MARMAC
Hydraulic Lift Solutions

General Specifications – Bascule Cross-Over Bridge

Scope: This Subcontractor shall furnish all labor, material, equipment and services to furnish and install one hydraulic bascule cross-over bridge.

Shop Drawings: Shall be submitted as set forth in general conditions and supplementary general conditions.

General Information: This specification is intended to cover the complete installation of one oil-hydraulic Bascule Bridge as approved by the Architect. The bridge manufacturer shall be regularly engaged in the manufacture and design of hydraulic lifting devices, submitting proof he has been regularly engaged in this type of business for a period of not less that five (5) years. The general contractor is to list in his bid the make of bridge proposed and the allowance set up for same. All work, including the accessory items listed herein shall be performed in a first class workmanlike manner, and is to include all materials and work as shown on the drawings or described hereinafter. All work shall be performed in accordance with the National Electrical Code, and such local codes as may be applicable.

Work Not Included: The following work shall be performed under another contract:

A. Extend the electrical service from the power main through a fused safety switch of ample capacity, to the terminals of the power unit controller.

B. Cutting and/or alteration of docks & piers, including curb angles, sleeves & painting as required.

C. Adequate supports or piers for bridge and hinge assembly. All items to be anchored in concrete will be installed by others under the direction and/or supervision of the bridge manufacturer.

D. Electric current during erection and testing of equipment.

Capacity: The bascule bridge shall be capable of supporting an axle load of _____#.

Platform: The bridge platform shall be of the size and configuration as shown on the drawing. The frame of the platform shall consist of formed and/or structural steel members welded and properly reinforced, covered with non-skid steel floor plate, and shall be capable of carrying the rated load when supported at the back hinge and at the front edge support. The maximum allowable stress, in bending, shall not exceed 15,000 psi. The hydraulic cylinders will not be considered as a source of support when the bridge is in the “cross-over” position. Safety side curbs at least 3 ½” high shall be provided the length of the bridge which extends between the docks. Curbs will not be supplied or required on that portion of the bridge which extends into the dock area. The transition between the bridge platform and the dock shall be smooth with no more than one inch (1”) lateral clearance, and one-quarter inch (1/4”) difference in elevation permitted. The outer edge of the platform will be equipped with a beveled “toe-guard” arrangement, where possible, to eliminate a shear point as the platform is lowered into “cross-over” position.

Hinge Frame Assembly: The hinge assembly shall be a single unit, made up of heavy structural steel and plates welded together and heavily reinforced to provide a rigid support across the entire width of the platform and provide support for the hydraulic actuating cylinders. The cylinder mounting plates and hinge will react as a single unit to isolate the forces involved in raising the bridge, and will be complete with reinforcing bars to be anchored into the concrete.

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Hydraulic Cylinders: The bascule bridge will be powered with heavy duty industrial hydraulic cylinders of the single acting type. Each cylinder will consist of the following: - A plunger of heavy seamless steel pipe with heavy welded heads and having a stop ring welded at the bottom to positively prevent it from leaving the casing, with the plunger being accurately turned and polished to an extremely smooth finish over its entire length; a heavy wall seamless steel casing with welded steel bottom head, widely spaced internal bronze bearings for greater stability, welded oil connection with automatic air eliminator (bleeder) device, a heavy duty gland with multiple "Vee" type packing rings supported top and bottom with metal adaptors, an adjustable packing gland ring, a circular pressure ring, and an effective wiper ring. The cylinder will be factory tested at twice the operating pressure required for the system, but at not less than 600-psi. A safety factor of 5-to-1, at maximum operating pressure, will be maintained at all times for all components of the cylinder. Heavy duty swivels will be provided for both casing and plunger ends of the cylinder and one end will be provided with means for longitudinal adjustment.

Hydraulic Pumping Unit: The electric hydraulic power unit will be neatly and compactly designed. The hydraulic pump will be a heavy duty industrial unit adequate for the service involved and capable of developing the required pressure, directly driven, through a flexible coupling, by a standard NEMA frame, open drip-proof motor of adequate size to operate the pump at maximum pressure without overload. The system will be of adequate size to permit raising the bridge to the "raised" position in not more than two (2) minutes. The unit will be complete with a cleanable suction strainer, an adjustable relief valve, check valve, and solenoid controlled lowering valves so arranged as to provide a safety "sow-down" cycle as the bridge nears either the "raised" or "cross-over" position. The lowering valves will be sized to permit lowering in approximately one (1) minute. No leakage through the valves holding the bridge in the raised position will be permitted. The motor, pump, strainer and valving will be mounted within a rectangular enclosure which includes an oil reservoir of ample capacity to properly operate the system, plus a minimum of 25% reserve oil. The reservoir will be complete with drain, breather, oil level sight gage and removable flanged tank cover with hold-down screws to eliminate contamination. Oil line connections to fittings in the tank will pass through sealable tank flanges. When a single hydraulic pump is used to power more than one bridge platform, independent control will be maintained over each bridge section.

Controls: A fused disconnect of proper size will be provided. The motor will be protected with an across-the-line magnetic motor starter with proper heaters for all phases. A control transformer with fused secondary will be provided to limit the control voltage to 115 Volts. All wiring will be in accord with national and local code requirements. Two (2) constant pressure push-button stations marked RAISE/LOWER will be provided for each bridge platform for mounting on opposite sides of the track well. Continuous pressure on the "LOWER" button energizes the lowering solenoids causing the bridge to lower. Releasing either button or striking the terminal limit switches will stop the movement of the bridge. Terminal limit switches will be provided to limit the travel of the bridge in either direction. These will be of the double pole, double throw type to permit interlocking safety switches or warning systems, as required. Limit switches will be furnished to provide a "slow-down" of the bridge as it approaches its full raised or full lowered position. All push-button stations and limit switches will be "oil-tight". A means will be provided for manually lowering the bridge under emergency conditions.

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Optional Equipment

Safety Locking Device: An automatic mechanical safety locking device will be provided to prevent the bridge from accidentally falling in case of loss of pressure in the hydraulic system. It shall be of adequate strength to support the bridge at any position of its travel and will consist of a heavy rack bar, a rack bar guide bearing and housing, a hinged spring loaded locking pawl, a solenoid release device and heavy swivels and pins to connect the assembly to the hinge frame assembly and to the bridge platform. The locking pawl will be arranged to be held in contact against the rack bar during the full raising cycle and will lock the rack against accidental lowering. Actuating of the" LOWER" button of the push-button station will automatically cause the release solenoid to pull the locking pawl out of the locked position, thereby permitting the bridge to lower. Electrical circuitry will be provided to make it unnecessary to actuate the "raise" circuit before lowering.

Automatic Counterweighted Bridge Support: In those instances where the outer bridge support is a part of the bridge platform, it will be of the automatic self-locking type for full support when the bridge is in the "cross-over: position; however, shall, upon raising the bridge, swing down in order to provide maximum rail clearance.

Automatic Raising/Locking Barrier: (For single leaf bridges where the outer edge of the bridge – when down – is supported by the dock or other part of the building structure.) To prevent traffic from inadvertently driving into the depressed track well when the bridge is up, a barrier will be provided in the dock opposite the hinge end of the bridge. This barrier assembly will be set in the dock, and arranged to automatically raise to a positively UP and LOCKED position as the bridge raises, and remain so locked at all times except when the bridge is in the down/cross-traffic position. (See Form A-112)

Side Railings: A pipe railing shall be provided along both sides of the bridge platform extending between the docks. Each shall be constructed of 1 ½" standard pipe and shall have a minimum height of 42" with the horizontal members spaced evenly. Vertical members shall be spaced at not more than eight feet (8'0").

JIC Options: To meet specification as required, the following items are available:

- JIC Tanks
- NEMA-12 combination motor starter-transformer-disconnect switch
- TEFC motors
- Oil filters
- NEMA-12 push-button stations
- Limit switches