

## DC MOTORS - BRIDGE DUTY SPECIFICATION

The drive motors shall be \_\_\_\_ duty motors. They shall be built in strict accordance with NEMA publication MG-1 and designed for use with an SCR closed loop DC control. They shall be shunt wound with moisture resistance insulation for 40 degree C ambient temperature, and capable of reversing. Motor shall be:

1. Horsepower: \_\_\_\_ HP
2. Nominal Voltage: \_\_\_\_ DC primary
3. Field Voltage \_\_\_\_ Volts
4. Base speed: \_\_\_\_ RPM
5. Duty: 60 minute
6. Frame size: \_\_\_\_\_
7. Insulation: F
8. Service Factor: 1.0

The motors shall be totally enclosed non-ventilated construction, with re-greaseable ball bearings, moisture resistant insulation and internal space heater (115VAC) sized by the manufacturer. The motor shall have a special extended shaft as shown on the mechanical contract drawings to accommodate the motor coupling on one end and a rear mounted encoder on the other. The motor shafts shall be Cadmium plated. A drain hole of not less than 1/2 inch diameter shall be provided at the bottom of the motor.

All winding shall be copper. The motor shall be capable of having a minimum breakdown torque of 300%. Motor must have a speed range of 100: 1 and be capable of having full torque at zero speed. Motor design shall be low inertia and slip design and include an N/O temperature sensor in the windings.

The motor shall have a rear mounted encoder. The encoder shall be a magneto-resistive industrial type (aluminum and glass thin disc optical encoder wheels are not acceptable). The encoder shall have a resolution of 1024 ppr with 12 volt DC power and be compatible with the DC control. Separate terminal box with terminal strip for feedback unit.

The conduit boxes shall be liberally sized and located to avoid interference with the machinery. The conduit boxes shall be sized in accordance with the requirements of the NEMA MG 1-1987 PART 11.

The motors shall be designed and manufactured in the United States of America.

Modifications needed to meet the requirements of these specifications are as follows:

1. Drain holes at the low point of the motor with a removable plug.
2. Washers under pole bolts
3. Re-greaseable ball bearings, sleeve bearing are NOT acceptable.
4. Spot faced surfaces on frame under the pole bolts
5. Seal all joints and eye bolt holes.
6. Sealed leads in waterproof conduit box with tapped conduit entrance.
7. Shaft seals - lip type rubbing seals on both outboard bearings.
9. Final coat of polyurethane paint.
10. Corrosion-resistant hardware.
11. Special neoprene gasketed heavy handhole covers with machined surfaces on cover and bearing bracket.
12. Sealed frame fits and special treatment of all mating surface.

The motor frame shall be finished with a corrosion-resistant paint or coating. Exposed unpainted metal surfaces shall be of a corrosion-resistant material.

A complete set of speed-torque-current curves for one of the \_\_\_\_ main span motors shall be prepared and submitted to the Engineer for approval. The speed current tests must be performed with the actual DC drives and motors to be used on the bridge. These tests shall be performed by the drive manufacturer and certified documented tests results shall be provided for the engineer on record to review and approve. The Test technician(s) that actually did the system testing, the Quality Control person or the system design engineer on record for the job must sign off on the test procedure before the unit is removed from the test department. Current corresponding to full-load speed shall be provided. Armature and field currents and voltages shall be shown. The test report should at a minimum include all of the information listed in the table below.

Also, the same main span motor subjected to the complete test shall also be subjected to a full load heat run test by the motor manufacturer.

The remaining main span motors shall be subjected to the short commercial (routine) test at the plant of manufacture in accordance with the current requirements of the NEMLA MG 1-1987 PART 12, and IEEE STD 112-1984.

The DC motors shall be supplied by the DC drive manufacturer. The motor and drive must be dynamometer tested as a pair, prior to shipment from the drive manufacturer.

**TEST REPORT**

RPM		MOTOR		AC LINE CURRENT		
		VOLTAGE	CURRENT	A	B	C
FULL LOAD	¼ SPEED					
½ LOAD	¼ SPEED					
NO LOAD	¼ SPEED					
FULL LOAD	½ SPEED					
½ LOAD	½ SPEED					
NO LOAD	½ SPEED					
FULL LOAD	FULL SPEED					
½ LOAD	FULL SPEED					
NO LOAD	FULL SPEED					
FULL LOAD*	FULL SPEED					
½ LOAD*	FULL SPEED					
NO LOAD*	FULL SPEED					

\* For regenerative drives

ARM VOLTAGE: \_\_\_\_\_ ARM CURRENT: \_\_\_\_\_

FIELD VOLTAGE: \_\_\_\_\_ FIELD CURRENT: \_\_\_\_\_

BASE SPEED RPM: \_\_\_\_\_ HORSEPOWER: \_\_\_\_\_

TACH VOLTAGE / ENCODER PULSES PER REVOLUTION: \_\_\_\_\_

Approved Manufacturers:

Motors shall be supplied by Stevens Drives & Controls (973-831-9573), General Electric, or Fincor.