

Supplementary Specification to API Specification 2C for Offshore Pedestal-mounted Cranes

Revision history

VERSION	DATE	PURPOSE
2.0	January 2025	Second Edition
1.0	December 2018	First Edition

Acknowledgements

This IOGP Specification was prepared by a Joint Industry Programme 33 Standardization of Equipment Specifications for Procurement organized by IOGP with support by the World Economic Forum (WEF).

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Foreword

This specification was prepared under Joint Industry Programme 33 (JIP33) "Standardization of Equipment Specifications for Procurement" organized by the International Oil & Gas Producers Association (IOGP) with the support from the World Economic Forum (WEF). Companies from the IOGP membership participated in developing this specification to leverage and improve industry level standardization globally in the oil and gas sector. The work has developed a minimized set of supplementary requirements for procurement, with life cycle cost in mind, resulting in a common and jointly agreed specification, building on recognized industry and international standards.

Recent trends in oil and gas projects have demonstrated substantial budget and schedule overruns. The Oil and Gas Community within the World Economic Forum (WEF) has implemented a Capital Project Complexity (CPC) initiative which seeks to drive a structural reduction in upstream project costs with a focus on industry-wide, non-competitive collaboration and standardization. The CPC vision is to standardize specifications for global procurement for equipment and packages. JIP33 provides the oil and gas sector with the opportunity to move from internally to externally focused standardization initiatives and provide step change benefits in the sector's capital projects performance.

This specification has been developed in consultation with a broad user and supplier base to realize benefits from standardization and achieve significant project and schedule cost reductions.

The JIP33 work groups performed their activities in accordance with IOGP's Competition Law Guidelines (November 2020).

This second edition cancels and replaces the first edition published in December 2018. Due to technical writing requirements leading to extensive changes, this second edition should be treated as a new document.

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Introduction

The purpose of the IOGP S-618 specification documents is to define a minimum common set of requirements for the procurement of offshore pedestal-mounted cranes in accordance with API Specification 2C, 8th Edition, published October 2020 and Errata 1, published June 2021, Offshore Pedestal-mounted Cranes, for application in the petroleum and natural gas industries.

The IOGP S-618 specification documents follow a common structure (as shown below) comprising a specification, also known as a technical requirements specification (TRS), a procurement data sheet (PDS), an information requirements specification (IRS) and a quality requirements specification (QRS). These four specification documents, together with the purchase order, define the overall technical specification for procurement.



JIP33 Specification for Procurement Documents Supplementary Technical Requirements Specification (TRS)

This specification is to be applied in conjunction with the supporting PDS, IRS and QRS as follows.

IOGP S-618: Supplementary Specification to API Specification 2C for Offshore Pedestal-mounted Cranes

This specification defines technical requirements for the supply of the equipment and is written as an overlay to API 2C, following the API 2C clause structure. Clauses from API 2C not amended by this specification apply as written. Modifications to API 2C defined in this specification are introduced by a description that includes the type of modification (i.e. *Add*, *Replace* or *Delete*) and the position of the modification within the clause.

NOTE Lists, notes, tables, figures, equations, examples and warnings are not counted as paragraphs.

IOGP S-618D: Procurement Data Sheet for Offshore Pedestal-mounted Cranes (API)

The PDS defines application-specific requirements. The PDS is applied during the procurement cycle only and does not replace the equipment data sheet. The PDS may also include fields for supplier-provided information required as part of the purchaser's technical evaluation. Additional purchaser-supplied documents may also be incorporated or referenced in the PDS to define scope and technical requirements for enquiry and purchase of the equipment.

IOGP S-618L: Information Requirements for Offshore Pedestal-mounted Cranes (API)

The IRS defines information requirements for the scope of supply. The IRS includes information content, format, timing and purpose to be provided by the supplier, and may also define specific conditions that invoke the information requirements.

IOGP S-618Q: Quality Requirements for Offshore Pedestal-mounted Cranes (API)

The QRS defines quality management system requirements and the proposed extent of purchaser conformity assessment activities for the scope of supply. Purchaser conformity assessment activities are defined through the selection of one of four generic conformity assessment system (CAS) levels on the basis of evaluation of the associated service and supply chain risks. The applicable CAS level is specified by the purchaser in the PDS or in the purchase order.

The specification documents follow the editorial format of API 2C and, where appropriate, the drafting principles and rules of ISO/IEC Directives Part 2.

The PDS and IRS are published as editable documents for the purchaser to specify application-specific requirements. The TRS and QRS are fixed documents.

The order of precedence of documents applicable to the supply of the equipment, with the highest authority listed first, shall be as follows:

- a) regulatory requirements;
- b) contract documentation (e.g. purchase order);
- c) purchaser-defined requirements (e.g. PDS, IRS and QRS);
- d) this specification;
- e) API 2C.

2 Normative References

Add to first paragraph

The following documents are referred to in this specification, the PDS (IOGP S-618D) or the IRS (IOGP S-618L) in such a way that some or all of their content constitutes requirements of these specification documents.

Add to section

API Recommended Practice 14C, *Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities*

API Specification 2B, *Specification for the Fabrication of Structural Steel Pipe*

Dropped Object Prevention Scheme Recommended Practice:2020,

EN 614-1:2006, *Safety of machinery – Ergonomic design principles – Part 1: Terminology and general principles*

EN 13852-1, *Cranes – Offshore cranes – Part 1: General purpose offshore cranes*

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

NFPA 70, *National Electrical Code*

3 Terms, Definitions, Acronyms, Abbreviations, Units, and Symbols

3.1 Terms and Definitions

Add new term 3.1.140

3.1.140

common cause failure

Failures of different items, resulting from a single event, where these failures are not consequences of each other.

3.2 Acronyms and Abbreviations

Add to section

CAS	conformity assessment system
CIS	component identification system
CSV	comma-separated values
FAT	factory acceptance test
FMEA	failure mode effects analysis
HVAC	heating, ventilation and air conditioning

IRS	information requirements specification
LED	light emitting diode
MBL	minimum breaking load
MOPS	manual overload protection system
OEM	original equipment manufacturer
PDS	procurement data sheet
PLr	required performance level
QRS	quality requirements specification
SAT	site acceptance test
TRS	technical requirements specification

4 Documentation

4.2 Purchaser-supplied Information Prior to Purchase

Add new list item m)

m) applicable regulatory requirements.

4.4 References to Annexes

Add new list item

— Hydraulic systems and pneumatic lines; see Annex G (informative).

5 Loads

5.2 Critical Components

In first sentence, replace "whose failure shall result in an uncontrolled descent of the load or uncontrolled rotation of the upper structure" with

whose failure results in an uncontrolled movement of the crane or load

6 Structure

6.4 Pedestal, Kingpost, and Crane-supporting Foundation

Add to section

The pedestal adaptor shall have lifting points for use during installation.

6.6 Structural Fatigue

Add to section

Bolts subject to combined tension and fatigue shall be pre-tensioned in accordance with the AISC minimum pretension for fully-tightened bolts values.

Add new section

6.7 Pedestal Adapter and/or Kingpost Fabrication

The pedestal adapter and pedestal shall be fabricated in accordance with API 2B.

The pedestal adapter and/or kingpost shall have no changes in wall thickness at offshore field welds.

The pedestal adapter and/or kingpost shall have an outside diameter that allows access for maintenance of the swing bearing bolts.

The pedestal or pedestal adapter shall be equipped with a manway that is at least 18 in. (460 mm) wide.

7 Mechanical

7.2 Critical Rigging Components

7.2.2 Wire Rope

Add new section

7.2.2.8 Hoist Wire Rope Wear Protectors on Booms

Booms shall be protected from running wire rope.

Wire rope boom protectors shall not create a snag point with the running rope or cause twisting of the lower block or hook block during hoisting operations.

7.2.3 Wire Rope End Terminations

7.2.3.2 Eye Splice

Replace section with

U-bolt or eye splice terminations shall not be permitted.

Poured spelter or swaged sockets shall be used for pendant line and non-running wire rope end termination.

7.2.4 Sheaves

7.2.4.2

In first sentence, replace "18" with

20

Delete second sentence

7.3 Hoisting, Boom Luffing, Telescoping, and Folding

7.3.2 Hoisting

7.3.2.5 Drums

Replace list section a) with

- a) Drums shall provide a first layer rope pitch diameter of not less than 20 multiplied by the nominal rope diameter (see Figure 7).

Add to section

The crane operator shall have the ability to check the rotation of drums by direct line of sight or using winch cameras.

Drums shall be radially striped black and yellow with high visibility, reflective paint along the flange.

Lights shall be directed on drums to increase the crane operator's visibility of the drums.

7.4 Swing Mechanism

7.4.1 Swing Rotation Mechanism

7.4.1.1 General

Add to section

If specified, a minimum of two swing drives shall be provided.

If swing drives do not have a means of adjusting backlash on site, the provided system shall not have performance degradation from fabrication and installation tolerances.

The crane shall have a means to install a slew bearing replacement system.

The soft spot location on the swing bearing ring shall be clearly and permanently marked.

If the slew angle required is greater than 359 degrees, the crane swing shall allow for unrestricted and continuous rotation in the clockwise and counter-clockwise directions.

The crane shall be designed for the maintenance requirements specified in API 2D.

The soft spot on the swing bearing shall be positioned to avoid highly loaded areas.

7.4.2 Swing-circle Assembly

7.4.2.2 Design

7.4.2.2.5 Ultimate Strength Criteria for Swing-circle Assembly Fasteners

Add to first paragraph

When a bolted transition piece below the swing mechanism is required, the requirements of this section shall be applicable.

7.4.2.4 Mounting

Replace section 7.4.2.4.2 title with

7.4.2.4.2 Pedestal and Swing-Circle Assembly Deflection

Add to section

The crane pedestal lateral deflection shall not exceed the unsupported extended length (L) divided by 180 (i.e. $L/180$) where L is the distance from the centerline of the boom fit of the pin to the upper deck connection (see Figure 13).

NOTE This requirement is a major interface to be worked between the crane manufacturer and the topsides primary.

The swing-circle assembly of pedestal-mounted cranes and the swing-drives of kingpost type cranes shall be designed for a lateral crane pedestal deflection of $L/120$.

Add new Figure 13

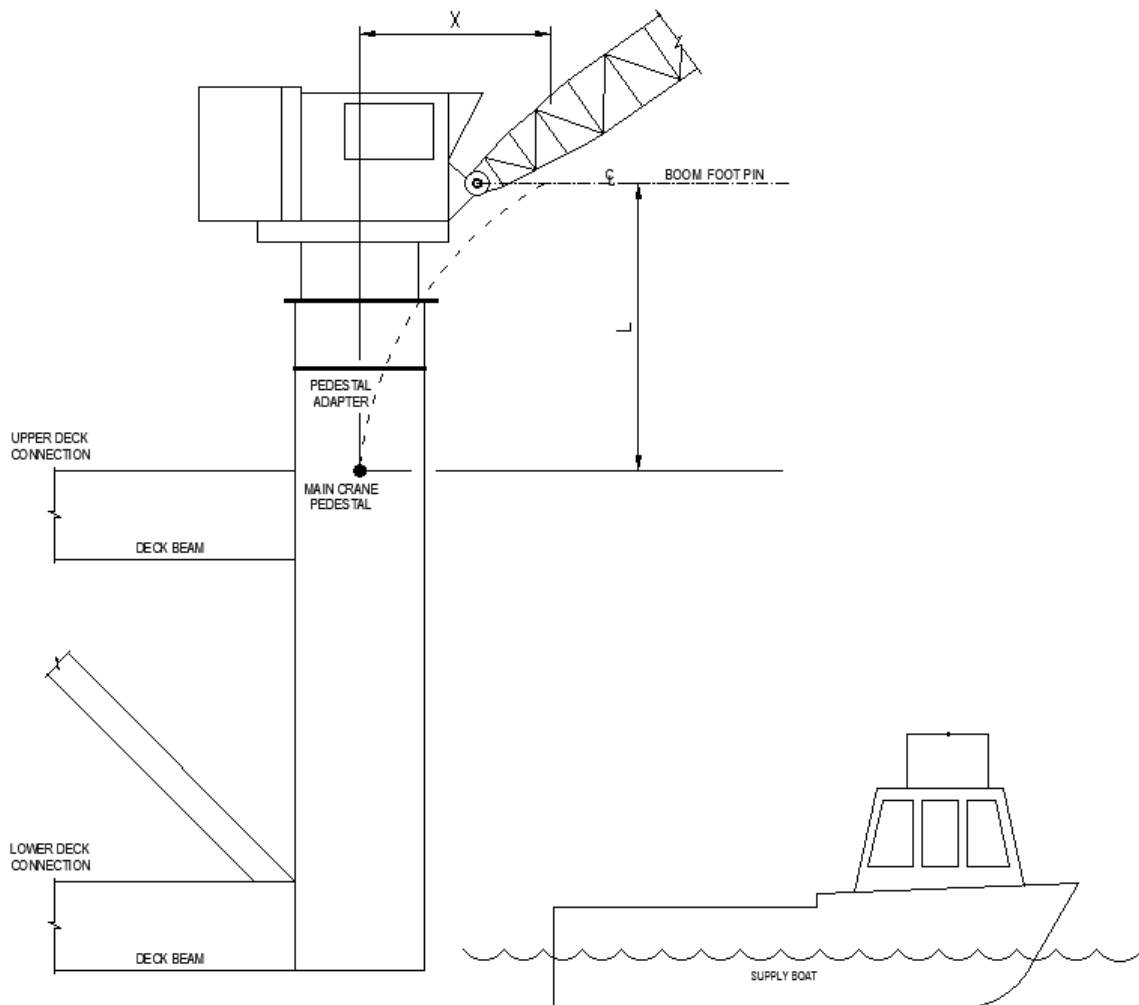


Figure 13—Crane Pedestal Lateral Deflection Unsupported Length

7.5 Power Plant

7.5.1 General

7.5.1.2 Power Plant Sizing

Add to section

The main power supply, power transmission and power control elements shall be sized for full power demands in any combination of load, speed and motion.

The prime mover shall not overspeed, overheat, trip, stall or fall below the nominal speed of the prime mover at the rated load of the crane.

When an external power source is used, the external power source shall not overload, overheat, trip or stall below the nominal speed of the external power source at the rated load of the crane.

The installed power shall be sized for 100 % hoisting speed, 50 % luffing speed and 50 % swing speed simultaneously at SWLH.

Hoisting motions shall have priority over luffing and swing operations.

Luffing and swing motions shall not fall below 50 % speed when operated simultaneously with hoisting motion.

7.5.2 Exhaust Systems of Internal Combustion Prime Movers

Add new section

7.5.2.4 Ignition Prevention Measures

The engine exhaust and other hot surfaces shall comply with the ignition prevention measures of API 14C.

7.5.3 Fuel Tanks

7.5.3.2 Fuel Tank Drains

Add to section

The tank drain shall be placed at a location that allows the contents of the tank to be removed.

If specified, a drip pan shall be provided under the nozzle or fixture.

Add new section

7.5.3.3 Fuel Tank Capacity

The fuel tank shall be sized to accommodate fuel consumption with the engine running at 4 hr maximum fuel burn and 20 hr at idle speed.

On cranes subject to motions and with large free tank surfaces, the fuel tank shall have baffles or a mechanism to reduce fluid sloshing effects.

The fuel tank shall be manufactured from 316L stainless steel.

A handhole or manway for internal cleaning of the fuel tank shall be sized as specified.

7.5.5 Isolation of Ignition Sources and Heated Surfaces

Add new section

7.5.5.3 Fire and Gas Detection

The crane shall be equipped with fire and gas detectors in accordance with the specific project requirements.

9 Gross Overload Conditions

Add new section

9.6 Manual Overload Protection System (MOPS)

9.6.1 General

If a manual overload protection system (MOPS) is specified, the MOPS shall be provided in accordance with the requirements given in 9.6.2 through 9.6.5.

9.6.2 System Criteria

The MOPS shall be capable of activation during either of the following:

- operation only;
- operation and normal stop;
- operation, normal stop and emergency/power failure stop (e.g. prime mover failure, loss of hydraulics, main power supply failure or shutdown of the crane during an offboard lift).

When overloads due to entanglement and relative motions occur, the MOPS shall be capable of activation.

The MOPS shall be arranged for manual activation only, for all reeving configurations.

In any circumstance, the MOPS shall have the ability to be deactivated.

Activation of the MOPS shall disengage the hoisting brakes if this has not already been done when entering the offboard lift zone.

If activated, the MOPS shall maintain a retaining force in the hoisting system that is suitable to prevent free fall of an onboard lift, allowing the wire rope to be spooled completely off the drum, without causing significant damage to the crane.

9.6.3 Operation During Power Failure or Emergency

If specified, in the event of a prime mover failure or loss of hydraulics, the MOPS stored capacity shall allow activation and/or reset at least three times in succession over a period of 5 min.

When the MOPS is activated, the motion limiters for the low hook shall be automatically overridden.

9.6.4 Manual Overload Protection System (MOPS) Activation Mechanism Location and Marking

The MOPS activation mechanism shall be located in the control station on the left-hand side of the crane operator.

The MOPS activation mechanism shall be permanently marked with yellow color against a contrasting background.

The MOPS activation mechanism shall be protected (e.g. by a flip cover or pull-push button) against inadvertent use.

9.6.5 Manual Overload Protection System (MOPS) Control System Indicators and Alarms

The MOPS shall have control system indicators in accordance with this section.

MOPS control system indicators shall be located in the control station.

MOPS control system indicators shall indicate when the system is operational by means of a continuous visual signal (i.e. no visual signal when the system is not in operation).

MOPS control system indicators shall indicate when the MOPS is activated by means of a distinguishable continuous visual and an audible signal.

MOPS control system indicators shall indicate when the MOPS is activated with an external audible alarm giving a sound level of approximately 110 dB(A) measured at 3.28 ft (1 m) from the alarm.

Add new section

9.7 Automatic Overload Protection System (AOPS)

If specified, an AOPS shall be provided.

NOTE The recognized standard for the AOPS is EN 13852-1.

The AOPS shall have indicator alarms in accordance with Table 23.

10 Human Factors—Health, Safety, and Environment

10.1 Controls

10.1.1 General

10.1.1.2 Automatic Return

Add to section

Controls shall have the ability to be deactivated when not in use.

10.1.1.4 Emergency Stop

Add to section

Emergency stop shall semi-instantaneously suspend hydraulic functions with the control levers in any position and set the emergency brakes.

Emergency stop shall shut down the power plant.

The emergency stop button shall have a manual reset function only (i.e. not have an automatic reset).

The emergency stop button shall be positioned away from controls to prevent unintentional activation.

Add new section

10.1.1.7 Control System Response

Crane motions shall be proportional to the control system lever signal.

The maximum response time to reach the required speed for the main motions shall be as follows:

- 1 s for brakes to engage;
- 2 s for hoisting;
- 3 s for luffing, folding and telescoping;
- 4 s for swinging.

The response time for the main functions (e.g. hoisting, swinging, luffing, folding and telescoping) shall be the time from control lever activation at standstill to the achievement of the required motion velocities at 100 % lever actuation.

Single fault or common cause failures shall not result in uncontrolled movements.

The control system shall be capable of simultaneous hook movements in vertical, radial and lateral (i.e. hoist, boom and swing).

Add new section

10.1.1.8 Controls for Personnel Lifts

Cranes equipped with a GOPS, a MOPS or motion compensators (e.g. constant tension systems) shall have a lockable mode selector at the control station.

10.2 Cabs and Enclosures

10.2.1 General

Add to section

Crane operators' cabs that are on the rotating portion of the crane shall be enclosed and weatherproof.

Cab enclosures shall be constructed of fire-resistant insulated welded metal.

Enclosed crane cabs shall be designed with proper regard to the body dimensions of the expected population of operators as referenced in EN 614-1:2006, 4.3.2.

Roofs of enclosed cabs shall withstand a concentrated load of at least 300 lbs (1.33 kN).

Enclosed cabs shall have a secondary means of escape (e.g. pop-up window).

The crane operator's seat shall be equipped with arm supports.

The crane operator's seat shall be fully adjustable in the up/down and forward/backward directions of movement.

A foldable seat attached to the cab shall be provided for an instructor behind the operator's seat.

The cab shall have a dedicated space for a life jacket and a fire extinguisher.

10.2.2 Windows

10.2.2.1 General

Replace first sentence with

Windows shall be made of shatterproof glass or laminated safety glass.

Window glass or laminate of windows shall be at least 0.25 in. (6 mm) thick.

Replace second and third sentence with

The size and location of windows shall provide an unobstructed line of sight from the crane operator's seat to the boom, hooks and load in all of the crane's operating positions.

Add to section

Windows shall be provided with adjustable sun blinds positioned to shade the crane operator from sunlight from any direction.

The interior and exterior sides of the windows shall be accessible for cleaning.

Protection bars shall not obstruct the crane operator's view.

When open, operable windows shall remain secured in position.

10.2.2.2 Window Wipers and Washers

Delete "if specified by the purchaser"

Add to section

Access for window wipers and wiper motor maintenance shall be provided.

10.2.3 Doors

Add to section

Doors of enclosed cabs shall be of the self-closing type.

Doors of enclosed cabs shall be equipped with a window.

Cab door openings shall have a clearance of at least 71 in. (1.8 m) high and 24 in. (0.609 m) wide.

10.2.5 Platforms and Walkways

Add to section

When permanently installed platforms are not provided, an alternative means to facilitate wire rope replacement shall be provided.

Permanently installed platforms should be provided to facilitate wire rope replacements.

10.2.7 Noise Level

Add to section

Noise levels shall not exceed the maximum allowable noise level at the testing conditions and locations specified in Table 30.

Add new Table 30

Table 30—Noise Level Testing

Test Number	Test Conditions	Allowable Noise Level
1	Inside the crane operator's cab with the cab door closed with maximum noise condition. <ul style="list-style-type: none"> — Noise measurement includes simultaneous operation of engine, pumps and HVAC at full capacity. — Noise measurement does not include alarms or horns. 	70 dB(A) time weighted average with an 85 dB(A) peak, assessed for at least 60 min
2	On the access level to the crane cab with maximum noise condition. <ul style="list-style-type: none"> — Noise measurement includes simultaneous operation of engine, pumps and HVAC at full capacity. — Noise measurement does not include alarms or horns. 	90 dB(A) time weighted average assessed for at least 60 min

Add new section

10.2.8 Heating, Ventilation, and Air Conditioning (HVAC) Unit

Enclosed cabs shall be equipped with a heating, ventilation and air conditioning (HVAC) unit.

HVAC units shall have adjustable ventilation.

HVAC units shall control and maintain the internal temperature between 60 °F and 80 °F (15 °C and 25 °C).

The HVAC unit design shall account for the specified operating temperature due to radiated heat from external heat sources of nearby operating equipment.

10.3 Miscellaneous Requirements and Equipment

10.3.1 Indicators, Alarms, and Limits

Table 23—Indicators, Alarms, and Limits

Replace Table 23 with

Indicators, Alarms, and Limits	Ind	Trip	AA	VA
Hydraulic system pump pressure	X	PO	PO	X
Hydraulic oil temperature	X	PO	PO	X
Hydraulic control system pressure (if applicable)	X	PO	X	X
Engine start system pressure (if applicable)	X	PO	PO	PO
Hydraulic fluid level (required on reservoir)	X	PO	PO	X
Engine lube oil pressure (if applicable)	X	PO	X	X
Engine coolant temperature (if applicable)	X	PO	PO	X
Engine tachometer (if applicable)	X	PO	PO	PO
Engine overspeed (if applicable)	PO	X	X	X
Fuel level (required on reservoir)	X	PO	PO	PO
Hoist slack rope	PO	PO	PO	PO
Hoist low hook limit	PO *	PO *	PO *	PO *
Wind speed	PO	PO	PO	PO
Hook position	PO *	PO	PO	PO
Motion compensator parameters	PO *	PO	PO	PO
Hook speed and direction	X	PO	PO	PO
Engine fire and smoke	X	X	X	X
Crane slew limits	PO	PO	PO	PO
LMIS	NR	NR	X	X
MOPS (if applicable)	NR	NR	X	X
AOPS (if applicable)	NR	NR	X	X
Motion limit overrides (anti two block)	PO	NR	PO	PO
Motion limit overrides (high angle kick out)	PO	NR	PO	PO
Key Ind = indicator, AA = audible alarm, X = mandatory, Trip = function limit, VA = visual alarm, PO = purchaser option (indicated in IOGP S-613D), NR = not required. * = changes from PO to X for crane with subsea ratings.				

**This table is an adaptation of API 2C; Indicators, Alarms, and Limits; Table 23,
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10.3.2 Boom Equipment

10.3.2.2 Boom Angle Limiters and Shut-off Devices

Replace second sentence with

For cranes fitted with boom winches, a low-angle limiter shall be provided.

Add to section

The high-angle limiter shall be configured such that upon activation, the load hoists and swing mechanisms remain operable.

If specified, a high-angle limiter override device shall be provided.

If a high-angle limiter override device is specified, the override device shall automatically return to the "off" function when the override actuator is not manually held in the override position.

The boom hoist speed shall be automatically reduced to at least 50 % of its maximum operating speed when approaching the boom hoist limiting device engagement.

If specified, manual override of motion limiters shall be by a hold-to-run device.

10.3.2.5 Boom and Load Indicators

Replace list section c) with

- c) a load-moment indicator system (LMIS) shall be provided.

Table 24—Boom and Load Indicators

Delete Table 24

Add to section

The LMIS shall have a continuous visual display.

For offboard lifts, the continuous visual display of the LMIS shall show the selected wave height, actual hook load, load radius and rated capacity for the selected wave height.

For platform lifts, the continuous visual display of the LMIS shall show the actual hook load, load radius and rated capacity at the radius.

The accuracy of hook load values shown on the LMIS display shall be within ± 2.5 % of full scale reading at an agreed height and boom angle.

NOTE Full scale reading is the maximum capacity of the crane for the different hoists.

When the actual hook load exceeds 90 % of the rated capacity for any lift conditions, the LMIS shall display a visual warning.

When the actual hook load exceeds 95 % of the rated capacity for any lift conditions, the LMIS shall emit a continuous audible and visual warning inside the cab.

Reverse motions that reduce the overload or over-moment shall not be prevented.

Add new section

10.3.2.6 Tension Load Cells

Tension load cells shall maintain a ratio of 5:1 of the minimum breaking load (MBL) to the SWLH.

Tension load cell design shall account for the offboard dynamic loading, sidelead and offlead forces of the crane in accordance with API 2C.

Tension load cells shall not be side loaded.

Where the tension load cell is attached to a rigid body dead end and where side-loading the tension load cell is likely due to long hook drops (i.e. 1.25 times the boom length), a mechanical device shall be used to eliminate out-of-plane bending in the tension load cell.

If tension load cells are made from 17-4PH stainless steel material and subject to a saltwater environment, the tension load cell shall have a minimum heat-treating using an H1150 process.

NOTE 1 Tension load cells made from 17-4PH stainless steel that have been heat-treated using an H900 process are not to be used on offshore or coastal onshore sites.

NOTE 2 Other materials can be used for tension load cells provided the tension load cells material heat treatment process is suitable for prevention of environmentally assisted brittle fracture.

If used in a marine environment, carbon materials and low-alloy steel materials used for tension load cells shall have a Rockwell-C hardness value of 35 HRC or less.

Add new section

10.3.2.7 Boom Structure

The boom sections shall not exceed a length of 40 ft (12.19 m).

There shall be no weld splices in straight boom chords of lattice boom type cranes.

Boom inserts shall be interchangeable.

Boom foot pins shall have a means of preventing rotation.

On boom heel pins without maintenance-free bearings, the boom heel pins shall have a means of lubricating the entire length of sliding or rotating surfaces between the pin and the bearing or bushing.

A means for replacing the boom foot pin bushings shall be provided.

The boom shall be supplied with bearing plates on the bottom chords in the location of the boom rest.

10.3.3 Guards for Moving Parts

10.3.3.2 Components to Guard

Add to section

Fans, fan belts and slew drive pinions shall be guarded.

NOTE Fans, fan belts and slew drive pinions are considered exposed moving parts that constitute a hazard.

10.3.3.4 Warning Signs Instead of Guards

Replace section with

Warning signs instead of guards on moving parts shall not be allowed.

10.3.6 Anti Two-block

Add to section

The anti two-block system shall prevent functions that cause the block to travel towards the boom tip.

Movements in the opposite direction for hoists shall be available for use without override intervention.

Replace section 10.3.7 title with

10.3.7 Powered Emergency Load Lowering and Slewing System

Replace first paragraph with

The powered emergency load lowering and slewing system shall enable operation of the crane (i.e. lowering the boom, lowering the hoist and slewing the crane) regardless of load conditions in the event of the following emergencies:

- single point failure or interruption of the main power supply;
- single point failure in the main power unit;
- single point failure in the control system.

Add to section

Manual lowering of loads and release of slew brakes shall remain operable in the event of loss or unavailability of the main control system of the crane.

10.3.8 Miscellaneous Equipment

Add new section

10.3.8.7 Aviation Warning Lights

Cranes shall be fitted with permanent aviation warning lights in accordance with statutory civil aviation regulations, purchaser's requirements and specifications.

Aviation warning lights shall be powered from the uninterruptible power supply of the platform.

Add new section

10.3.8.8 Maintenance Access

A permanent means of access shall be provided for crane components that require routine inspection and maintenance as defined by the original equipment manufacturer's (OEM's) practices or the site maintenance plan.

The permanent means of access shall be located on the crane itself.

Maintenance access shall not require special scaffolding, rope access or special equipment.

Ram-luffing, telescoping and knuckle-boom cranes shall be provided with a deliberate and planned means to remove luffing cylinders without damage.

Maintenance davits, lifting beams and/or padeyes shall be provided to enable the replacement of major components without using additional cranes.

NOTE 1 Major components include components in the machinery house (e.g. the prime mover, gearbox, cabinets and pumps), winches, sheaves and slew drive components.

Major structural components shall have lifting points or an approved lifting means for the individual lifting of major structural components.

NOTE 2 Major structural components include the pedestal adaptor, machinery deck, cab and machinery house.

Procedures and instructions for the use of lifting points shall be provided in the installation, operation and maintenance manual.

Lifting points, davits, lifting beams and padeyes for operations and maintenance shall be permanently and legibly marked with a unique identification number and the SWL.

The boom shall incorporate a cross-over walking surface at chord splices from the main boom walkway to provide access for inspection and maintenance of connector fasteners on the top, bottom and sides of the boom.

Permanent maintenance access to the boom hoist dead end connection shall be provided.

Grease nipples shall be accessible from permanently installed walkways and platforms with the crane boom stowed in the boom rest.

Add new section

10.3.8.9 Communication Equipment

If communication equipment is specified as supplied by the manufacturer, the requirements of this section shall apply.

The communication equipment shall provide the crane operator with a means to directly communicate with the platform, supply vessels and additional units involved in lifting operations.

The radio communication system shall be operable by a microphone speaker / headset system, without the crane operator's hands moving from the main control levers.

The communication equipment shall incorporate a public-address system.

Add new section

10.3.8.10 Camera and Monitors

A boom tip camera shall be provided unless otherwise specified.

If the boom tip camera is specified in accordance with this specification, the requirements of this section shall apply.

The camera system shall consist of a high-definition color camera located at the boom tip and a high-definition color monitor located in the crane operator's cab.

The camera system shall have remote controls for camera zoom, focus and iris.

The camera system shall be mounted in a location that is reachable and operable by the seated crane operator.

Add new section

10.3.8.11 Data and Video Recorder

10.3.8.11.1 Data Recorder

A data recorder shall be provided unless otherwise specified.

The recorded data shall be reviewable by the crane operator without the OEM's intervention.

While the crane is operating, the data recorder shall record as a minimum the following information:

- date (using dd/mm/yyyy format);
- time (using hh/mm/ss format);
- duration(s);
- crane motions;
- rated load at hook position for all hoists;
- actual load at hook position for all hoists;
- boom radius and angle;
- peak dynamic load at hook position for all hoists;
- load chart;
- alarm activation;
- lifetime load cycle history;
- overrides of alarm;
- alarms acknowledged;
- crane operator's unique identification, if specified.

The data recorder shall be automatic (i.e. not require manual activation).

The memory capacity of the data recorder shall be listed in the operating manual.

The data stored in the memory of the data recorder shall be downloadable by the crane owner without the OEM's intervention.

The output data file shall be in comma-separated value (CSV) or equivalent format.

Software/hardware required to download the data shall be supplied with the crane.

Passwords that are required to access the data recorder shall be provided in a password manual.

It shall not be possible to deactivate the data recorder.

10.3.8.11.2 Cameras

Cameras shall have video recording functionality.

Add new section

10.3.9 Hydraulic and Pneumatic Line Protection

The hydraulic and pneumatic line system shall be the manufacturer's standard system or, if specified, in accordance with Annex G.

Add new section

10.4 Lighting

Lighting with an intensity of 30 foot-candles (323 lux) or greater shall be provided in the machinery house and the crane cab for use during operation and maintenance activities.

General lighting for walkways and other means of access shall be 13.9 foot-candles (150 lux) or greater in the horizontal plane.

Emergency lighting covering escape routes from the crane cab and machinery house shall be light emitting diode (LED) technology.

Emergency light fixtures shall be connected to an integral charger and backup battery or a platform emergency lighting supply.

Where emergency light fixtures are connected to an integral charger and backup battery, the battery shall last at least 90 min.

Lighting shall not directly impair the vision of the crane operator (e.g. lights shining directly into the crane cab).

Add new section

10.5 Other Safety Requirements and Protective Measures

10.5.1 Dropped Objects

Assessment of the crane components for the risk of dropped objects shall be performed in accordance with a recognized code or guideline (e.g. Dropped Object Prevention Scheme:2020).

10.5.2 Risk Assessment

If specified, a risk assessment shall be performed in accordance with the principles of EN ISO 12100 for relevant hazards that are not covered by this specification (e.g. sharp edges).

If the risk assessment requires a protective/risk-reduction measure for a control system with safety functions, ISO 13849-1 shall be used to evaluate the safety-related parts of the control system.

In ISO 13849-1, the minimum required performance level (PL_r) for safety-related parts of the control system for personnel lifting shall be "d".

NOTE Cranes covered by the scope of API 2C are designed for personnel lifting.

10.5.3 Failure Mode Effects Analysis (FMEA)

A failure mode effects analysis (FMEA) of the crane shall be performed.

The FMEA shall identify the risks with single technical failures and common cause failures of non-redundant components.

The FMEA results shall be used in the development of the manufacturer's recommended maintenance strategy.

The FMEA results shall be utilized to assess the reliability of the proposed equipment.

11 Manufacturing Requirements

11.1 Material Requirements of Critical Components

11.1.5 Structural Steels, Castings and Forgings

11.1.5.3 Additional Requirements for Castings

11.1.5.3.1 Prototype Castings

Add to section

Prototype castings shall not be part of the final product.

Add new section

11.4 Surface Protection

Exposed carbon steel surfaces shall be protected by a surface protection system.

Walkways, platforms, work areas and floors that require painting shall be coated with non-skid paint or fitted with anti-skid provisions.

NOTE This requirement is not applicable to surfaces that are not painted such as fiberglass walkways or galvanized steel walkways.

Faying surfaces shall have a continuous seal weld to prevent ingress of water and corrosion.

Add new section

11.5 Spare Parts and Interchangeability

A list of recommended spare parts shall be identified for commissioning and operational spares.

Each spare part item shall be referenced by its original manufacturer's name and part number to the extent that is practical.

NOTE 1 This requirement is not applicable to parts that have been modified by the manufacturer.

The spare part item shall be identified and described such that the whole necessary spare or parts thereof can be obtained.

Equipment and components in equivalent service shall be interchangeable to the extent that is feasible for the purpose of reducing spare parts.

NOTE 2 Equipment and components include valves, filters, fittings, bearings, seals and consumables that are in equivalent service.

12 Design Validation by Testing

12.3 Operational Tests

Add to section

Cranes shall undergo an initial factory acceptance test (FAT) prior to delivery.

As specified, the FAT shall be performed on a fully assembled crane or functional sub-assemblies.

Add new section

15 Traceability

15.1

All components shall be traceable to the OEM's information.

15.2

If the crane manufacturer adds identification details or markings, these identification details or markings shall not interfere with or detract from the OEM's information.

Add new section

16 Component Identification System (CIS)

16.1 General

The specified component identification system (CIS) shall be used to identify components in accordance with one of the following:

- manufacturer's CIS (see 16.2);
- integrated manufacturer-purchaser's CIS (see 16.3);
- purchaser's CIS (see 16.4).

The same CIS number shall be used to identify the equipment, components and sub-assemblies in the documentation for the crane (e.g. installation, operation and maintenance manual, drawings, equipment list).

NOTE The CIS number is used for multiple purposes including the management of spare parts and maintenance. The term "CIS" is also referred to as tag numbering.

The overall crane assembly shall be assigned a project-specific tag number.

16.2 Manufacturer's Component Identification System (CIS)

If a manufacturer's CIS is specified, the manufacturer's standard system shall be provided without modifications.

16.3 Integrated Manufacturer-Purchaser's Component Identification System (CIS)

If an integrated manufacturer-purchaser's CIS is specified, the CIS shall be the manufacturer's standard system with the exceptions listed in this section.

Systems and components detailed in Table 31 shall be identified with the purchaser's CIS.

Components that are part of another end-user facility system shall be identified with the purchaser's CIS.

NOTE The purchaser specifies the components that are part of another end-user facility system.

Add new Table 31

Table 31—Purchaser's CIS—Identification Items

System	Typical Components
Fire and gas	Fire and gas detectors, cables, junction boxes
Facility-connected lighting	Lights, cables, junction boxes
Aircraft warning lights	Lights, cables, junction boxes
Telecommunications	Radios, telephone, cables, junction boxes
Power supply	Slipring, starter cabinet, distribution panel, junction boxes

The sub-assemblies detailed in Table 32 shall be assigned a single end-user identification.

The individual components within the sub-assembly shall be identified by the manufacturer's CIS unless the individual components are part of another end-user facility system as described in Table 31.

Add new Table 32

Table 32—Manufacturer's Sub-assembly—Identification Items

Sub-assembly	Identification
Winches	One identification for each winch unit (e.g. main hoist, auxiliary hoist, luff)
Slewing drives	One identification for the slew drive system
Ram-luffing system	One identification for the ram-luffing cylinder system
Knuckle system	One identification for the knuckle cylinder system
Telescoping system	One identification for the telescoping system
Crane cab	One identification for the crane cab
Prime mover	One identification for the prime mover assembly, including gearbox and pumps
Emergency operating system	One identification for the emergency operating system
Pedestal adaptor	One identification for the pedestal adaptor

16.4 Purchaser's Component Identification System (CIS)

If a purchaser's CIS is specified, the CIS details shall be provided by the purchaser.

Annex B **(informative)**

Commentary

B.5.4 In-service Loads

B.5.4.5 Vertical Factored Loads

B.5.4.5.1 General

Replace last sentence of third paragraph with

The stiffness calculations shall be based on the manufacturer's specified wire rope information used on the crane.

Add new Annex G

Annex G (informative)

Hydraulic Systems and Pneumatic Lines

G.1 General

When a hydraulic and pneumatic line system is specified as an IOGP S-618 Annex G system, the requirements of this annex shall apply.

G.2 Design Standard

The hydraulic system shall comply with the international standard ISO 4413 or an equivalent recognized standard.

G.3 Oil Grade and Cleanliness

The hydraulic oil grade and cleanliness shall be provided for all operating, FAT and site acceptance test (SAT) conditions and operating locations.

G.4 Corrosion Protection

G.4.1

Hydraulic components shall be resistant to corrosion from exposure to marine environments.

G.4.2

Hydraulic tanks not manufactured from 300 series stainless steel shall be coated internally and externally by a coating that provides corrosion prevention.

G.5 Material Requirements for Flanges, Split Flanges, and Hose Ends

Flanges, split flanges and hose ends that are not AISI 316L material shall be chromated and protected with a grease band (i.e. petroleum impregnated tape or equivalent).

G.6 Oil Tank

The hydraulic tank shall have the means to be fully drained and cleaned.

G.7 Hose Ends

Hose ends shall allow the fitting of plugs or caps for maintenance.

G.8 Hydraulic Hoses Pressure Testing

Hydraulic hoses shall be pressure tested to 1.5 times the maximum working pressure.

G.9 Identification and Labeling

Hydraulic lines shall have permanent identification, traceable to the hydraulic schematic, hose register and certificates.

G.10 Suction Lines

G.10.1

Suction lines, from the tank to the pumps, shall have isolation valves to accommodate pump and hose replacement without the need for draining the oil tank.

G.10.2

Isolation valves shall be permanently and clearly labeled.

G.10.3

Isolation valves shall be secured in the open position.

G.11 Circulation System

G.11.1

The hydraulic system shall have provisions for adding a circulation system for continuous flushing, filtration and removal of water from the hydraulic oil.

G.11.2

If specified, a circulation system shall be provided.

G.11.3

The circulation system shall consist of a separate circulation pump and necessary filters.

G.12 Accumulators

Accumulators shall be equipped with a pressure gauge and permanent means for draining to verify the pre-charge pressure.

G.13 Test Points

G.13.1

Test points shall be provided on the main pressure lines, the return lines and any pilot and boost lines in the hydraulic system.

G.13.2

Test points shall be clearly labeled.

G.14 Cleanliness Testing and Certification

G.14.1

Prior to the FAT, cleanliness of the hydraulic system shall be tested.

G.14.2

After completion of cleanliness testing, a cleanliness certification shall be provided.

Bibliography

Add to start of Bibliography

The following documents are informatively cited in the text of this specification, API 2C, the PDS (IOGP S-618D) or the IRS (IOGP S-618L).

Add to Bibliography

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* Cited in IOGP S-618J only.

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