

GENERAL SPECIFICATION

STRUCTURAL

GS EP STR 006

Requirements for the design, fabrication and testing of Overhead Travelling Cranes

03	12/2016	§ 6.2, 7.7
02	05/2015	Organisation change – January 2015
01	01/2012	§ 4.2, 6, 6.2, 6.3, 6.13, 7.5 revised
00	10/2009	First issue
Rev.	Date	Purpose of the revision

Owning entity: DSO/TEC	Managing entity: DSO/TEC/STR
Other Approving entity(ies):	

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 2 of 35

Contents

1. Scope	4
1.1 Scope of supply for mechanical equipment	4
1.2 Scope of supply for electrical equipment	5
1.3 The following are excluded from Supplier scope	6
2. Reference documents	7
3. Purpose	8
4. Regulation and safety requirements	8
4.1 Legislation	8
4.2 Safety	9
5. General data and requirements	9
5.1 General Data: site and environment	9
6. Design and Manufacture	11
6.1 General requirements	11
6.2 Basis of Design	12
6.3 Structural	14
6.4 Mechanical	15
6.5 Winch or Hoist Trolley	17
6.6 Hooks	19
6.7 Lifting Mechanism	19
6.8 Crane and Hoist controls	20
6.9 Electrical Design	21
6.10 Safety	22
6.11 Performance guarantee	23
6.12 Light and horn warning signals data plates and marking	24
6.13 Maintenance and access	24
6.14 Equipment noise	25
7. Quality control	25
7.1 General	25

7.2	Inspection	25
7.3	NDT Qualification.....	26
7.4	Inspection and Testing.....	26
7.5	Marking.....	28
7.6	Factory Testing	28
7.7	Field testing	29
8.	Packing and preservation.....	29
9.	Spare parts	29
10.	Special tools	30
11.	Painting and coating.....	30
11.1	General.....	30
11.2	Guarantee.....	30
11.3	Application	30
11.4	Repairs	30
12.	Documentation	31
12.1	Documentation required for the Bid.....	31
12.2	Documentations	31
	Bibliography.....	33
Appendix 1	Summary table of roles and responsibilities.....	35

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 4 of 35

1. Scope

This general specification applies to Overhead Travelling Cranes installed on fixed or floating offshore installations and onshore plants, used either for material handling or maintenance purposes.

In addition to the specific requirements of the material requisition and datasheets, the Supplier shall provide the following components and piece of equipment:

1.1 Scope of supply for mechanical equipment

Supplier shall supply for each equipment the following (but not limited) accessories:

- Sheet or mesh grid metal casing to protect accessible mechanical parts and impact proof casings for over hanging elements
- Resilient bumpers and rubber buffer or hydraulic bumpers where necessary
- Inhibition of starting in high speed
- Inhibition of breaking in reverse at high speed
- Name plates, visible and permanent (with maximum load indicated)
- Direction shall be visible and indicated on the crane if radio command is use
- Crane rail. Jacking position at the end of crane path shall be engineered to adapt jacks for boogies maintenance when cranes are in park position
- Stopper at the end of crane rail
- Anti-derailment devices
- Anti-uplifting devices (for seismic area 1)
- Lubricators
- Annunciators (visual and/or acoustic) as required in the data-sheet
- Chain guides and cable guides
- Hook with safety latch
- Oil and grease for the first filling
- Girders for crane
- Maintenance platform (if required in the data-sheet)
- Pad-eyes or lifting points for installation or removal of the crane
- Pad-eyes of davit for hoist, electric motors... maintenance or replacement
- Fittings and bolts
- Protective hood against sun for equipment located outdoor
- Special tools if necessary
- Surface finishing and painting

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 5 of 35

- Pre-commissioning and start up spare parts
- Lifeline along the runway in accordance with European directive 89/686 (Personal Protective Equipment).

1.2 Scope of supply for electrical equipment

The supply of electrical equipment shall include (but not limited) the following items (see also below schematics for hoist):

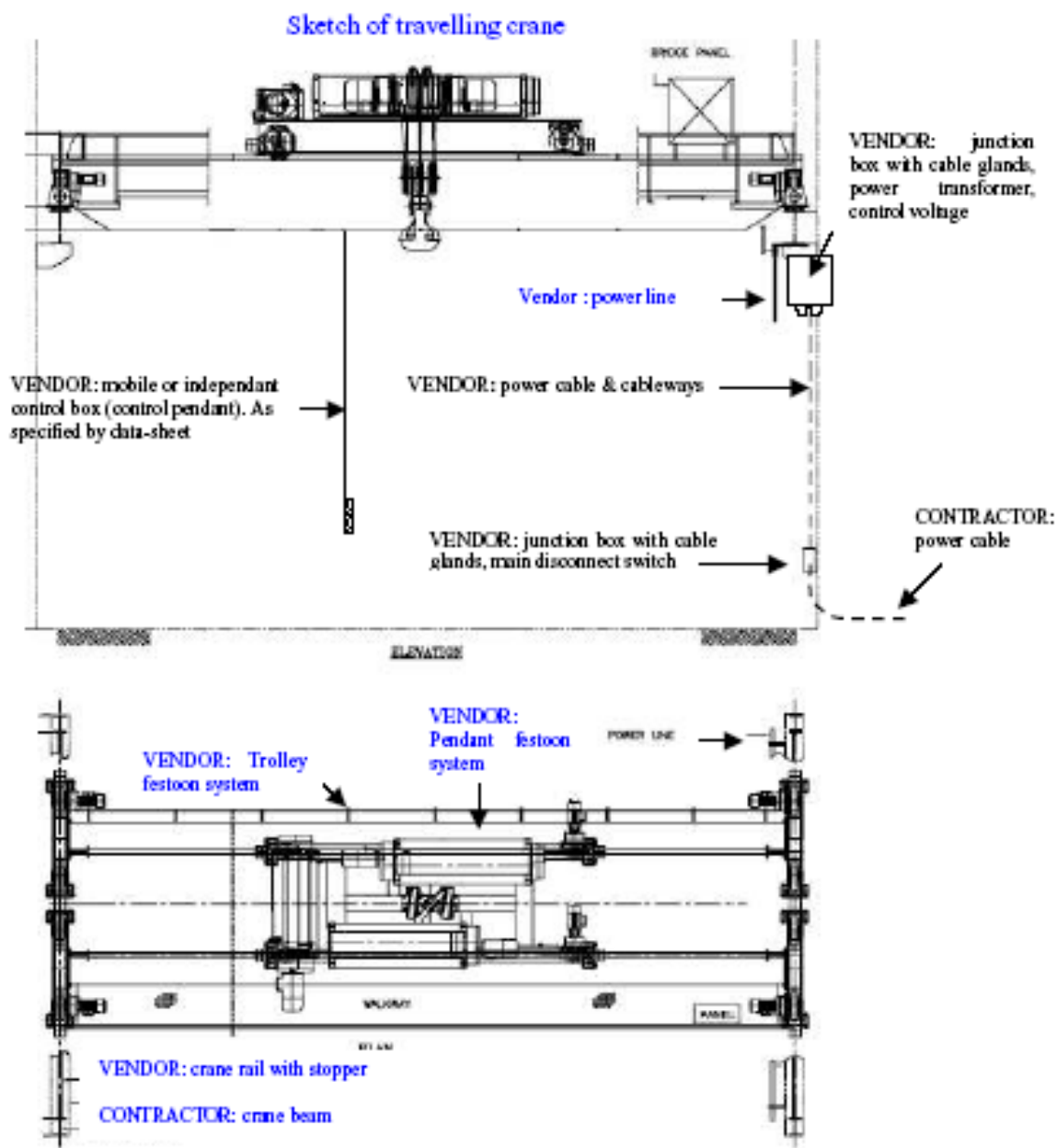
- Motors
- Motors protection
- Earthing: Bonding of the complete crane shall be provided by Supplier
- All necessary cables, conductors, collectors, festoons, tracks, supports, hangers, fittings etc., required to extend over the full length of travel
- Disconnecting switch with lock for the main switch box
- All cable glands
- Control voltage with transformer (control voltage derivated from the main power supply)
- Limit switches on all electrical moving parts with protections (one for low speed activation and one for stopping translation)
- Load limit switch with protection (unless otherwise specified in the data-sheet)
- Push button control box with on/off position secured by key.

Requirements for the design, fabrication and testing of Overhead Travelling Cranes

Rev.: 02

Effective date: 05/2015

Page: 6 of 35



1.3 The following are excluded from Supplier scope

- Civil works
- Connection and wiring of electrical power between site networks and main disconnect switch
- Connection of the hoist earth circuit to the building earth network
- Lighting of building
- Access to maintenance platform.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published at the effective date of this document.

Reference	Title
ASTM B633	Standard specification for electro deposited coatings of zinc on iron and steel
ASTM F1941M	Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric
AWS D1.1	Structural Welding Code - Steel
BS 3692	ISO Metric Precision Hexagon Bolts, Screws and Nuts - Specification
EN 14492-2	Cranes - Power driven winches and hoists - Part 2: Power driven hoists
EN 1990	Eurocode: Basis for structural design
EN 1991-3	Actions on structures Part 3: Actions induced by cranes and machinery
EN 1993-6	Eurocode 3: Design of steel structures - Part 6: Crane supporting structures
EN 10204	Metallic products - Types of inspection documents
EN 10025 (All parts)	Hot rolled products of structural steels – All parts
EN 13157	Cranes - Safety - Hand powered lifting equipment
EN 15011	Cranes - Bridge and gantry cranes
EN 61000-2	Electromagnetic compatibility (EMC). Part 2: Environment
IEC 60079 (All parts)	Explosive atmospheres – All parts
ISO 2408	Steel wire ropes for general purposes - Minimum requirements
ISO 4042	Fasteners. Electroplated coatings
ISO 9001	Quality management systems - Requirements
ISO 9927-1	Cranes - Inspections - Part 1: General
API SPEC 9A	Specification for wire rope
ATEX European Directives 94/9/CE & 99/92/CE	Rules for the design of material in hazardous area classifications

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 8 of 35

Reference	Title
FEM 1.001 FEM Section 9	Rules for the Design of Hoisting Appliance Fédération Européenne de la Manutention (Section 9 : Appareils de levage de série)

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published.

Reference	Title
GS EP COR 350	External protection of offshore and coastal structures and equipment by painting
GS EP ELE 079	Electrical apparatus for potentially explosive gas atmospheres
GS EP EXP 105	Pre-commissioning Execution
GS EP INS 101	Instrumentation Design

3. Purpose

This specification gives the minimum requirements for electrical overhead travelling cranes on onshore plants, fixed offshore platforms or floating offshore installations.

Additional or variable requirements specific to each device shall be dealt with in the Project particular specification.

4. Regulation and safety requirements

4.1 Legislation

The country having authority over the installation is designated in the particular specification, as a basic data.

The handling device must comply with the legislation of this country, and be such that it can be accepted in accordance with the conditions imposed or recommended by this legislation. If the country has no specific legislation or less stringent legislation than in Europe, it is European legislation that should be taken into account.

Any certificates of compliance with legislation required by the country having authority shall be supplied with the device.

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 9 of 35

4.2 Safety

The devices shall be equipped with all components necessary:

- For the safety of the personnel
- For the safety of equipment
- For operating safety
- For easy and safe access for maintenance

in accordance with the requirements stated in this document.

If the legislation, which prevails over this document, imposes more stringent requirements, the constructive arrangements shall be altered accordingly.

The crane shall incorporate all guards, where reasonably practicable to protect personnel against hazards which cannot be eliminated by design. Where it is not practicable to fit guards around any hazardous area, then clear, unambiguous and relevant warning notices should be posted at suitable positions on the crane.

All removable parts likely to become loose due to vibrations, dynamic forces or accidental shocks are to be provided with appropriate locking devices.

5. General data and requirements

5.1 General Data: site and environment

5.1.1 The site, the zone in the site

The site is the geographical location of the installation on which the handling device in question is installed. It is defined in the basic data by:

- Its name
- Its location (latitude, longitude, distance from the coast)
- The jurisdiction having authority over it.

The zone in the site is the portion of the installation within the handling device operates; it is defined in the particular specification, which includes in particular:

- A descriptive text
- A drawing showing the location and characteristics of the device
- The classification based on the probability of the existence of an explosive gas/air mixture.

5.1.2 Hazardous area

All equipment shall be designed and supplied in accordance with the hazardous area classification as specified in the Project Particular Specification and Data Sheets.

Unless otherwise specified the complete equipment will be installed in a hazardous area: Zone 2 Group II A Temperature class T3, IP part 15: [IEC 60079](#).

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 10 of 35

5.1.3 Environmental conditions

As a general rule, the handling devices shall be designed for outdoor use in an offshore atmosphere (i.e. humid, salt laden and eventually corrosive and subject to equatorial rains). Attention of Supplier shall be drawn on tightness or full protection of all bearings, sliding or movable parts of the equipment that shall be protected from any ingress as sea water, salt spray, sand or dust.

All handling devices must be useable with a maximum service wind of 20 m/sec.

The other specifications to be taken into account are those specified in the basic data, namely:

- Design temperature (average of the coldest month minus 5°C) and corresponding humidity of the air
- The maximum temperature (average of the hottest month) and corresponding humidity of the air
- Ambient temperature
- The extreme wind with the device not in operation: the maximum wind to be expected in a 100-year period, lasting 3 seconds, acting in any direction
- Snow surcharge load (device not in operation)
- Ice surcharge load (device in operation and device not in operation)
- Earthquake risk (site conditions) for fixed installations
- Support motions and accelerations for floating units.

5.1.3.1 Temperature

If the device is exposed to discharges of hot gases at a temperature higher than the maximum temperature specified above, it must be designed accordingly. Lifting equipment shall be protected from any radiant heating source.

5.1.3.2 Worst-case wind

For monorails, overhead cranes, gantry cranes and davits installed in an open area, a park / stand-by position with securing / fastening system shall be provided and designed for the most unfavourable condition. It shall however be assumed that this position must be reached with the extreme wind but with no load.

5.1.3.3 Snow surcharge load

Since the devices are mobile, it is assumed that snow does not build up when they are in use.

5.1.3.4 Ice surcharge load

Two cases shall be considered:

- The surcharge load with the device in operation, i.e. the surcharge load such that the mechanisms and/or pivot points of the structural elements can operate
- The surcharge load with the device not in operation, i.e., the surcharge load prevents all movements by locking the mechanism and/or the pivot points of the structural elements.

General Specification		GS EP STR 006
Requirements for the design, fabrication and testing of Overhead Travelling Cranes		
Rev.: 02	Effective date: 05/2015	Page: 11 of 35

5.1.4 Material obstacles

5.1.4.1 Definition

Material obstacles are all elements of the installation that may have an effect either on the setting of the device or on its shape (within limits acceptable for the technology of the device), or its movements or those of the load and suspension elements associated with it.

5.1.4.2 List of obstacles

This list is to be drawn up as soon as possible as the use of a handling device is planned; since the device and obstacle affect each others setting requirements, this list is to be drawn up in the order of arrival of the obstacles at the installation, so as to provide a permanent statement of the configuration of the environment at all times during the erection stage.

The main obstacles to the movements of the crane and loads are the installations they pass over, located below the plan of translation and protruding inside the envelope of loads movements.

Zones of discharges of hot gases that may affect the design of the device shall also be treated as obstacles.

If a second overhead crane or gantry crane is installed on the installation, special attention shall be paid to possible interactions with the first crane. In such a case, anti-collision devices shall be incorporated in both cranes.

6. Design and Manufacture

“Lifting Devices” shall be suitable for their intended purpose and should be of sound design, construction, suitable material, of adequate strength and free from defects.

Equipment shall be designed with due regard to the intended use with or near other equipment and for safe use under known operating conditions such static heel or trim and particularly dynamic effects due to roll, pitch, heave, yaw, surge and sway, including any overload conditions which may be anticipated (i.e. proof load testing, etc.). These dynamic data of the floating installation on which the equipment will be installed, shall be stated in the Project Particular Specification and the equipment shall be designed in accordance. No deviation shall be allowed.

Where relevant, the equipment shall have efficient control systems, guards, fences and shields. Particular consideration should be given to the effectiveness of mountings on all “Lifting Devices”.

Note: All calculations notes, drawings and Load charts shall be issued using the International System of Units or results shall at least be converted to (SI) metric equivalents.

6.1 General requirements

The equipment according to its Data Sheet and the Project Particular Specification may operate onshore or offshore on a fixed or floating installation but always in a remote location and must be reviewed not only for design and construction, but also for servicing and availability of spare parts.