

NORSOK STANDARD

COMMON REQUIREMENTS
LIFTING EQUIPMENT

R-CR-002
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1. FOREWORD

This standard has been developed by the NORSOK Standardisation Work Group.
ANNEX A is normative.

2. SCOPE

This standard specifies the basic requirement for the design, fabrication, testing and other relevant services of lifting equipment.

This standard is in compliance with requirements in harmonised CEN standards. If relevant CEN standards have not been issued the priority shall be FEM standard, ISO and relevant recognised standards.

If no particular requirements to the equipment are defined, the general parts and data sheet are considered to be sufficient.

Supplier's standard solution shall be used to an optimum extent, provided these solutions are not in conflict with the requirement herein.

3. NORMATIVE REFERENCES

EN Standards:

EN 292	Safety of machinery - Basic concepts, general principles of design - Part 1: Basic terminology, methodology. Part 2: Technical principles and specifications.
prEN 292-3	Safety of machinery - Basic concepts - General principles for design -Part 3: Additional technical principles and specifications for mobility and for load lifting.
EN 418	Safety of machinery - Emergency stop equipment - functional aspects -principle of design.
EN 818	Short Link Chain for Lifting Purposes - Safety - Part 1: General Conditions of Acceptance. Part 2: Medium Tolerance Chain Slings - Grade 8.
prEN 818-4	Short link chain for lifting purposes - Safety.
EN 818-8	Short Link Chain for Lifting Purposes - Safety - Part 1; General Conditions of Acceptance.
prEN 953	Safety of machinery - General requirements for the design and construction of guards (fixed, movable)

prEN 954	Safety of machinery - Safety related parts of control system - Part 1 General principles for design
prEN 982	Safety requirements for fluid power system and components - Hydraulics.
EN 983	Safety of machinery - Safety requirements for fluid power systems and components - Pneumatics.
EN 1050	Safety of machinery - Risk assessment
EN 1070	Safety of machinery - Terminology
EN 10204	Material documentation

ISO standards:

ISO 7752-4	Cranes - Controls - Layout and characteristics - Part 4 Jib cranes.
ISO 1461	Hot dip galvanised coatings on fabricated ferrous products.
ISO 2408	Steel Wire Ropes for General Purposes - Characteristics.
ISO 7531	Wire Rope Slings for General purposes - Characteristics and Specification.

FEM:

FEM, SEC.1	Heavy Lifting and Handling Equipment.
FEM, SEC. 9	Series Lifting Equipment.

DNV:

DNV Lifting Appliances	DNV Rules for Certification of Lifting Appliances, 1989.
DNV CN 2.7.1	Offshore Freight Containers - Design and Certification
DNV CN 2.7.2	Offshore Service Containers - Design and Certification

NORSOK Standards:

S-DP-002	Working Environment
S-DP-003	Environmental Care
E-CR-001	Electrical Systems
R-CR-001	Mechanical equipment
M-DP-001	Material Selection

M-CR-120	Material data sheets for Structural steel.
M-CR-101	Structural Steel Fabrication
M-CR-630	Material Data Sheet
M-CR-501	Surface Preparation and Protective Coating
S-DP-001	Technical Safety
Z-CR-001	Documentation for Operation

4. DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

Terms and phrases within the scope of this standard not defined herein shall be regarded as defined in the regulations and international codes and standards referred to in this document.

Offshore crane	Crane which is used for handling of loads in open sea and which is subjected to offshore environmental condition. Offshore cranes are used on fixed platforms, Floating Production System (FPS), Rigs, Floating crane vessel, Service vessel (Supply boat, Diving vessel) etc.
H1/3, Significant wave height	Significant wave height is the average of the highest one third of the individual wave heights in a short term stationary state of sea.
Lifting Appliance	Combined unit with or without horizontal movement, used for hoisting/lowering of cargo.
Other Lifting Appliances	Lifting appliances used internally on an installation and which is not to be regarded as an offshore crane.
Lifting Gear	Every type of equipment placed on the loading hook of a lifting appliance. Examples are: container, steel basket, lifting yoke, multileg slings of chain or wire etc.

4.2 Abbreviations

L.A.T	Lowest astronomic tide
MOB	Man over boards boat which are launched by dedicated davits or by offshore crane for rapid rescue of personnel.
NDE	Not destructive examination
SLI	Safe load indicator

SWL	Safe working load. The maximum permitted load that can be lifted.
AOS	Automatic overload system
MOS	Manual overload system

5. GENERAL TECHNICAL REQUIREMENTS

5.1 Design

The safety requirements for this equipment shall be according to EU Machinery Directive (89/392/EEC, 91/368/EEC, 93/44/EEC and 93/68/EEC) and the requirements laid down in national and international regulations. General hazards are covered by EN 292 or by A, B1 and B2 standards for mechanical, electrical, hydraulic and other types of hazards.

5.1.1 General

SI System of Units shall be used allthrough the documentation and the data sheets. Safety requirements shall be according to EN 1050 - Safety of machinery - Risk assessment. Design and fabrication of lifting appliances shall be in compliance with DNV Lifting Appliances, sec. 2, 3, and 5.

5.1.2 Structural and Mechanical design

For all types of bolt fastenings, replaceable through bolting with bolts and nuts shall be used wherever possible. All bolts, nuts and washer 10 mm or smaller shall be of stainless steel. Bolts, nuts and washers larger than 10 mm shall be hot dip galvanised in accordance with ISO 1461. Steel wire ropes shall be in compliance with DNV Lifting Appliances, sec. 2, F.

5.2 Material selection

Fabrication, documentation, and testing of materials for welded steel structures shall be in compliance with NORSOK Standards M-DP-001, Material selection, M-CR-101, Structural steel fabrication and M-CR-120, Material data sheets for Structural steel.

All load carrying components made of "Rolled steel not for welding", "Steel forgings" and "Castings" shall be in compliance with DNV Lifting appliances, sec. 2, C/D/E and be documented by material certificates according to EN 10204, type 3.1B. Materials in slewing rings and slewing fasteners shall be documented by material certificates according to EN 10204, type 3.1C.

All hydraulic piping and fittings shall be of stainless steel, type 316L or Cupro-nickel alloy or in accordance with the crane data sheet. Control Valves shall as a minimum have stainless steel trim.

5.3 Fabrication

5.3.1 General

Fabrication, welding, inspection, surface preparation and protection shall be in compliance with NORSOK Standards M-CR-101, Structural steel fabrication, M-DP-001, Material selection, M-CR-501, Surface preparation and protective coating.

5.3.2 Testing

Testing shall be in compliance with prEN 292, Part 3, Additional technical principles and specifications for mobility and for load lifting.

5.4 Maintenance

Procedures for inspection and maintenance shall be prepared. Grease lubrication points shall be centralised for ease of maintenance and access.

5.5 Certification

The manufacturer or his authorised representative of all lifting equipment which is defined as machinery shall draw up an EU-declaration of conformity and affix the CE mark to the equipment as described in the Machinery Directive.

In addition, all lifting equipment shall be subject to conformity assessment procedures described by specific modules for the design and production phase of the manufacturing process including final installation of the equipment on the offshore installation.

The following modules according to the EC Council Decision of 22 July 1993, (93/465/EEC), shall apply for the design and production phases:

Group of lifting equipment	Type of lifting equipment	Module for design	Module for production
Offshore cranes	Hydraulic offshore cranes.	G	G

5.6 Documentation

Documentation shall be in compliance with NORSOK Standard Z-CR-001, Documentation for operation.

6. OFFSHORE CRANES

6.1 General

In addition to the requirements in regulations codes, standards and specifications specified in section 3 and the particulars according to the data sheets, requirements are given in clause 5 General Technical requirements and in the following clauses.

Failure Mode Analysis:

The designer shall evaluate the failure strength of all the principal loadcarrying components (structures, winches, slewing bearing, ropes and hooks) of the crane for the case of a catastrophic overload situation to occur. Catastrophic overload caused by the hook being pulled away from the crane either in vertical or in horizontal direction, shall be evaluated.

The failure strength of the principal loadcarrying components shall be such that the consequences of a catastrophic overcapacity situation is minimised, with priority on safety of humans, equipment and the environment. The failure strength of the principal loadcarrying components shall be such that the components supporting the operators cabin, is not the first to fail in any condition. It shall be emphasised that the first component to fail in any condition causes the crane to enter a less critical situation, with respect to safety of humans, equipment, and the environment.

The ratio between the failure strength of any component supporting the crane cabin, and the weakest component for each radius, shall not be less than 1.3, in any condition.

Failure Mode Charts:

For all operational conditions, reeving configurations and operating radiuses, calculations shall be made to establish the failure strength. The calculations shall be summarised in the form of Failure Mode Charts. The Failure Mode Charts shall have a vertical axis of the failure strength and a horizontal axis of the operating radius. The failure strength may be based on excessive yielding or buckling strength of structural and machinery components, and ultimate strength of ropes and hooks.

The failure strength of the components shall be visualised in the Failure Mode Charts by curves for each component. Curves shall be established for both vertical load and relevant significant offlead angles, dependant on the intended location of the crane.

6.2 Hydraulic Offshore Cranes

6.2.1 General

a) Hook Speed

Vertical hook speed shall be minimum so high that after a load is lifted a second wave does not cause the ship to re-contact the load. The hoisting and lowering speed of whip hoist with a 5 tons load shall be at least 100 m/min.

The speed of slewing, and where practicable the boom luffing speed, shall have the capacity to follow the horizontal movement of the supply boat.

b) Shock Absorber

Shock absorbers may be installed to reduce dynamic impact and improve the fatigue life of the crane. However the fitting of a shock absorber does not permit the reduction of the design dynamic factor unless the system has been approved and tested to demonstrate its efficiency, effectiveness and suitability for offshore use, and the system is of proven reliability.

c) Motion Compensator

To improve load control during certain offshore operation motion compensators should be installed. Similar to shock absorber, motion compensators may reduce dynamic impact and improve the fatigue life of the crane. Reduction of design dynamic factors is however not permitted.

6.2.2 Structural Design

a) General

The crane structure (included pedestal) shall be designed in compliance with FEM - standards sec.1, DNV Lifting appliances sec. 3, and relevant information in data sheets.

The crane shall be calculated for all load operations in the most adverse positions, and for a mean wind velocities of at least 25 m/s, gust 36 m/s, for cranes in operation, and at least 63 m/s (60 s intervals), gust 70 m/s (15 s intervals), for cranes out of operation in stowed position. In the wind load calculations it shall be assumed that a 10' ISO standard container is suspended to the hook.

Above wind speeds are to be considered as minimum values. If greater figures are stated in data sheets then data sheet values are to be used.

For all reevings, load charts shall be made, to determine the crane lifting capacity. Such charts shall be made for platform lift and for all significant wave heights up to and including the operational limitation of the crane.

b) Pedestal Adapter

Provisions shall be made on the adapter for jacking the crane clear of the slew bearing so that bearing replacement may be made. The jacking height shall also be sufficient to allow for an optical sweep and machining of the flanges if the flange flatness is out of tolerance.

The flatness and slope of the adapter flange shall be checked after the adapter has been welded to the pedestal. The pedestal adapter should be stress relieved after welding and be able to meet the specified impact values. No welding shall be performed after final stress relieving.

6.2.3 *Mechanical Design*

a) General

Machinery and equipment shall be in compliance with FEM-standards sec.1, DNV Lifting appliances, sec. 5, and relevant information in data sheets.

The crane shall have the capacity for three motions to be operated simultaneously at maximum rated capacity. This requirement is not valid for cranes with lifting capacity above 100 tonnes and their main hoist.

The crane machinery should be surrounded by a coaming for the collection of spillage oil. The oil shall be drained through pipes down to the outside of the crane pedestal and shall be connected to the open drain system on the platform.

b) Hoist Machinery

The capacity of the whip hoist drum shall be such that no less than 4 turns of steelrope are left on the drum when the hook is at the lowest astronomic tide (L.A.T) with the boom in the most adverse position.

The hoist machinery shall be designed in such a way that it can be used safely for the transfer of personnel between a supply boat and the platform by means of a hook attached basket and also for handling a MOB boat. "Launching and Recovery Arrangements" on seagoing vessels shall comply with SOLAS convention, those on mobile offshore units shall comply with MODU CODE Requirements. In addition national Requirements are to be observed in the case with cranes on fixed offshore installations.

The drums should be suitably grooved with "Lebus" grooves or equal if there are more than one layer on the drum.

Rope anchorages shall be provided to allow simple and convenient inspection. The wire rope for the whip hoist shall be connected to a "tail rope" on the drum and be designed to release or to brake before any structural failure occurs.

c) Slewing Machinery

Facilities shall be provided for emergency slewing in case of power failure by means of an air operated auxiliary pump to operate the slew motors.

d) Slewing Bearing

Procedures and necessary equipment regarding following items 1-6 shall be provided:

- 1 Replacement of slew bearing.
- 2 Pretensioning of slew ring bolts.
- 3 Periodical control of slew ring bolt pretension.
- 4 Slew ring tilting test.
- 5 Slew ring grease samples.
- 6 Alignment check and adjustment of slew pinion and gear.

Slew bearing should be equipped with accessories for NDE-based monitoring of critical surfaces inside the bearing.

e) Slew Bearing Fastening Bolts

The fastening down bolts shall be equally spaced over the 360° circumference and shall be throughgoing bolts with nuts in both ends. Use of hydraulic stretch tensioning tools shall be required for tensioning of the bolts. The degree of permanent pretensioning shall at least be 65%, but not more than 80% of bolt material nominal yield strength. Only rolled threads or fly-cut threads (whirling) shall be accepted. The bolts shall be fitted with protective cups at each end and shall be grease filled. Bolts corrosion protection shall be in compliance with NORSOK Standard M-CR-501 -Surface preparation and protective coating.

100 % visual inspection of the surface treatment is to be performed on completed bolts, nuts and washers. 5 % of washers shall be checked for flatness. 100% of the studs and nuts shall be subjected to magnetic particle inspection at least 48 hours after completion of machining, quenching and tempering. Inspection shall be in compliance with NORSOK Standard M-CR-101, Structural steel fabrication and M-CR-120, Material data sheets for Structural steel.

The complete delivery consisting of bolts with nuts and washers shall be delivered with a certificate according to EN 10204-3.1C.

f) Luffing Machinery

Brakes for the luffing system shall be arranged as a working brake and a parking brake. As parking brake an automatically applied pawl can be fitted.

g) Sheaves, Blocks, Hooks, Wire Ropes

The ratio between the diameter of the hook block sheaves and the diameter of the steel rope shall be the greatest possible, and not less than 16:1.

All hooks and weights shall be supported in thrust bearings giving full rotational freedom and be provided with a lockable safety latch and lubrication point. The multiple fall hook shall be of the ramshorn type and have a swivel lock. The single hoist hook shall be of the C-type.

A separate support frame for the main hook block when detached, shall be supplied with the crane. The hook block shall be kept standing in an upright position in the frame. The support frame shall be constructed and certified as lifting equipment and be provided with fork pockets.

The wire ropes shall be galvanised. The hoist rope shall be of the non rotating type. Hooks and blocks shall be furnished with material certificates to EN 10204-3.1.C.

6.2.4 Operator Cab

a) Cab structure, Windows and Wind Shield Wipers

The cab shall provide adequate room for the driver and an instructor. Angle of free sight from seat shall be at least 240 degrees sideways.

The windows should have double glass of the laminated safety type with high impact plastic sheet insert (except floor- and roof windows). The windows shall be of the glarefree type. Front and side windows shall extend down to the floor with narrow crossbars for safety. Floor window shall have adequate thickness to resist the loading of driver with a good safety margin. Additionally floor window shall be protected by grating, which should be arranged not to obstruct a free view to the supply boat. Roof window should be tinted.

The windows should be equipped with guided sunblinds. The cab shall be equipped with the necessary number of wind-shield wipers and spray nozzles to ensure a clear view of the boom top and landing/storage areas on deck.

b) Drivers Chair and Foot Rest

The driver's chair shall be of an ergonomic design in accordance with padded seat and adjustable arm supports. The seat shall be fully adjustable i.e. height, forward/backward and back rest angle. Arm supports shall be easy to remove. The chair shall have an easily attachable head rest which shall give full support in the reclined position. Adjustable, inclined foot rest shall be provided. Rests shall not obstruct the free sight, and shall allow the driver a quick change of foot between controls.

c) Control Handles

Luffing and slewing movements shall be operated by left hand and lifting movement by right hand. Ref. ISO 7752-4. Emergency release control shall be located at the right side of the driver's seat. Control handles shall be adjustable for safe operation of the crane, from the chair in any positions.

A manually operated slew lock shall be provided and activated preferably by one of the control handles without undue movement from the driving position. If spring activated brakes are used, the above requirements is not valid.

d) Cab Instrumentation

The crane shall be equipped with safe load and load moment indicator. The load chart shall be mounted inside the driver's cabin.

The drivers cab shall be provided with a direction and hook speed indicator to show raise or lower of hook relative to chosen constant tension datum height. Actual height from hook to L.A.T. shall be displayed in the cab. Additional mechanical boom angle or hook radius indicator shall be provided.

e) Telecommunication

The Crane cab shall be provided with a combined UHF/VHF radio telephone, a telephone connected to the platform switch system., and a PA-speaker connected to the PA-system on the platform. The equipment shall be located so that the operator may select channels while seated. Actuation of the transmit-receive switch shall be by foot or on the top of one of the controllers.

f) Cab Outfitting

The cab shall have a ventilation system for acceptable comfort (HVAC system) and shall be provided with means for heating and quick defrosting of the windows. An earthed double electric power socket (230V, 16A, single phase) and a battery hand torch of the explosion protected type, attached to a charger unit, shall be installed.

6.2.5 Machinery House

The machinery house shall be a separate weather enclosed compartment containing at least the diesel engines/el. motor and the hydraulic pumps with all their accessories. The machinery house roof shall be drained and piped down to under floor level.

The machinery house shall have space for a workbench with vice and sufficient space and facilities for operation and maintenance. A light shall be installed above the workbench.

6.2.6 Power Package

The prime mover shall be diesel engine or electric motor. An hour counter indicating crane operating time shall be provided.

Diesel engine shall be in compliance with NORSOK Standard M-CR-001, Mechanical equipment. Means of surface (black) starting shall be provided for the diesel engine. A hydraulic handpump shall be provided, as back-up to charge the accumulator if a hydraulic starting system is provided..

6.2.7 *Hydraulic System*

The hoist, luffing and slewing systems shall be arranged to operate independently.

The hydraulic system shall have provisions for manual operation of slewing and hoist movement for the purpose of unloading the crane in the case of prime mover failure. During power failure on one driver, the other driver shall supply power to both systems if more than one prime mover is supplied.

6.2.8 *Control System*

The control system shall be electronic with adjustable speed integrators allowing for fast and precise load handling and cargo spotting. It shall have short response times and give inching capability. Regulating curve shall be smooth and repeatable. Regulating curves for all control valves shall be developed and presented for both empty hook and loaded hook conditions.

In order to improve the hydraulic regulation of the motors, overriding facilities of the automatic or stepwise alteration of the stroke or chambers shall be provided to obtain low speed, high torque and max. displacement in case of a sudden change in the lifting speed.

Emergency stop function shall be in compliance with EN 418.

6.2.9 *Electrical Systems*

Electrical Systems for cranes and accessories shall be in compliance with NORSOK Standard E-CR-001 - Electrical systems.

If safety devices, override systems and control levers etc. on the crane depend on electric power in order to function, they shall be connected to separate independent power system, which automatically takes over in the event of main power source failure.

Electrically operated cranes shall be fitted with an arrangement which in the event of power failure prevents the motor being restarted automatically before the control handle has been reset to the neutral position.

The crane shall be provided with a slip ring unit with collector rings. Types and number of rings will be listed in data sheets, ANNEX A.

On electric hydraulic operated cranes a lockable push button shall be provided for tripping of all phases of the main power supply. The push button shall be located at a convenient place close to the slipping unit.

The cranes shall be fitted with fixed aircraft warning lights on boom tip, middle of boom and A-frame top according to statutory civil aviation regulations. The power shall be 230V "no break" supply.

The slewing bearing shall be fitted with a lightning protection (scraper earth), i.e. a fixed connection between the crane structure and the platform steel structure.

6.2.10 General Safety Devices

Safety equipment and devices shall be provided according to DNV Lifting Appliances.

An air or electric operated horn shall be provided to enable the driver to give a warning of crane or load movement.

The Safe Load Indicator (SLI) shall be connected with an audible and visible alarm system in the operators cabin. Both alarms shall be activated when the actual load is 90% of the permitted load. When the actual load reaches 110% of the permitted load, an audible alarm (horn) outside operators cabin shall automatically be activated. When the 110% limit is reached further boom-out shall not be possible.

The SLI monitor shall be furnished with a screen or glass of a glare free type. The monitor shall be easy readable in bright sunshine.

A wind indicator with an adjustable setpoint alarm shall be mounted in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant wind speeds and gusts. The alarm shall be designed to disregard gusting, giving continuous on/off alarm signals.

6.2.11 Overload Protection System

An automatic and a manual overload protection system shall be installed to prevent significant damage of offshore cranes if overload occurs when operating over sea. When activating the overload protection systems, the limit switch for low hook shall automatically be set out of function and it shall be possible to pull the rope completely off the drum and the crane without causing breakdown.

For both systems, AOS and MOS shall all safety related parts as a minimum be in accordance to third category in prEN954-1 Safety of machinery.

- a) Automatic Overload Protection System (AOS)

In case of overload on hoisting rope, luffing rope or slewing gear, an overload protection system shall prevent significant damage of the crane without intervention by the crane driver. It shall be possible to drag the hook away from the crane. This can be done by reducing the winch retaining force, and by letting the crane slew in the hook direction.

AOS shall continuously monitor the loading condition of the crane. It shall be operative in any operation mode, i.e. hoisting up/down, luffing, slewing or shut downs. AOS shall be operative for all reeving possibilities of the crane for sealift operation. AOS shall be designed to protect the crane against all extreme loadcases (hazards), vertical hook movement, offlead, sidelead and any combination of this hazards.

AOS shall be activated automatically if overload occurs. The hook shall be allowed to be dragged away from the crane without causing significant damage. In case of significant sidelead, the crane shall automatically slew in the direction of the hook.

AOS shall give a quick response to the overload. The overload must under no circumstances exceed 67% of the minimum significant damage load for any loadcarrying member.

When AOS is activated, the retaining force at the hook shall be equal to or greater than SWL for platform lifts for the particular radius.

After a termination of an overload situation, the system shall automatically be deactivated and the crane shall return to normal operation mode.

The AOS shall be operative without power supply, at least 3 times in rapid succession. The capacity of the system shall be sufficient for continuously overload during at least 5 minutes.

A control panel in the crane cabin shall include two visual signals and one acoustic signal. One visual signal shall continuously indicate when AOS is in operative mode. The other visual signal shall continuously illuminate when AOS is activated, and it shall last after deactivating of AOS. An acoustic signal shall sound when AOS activates, the signal shall stop when AOS deactivates.

The limit value for offlead and sidelead may be taken as illustrated in the figure:

Normal operation:	Offlead:	$O_n(m) = 2,5 + 1,5H_{1/3}$
	Sidelead:	$S_n(m) = 0,5 (2,5 + 1,5H_{1/3})$
Critical operation:	Offlead:	$O_c(m) = 12,5 + 7,5H_{1/3}$
	Sidelead:	$S_c(m) = 0,5 (12,5 + 7,5H_{1/3})$

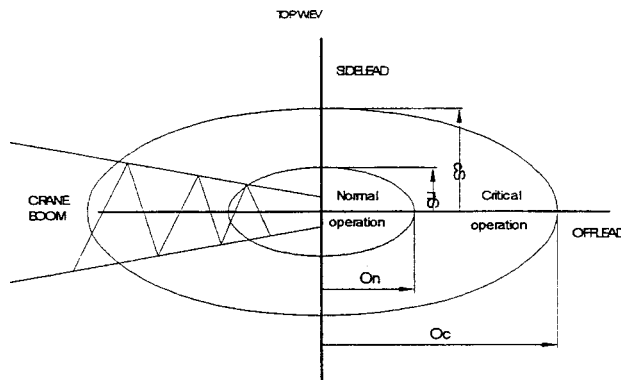


Fig. 1 Hook position relative to crane boomtip.

b) Manual Overload Protection System (MOS)

The crane driver shall be able to activate an emergency release system (manual overload protection system) to avoid a overload situation to occur. The emergency release system shall maintain a constant tension on the hoisting wire of about 1.5 tonnes or 10% of the maximum wire tension allowed.

MOS shall be operational in any operation mode of the crane, i.e. hoisting up/down, luffing, slewing or shut down, and for all reeving possibilities of the crane for sealift operation. It shall be able to be activated at any time prior to or after overload occurs, and if necessary pay out the hoisting wire rope from the crane, without causing significant damage.

MOS shall give a quick response to activate, and when activated it shall maintain a constant tension in the wire of about 1.5 tonnes or 10% of the maximum wire tension allowed. The capacity of the system shall be sufficient for activating at least 3 times in rapid succession and for continuously activating during 5 minutes.

At any time the system shall be possible to reset by the crane operator, to make the crane enter a normal operation mode in a safe manner.

A control panel in the crane cabin shall include a combined visual and acoustic signal. The signal shall be active when MOS is activated and return to normal mode when MOS is deactivated

6.2.12 Fire and Gas detection and Fire extinguishing

Fire and gas detection and fire extinguishing shall be in compliance with NORSOK Standard S-DP-001- Technical safety.

6.2.13 Working Environment

Working environment shall be in compliance with NORSOK Standard S-DP-001- Working environment.

6.2.14 Utility Requirements

For necessary utility supply valves on the slewing ring inspection platform and fixed pipelines from the underside of the machinery frame to the required utility destinations shall be installed..

Provisions shall be made for separate flexible hoses with quick connecting couplings between fixed piping on the adapter and fixed piping on the slewing structure. The couplings shall be of different size for each supply to prevent any interchanging. The hoses shall have sufficient length to connect up to any position of the slewing ring inspection platform.

6.2.15 Special Tools

Supplier shall furnish any special tools required for installation and maintenance of the crane including all auxiliary systems.

6.3 Fabrication

6.3.1 Markings

The maximum permissible safe working load of the crane in extreme positions of boom shall be clearly and visibly marked on each side of the crane jib. The markings shall be easily read by the riggers from the platform weather deck. Hook and block shall be permanently marked according to DNV Lifting Appliances.

All crane controls and equipment shall be clearly marked with legible and durable signs, preferably engraved to show their respective functions. Signs shall be in the local language.

6.3.2 Inspection and Testing

Inspection and testing shall be in compliance with prEN 292, Part 3, Additional technical principles and specifications for mobility and for load lifting. Procedures for inspection and testing shall be prepared.

7. POWER DRIVEN WINCHES AND HOISTS

7.1 Winches and Hoists

Technical requirements in addition to requirements given in normative references and in general technical requirements, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A2 - POWER DRIVEN HOISTS DATA SHEET

8. HAND POWERED LIFTING APPLIANCES

8.1 Hand Powered hoists w/o Trolley

Technical requirements in addition to requirements given in normative references and in general technical requirements, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A3 - HAND POWERED HOISTS DATA SHEET
A4 - TROLLEYS DATA SHEET

8.2 Hand Powered Low Headroom Hoists with Integral Trolley

Technical requirements in addition to requirements given in normative references and in general technical requirements, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A5 - HAND POWERED LOW HEADROOM HOISTS WITH
INTEGRAL TROLLEY DATA SHEET

9. LIFTING GEAR

9.1 Chain Slings

Technical requirements in addition to requirements given in normative reference, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A6 - CHAIN SLINGS DATA SHEET

9.2 Shackles

Technical requirement in addition to requirements given in normative reference, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A7 - SHACKLES DATA SHEET

9.3 Hooks

Technical requirements in addition to requirements given in normative reference, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A8 - LOAD HOOKS DATA SHEET

10. OTHER LIFTING ARRANGEMENTS**10.1 Lifting Lugs**

Technical requirements in addition to requirements given in normative references and in general technical requirements, are given in the equipment's data sheet in ANNEX A.

Data sheets title: A9 - LIFTING LUGS DATA SHEET

10.2 Lifting Eyebolts and Eyenuts

Technical requirements in addition to requirements given in normative references are given in the equipment's data sheet in ANNEX A.

Data sheets title: A10 - LIFTING EYEBOLTS & EYENUTS DATA SHEET

ANNEX A
EQUIPMENT DATA SHEET
(Normative)

ANNEX A**DATA SHEETS(NORMATIVE)**

Enclosed data sheets title:

A1 - Hydraulic marine deck crane data sheet

A2 - Power driven hoists data sheet

A3 - Hand powered hoists data sheet

A4 - Trolleys data sheet

A5 - Hand powered low headroom hoists with integral trolley data sheet

A6 - Chain slings data sheet

A7 - Shackles data sheet

A8 - Hooks data sheet

A9 - Lifting lugs data sheet

A10- Lifting eyebolts & eyenuts data sheet

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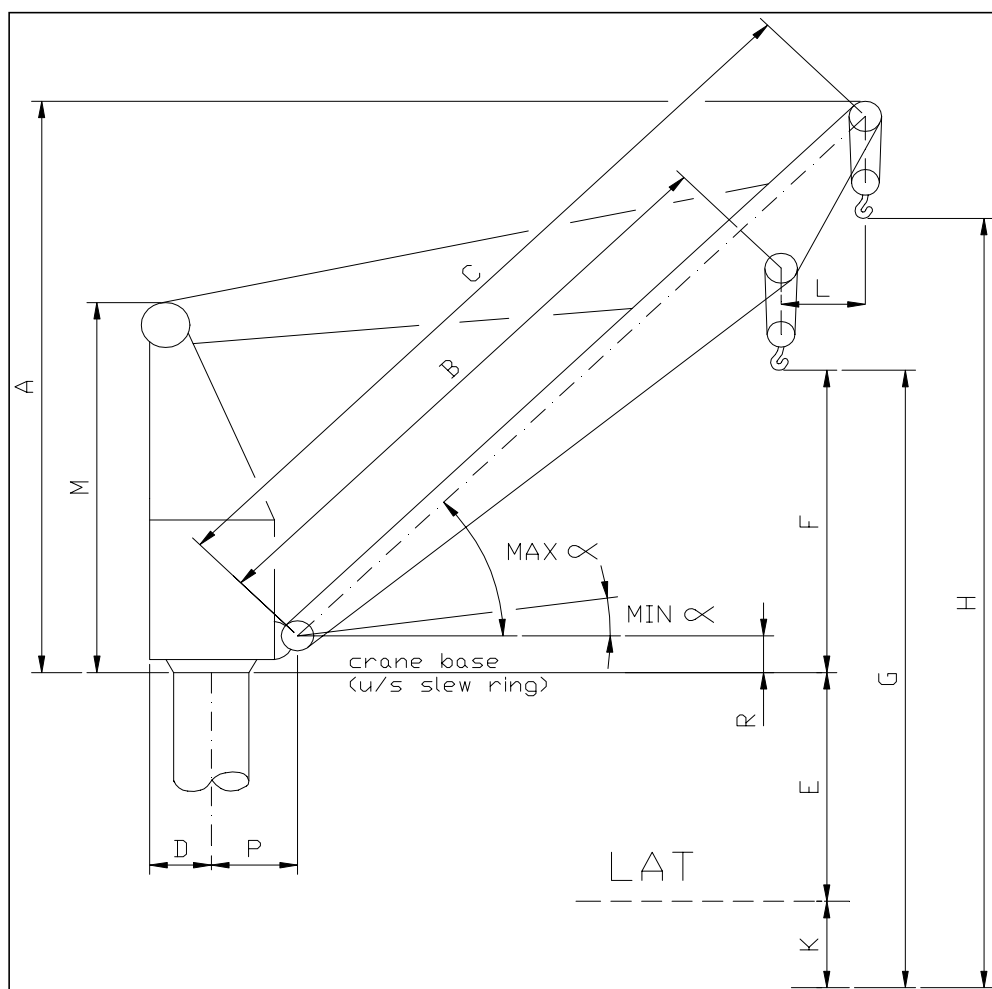
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Contractor		Project		Project no.	
Job no.					
Equipment no.					
Service				Sheet	of rev.
Applicable to:		Proposal		Purchase	As built
1 GENERAL					
1.1	Description				
1.2	Tag no.				
1.3	Location area				
1.4	Serial no.				
1.5	Supplier				
2 ENVIRONMENT					
2.1	Area classification:	Machinery house:		Boom:	
2.2	Hazard class/Ignition group:	Machinery house:		Boom:	
2.3	Design temperature				
2.4	Max./min. ambient temp.:	Max.	°C	Min.	°C
2.5	Wind: const./gust-period	Operation:	M/S / M/S S	Stowed pos:	M/S/ M/S S
3 DESIGN REQUIREMENTS					
3.1	To meet standard spec. no.:	Norsok standard no: R-CR-001 Lifting Equipment			
3.2	Structural:*				
	Duty group				
	Class of utilization				
	State of loading				
3.3	Machinery:*	Hoist 1	Hoist 2 (WHIP)	Slew	Luff
	Group				Splitter box
	Class of operation				
	State of loading				
3.4	Operation under max. load and radius at:		° list		
3.5	Design dynamic factor:				
3.6	Prime mover(s):				
* compatible with F.E.M. standard classification					

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4 CRANE PARAMETERS



A	Overall height maximum:	m
B	Main boom length:	m
C	Total boom length with whip line:	m
D	Tail swing:	m
E	Height crane base - lat:	m
F	Max height of hook above crane base:	m rad
G	Actual hook travel main hoist	m rad
H	Actual hook travel whip hoist	m rad
K		m
L	Min. distance between hooks:	m
M	Height over "A" frame:	m
P	C.L. pedestal to C.L. boom bearing	m
R	Crane base to C.L. boom bearing:	m
S	Min. α :	deg
T	Max. α :	deg

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5 CAPACITIES All capacities shall be given as hook lifts, I.E. exclusive of hook, locks and wire ropes etc.							
<u>CAPACITY OF CRANE RELATED TO PLATFORM LIFTS</u>							
<u>Hoist 1</u>							
	Reavings or fixed hook	1 Fall		2 Fall		3 Fall	
5.1	Load: at radius:	m	T	m	T	m	T
5.2	Load: at radius:	m	T	m	T	m	T
5.3	Max. radius:	m					
5.4	Min. radius	m					
5.5	Lifting height above slewing ring	m		At radius:		m	
5.6	Lifting height below slewing ring	m		At radius:		m	
5.7	Hoist speed: with load as in 5.1	m/s		m/s		m/s	
5.8	Hoist speed: with load as in 5.2	m/s		m/s		m/s	
5.9	Hoist speed without load:	m/s		m/s		m/s	
5.10	Hoist speed cont. variable between zero and max:						
5.11	Hoist speed variable with load:						
<u>Hoist 2 (WHIP) if required</u>							
5.12	Max. load:	T					
5.13	Max. radius:	m					
5.14	Min. radius:	m					
5.15	Lifting height above slewing ring	m		At radius:		m	
5.16	Lifting height below slewing ring	m		At radius:		m	
5.17	Hoist speed: with:	T				m/s	
5.18	Hoist speed: with:	T				m/s	
5.19	Hoist speed without load:	m/s					
5.20	Hoist speed cont. variable between zero and max:						
5.21	Hoist speed variable with load (const. torque motor):						
6 DATA FOR SLEWING AND LUFFING							
6.1	Slewing speed with max. load in hook:	r.p.m.					
6.2	Slewing operation with full load at max.:	degree list					
6.3	Luffing time with max. load:	from:	° boom angle	to:	° boom angle	time:	secs.

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7 PEDESTAL ADAPTER		
7.1	Outs. dia. at lower end:	m
7.2	Outs. dia. at upper end:	m
7.3	Total height:	m
7.4	Height of conical section:	m
8 PEDESTAL REACTION FORCES		
8.1	Max. vertical force incl. impact factor:	tonnes
8.2	Max. vertical moment incl. impact factor:	Tm
8.3	Max. torisonal moment:	Tm
8.4	Max. downward force at one side of ring:	tonnes
8.5	Max. upward force at opposite side of ring:	tonnes
9 SLEWING RING DATA, REF. NOTE A.		
9.1	Manufacturer:	
9.2	Model no.:	
9.3	Type:	
10 BEARINGS, REF. NOTE A.		
10.1	Boom hinge type / make:	
10.2	Rope sheave type / make:	
10.3	Drum type / make:	
11 ROPE, SHEAVES AND DRUM - HOIST 1		
11.1	Rope type / construction:	
11.2	Rope diameter:	mm
11.3	Wire min. tensile grade:	N/mm ²
11.4	Ropes min. breaking load:	kN
11.5	No. of load carrying parts:	
11.6	Sheave diameter:	mm
11.7	Drum diameter:	mm
11.8	No.of layers:	
11.9	Spolling device:	
11.10	Spolling device type / make:	
11.11		

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12 ROPE, SHEAVES AND DRUM - HOIST 2,(WHIP).		
12.1	Rope type / construction:	
12.2	Rope diameter:	mm
12.3	Wire min. tensile grade:	N/mm ²
12.4	Ropes min. breaking load:	kN
12.5	No. of load carrying parts:	
12.6	Sheave diameter:	mm
12.7	Drum diameter:	mm
12.8	No.of layers:	
12.9	Spolling device:	
12.10	Spolling device type / make:	
12.11		
13 ROPE, SHEAVES AND DRUM - LUFFING		
13.1	Rope type / construction:	
13.2	Rope diameter:	mm
13.3	Wire min. tensile grade:	N/mm ²
13.4	Ropes min. breaking load:	kN
13.5	No. of load carrying parts:	
13.6	Sheave diameter:	mm
13.7	Drum diameter:	mm
13.8	No.of layers:	
13.9	Spolling device:	
13.10	Spolling device type / make:	
14 HYDRAULIC POWER GENERATION, REF. NOTE A.		
14.1	Pump make / type:	
15 POWER CONTROL SYSTEM, REF. NOTE A.		
15.1	Operating medium	
15.2	Control pressure	barg
15.3	Control unit, make / type	

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16 SLIP RING UNIT

		No. of rings	Voltage	Frequency	EEX
16.1	Main supply				
16.2	Normal service supply				
16.3	No break " supply				
16.4	Earth connection				
16.5	Central computer				
16.6	Public adress (PA-speaker)				
16.7	Telephone				
16.8	Future purposes (spare)				
16.9	Future purposes (spare) EEX				
16.10	Fire detection and CO2 system				

17 CORROSION PROTECTION

17.1	According to NORSOK spec.:	
17.2	Primer type / colour	
17.3	Intermediate coat type / colour	
17.4	Top coat type / colour:	
17.5	Primer dry film thickness:	micron
17.6	Intermediate coat dry film thickness:	micron
17.7	Top coat dry film thickness:	micron
17.8	Minimum total dry film thickness:	micron
17.9		
17.10	Items to be galvanized:	
17.11		
17.12	Special treatment:	
17.13		
17.14		

18 WEIGHTS AND CENTRES OF GRAVITY

18.1	Total unit weight	tonnes
18.2	Pedestal adapter	tonnes
18.3	Total weight including adapter	tonnes
18.4	Hoist ropes / hooks / blocks	tonnes

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		Positions of CG-metres			
		Weight tonness	Above slew ring	From CL of rotation	
				Forward	Rearward
18.5	Total crane structure without boom				
18.6	Gantry frame ("A" frame)				
18.7	Prime mover				
18.8	Boom weight total			tonnes	
18.9	Head section			tonnes and length	metres
18.10	Foot section			tonnes and length	metres
18.11	Insert X (No. off)			tonnes and length	metres
18.12					
19 DETAILED INFORMATION REQUIRED, REF. NOTE A.					
		Suppliers specification			
19.1	*Load moment indikator - main hoist				
19.2	*Load indicator - auxiliary hoist				
19.3	*Boom angle indicator				
19.4	Constant tension system				
19.5	Hydraulic safety valves				
19.6	Mechanical radius indicator				
19.7	Jacking arrangement for slewing ring removal				
19.8	Data recording equipment				
*Items marked thus to operate coupled to data recording equipment					
Notes: Requirements to be given when company shall have standard components, otherwise supplier shall nominate components.					
20 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT					
20.0					
20.1					
20.2					
20.3					
20.4					
20.5					
Give ref. to appendix, if required.					

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21 DOCUMENTATION							
21.1	Supplier certification level	NS-ISO 9001		NS-ISO 9002		No certification	
21.2	Documentation requirement to be delivered with the order	ILO certification, EC declaration of conformity for machinery and crane manual.				ILO certification, EC declaration of conformity for machinery, crane manual, material certification and complete fabrication documentation	
22 REVISION STATUS							
Rev	Supplier	Date	By	App'r	Date	App'r	Date
		Contractor			Operator		

NORSOK R-CR-002 Rev. 1, Jan. 1995	POWER DRIVEN HOISTS DATA SHEET	Made by	
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		Date	
		Data sheet	RDS-051

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Contractor		Project				Project no.			
Job no.									
Equipment no.									
Service						Sheet of rev.			
1 GENERAL									
1.1	Description								
1.2	Tag no.								
1.3	Location area								
1.4	Serial no.								
1.5	Supplier								
2 CAPACITY / DIMENSION, REF. INCLOSED SKETCH									
2.1	Working load limit (WLL)	0.5T	1T	2T	3T	5T	8T	10T	Special
	Number of order								
2.2	Hoist type	Power driven, pneumatic					Power driven, electric		
2.3	Monting	Hook		For manual trolley			Incl. motor trolley		Special
2.4	Classification groups	Standard group 1Dm in ACC. to FEM					Standard group in ACC. to FEM to be given:		
2.5	Trolley for IPE size	IPE 200		IPE 300		IPE 400		Special:	
2.6	Area classification for electric hoists	Not to be used in hazardous area				Ex(d) protected		Ex(e) protected	
2.7	Lifting hight	"A" max:					"A" min:		
2.8	Lenght of controls chain / cable "N":			Lenght of run way beam if trolley "L":					
3 BASIC REQUIREMENTS									
3.1	Area of use	For common use onshore and common use internal installations offshore.							
3.2 Environment									
3.2.1	Design / ambient temp°C	-20°C							
3.3 Design									
3.3.1	Design codes / class	FEM section IX or equivalent standard.							
3.3.2	Hoist design, general	All hoists shall be provided with an overload protection device. All rotating parts shall be provided with anti-friction bearing type.							
3.3.3	Trolley design	Four-weel, self-aligning, anti-friction bearing type, steel-plate construction, ends bumpers at boat ends, climb protection for the wheels							
	Manual chain drive	Should be of the spur gear type enclosed in a steel housing. Travel motion should be provided with a fail safe brake. Max. pull in chain to lift with max. load, shall not exeed 350 N.							
3.3.4	Power-driven hoists machineries, general	Brake of failersafe type with spring activation and power-operated release. Brakes shall be designed to manually lower and stop safe working under load under full controll.							

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3.3.5	Air motor drive	Preferable be of the high-speed type with integral trolleys. May be driven by a radial piston or multi-vane motor. Provided with a pressure relief valve.
3.3.6	Electric motor drive	Motors shall be totally enclosed, at least to IP55, cabinets, terminal- and control boxes to IP55. All equipment including cables shall be flame retardant, in accordance with IEC 92.101. Industrial weather proofed glands shall be used for Ex(d) and Ex(e) enclosure. Machineries may be driven by three-phase induction motors. Motor and associated equipment shall be supplied according to temperature class T3 (200°C) and gas group IIA requirements.
3.3.7	Controls, switchgear and safety devices	"Non breakable", antistatic push-button controlbox or a hydraulic servo control with hydraulically piloted proportional valves, provided with a red emergency stop button, protected against inadvertent use. Chain or wire suspension system provision for height adjustments. The switchgear cabinet shall be provided with a space heater which is to be actuated when the hoist limit switches shall be provided for trolley travel motions.
3.3.8	Power supply, cables and markings	The flexible power supply cable or piping and suspension system, shall be part of the delivery. The cable shall terminate in a locable isolation switch to be mounted on the wall within easy reach of the operator on the control deck. Required length of cable / hose shall be based on runways length and height. Cables shall comply with IEC322, fixing devices by means of non-corrosive cable. Cleats, with intervals shall not exceed 350 mm, and max. 6 cables in one cleat. Shut-down circuits and alarm circuits shall be segregated from power supply circuits. Intrinsically safe circuits shall be physically segregated from all other circuits.
3.3.9	Noise level requirements	NORSOK SPEC NO.: working environment.
3.3.10	Maintenance, access and lubrication	The hoist shall be designed with facilities for easy inspection and maintenance. All equipment shall be delivered ready filled with oil and grease.

3.4 Fabrication

3.4.1	Material	Shall be suitable for its purpose and shall have a chemical composition ensuring adequate strength, ductility and toughness also after welding.
3.4.2	Welding	Off / on primary structure shall be based on a welding procedure and welders. Qualification test in ACC. to recognized standards (EN-288-1,2 & 3/EN-287-1). All enclosed welded structures like boxes, tubes etc. shall be seal welded. Drilling of holes in such structures will not be accepted.
3.4.3	Shop tests	Mechanical run under loaded conditions of the machinery in accordance with specified machinery classification group. The brakes, motors and bearings shall be checked for vibrations and temperature rise, and seals shall be checked for leakage. Noise level tests in accordance with NORSOK SPEC.NO.:..... Working Environment.
3.4.4	Surface treatment	All surfaces to be painted and protected suitable for the environments in the area for use.
3.4.5	Marking	Equipment shall be visibly and permanently marked with at least: SWL and certification no..

3.5 Certification

3.5.1	Load test	2 x SWL, number to be tested given by competent person.
3.5.2	Certification	ILO form no. 1 and 2 performed by competent person.

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of

1 GENERAL

1.1	Description	
1.2	Tag no.	
1.3	Location area	
1.4	Serial no.	
1.5	Supplier	

2 CAPACITY / DIMENSION, REF. INCLOSED SKETCH

2.1	Working load limit (WLL)	0.5T	1T	2T	3T	5T	8T	10T	Special
	Number of order								
2.2	Hoist type		Lever chain hoist						Manual chain hoist
2.3	Monting		Hook			For manual trolley			Special
2.4	Classification groups		Standard group 1Dm in ACC. to FEM						Special group in ACC. to FEM to be given:
2.5	Lifting hight	"A" max.:						"A" min.:	
2.6	Lenght of controls chain / cable	"N":							

Special capacity / dimension requirements to be given i table 4.

3 BASIC REQUIREMENTS

3.1	Area of use	For common use onshore and common use internal installations offshore.
-----	-------------	--

3.2 Environment

3.2.1	Design / ambient temp°C	-20°C
-------	-------------------------	-------

3.3 Design

3.3.1	Design codes / class	FEM section IX or equivalent standard.
3.3.2	Design general	Should generally be of the spur gear type enclosed in a steel housing. Hoist motion shall be provided with a fail safe brake. Max pull in chain to move with max. load shall not exceed 350 N. All rotating parts shall be provided with anti-friction-bearing type-
3.3.4	Hooks	Hooks shall be suported in thrust bearing with full rotational freedom and be provided with a safety latch and lubrication point.
3.3.5	Maintenance, access and lubrication	The hoist and trolley shall be designed with facilities for easy inspection and maintenance. All equipment shall be delivered ready filled with oil and grease.

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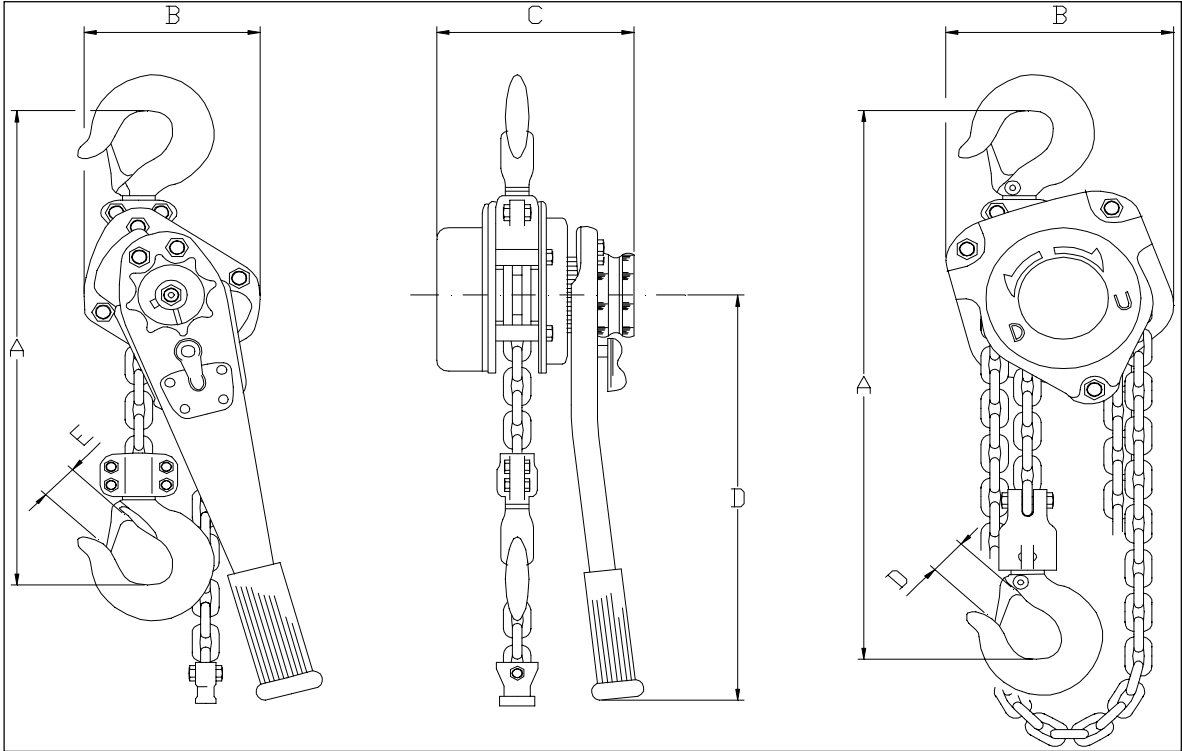
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3.4 Fabrication			
3.4.1	Material	Shall be suitable for its purpose and shall have a chemical composition ensuring adequate strength, ductility and toughness also after welding. The load chain shall be according to EN 818.	
3.4.2	Welding	Off / on primary structure shall be based on an welding procedure and welders qualification test in ACC. to recognized standards (EN-288-1, 2 & 3./EN-287-1). All enclosed welded structures like boxes, tubes etc. shall be seal welded. Drilling of holes in such structures will not be accepted.	
3.4.3	Shop tests	Mechanical run under loaded conditions of the machinery in accordance with specified machinery classification group. The brakes, motors and bearings shall be checked for vibrations and temperature rise, and seals shall be checked for leakage.	
3.4.4	Surface treatment	All surfaces to be painted and protected suitable for the environments in the area for use.	
3.4.5	Marking	Equipment shall be visibly and permanent marked with atleast: SWL and certification no..	
3.5 Certification			
3.5.1	Load test	2 x SWL, number to be tested given by competent person.	
3.5.2	Certification	ILO form no. 1 and 2 performed by competent person.	
4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT.			
4.0			
4.1			
4.2			
4.3			
4.4			
4.5			
Give ref. to appendix, if required.			
5.1	Supplier certification level	NS-ISO 9001	NS-ISO-9002
			No certification
5.2	Documentation requirement to be delivered with the order	ILO certification, EC declaration of conformity for machinery	
		ILO certification, EC declaration of conformity for machinery, material certification and complete fabrication documentation	

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6 SKETCH



Lever chain hoist

Manual chain hoist

Rev	Supplier	Date	By	App'r	Date	App'r	Date
		Contractor				Operator	

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		Data sheet	RDS-053

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description
1.2	Tag no.
1.3	Location area
1.4	Serial no.
1.5	Supplier

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

	Manually trolley type	Plain type	Geard type when wll >= 1 T.(10kN)						Special
2.1	Working load limit (wll)	0,5 T	1T	2T	3T	5T	8T	10T	
	Number of to order								
2.2	Classification groups	Standard group 1Dm IN ACC. to fem				Spesial group in ACC. to fem to be given			
2.3	Trolley for IPE size	IPE 200		IPE 300		IPE 400		Special dim.	
2.4	Length of hand chain	"N":							

Special capacity/dimention requirements to be given in table 4.

3 BASIC RECUIREMENTS

3.1	Area of use	For common use onshore and common use internal installations offshore.
-----	-------------	--

3.2 Environment

3.2.1	Design ambient temp°C	- 20°C
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3.3 Design

3.3.1	Design code/class	Fem section IX or equivalent standard
3.3.2	Design general	Four - well self-aligning, anti-friction bearing type, of steel- plateconstruction, ends bumpers at boat ends, climb protectionm for the wheels, all rotating parts shall be provided with anti-friction bearings.
3.3.3	Manual chain drive	Should gennerally be of the spur gear type enclosed in a steel housing. Travel motion shall be provided with a fail safe breake. Max pull in chain to move with max, load shall not exceed 350N.
3.3.4	Maintenance , access and lubrication	The trolley shal be designed with facilities for easy inspection and maintenance. All equipment shall be delivered ready filled with oil and grease.

3.4 Fabrication

3.4.1	Material	Shall be suitable for its purpose and shall have and chemical composition ensuring adequate streghth, ductility and toughness also after welding.
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3.4.2	Welding	Of/on primary structure shall be based on an welding procedure and welders qualification test in ACC. To recognized standards (EN-228-1,2 & 3./EN-287-1). All enclosed welded structures like boxes, Tubes etc. shall be seal welded . Drilling of holes in such structureswill not be accepted.
3.4.3	Shop tests	Mecanical run under loaded conditions of the machinery in according with specified machinery classification group. The brakes and bearings shall be checked for vibration and temperature rise , and seals shall be checked for leage.
3.4.4	Surface treatments	All surfaces to be painted and proteckted suitable for the environments in the area for use.
3.4.5	Marking	Equipment shall be visebly and permanent marked with least : SWL and sertification no.

3.5 Certification

3.5.1	Load test	2 x SWL, Number to be tested given by competent person
3.5.2	Certification	ILO form no 1 and 2 performed by competent person

4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT..

4.0		
4.1		
4.2		
4.3		
4.4		
4.5		

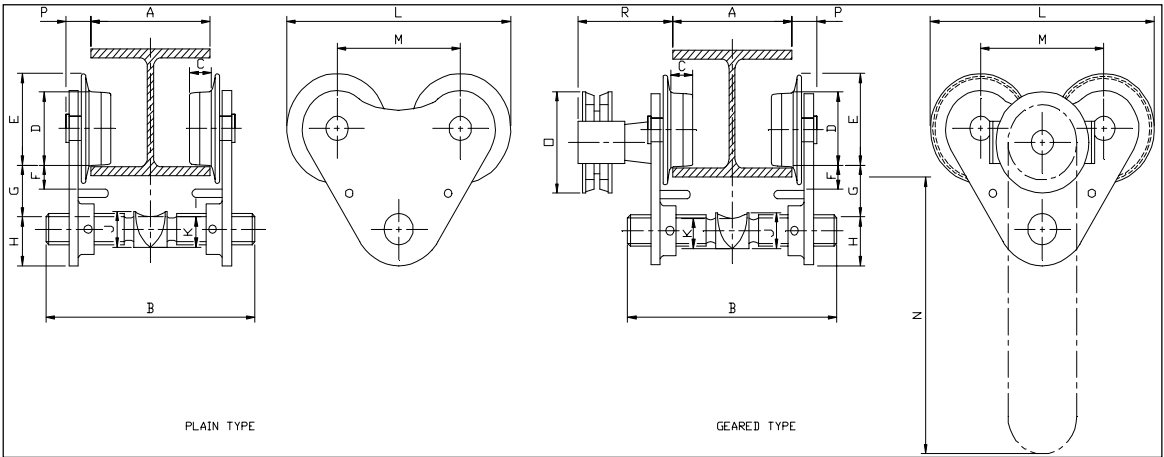
5 DOCUMENTATION

5.1	Suplier certification level	NS-ISO 9001	NS-ISO 9002	No certification
5.2	Documentation requirement to be deliverd with the order.	ILO Certification, ec declaration of confirmity for machinery	ILO certification , ec declaration of confirmity for machinery, material certification and complete fabrication documentation.	

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		Checked by	
		Date	
		Data sheet	RDS-053

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6 SKETCH



	Date	By	APP'R	Date	APP'R	Date
Rev	Supplier	Contractor			Operator	

NORSOK R-CR-002 Rev. 1, Jan. 1995	HAND POWERED LOW HEADROM HOISTS WITH INTEGRAL TROLLEYS DATA SHEET	Made by	
		Checked by	
		Date	
		Data sheet	RDS-054

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description	
1.2	Tag no.	
1.3	Location area	
1.4	Serial no.	
1.5	Supplier	

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

2.1	Manually trolley type		Plain type		Geard type when wll >= 1 T.(10kN)				Special		
	Working load limit (wll)		0,5 T		1T	2T	3T	5T	8T	10T	
	Number of to order										
2.2	Classification groups		Standard group 1Dm IN ACC. to fem					Spesial group in ACC. to fem to be given			
2.3	Trolly for	HEB200	HEB300	HEB400		IPE200		IPE300		IPE400	Special dim.
	Heb/Ipe size										
2.4	Lifting hight		"A" max :					"A" min:			
2.5	Length of hand chain		"N":								

Special capacity/dimention requirements to be given in table 4.

3 BASIC REQUIREMENTS

3.1	Area of use	For common use onshore and common use internal installations offshore.
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3.2 Environment

3.2.	Design ambient temp°C	- 20°C
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3.3 Design

3.3.	Design code/class	Fem section IX or equivalent standard
3.3.	Design general	Four - well self-aligning, anti-friction bearing type, of steel- plateconstruction, ends bumpers at boat ends, climb protectionm for the wheels, all rotating parts shall be provided with anti-friction bearings.
3.3.	Manual chain drive	Should gennerally be of the spur gear type enclosed in a steel housing. Travel motion shall be provided with a fail safe breake. Max pull in chain to move with max. load shall not exceed 350N
3.3.	Hooks	Hooks shall be supported in thrustr bearing with full rotational freedom and be proveded with a safety latch and lubrication point.
3.3.	Maintenance , access and lubrication	The Hoist and trolly shal be designed with facilities for easy inspection and maintenance. All equipment shall be delivered ready filled with oil and grease.

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3.4.1	Material	Shall be suitable for its purpose and shall have a chemical composition ensuring adequate strength, ductility and toughness also after welding. The load chain shall be according to EN 818 when available.
3.4.2	Welding	Of/on primary structure shall be based on a welding procedure and welders qualification test in ACC. To recognized standards (EN-228-1,2 & 3./EN-287-1). All enclosed welded structures like boxes, tubes etc. shall be seal welded. Drilling of holes in such structures will not be accepted.
3.4.3	Shop tests	Mechanical run under loaded conditions of the machinery in accordance with specified machinery classification group. The brakes and bearings shall be checked for vibration and temperature rise, and seals shall be checked for leakage.
3.4.4	Surface treatments	All surfaces to be painted and protected suitable for the environments in the area for use.
3.4.5	Marking	Equipment shall be visibly and permanently marked with at least : SWL and certification no..

3.5 Certification

3.5.1	Load test	2 x SWL, Number to be tested given by competent person
3.5.2	Certification	ILO form no 1 and 2 performed by competent person

4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT..

4.0		
4.1		
4.2		
4.3		
4.4		
4.5		

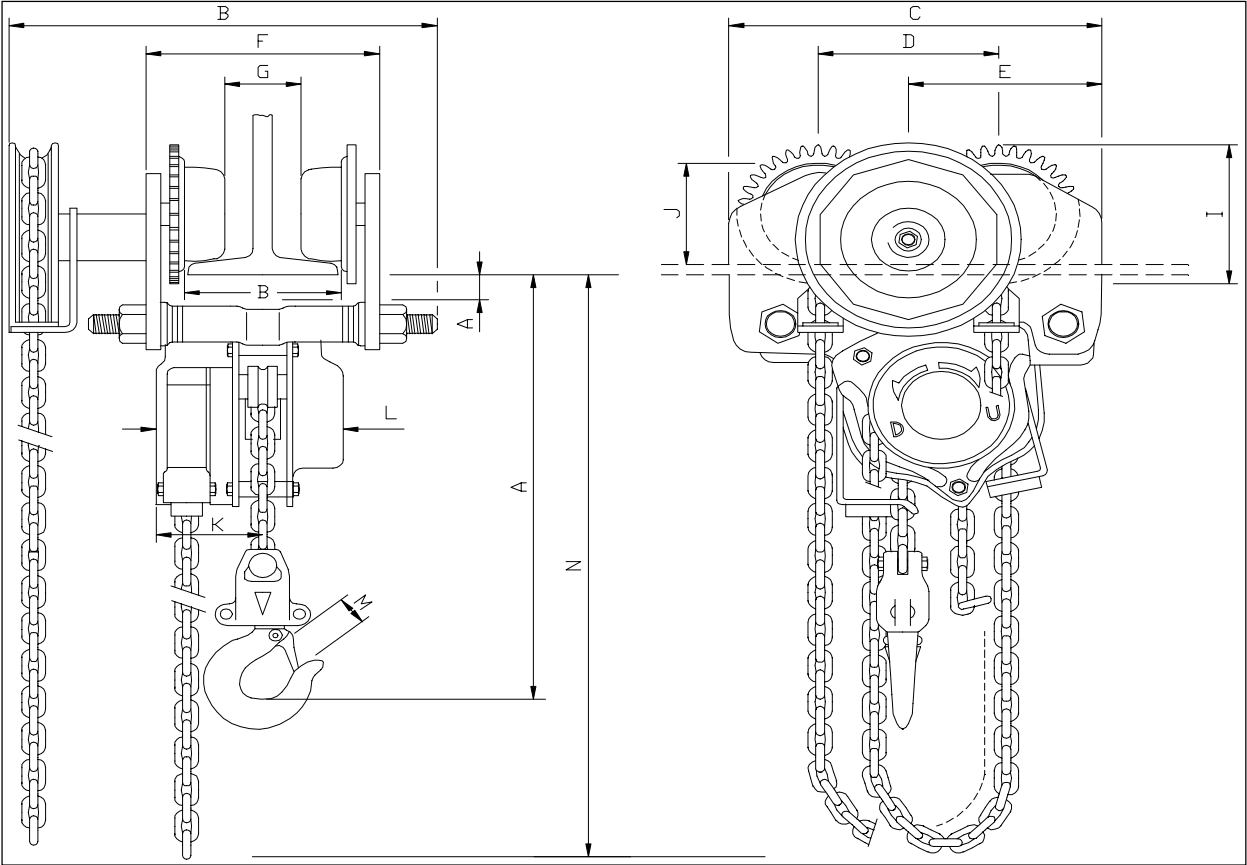
5 DOCUMENTATION

5.1	Supplier certification level	NS-ISO 9001	NS-ISO 9002	No certification
5.2	Documentation requirement to be delivered with the order.	ILO Certification, ec declaration of conformity for machinery.	ILO certification , ec declaration of conformity for machinery, material certification and complete fabrication documentation.	

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6 SKETCH



		Date	By	APP'R	Date	APP'R	Date
Rev	Supplier	Contractor				Operator	

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		Checked by	
		Date	
		Data sheet	RDS-055

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description
1.2	Tag no.
1.3	Location area
1.4	Serial no.
1.5	Supplier

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

2.1	No. of	1 part	2 parts	2 parts (+) forerunner	3 parts	3 parts (+) forerunner	4 parts	4 parts (+) forerunner	Spesial
2.2		WLL (tonn)							
2.3		Leg angle from vertical			30°	45°	Special :		
2.3		Leg length (mm)			All equal	1.Leg	2.Leg	3.Leg	4.Leg
2.4		Forerunner length (mm)							
2.5		Type of ends			Ring for shackles, shackles dim.:			Other ends, type:	

Special capacity/dimension requirement to be given in table 4.

3 BASIC REQUIREMENTS

3.1	Area of use	Onshore	Internal installation	Sealift offshore

3.2 Environment

3.2.1	Design/ambient temp°C	- 20°C
-------	-----------------------	--------

3.3 Design

3.3.1	Design codes	EU- machine directive	DNV liftig appliances	DNV C.N 2.7-1
3.3.2	Design standard	EN 818, part 1,2 and 8		
3.3.3	Safety factor	EU - machine directive	DNV liftig appliances 1989	DNV C.N 2.7-1

3.4 Fabrication

3.4.1	Material	EN 818 - 2	DNV liftig appliances 1989 SEC.2 D 400
3.4.2	Fabrication	EN 818	
3.4.3	Inspection	EN 818 Part 8	
3.4.4	Surface treatment	Zink galvanized in accordance with recognized standards	
3.4.5	Marking	EN 818 part 8.	

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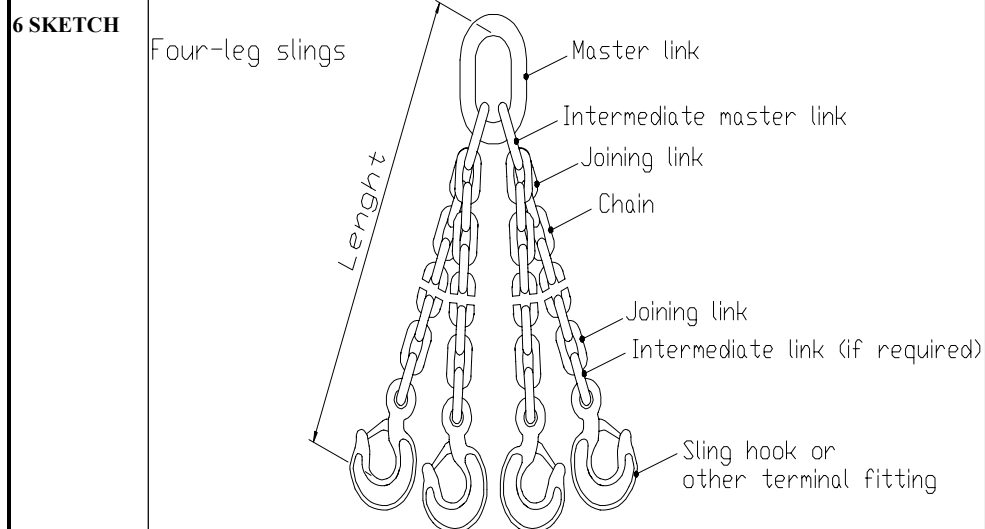
3 BASIC REQUIREMENTS			
Area of use	Onshore	Internal installation	Sealift offshore

3.5 Certification			
3.5.1	Load test	2 x SWL, number to be tested given by competent person.	2 x SWL, number to be tested ref. npd's regulation related to lifting appliances and lifting gear in the petroleum activities, cap. 16.3.
3.5.2	Certification	ILO from no 3 and 4	

4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT.			
4.0			
4.1			
4.2			
4.3			
4.4			
4.5			

Give ref. to appendix, if required

5 DOCUMENTATION				
5.1	Supplier certification level	NS-ISO 9001	NS-ISO 9002	No certification
5.2	Documentation requirement to be delivered with the order.	ILO Certification, ec declaration of conformity for machinery.	ILO certification , ec declaration of conformity for machinery, material certification and complete fabrication documentation.	



	Date	By	APP'R	Date	APP'R	Date
Rev	Supplier	Contractor			Operator	

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		Date	
		Data sheet	RDS-056

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description
1.2	Tag no.
1.3	Location area
1.4	Serial no.
1.5	Supplier

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

	Standard dimention							
WLL	0,5 , 1 , 2	3,25 , 4,75	6,5 , 8,5	9,5 , 12	13,5 , 17	25 , 35	42,5 , 55	85 , 120
No of								

3 BASIC REQUIREMENTS

3.1	Area of use	For common use onshore and common use internal installations offshore.	Sealift offshore

3.2 Environment

3.2.1	Design/ambient temp°C	- 20°C
-------	-----------------------	--------

3.3 Design

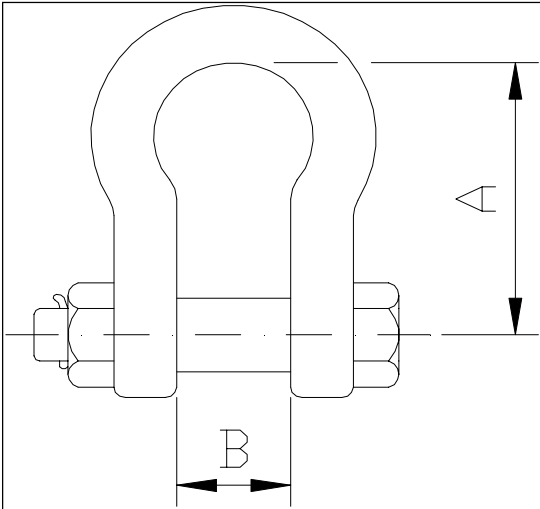
3.3.1	Design codes	EU- machine directive	
3.3.2	Design standard	U.S federal specification RR-C-2716 type IV	
3.3.3	Safety factor	DNV lifting appliances 1989 sec.5 b 600	DNV C.N 2.7-1 SEC. 3.3

3.4 Fabrication

3.4.1	Material	DNV lifting appliances 1989 sec.2 d 400
3.4.2	Fabrication	DNV lifting appliances 1989 sec.2 d 400
3.4.3	Inspection	DNV lifting appliances 1989 sec.2 d 400
3.4.4	Sureface treatment	All surfaces to be painted and protected suitable for the environments in the area for use.
3.4.5	Marking	Equipment shall be visably and permanent marked with at least: SWL and sertification no.

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3.5 Certification							
3.5.1	Load test	2 x SWL, number to be tested given by competent person					
3.5.2	Certification	ILO from no 3 and 4					
4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT..							
4.0							
4.1							
4.2							
4.3							
4.4							
4.5							
Give ref. to appendix, if required							
5 DOCUMENTATION							
5.1	Supplier certification level	NS-ISO 9001	NS-ISO 9002	No certification			
5.2	Documentation requirement to be delivered with the order.	ILO Certification, ec declaration of conformity for machinery.		ILO certification , ec declaration of conformity for machinery, material certification and complete fabrication documentation.			
6 SKETCH							
							
		Date	By	APP'R	Date	APP'R	Date
Rev	Supplier	Contractor				Operator	

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		Checked by	
		Date	
		Data sheet	RDS-057

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description
1.2	Tag no.
1.3	Location area
1.4	Serial no.
1.5	Supplier

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

2.1	Hook type		Single hook din 15401		Double hook din 15402
2.2	Hook form and number				
2.3	Working load limit (WLL)				
2.4	Hook drawing no.				
2.5	Quantity				

3 BASIC REQUIREMENTS

3.1	Area of use	For common use onshore and common use internal inatallations offshore.	Sealift offshore

3.2 Environment

3.2.	Design/ambient temp°C	- 20°C
------	-----------------------	--------

3.3 Design

3.3.	Design codes/standard	DNV lifting appliances 1989, din 15400, din 15401 and din 15402.
3.3.	Safety factor	DNV lifting appliances 1989 sec.5 b 600

3.4 Fabrication

3.4.	Material	DNV lifting appliances 1989 sec.2 d 400, din17135, din 17200
3.4.	Fabrication	DNV lifting appliances 1989
3.4.	Inspection	DNV lifting appliances 1989
3.4.	Sureface treatment	DNV lifting appliances 1989 sec.2, G 1600.
3.4.	Marking	Equipment shall be visibly and permanent marked with at least: SWL and sertification no..

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		Date	
		Data sheet	RDS-057

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3.5 Certification						
3.5.1	Load test	2 x SWL, number to be tested given by competent person				
3.5.2	Certification	ILO from no 3 and 4				
4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT..						
4.0						
4.1						
4.2						
4.3						
4.4						
4.5						
Give ref. to appendix, if required.						
5 DOCUMENTATION						
5.1	Supplier certification level	NS-ISO 9001	NS-ISO 9002	No certification		
5.2	Documentation requirement to be delivered with the order.	ILO Certification, ec declaration of conformity for machinery.		ILO certification , ec declaration of conformity for machinery, material certification and complete fabrication documentation.		
6 SKETCH						
<p style="text-align: right;">TREAD DETAIL Y.</p>						
		Date	By	APP'R	Date	APP'R
Rev	Supplier	Contractor			Operator	

NORSOK R-CR-002 Rev. 1, Jan. 1995	LIFTING LUGS DATA SHEET	Made by	
		Checked by	
		Date	
		Data sheet	RDS-058

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description
1.2	Tag no.
1.3	Location area
1.4	Serial no.
1.5	Supplier

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

	Standard dimentions							Special dimention
WLL	0,6T	1T	2T	3T	4T	6T	10T	
No of								

3 BASIC REQUIREMENTS

3.1	Area of use	For common use onshore and common use internal inatallations offshore.
-----	-------------	--

3.2 Environment

3.2.1	Design/ambient temp°C	- 20°C
-------	-----------------------	--------

3.3 Design, only for special dimention

3.3.1	Design codes/class	Fem
3.3.2	Design factor	1,3
3.3.3	Dynamic amp.factor	Minimum 2,0
3.3.4	Material factor	1,15
3.3.5	Lateral load	Max. 10%

3.4 Fabrication

3.4.1	Material	Norsok material spec no.: ... Steel quality, level 1
3.4.2	Welding	NS-EN-287-1 and NS-EN-288-1,2 &3
3.4.3	NDT	100% visual inspection, 100 % MPI and 100% ultrasonic testing of welds, acceptanse procedure NS-EN-25817
3.4.4	Sureface treatment	Cleaned to Sa 2,5 and primet.
3.4.5	Marking	Equipment shall be visibly and permanent marked with at least: SWL and certification no.

3.5 Certification, only for special dimention

3.5.1	Design approval	DNV lifting appliances related to the machine directive
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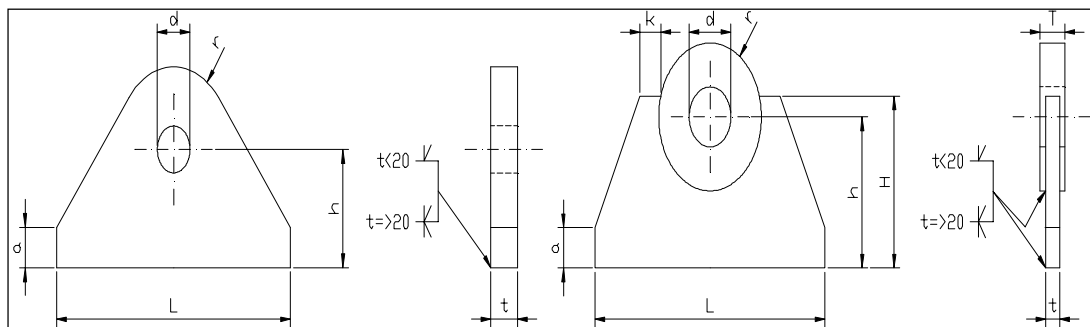
4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT.	
4.0	
4.1	
4.2	
4.3	
4.4	
4.5	

Give ref. to appendix, if required.

5 DOCUMENTATION

5.1	Supplier certification level	NS-ISO 9001	NS-ISO 9002	No certification
5.2	Documentation requirement to be delivered with the order.	ILO Certification, ec declaration of conformity for machinery.	ILO certification , ec declaration of conformity for machinery, material certification and complete fabrication documentation.	

6 SKETCH



WL,tc	t	T	d	r	h	H	L	a	k
1	16		15	15	32		85	10	
2	10	20	18	18	65	73	120	20	15
3	10	25	21	21	65	75	140	20	15
5	12	32	27	27	90	95	160	20	15
8	16	38	30	30	100	113	200	20	20
10	16	48	37	37	100	125	260	20	25
			Date	By	APP'R	Date	APP'R	Date	
Rev	Supplier		Contractor				Operator		

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		Date	
		Data sheet	RDS-059

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Contractor	Project	Project no.	
Job no.			
Equipment no.			
Service		Sheet	of Rev.

1 GENERAL

1.1	Description
1.2	Tag no.
1.3	Location area
1.4	Serial no.
1.5	Supplier

2 CAPACITY/DIMENTION, REF. INCLOSED SKETCH

	Standard dimentions								Special dimation
WLL	0,4T	1T	1,5T	2T	3T	4T	5T	6T	8T
No of eyebolts									
No of eyenuts									

3 BASIC REQUIREMENTS

3.1	Area of use	For common use onshore and common use internal inatallations offshore.		
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3.2 Environment

3.2.1	Design/ambient temp°C	- 20°C
-------	-----------------------	--------

3.3 Design

3.3.1	Design codes/class	DIN 5687/580
3.3.2	Design factor	F2, ref sketch.

3.4 Fabrication

3.4.1	Material	DIN 5691 grad 80
3.4.2	Fabrication	DIN 5687/580
3.4.3	Surface treatment	All surfaces to be painted and protected suitable for the environment in the area for use.
3.4.5	Marking	Equipment shall be visibly and permanent marked with at least: SWL and certification no.

3.5 Certification

3.5.1	Load test	2 x SWL, Number to be tesed givend by competent person
3.5.2	Certification	ILO form no 1 and 2 performed by competent person.

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		Data sheet	RDS-059

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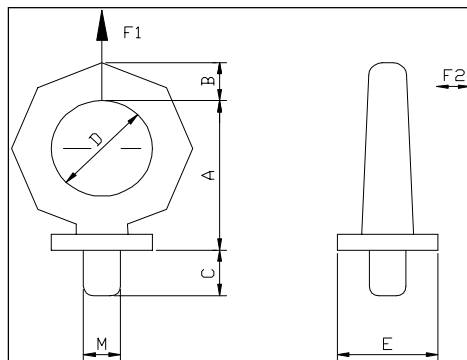
4 PROJECT RELATED REQUIREMENTS, TO BE SPECIFIED IF RELEVANT.			
4.0			
4.1			
4.2			
4.3			
4.4			
4.5			

Give ref. to appendix, if required.

5 DOCUMENTATION

5.1	Supplier certification level	NS-ISO 9001	NS-ISO 9002	No certification
5.2	Documentation requirement to be delivered with the order.	ILO Certification, ec declaration of conformity for machinery.		ILO certification , ec declaration of conformity for machinery, material certification and complete fabrication documentation.

6 SKETCH



M	E	B	D	WLL,F1, kg	WLL,F2,kg	WLL,45°,kg	
M12	30	12	30	1600	400	1120	
M16	35	16	35	4000	100	2800	
M20	40	20	40	6000	1500	4200	
M24	50	20	50	8000	2000	5600	
M30	65	24	60	12000	3000	8400	
M36	100	43	90	16000	4000	11200	
M42	100	43	90	24000	6000	11600	
M48	100	43	90	32000	8000	22400	
Date				By	APP'R	Date	APP'R
Rev	Supplier	Contractor				Operator	