51mm) vertical members weighing not less than .82 lb/lf shall alternate between 2” x 2” major members.
		3. Splicing:
			1. A ¼" x 5" x 24" galvanized steel splice plate shall be used to secure the two bottom channel members together utilizing eight (8) plated carriage bolts with lock nuts. The top members will be spliced together using a ¼" x 2" x 24" aluminum splice plate secured with six (6) drive rivets on one side and welded to the top member on the other side. The track is overlapped onto the opposing section in an alternating fashion, interlocking with the top primary member.
		4. Gate Track:
			1. The gate shall have a separate semi-enclosed “keyed” track, extruded from 6005A-T61 or 6105‑T5 aluminum alloy, weighing not less than 2.9 lb/lf. Track members are to be located on each side of the top member. When interlocked and welded to the “keyed” top member, it forms a composite structure with the top of the gate frame. Welds are to be placed alternately along the top and side of the track at 9" centers with welds being a minimum of 2" long.
		5. 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 D.
		6. Gate Mounting:
			1. The gate frame is to be supported from the track by four (4) swivel type, self-aligning, 4‑wheeled, sealed lubricant, ball-bearing truck assemblies.
			2. The bottom of each support post shall have a bracket equipped with a pair of 3” (76mm) UHMW guide wheels Wheel cover protectors shall be included with bottom guides to comply with UL325.
			3. Gap protectors shall be provided and installed, compliant with ASTM F 2200-05.
		7. Diagonal Bracing:

### Diagonal "X" bracing of 3/16" or ¼” diameter stainless or galvanized steel cable shall be installed throughout the entire gate frame.

* + 1. The gate shall be completed by installation of approved filler as specified.

### Chain Link: 2” x 2” x 9 gauge aluminized steel chain link fabric shall extend the entire length of the gate (if operated gate, counterbalance must also have fabric to prevent reach through and comply with ASTM F 2200, see 1.03 C.1) Fabric shall be attached at each end of the gate frame by standard fence industry tension bars and tied at each 2” x 2” (51mm x 51mm) vertical member with standard fence industry ties. ASTM F 2200 requires attachment method that leaves no leading or bottom edge protrusions (cannot exceed 0.5 inch).

* + 1. Posts:
			1. Double sets of support posts shall be minimum 4" O.D. (102mm) round SS40 or 4” x 4” x 3/16” wall square steel tubing, grade 500. Gate posts shall be galvanized or coated and supported in concrete footings as specified by the design team.
		2. Finish:
			1. 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.
	1. WARRANTY:
		1. The cantilever slide gate and operator system shall be warranted by the manufacturer against manufacturing defects for a period of (3) three years from date of sale. The truck assembly shall be warranted against manufacturing defects by the manufacturer for a period of (5) five years from date of sale.
1. EXECUTION:
	1. Site Inspection:
		1. Examine final grades and installation conditions.
		2. Do not begin work until all unsatisfactory conditions are corrected.
	2. Installation:
		1. Install equipment of this section in strict accordance with the company’s printed instructions unless otherwise shown on the contract drawings.
		2. The gate and installation shall conform to ASTM F 1184 standards for aluminum cantilever slide gates, Type II, Class 2. See 1.02 C.
		3. The gate system is to comply with ASTM F 2200 and UL 325. See 1.02 B and 1.02 A respectively.
		4. Obstruction Sensing Systems:
			1. The inherent motor current sensors are part of the gate operator system and may not be removed or bypassed.
			2. The installing contractor shall be responsible to ensure that appropriate external secondary entrapment protection 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 Acceptance & validation:
		1. Acceptance Test:
			1. Test each system function.
			2. Supply all equipment necessary for system adjustment and testing.
		2. Test and Explain Safety Features:
			1. Each system feature and device is a separate component of the gate system.
			2. Read and follow all instructions for each component.
			3. Ensure that all instructions for mechanical components, safety devices and the gate operator are available for everyone who will be using the gate system.
			4. The warning signs shipped with the gate operator must be installed in prominent position on both sides of the gate.
		3. System Validation:
			1. The complete system shall be adjusted to assure it is performing properly.
			2. The system shall be operated for a sufficient period of time to determine that the system is in proper working order.
			3. 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 operator manual and must be read prior to system use.
			4. Installer and customer shall complete Operated Gate System Installation Checklist (see operator manual).

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