MATERIAL STANDARD

FOR

GANTRY AND OVERHEAD CRANES

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0. INTRODUCTION

This Standard specification covers general requirements including design, construction, inspection, testing and other aspects of Gantry and Overhead Cranes top running bridge and top running trolleys.

This Standard shall be applicable for purchasing and furnishing of Overhead and Gantry Cranes.

1. SCOPE

1.1 This Standard covers general requirements for overhead and gantry cranes with a top running bridge of single or multiple girder construction utilizing a top running trolley, including polar, semigantry and cantilever gantry for use in refinery services, chemical, gas and petrochemical plants and where applicable in production and other services.

This Standard shall be used in conjunction with individual crane data sheet.

1.2 Compliance by the crane manufacturer with the provisions of this Standard does not relieve him of responsibility of furnishing crane and accessories of proper design, mechanically suited to meet guarantees at specified service conditions.

1.3 No deviations or exceptions from this Standard shall be permitted without the written prior approval of the Purchaser.

Intended deviations shall be separately listed by the Vendor and supported by reasons thereof for Purchaser consideration.

2. REFERENCES

Throughout this Standard the following standards and codes are refered to. The editions of these standards and codes that are in effect at the time of publication of this Standard shall, to the extent specified herein, form a part of this Standard. The applicability of changes in standards and codes that occur after the date of this Standard shall be mutually agreed upon by the Company and the Vendor.

AISC (AMERICAN INSTITUTE OF STEEL CONSTRUCTION)

"Manual of Steel Construction"

AISE (ASSOCIATION OF IRON AND STEEL ENGINEERS)

No. 6 "Specification for Electric Overhead Traveling Cranes for Steel Mill Service"

ANSI (AMERICAN NATIONAL STANDARD INSTITUTE)

A 12.1 "Safety Requirements for Floor and Wall Openings, Railings, and Toeboards"
B 30.2 "Overhead and Gantry Cranes"
A 14.3 "Safety Code for Fixed Ladders"

AWS (AMERICAN WELDING SOCIETY)

D 1.1 "Structural Welding Code"
D 14.1 "Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment"

CMAA (CRANE MANUFACTURERS ASSOCIATION OF AMERICA)

Spec.# 70 "Specification for Electric Overhead Traveling Cranes"

3. CONFLICTING REQUIREMENTS

In the case of conflict between documents relating to the inquiry or order, the following priority of documents shall apply:

- First priority

Purchase order and variations thereto.

- Second priority

Data sheets and drawings.

- Third priority

This Standard specification.

All conflicting requirements shall be referred to the Purchaser in writing. The Purchaser will issue confirmation document if needed for clarification.

4. UNITS

This Standard is based on International System of Units (SI), except where otherwise specified.

5. DEFINITIONS

For the purpose of this Standard definitions given in ANSI/ASME Standard B 30.2 Section 2-0.2 shall hold.

6. DESIGN AND CONSTRUCTION

6.1 General

6.1.1 Each item of equipment supplied under this specification shall be designed and fabricated by a Manufacturer regularly engaged in the manufacture of the equipment of the type specified herein. Equipment supplied shall be substantially identical in mechanical design and details to equipment previously designed and constructed by the Vendor which has demonstrated a minimum of two (2) years of successful operation in similar service.

6.1.2 Mechanical parts of the crane system shall be designed to have a minimum factor of safety of five (5) (with capacity load) based on the ultimate strength of the material used. Adequate safety features shall be provided to insure protection of operating personnel.

6.2 Clearances

Clearances from obstruction and between parallel cranes shall meet the requirements of Section 2-1.2 of ANSI/ASME Standard B 30.2.

6.3 Runways and Supporting Structure

6.3.1 Foundations and anchorages

Foundation and anchorages shall meet the requirements of Section 2-1.2.2 of ANSI/ASME Standard B 30.2.

6.3.2 Crane runways

Construction of runways and rails and runway stops shall meet the requirements of Section 2-1.3.2 of ANSI/ASME Standard B 30.2.

6.4 Crane Construction

6.4.1 Welded construction

All welding procedures and welding operator qualifications to be used on load sustaining members shall be in accordance with the American Welding Society Structural Welding Code, AWS D1.1, except as modified by Specifications for Welding Industrial and Mill Cranes, AWS D14.1. Where special steels or other materials are used, the manufacturer shall provide welding procedures.

6.4.2 Girders

All cranes built, should conform to the minimum design parameters as specified in CMAA #70, the AISC Manual of Steel Construction, or AISE Standard #6.

6.5 Cabs (if Provided)

6.5.1 Cab location

Location of cab shall meet the requirements of Section 2-1.5.1 of ANSI/ASME Standard B 30.2.

6.5.2 Cab construction

Cab construction shall comply with the requirements of Section 2-1.5.2 of ANSI/ASME Standard B 30.2.

6.5.3 Access to crane

Access to the cab or bridge walkway shall be by a fixed ladder, stairs, or platform requiring no step over any gap exceeding 305 mm. The ladder shall be in conformance with ANSI Safety Code for Fixed Ladders, A14.3.

6.5.4 Toolbox

If a receptacle is provided for the stowing of tools and oilcans, it shall be metal and shall be securely fastened in the cab or on the walkway.

6.5.5 Fire extinguisher

A carbon dioxide, dry chemical, or equivalent hand fire extinguisher should be kept in the cab. Carbon tetrachloride extinguishers shall not be used.

6.5.6 Lighting

Cab lighting, either natural or artificial, shall provide a level of illumination that enables the operator to observe the operating controls.

6.6 Footwalks and Ladders

Location of footwalks, construction of footwalks, toeboards and handrails for footwalks, ladders and stairways and egress shall comply with the requirements of Section 2-1.7 of ANSI/ASME Standard B 30.2.

6.7 Stops, Bumpers, Rail Sweeps, and Guards

Trolley stops, bridge bumpers (buffers), trolley bumpers (buffers), rail sweeps, wheel and truck frames and guards for moving parts shall comply with the requirements of Section 2-1.8 of ANSI/ASME Standard B 30.2.

6.8 Brakes

Brakes for hoists, hoist holding brakes, hoist control braking means, brakes for trolleys and bridges (cab, floor and remote operated), trolley and bridge braking means and application of trolley and bridge brakes shall meet the requirements of Section 2-1.9 of ANSI/ASME Standard B 30.2.

6.9 Electrical Equipment

Electrical equipment including controllers, resistors, switches, runway conductors, lifting magnets, extension lamps shall comply with the requirements of Section 2-1.10 of ANSI/ASME Standard B 30.2. The control circuit voltage shall be specified in the crane data sheet by the purchaser (see Appendix A).

6.10 Hoisting Equipment

Hoisting equipment including sheaves, drums, ropes, equilizers, hooks, guards for hoisting ropes shall comply with the requirements of Section 2-1.11 of ANSI/ASME Standard B 30.2.

6.11 Warning Devices or Means

On cab-operated cranes and remote-operated cranes, a gong or other warning means shall be provided for each crane equipped with a power traveling mechanism.

6.12 Lubrication

Parts not in oil bath shall be prelubricated and sealed or shall be lubricated by grease fittings. If bearings are not accessible, the lubrication fittings shall be brought to a convenient spot by the use of pipe fittings. Vendor shall supply complete lubrication data.

6.13 Painting

Surface preparation and painting shall be according to manufacturer’s standard, unless specified otherwise.

6.14 Marking

The rated load of the crane shall be marked on each side of the crane.

If the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block.

This marking shall be legible from the ground or floor.

7. INSPECTION AND TESTING

7.1 Inspection

7.1.1 Prior to shipment, all cranes shall be inspected by purchaser's representative to ensure compliance with the applicable provisions of this Standard.

7.1.2 Purchaser's representative shall have the right to reject any parts of the equipment which do not conform with the Purchase Order.

7.2 Testing

7.2.1 Operational tests

Cranes shall be tested by a qualified person to insure compliance with this Standard, including the following functions:

a) Lifting and lowering.

b) Trolley travel.

c) Bridge travel.

d) Limit switches. The trip setting of hoist limit devices shall be determined by tests with an empty hook traveling in increasing speeds up to the maximum speed.

The actuating mechanism of the limit device shall be located so that it will trip the device under all conditions, in sufficient time to prevent contact of the hook or load block with any part of the trolley or crane.

e) Locking, limiting and indicating devices, if provided.

7.2.2 Rated load test

Cranes shall be tested and inspected by or under the direction of a designated or authorized person, and a written report be furnished by such person, confirming the load rating of the crane. The load rating should not be more than 80% of the maximum load sustained during the test. Test loads shall not be more than 125% of the rated load, unless otherwise recommended by the manufacturer. The test reports shall be placed on file where readily available to appointed personnel.

The rated load test, shall consist of the following operations as a minimum requirement.

1) Hoist the test load a distance to assure that the load is supported by the crane and held by the hoist brake(s).

2) Transport the test load by means of the trolley for the full length of the bridge.

3) Transport the test load by means of the bridge for the full length of the runway in one direction with the trolley as close to the extreme right hand end of the crane as practical, and in the other direction with the trolley as close to the extreme left hand end of the crane as practical.

4) Lower the test load, and stop and hold the load with the brake(s).

8. PREPARATION FOR SHIPMENT

8.1 Preparation for shipment shall be in accordance with Vendor's Standards and as noted herein. The Vendor shall be solely responsible for the adequacy of the "Preparation for Shipment" provision employed with respect to materials and application, to provide materials to their destination in "ex-works" condition.

8.2 Vendor shall provide for the following minimum preparation for shipment and packing features for all equipment: all equipment shall be packed, securely anchored (skid mounted when required) and weather protected for export over-seas shipment. Separate, loose and spare parts shall be completely boxed.

8.3 Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit and for at least six (6) months outdoor storage at jobsite prior to installation.

8.4 Exposed finish and machined surfaces, including bolting, shall be given a heavy coating of rust inhibiting compound.

8.5 Bearings and seal assemblies shall be fully protected from rusting, entry of moisture and dirt.

8.6 Vendor shall provide detailed information on the Vendor's preparation for shipment and packing for these units for purchaser's approval prior to shipment.

8.7 Impression stamped metal tags shall be wired to each item indicating Equipment Item No. and Purchase Order No. All pieces of equipment and spare parts shall be identified by item number and service, and marked on both inside and outside of each individual package or container.

8.8 Unless approved otherwise by Company, separate shipment of equipment and materials is not allowed.

9. GUARANTEE AND WARRANTY

Vendor shall guarantee that the equipment supplied shall be of sound, high grade material, built in a workmanlike manner and perform as described in this specification and attachments. Any material proving defective within one (1) year after start of operation or twenty-four (24) months after shipment, whichever comes first, shall be replaced free of charge, F.O.B Vendor's plant.

10. VENDOR'S DATA

10.1 Vendor shall supply all drawings and data necessary to install the crane completely.

10.2 Vendor shall provide information covering the following:

a) Lifting speeds, and operating speeds for all motions, should be stated for all conditions and configurations.

b) Material specifications for main structural members.

c) Type and rating of prime mover.

d) Full specification of main and auxiliary transmission systems and controls including actuating medium,e.g. air, hydraulic, hydrostatic, electric, mechanical, etc.

e) Specification of brakes and clutches, torque converters, hydraulic pumps, rams, etc.

f) Description and layout diagram of operator's controls.

g) Details of cab equipment, if supplied.

h) Specification and lengths for all ropes supplied.

i) Details of safety devices, alarms, indicators, etc., and other safety control equipment.

j) List of all tools and accessories supplied with the crane, indicating those which are 'special'tools.

k) Any unusual maintenance or servicing procedure unique to the crane.

10.3 The Manufacturer shall supply full operational instructions, erection and dismantling instructions, a driver's hand-book, maintenance instructions, a parts manual and, where appropriate, a workshop manual.

APPENDICES

APPENDIX A
TYPICAL DATA SHEETS

OVERHEAD AND GANTRY CRANE

DATA SHEET

JOB No.------- Rev.------
ITEM No. ------DATE -----
INQ./P.O. No.----------
PAGE 1 OF 2 BY -------

FOR: TYPE: OVERHEAD, GANTRY
SITE: No. REQUIRED: ----------
SERVICE:

NOTE: ○ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER ☐ BY MANUFACTURER

CRANE TYPE: ○ TOP RUNNING ○ UNDERHUNG ○ OTHER ----------
CAPACITY : ○ --------- Kg., ○ SPAN ------- M, ○ LIFT ---------- M, ○ CRANE TRAVEL ---------- M
ENVIRONMENT : CRANE LOCATION: ○ INDOOR, ○ OUTDOOR, ○ BOTH
TEMPERATURE : ○ Max. ------- °C ○ Min. ----------°C ○ SEISMIC ZONE ---------- WIND DESIGN LOAD -------
HAZARDOUS AREA : ○ YES, ○ No. IF YES, SPECIFY CLASS ---------- DIV. ---------- GROUP ----------
ELECTRICAL ENCLOSURE TYPE: NEMA ----------, UNUSUAL CONDITIONS (DUST, FUMES, ETC.,) EXPLAIN ----------
PLANT UTILITIES : ○ ELECTRICITY, ---------- PHASE ---------- CYCLE ---------- VOLTS, AIR-------
REMARKS: ----------

CRANE MOTION:	ELECTRICAL	AIR	MANUAL	SPEEDS
HOIST	○	○	○	○----------
TROLLEY	○	○	○	○----------
BRIDGE	○	○	○	○----------

REMARKS: ----------
CONTROL: ○ TYPE (SPECIFY) ----------
CONTROL LOCATION : ○ CAB, ○ FLOOR, ○ PENDANT STATION, ○ OTHER ----------

REMARKS: ----------
POWER DISTRIBUTION: TO TROLLEY SHALL BE SUPPLIED BY VENDOR ○ YES ○ NO
TO BRIDGE SHALL BE FURNISHED BY VENDOR ○ YES ○ NO
TYPE REQUIRED : (TO BE SUPPLIED BY VENDOR)

	BRIDGE	TROLLEY
RUNAWAY COLLECTORS	○	○
RUNAWAY CONDUCTORS	○	○
CABLE REEL	○	○
FESTOONED CABLE	○	○

REMARKS: ----------
ITEMS TO BE SUPPLIED BY VENDOR:
○ RAIL SWEEPS FOR BRIDGES ○ RAIL SWEEP FOR TROLLEYS
○ BUMPER STOPS FOR BRIDGES ○ BUMPER STOPS FOR TROLLEYS ○ TYPE -----
○ SURFACE PREPARATION ○ YES ○ NO ○ OTHER ----------
○ PAINTING, PRIME PAINT REQUIRED ○ FINISH PAINT REQUIRED
○ FLOOD LIGHTS REQUIRED, TYPE ----------
○ ELECTRIC SPARK HEATER REQUIRED : -------- ----------
○ SINGLE POINT LUBRICATION SYSTEM
○ MAINTENANCE & SERVICE PLATFORMS
○ SPARK RESISTANT CONSTRUCTION
○ ----------
○ ----------

REMARKS: ----------

(to be continued)

APPENDIX A (continue)

OVERHEAD ANY GANTRY CRANE
DATA SHEET

JAB No. ------- REV. -------
ITEM No. ----- DATE -------
INT./P.O.No. ----------
PAGE 2 OF 2 BY --------

DATA BY VENDOR (MUST BE COMPLETED AND RETURNED WITH QUOTATION) ☐

CRANE MANUFACTURER : ----------

BRIDGE : NUMBER OF GIRDERS ---------- TYPE ---------- SIZE ----------

BRIDGE TRUCKS : TYPE ---------- No. OF WHEELS ----------WHEEL DIAMETER ----------

WHEEL MATERIAL ----------, TREAD HARDNESS ----------

TYPE TREAD ---------- , TYPE WHEEL BEARING ----------

BEARING MANUFACTURER ----------MINIMUM B.10 LIFE ----------

BRIDGE DRIVER TYPE: ----------, GEAR REDUCER MANUFACTURER ----------

NO. REDUCTION ----- TYPE GEARS ---------- ENCLOSURE ----------

TYPE LUBRICATION ----------

BRIDGE BRAKE (IF REQUIRED): TYPE ---------- TORQUE RATING ---------- Mfg. ----------

REMARKS: ----------

TROLLEY: TROLLEY FRAME CONSTRUCTION ----------

TROLLEY TRUCKS : TYPE ---------- No. OF WHEELS ---------- WHEEL DIAMETER ----------

WHEEL MATERIAL ---------- TREAD HARDNESS ---------- TREAD TYPE ----------

TYPE WHEEL BEARING ---------- BEARING Mfg. ---------- B-10 LIFE ----------

TROLLEY DRIVE TYPE ---------- GEAR REDUCER Mfg. ----------

No. REDUCTIONS ---------- TYPE GEAR ---------- ENCLOSURE ----------

TYPE LUBRICATION ----------

TROLLEY BRAKE (IF REQUIRED) TYPE ---------- TORQUE RATING ---------- Mfg. ----------

SIZE OF TROLLEY RAILS ----------

REMARKS: ----------

HOIST : MANUFACTURE ---------- MODEL No. ---------- CAPACITY ----------

DRUM DIAMETER ---------- MATERIAL ----------

HOIST DRIVE TYPE ---------- GEAR REDUCER Mfg. ----------

No. REDUCTIONS ----------TYPE GEAR ---------- ENCLOSURE ----------

TYPE LUBRICATION ----------

WIRE ROPE :DIAMETER ---------- CONSTRUCTION ---------- COKE ----------

No. OF PARTS SUPPORTING LOAD ---------- TYPE REEVING ----------

DIAMETER OF SHEAVES ---------- MATERIAL ----------

LOAD BRAKE :TYPE ---------- Mfg. ---------- TORQUE RATING ----------

MOTOR BRAKE:TYPE ---------- Mfg. ---------- TORQUE RATING ----------

HOOK TYPE ---------- MATERIAL ----------

LIMIT SWITCHES :(YES OR NO) UPPER ---------- LOWER ---------- TYPE ---------- Mfg. ----------

REMARKS: ----------

MOTOR DATA:	MOTOR KW	MOTOR RPM	SPEED	MOTOR TYPE	INSULATION	MOTOR Mfg.
HOIST	---------	---------	-----	----------	----------	----------
TROLLEY	---------	---------	-----	----------	----------	----------
BRIDGE	---------	---------	-----	----------	----------	----------

REMARKS: SPEED TORQUE CURVE FOR HOIST SHALL BE SUBMITTED WITH QUOTATION.

CONTROL DATA: Mfg. ---------- LOCATION ---------- NEMA ENCLOSURE CLASS ----------

No. SPEED POINTS: HOIST ---------- BRIDGE ---------- TROLLEY ---------- RESISTOR CLASS----------

CONTROL STATION TYPE ---------- ---------- LOCATION ----------

REMARKS: ----------

POWER DISTRIBUTION TYPE : TROLLEY ---------- BRIDGE ---------- SUPPLIED BY VENDOR (YES, NO.)

MAIN LINE DISCONNECTED SWITCH PROVIDED (YES,NO) ---------- LOCATION-- ----------

WHEEL LOADING: TROLLEY ---------- Kg, BRIDGE --- ----- Kg,DEAD LOAD:BRIDGE ---------- Kg,TROLLEY ----------

VENDOR RECOMMENDED BRIDGE RAIL SIZE ---------- Kg/M,FIELD ASSEMBLY: ☐WELDED ☐BOLTED

ESTIMATED SHIPPING WEIGHT ---------- --- Kg, AND CUBAGE ---------- M³

REMARKS: DRAWING SHOWING OVERALL DIMENSIONS & CLEARANCES SHALL BE SUBMITTED WITH QUOTATION.