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| Specification Section 32 31 00**BOX FRAME CANTILEVER SLIDE GATE SYSTEM WITH** **TYM-VSA VARIABLE SPEED OPERATOR****(ORNAMENTAL)** | 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-VSA Box Frame 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 1.03 D-2.
			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 1.03 D-1.
		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 1.03 D-3.
	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 1.02 B.
			2. If operated gate system, gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator. See 1.02 A.
			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. 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 Wilbur Avenue, Greenwich, NY 12834 ‑ (800) 328 – 4283 or (888) 978-4283.
		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.
	2. VEHICULAR SLIDE GATE OPERATOR TYM-VSA:
		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 208/230 Volt AC single phase, or 208/230 Volt AC or 460 Volt AC three phase power. Motor box is 10 gauge galvanized steel with detention grade hinges and mogul lock.
		2. The gate operator shall be UL 325 compliant for Class III and IV.
		3. The gate operator includes an APeX Controller with integrated radio receiver, plug-in loop detector capability, surge protection, and easy to read labeling standard.
		4. Capacity:
			1. The gate operator shall be rated to operate a gate weighing up to 5,000 lbs.
		5. Motor Size:
			1. The electrical motor shall be 1 HP, [208/230VAC, Single Phase] or [208/230VAC, Three Phase] or [460 VAC, Three Phase] as produced by a nationally recognized manufacturer.
		6. AC Drive:
			1. The variable frequency drive unit shall allow for programmable speeds and programmable soft-start and soft-stop features.
		7. Overload Protection:
			1. Motor shall be protected against overload by either a thermal or a current sensing overload device.
		8. Gear (Box) Reducer:
			1. The self-enclosed gear-head gearbox shall be manufactured as a single unit, and shall consist of a hardened steel, machine cut worm and mating bronze gear running in oil bath. The gearbox shall perform the following functions:
				1. Adjustable Clutching Device.
				2. Manual disconnect by crank handle.
		9. Gear Box Heater
			1. Operator shall include internal gearbox heater and a heater strip for the control box.
		10. Drive – Chain:
			1. A #50 roller chain shall be utilized. All chain brackets and required attachment hardware shall be supplied.
		11. Manual Operation:
			1. A crank handle, located at ground level in the motor box, shall provide a two-step emergency procedure for manual operation:
				1. Unlock and open motor-box door.
				2. Fold out handle and crank gate opened or closed.
		12. Limits:
			1. The operator shall be equipped with an integral limit system, providing accurate settings to control the open and close positions of the gate, and shall not be affected by manual operation or motor removal.
		13. Control Circuit:
			1. U.L. listed operator shall have 5VDC control signal.
		14. Control wiring:
			1. The electrical contractor shall supply all exterior control wiring.
		15. Audio Alarm:
			1. This alarm shall have a dual function.
				1. The first function shall be as a warning prior to gate movement. When the motor control board recognizes a command, this alarm shall be activated three (3) seconds before the motor is energized and the gate begins to move. This shall be continuously activated while the gate is in motion.
		16. Main Power Disconnect Switch and Wiring Compartment:
			1. When this switch is in the OFF position, the main power shall be disconnected from the Variable Speed Drive, Motor Control Board and power transformer(s).
		17. Speed:
			1. The gate operator speed shall be fully programmable allowing a maximum speed of 2.2 feet per second.
		18. Transformer:
			1. Operators shall have an isolated low voltage (24VDC, 750mA) power supplied to provide power for external control devices (not including external gate lock).
		19. Auto Close Timer:
			1. The timer provides an automatic closure of the gate from the full open position, adjustable from 0 to 60 seconds.
		20. Master/Slave:
			1. Master/Slave or stand alone capable with programmable setting.
		21. 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. MOTOR HOUSING:
		1. Water Resistant Motor Box:
			1. The motor box shall be constructed of 10-gauge sheet steel, hot-dip galvanized per ASTM A 123, gasketed and located at ground level for easy maintenance.
		2. Security Hinges and Tamper Resistant Security Screws:
			1. Security hinges and screws shall be furnished to secure operator enclosure components.
		3. Motor Box Lock:
			1. Motor box shall be locked with a detention grade dead bolt. Three (3) keys shall be provided per key code.
	4. ACCESS CONTROL:
		1. Entrapment Devices:
			1. Photoelectric through beams/photo eyes shall be installed to span the clear opening and gate path at the tail section.
		2. 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.
		3. 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.
	5. GATE CONSTRUCTION DETAILS:
		1. The gate frames shall be fabricated from 6063-T6 aluminum alloy extrusions. If fabricated as a single horizontal piece, no splices will be required. When the gate frame is manufactured in two horizontal pieces or sections, they shall be spliced in the field (the gate frame shall be fabricated in one or multiple sections depending on size requirements or project constraints).

### 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. To maintain structural integrity this top member shall be "keyed" to interlock with a "keyed" track member.

* + 1. Vertical Members:

### End vertical members of the gate frame are 2”x2”, weighing not less than 1.1 lb/lf. Interior vertical members shall alternate between 1"x1" and 1"x2" in cross section, weighing not less than .52 lb/lf and .82 lb/lf respectively. The 1”x2” and 1”x1” intermediate vertical members 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.

* + 1. 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.
		2. 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.
		3. 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.
		4. Diagonal Bracing:
			1. Diagonal "X" bracing of 3/16" (5mm) minimum diameter stainless steel aircraft cable shall be installed throughout the entire gate frame.
		5. The gate shall be completed by installation of approved filler as specified.

### 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 1” x 2” (25mm x 51mm) or 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. 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. Gate posts (to be supplied by others) shall be galvanized or coated as specified by the design team .
	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.**