Thrustor Brake Specifications

Brakes shall be of the shoe type. The brakes shall be furnished complete with an electrically driven thruster type actuator. Brakes shall be manufactured to AISE-NEMA standards and of mill duty quality.

All brakes shall be from the same manufacturer and must have a minimum of 10 years supplying brakes to the movable bridge industry.

Brakes shall be rated at ___ ft-lb. factory set at ___ ft-lbs. The Hy-Thrust actuators shall be actuated by ___ Volt 3 phase 60 HZ, totally enclosed, squirrel cage ball bearing motors with moisture proof windings, cast-iron conduit box. The brakes shall have a NEMA 3R enclosure with shaft seals constructed of 304 stainless steel, painted steel is not acceptable. The thruster motor shall be of ample capacity for the intended application. The rated stalled thrust of each thrustor shall be not less than 135 percent of the thrust actually required to release the brake with the torque adjusted to the continuous rated value. Brakes are to set automatically when for any reason power is removed from the thrustor motor.

The oil used in the thrustor-operating chamber of the brakes shall be hydraulic oil specifically recommended by the thrustor manufacturer for low temperature operation. It shall have a free Operating temperature range between 20 degrees below zero and 122 degrees above zero Fahrenheit. Throughout this temperature range there shall not be any material change of operating characteristics.

All thrusters shipped, either mounted or as a spare, must be filled with hydraulic fluid at the factory prior to shipment. All thrusters must meet IP65 standards. External thruster material shall be Aluminum for light weight and corrosion protection. Thrustor motors shall be rated for inverter duty operation.

Each thrustor actuator shall be provided with an independent time delay valve adjustable between 0 and 5 seconds for both setting and releasing the brake. Only an internal time delay valve constructed of stainless steel is acceptable. Adjustment must be infinentialy adjustable between the minimum and maximum settings. These adjustments must be allowable with the brake in full service. A single time delay for both setting and releasing is not acceptable.

Each brake shall be provided with a manual release lever and a device for holding the brake in the released position. The hand release attachment shall be mounted permanently on the brakes and shall be arranged so that the brake can be released easily and quickly without the use of apparatus not permanently attached to the brakes. This hand release shall not affect any torque setting or brake adjustment.

The hand release shall be capable of being released without removing the brake cover. The mechanism shall latch in both the released and non-active positions. It shall provide at a minimum, 90% of the power release stroke and not inhibit the working stroke of the actuator when fully retracted.

On each brake shall be mounted lever type limit switch for use in control and indicating circuits. It shall not be possible to set the hand release of the brake without tripping the brake release limit switch. The limit switches shall be oil and watertight. Each brake limit switch shall actuate on positive setting of the brake shoes on the drum. A second circuit of the limit switch shall close controls when the brake is released.

Thrustor Brake Specifications

Each brake shall be furnished with an external torque spring. This shall provide stepless torque adjustment down to 40% of the maximum brake torque. The actual setting must be visible from a calibrated torque indicator provided on the torque spring assembly.

Each brake base must be manufactured from ductile iron with the following minimum base thickness for rigidity and torsional stability:

8" - 0.75" thickness
10" – 0.75 "
13" – 0.88"
16" – 1.00"
19" – 1.13"
23" – 1.13"
26" – 1.5"

Brakes shoes must be easily replaced from either side of the brake without disassembling the brake. All torque adjustments should not have to be reconfigured after replacing the shoes.

All exposed ferrous material shall be treated with a nitrocarburising process. This process shall improve wear resistance, lower the coefficient of friction and greatly reduce the tendency to weld or seize with a metallic counterpart. It shall also vastly improve corrosion resistance properties. The nitriting process shall produce a thick E-Nitrite layer of at least 12μm. Painting and other finishes such as hard chrome plating or hot dipped galvanizing are not an acceptable replacement for Nitriting.

All pivot points (pins) shall be manufactured from corrosion resistant material. The material must have a "softer" Rockwell hardness than the pivot arms to prevent arm wear.

Brake Wheels

The brake shall be furnished with new ____ inch finished bore ASTM A536 grade 65-45-12 ductile iron brake wheels. This alloy has a minimum tensile strength of 65,000 psi, minimum yield strength of 45,000 psi and 12% elongation in 2 inches. Bore size and keyway dimensions shall be sized to facilitate correct mounting of the wheel onto the span motor shaft extension. These shall be supplied to the brake manufacturer at the time of order.

The spherical precipitated free carbon in this Ductile Iron Alloy greatly improves the stiffness, strength, shock resistance and wearing capability of the brake wheel. Ductile Iron is used because of its good machinability, fatigue strength, wear resistance and high modulus of elasticity in heavy duty applications.

The brake wheels shall feature an angular web design as opposed to a straight web. The angular web design increases the heat dissipating surface area and also the wheel's resistance to distortion after severe temperature excursions. When the wheel rim expands, due to extremely severe heating, the angled web is superior to a straight web. This design helps in the prevention of web cracks and complete separation of the rim from the web.

A machining-sequence has been established which prevents distortion. Machining "all over" minimizes the need for residual unbalance corrections and also maximizes heat dissipation during operation.

All brake wheels are stamped with the manufacturing contract number to ensure QA traceability.

Thrustor Brake Specifications

All wheels must checked for “run-out”. Wheels 16” diameter and larger must be dynamically balanced.

The strength of the 65-45-12 Ductile Iron wheel increases the ability to accommodate the higher speeds encountered with modern drive technology.

The co-efficient of friction for the combination of organic linings and the Ductile Iron wheel braking surface of 65-45-12 Ductile Iron wheels is superior to most other materials for this application.

Cast steel and hardened steel wheels are prone to the development of heat expansion cracks on the wheel’s braking surface. These cracks can then cause accelerated lining wear. Cast grey iron is prone to rim separation from the web under severe duty conditions. Therefore, steel and cast grey iron wheels are NOT acceptable.

The brakes shall be Mondel Engineering mill duty brake (ABW series), AISE- NEMA rated as represented by SDC, Inc. - (973) 831-9573. Any deviation from this specification must have prior written approval.