SPECIFICATION

_____* (Top/Under) running _____* (single/double) girder crane

1. SCOPE

   Crane vendor to provide a complete ____*-ton capacity ____* running ____* girder crane

2. REFERENCE DRAWING

   (Drawing number and description)_____* - conceptual plan

3. RESPONSIBILITIES

   3.1. Crane vendor will furnish on this order:

   3.1.1. All material necessary for complete installation of the above-mentioned crane

   3.1.2. Complete controls

   3.1.3. Equipment operating instructions

   3.1.4. Drawings and parts lists as specified

   3.1.5. The complete system, including the installation, must conform to the applicable requirements of the latest edition of the following:

   - Occupational Safety and Health Act (OSHA)
   - State and Local Codes
   - American Gear Manufacturers Standards (AGMA)
   - American National Standards Institute (ANSI)
     B30.10 – Hooks
     B30.16 – Overhead Hoists (underhung)
     B30.17 – Overhead and Gantry Cranes (top running bridge, single girder, underhung hoist)
     HST-4M – Performance Standard for Overhead Electric Wire Rope Hoists
   - Crane Manufacturers Association of America (CMAA) Specification #70, specifications for electric overhead traveling cranes
   - National Electric Manufacturing Association, Inc.
   - National Electric Code (NFPA 70)

   3.2. Building contractor will furnish the materials and labor for the following:

3.2.1. Complete erection

3.2.2. Supporting steel for runway rails

3.2.3. Runway rails

3.2.4. Electric power service

4. OPERATING CONDITIONS

4.1. The equipment will be installed) _____* (location and dimensions of available space

4.2. The equipment will be operated in ambient temperatures ranging from ____* degrees Fahrenheit to ____* degrees Fahrenheit

4.3. The atmospheric conditions are classified as _____*

4.4. Electrical classification: _____*

4.5. Electrical power characteristics: Power for operating the equipment will be supplied by a ____* Volt____* Phase, ____* hertz circuit

5. GENERAL SPECIFICATIONS

5.1. Hook Capacity

5.1.1. ____* tons

5.2. Total Lift- ____* ft minimum

5.3. Operating Speeds

5.3.1. Bridge: ____* feet per minute _____* speed

5.3.2. Trolley: ____* feet per minute _____* speed

5.3.3. Hoist: ____* feet per minute _____* speed

5.4. Type of Control – ___* control for pendant operation from ___*

5.4.1. Pendant suspended from: ____*

5.4.2. Pendant shall hang ___* above floor

5.5. Type of Service

5.5.1. Crane – CMAA Crane Service Class ____*

5.5.2. Hoist – HST-4M, H4

5.6. Heights

5.6.1. Operating floor to hook in high position - ____* feet, minimum

5.6.2. Operating floor to underside of building structural steel - ____* feet

5.6.3. Operating floor to high point of crane – ____* feet maximum

5.7. Length of runway - ____* feet

5.8. Span between centerlines of runway rail - ____* feet

5.9. Size of runway rails shall be specified by vendor

6. CRANE RUNWAYS

Crane runway support steel, runway rails and crane runway stops will be provided by building contractor. The runway will be designed with sufficient strength and rigidity to prevent undue lateral or vertical deflection for the wheel loading of the crane. The runway rails will be installed straight, parallel, and level, at the same elevation and center-to-center distance as specified in Sections 5.6 and 5.8. The rails will be standard ASCE sections as specified by vendor.

7. BRIDGE

7.1. The bridge shall consist of a single girder fabricated of structural steel sections. Sections shall be braced for rigidity and securely fastened to the end trucks to maintain proper alignment.

7.2. The end trucks shall consist of structural sections bolted to the bridge beam. A long wheel base shall be provided for proper weight distribution. Each end truck shall be supplied with large diameter, heat treated, double-flanged, steel wheels.

7.3. End truck wheels shall be of the fixed axle type equipped with anti-friction bearings. Substantial guards shall be provided in front of each wheel. These shall project below the top of the runway rail. Safety lugs shall be furnished on each end truck to prevent excess drop in case of axle failure.

7.4. The bridge shall be motor-driven through suitable gear reducers. Gearing shall be enclosed and operate in an oil bath. An electro-mechanical brake shall be supplied on the motor drive.

7.5. Rubber bumpers shall be furnished on the bridge end trucks.

8. TROLLEY

8.1. A monorail type trolley shall be furnished to support the equipment and operate on the bridge girder.

8.2. Hardened tread wheels with anti-friction bearing shall be provided.

8.3. The trolley shall be motor-driven through a suitable gear reducer. An electric brake shall be furnished on this drive. The drive shall be shock free on starting and stopping.

8.4. The trolley frame shall be welded or cast steel construction. It shall be of rigid construction designed to transmit the imposed load to the bridge girder without undue deflection.

8.5. Safety lugs shall be furnished on each trolley.

9. HOIST

9.1. A ____* head room hoisting machine of proper capacity shall be mounted on the trolley. It shall consist of a motor, gear reducer, hoist drum, sheaves, load block, hook, and hoisting rope. An electric brake and mechanical load brake shall be supplied on the hoist.

9.2. The motor shall be designed specifically for hoisting duty. The electric brake shall be of suitable size to promptly stop the motor rotation in either direction, and hold the load.

9.3. The mechanical load brake shall be of the friction disc type and be capable of holding and controlling the lowering speed of the load under all conditions.

9.4. Precision cut, full depth teeth, heat treated forged steel gears shall be used in the gear reducer. These gears shall be provided with oil bath lubrication and enclosed in a drip proof case.

9.5. The hoist drum and sheaves shall be of large diameter to permit maximum rope life. The drum diameter shall be at least 20 times the rope diameter and shall be grooved to provide for the entire lift without overlapping the rope. The drum flanges shall be guarded so that the rope cannot wedge between the drum and the hoist frame.

9.6. A paddle or weight-operated type upper final limit switch shall be provided to protect against hoisting beyond safe limits of travel. This switch shall be connected to open a main line contactor. The switch system must be designed in such a manner that the switch operator mechanism cannot be over traveled and allow the switch to become inoperative.

9.7. A loading limit control device shall be provided to prevent over stressing the system. This device shall de-energize the hoist motor and immobilize the up-circuit when an over capacity lift is attempted. This switch must be set to overcome dynamic loading conditions but not exceed 125% rated capacity.

9.8. Geared upper and lower limit switches shall be furnished to restrict motion beyond the normal operating travel. These switch contacts shall be connected in the respective motor control circuits.

9.9. The hoisting rope shall be improved plow steel, of suitable diameter, with a factor of safety of at least five. Connection to the drum shall be made adequately and shall be easily detachable for replacement.

9.10. The load block shall be of the enclosed type and equipped with a swivel type safety latch hook.

10. MOTORS

All motors shall be totally enclosed, non-ventilated induction type. They shall be ____* volts, ____* phase, and rated for ____* min continuous operation under full load with a temperature rise not to exceed ____* degrees Celsius above an ambient temperature of ____* degrees Celsius.

11. CONTROL STATION

11.1. A pendant type ___* button push-button station shall be provided to control the motions of the bridge, trolley, and hoist. This station shall consist of buttons having the following marking:

_____*

_____*

_____*

_____*

_____*

_____*

_____*

_____*

11.2. The push-button station shall be suspended on a chain or cable, from a track mounted on the bridge, to a position 4'-0" above the operating floor level from the bottom of the station. It shall be possible to move the station along the bridge independent of the trolley.

11.3. The push-button enclosure shall be of lightweight construction in accordance with vendor's standard.

11.4. The push-button station shall consist of lightweight enclosure and a cover with button guards.

12. TRAVEL LIMIT SWITCHES

Limit switches shall be provided on the bridge and trolley and wired into the respective control circuits to stop the driving motors at the extremes of travel.

13. CURRENT CONDUCTORS

13.1. A four-bar, enclosed type conductor system, Insul-8 or approved equal, shall be provided along the full length of the runway. Three of these conductors will be used to supply electric power to the crane. The remaining conductor will be used for equipment grounding.

13.2. A ___*-conductor, flat, neoprene insulated, festooned flexible cable shall be provided along the bridge to supply electric power to the hoist and trolley. Three of these conductors will be used to supply electric power. The remaining conductor will be used for equipment grounding. The cable shall be connected to a terminating box at one end of the bridge.

14. CRANE CONTROL

14.1. Speed control shall be provided for all travel and hoisting motions as outlined in Paragraph 5.4 of these specifications.

14.2. All single motions shall be controlled by across-the-line, reversing type motor starters.

14.3. The control circuit voltage shall not exceed 120 volts. This voltage shall be supplied from a dry type transformer of proper capacity. The primary leads of

this transformer shall be connected across the "L_1" and "L_2" lines of power service. The X_2 line of the transformer secondary shall be grounded and adequate fuse protection supplied in the ungrounded X_1 line.

14.4. Overload protective relays shall be furnished in the ungrounded "T_1", "T_2", and "T_3" phase leads of all motor feeders.

14.5. Fuse or circuit breaker protection shall be furnished for each individual crane motor.

14.6. Forward and reverse motor contactors must be interlocked mechanically and electrically to prevent motor damage if the operator pushes the direction buttons simultaneously.

15. ELECTRICAL WIRING

15.1. The complete electrical installation shall be made in accordance with the National Electric Code requirements and the conditions outlined in Paragraph 4.3.

15.2. All electrical equipment shall be mounted in NEMA Type ___*, or better, enclosures.

15.3. All wiring connections within the electrical control enclosures shall be made with 600 volt, 90 degrees Celsius machine tool wire. Wiring connections between control enclosures and other electrical devices shall be made with 600 volt type THWN conductors and run in rigid conduit. Flexible metal conduit may be used to devices requiring position adjustment or run less than three feet. All wiring connections to electrical equipment in control enclosures shall be terminated on terminal strips with lugs or spades and properly identified.

15.4. Conduits shall be terminated at all enclosures and boxes in drilled holes or knockouts. Conduits one-inch and smaller shall be fastened to the enclosure by the use of dished type lock nuts with trailing knife edge. Conduits 1-1/4 inch and larger shall be terminated in a threaded hub or an Appleton "HUB" fitting inserted in a drilled hole knockout. Insulated bushings shall be furnished on all conduit terminations. Threaded conduit fitting shall be issued for all other connections.

15.5. A grounding system shall be furnished to effectively maintain the enclosures of all electrical equipment such as motors, brakes, starters, push button stations, boxes, etc, at zero potential. Rigid conduit will provide adequate grounding continuity between enclosures when installed as noted above.

15.6. Vendor is to specify, as part of his design, total connected load (kVA) and maximum expected load current (amperes.) Also, the vendor is to recommend feeder size and fuse size.

15.7. All labels and nameplates must be machine produced. Handwritten labels are not acceptable.

16. EQUIPMENT DESIGN SAFETY

16.1. All equipment furnished to vendor's standard design, which incorporates weldments, is to be welded in accordance with the appropriate codes and standard of the American Welding Society.

16.2. All equipment non-standard design to fulfill special requirements shall, in addition, meet the following:

16.2.1. All critical welds, the failure of which would cause potential accidents or injuries to personnel, are to be executed with special attention as outlined in this section.

16.2.2. An audit is to be made by the vendor to determine those welds to be in the critical category. Such welds are to be given special attention by the vendor to insure adequate quality control.

17. PAINTING

17.1. All surfaces of the structural parts of the crane shall be finished in accordance with the vendor's standard practice.

17.2. All surfaces of electrical and mechanical parts shall be finished in accordance with the vendor's standard practice.

18. INSPECTION AND TESTS

18.1. Inspection by the building contractor & _____* (customer name) during fabrication shall be permitted by the vendor. These inspections shall be performed to determine the general adherence to these specifications and, in particular, to determine the quality of welding and painting provided.

18.2. Final acceptance will be made after the entire installation has been completed and a satisfactory trial has been made. All tests required to prove the ability of the crane shall be made by the building contractor. A vendor's representative is invited to attend.

19. GUARANTEE

Vendor shall guarantee materials and workmanship of equipment installed under these specifications for a period of one year after installation.

20. GENERAL

Any other requirements not set forth in these specifications, but necessary for the safe and reliable operation of the equipment, shall be included.

21. INFORMATION TO BE INCLUDED WITH VENDOR'S PROPOSAL

21.1. Outline drawing indicating required clearances, end approaches, horsepower, and full load current rating of all motors and wheel loading.

21.2. Manufacturer's name and catalog number of any equipment to be furnished not manufactured by vendor.

21.3. Any exception or difference of any equipment to be furnished from that specified and reason for the substitution.

21.4. Name and address of manufacturer's representative nearest plant site maintaining 24-hour service facilities and complete stock of spare parts.

VENDOR DOCUMENTATION REQUIREMENTS

DRAWINGS AND DATA REQUIRED	SEND WITH BID	TYPE DWGS APPROVAL OR FINAL	QTY REQ'D	REPRO-DUCIBLE REQ'D
Overall dimensioned outline drawings (include mounting or foundation dimensions if applicable)		Approval	1	
Diagrams (single line)		Approval	1	
Diagrams (schematic interconnection)		Approval	1	
Diagrams (electric control)		Approval	1	
Diagrams (schematic elementary)		Approval	1	
Recommended spare parts for one year's maintenance with prices		Final	1	
Installation, operation, maintenance and lubrication manuals		Final	5	

DEFINITIONS

Design Approval Drawings: These drawings must be submitted before fabrication will be released. One drawing will be returned stamped "Approved", "Approved as Noted", or "Not Approved." Fabrication will be released according to a note on the transmittal letter. "Approved as Noted" drawing comments shall be included on all final drawings before submittal.

Final Drawings: These drawings must show "as built" configuration.

CMAA SPECIFICATION #70

Class A (Standby or Infrequent Service)
This service class covers cranes which may be used in installations such as powerhouses, public utilities, turbine rooms, motor rooms and transformer stations where precise handling of equipment at slow speeds with long, idle periods between lifts are required. Capacity loads may be handled for initial installation of equipment and for infrequent maintenance.

Class B (Light Service)
This service covers cranes which may be used in repair shops, light assembly operations, service buildings, light warehousing, etc., where service requirements are light and the speed is slow. Loads may vary from no load to occasional full rated loads with two to five lifts per hour, averaging ten feet per lift.

Class C (Moderate Service)
This service covers cranes which may be used in machine shops or papermill machine rooms, etc., where service requirements are moderate. In this type of service the crane will handle loads which average 50 percent of the rated capacity with 5 to 10 lifts per hour, averaging 15 feet, not over 50 percent of the lift at rated capacity.

Class D (Heavy Service)
This service covers cranes which may be used in heavy machine shops, foundries, fabricating plants, steel warehouses, container yards, lumber mills, etc., and standard duty bucket and magnet operations where heavy duty production is required. In this type of service, loads approaching 50 percent of the rated capacity will be handled constantly during the working period. High speeds are desirable for this type of service with 10 to 20 lifts per hour averaging 15 feet, not over 65 percent of lifts at rated capacity.

Class E (Severe Service)
This type of service requires a crane capable of handling loads approaching a rated capacity throughout its life. Applications may include magnet, bucket, magnet/bucket combination cranes for scrap yards, cement mills, lumber mills, fertilizer plants, container handling, etc., with twenty or more lifts per hour at or near the rated capacity.

Class F (Continuous Severe Service)
This type of service requires a crane capable of handling loads approaching rated capacity continuously under severe service conditions throughout its life. Applications may include custom designed specialty cranes essential to performing the critical work tasks affecting the total production facility. These cranes must provide the highest reliability with special attention to ease of maintenance features.