



Oil and Gas Design Appraisal Document

COPY

Lloyd's Register EMEA
 Compliance & Engineering Services Department
 Denburn House
 25 Union Terrace
 Aberdeen, ABN10 INN
 44 1224 267400: Fax: 44 1224 26775

Date
 20 May 2009
 Quote this reference on all future communications
 CESD/0990436/MPT/O-14923

CLIENT: HYDRAMEC OFFSHORE HYDRAULICS SYSTEMS LTD.
 SUBJECT: HH64 JAGUAR FRAME

1. The plans, as listed below, have been examined where appropriate for compliance with
- Lloyd's Registers Code for Lifting Appliances in a Marine Environment, Chapter 3
- and are approved, approved subject to conditions, or noted for information, subject to the following comments:

Document No.	Rev.	Title	Status	Date
HH64AF-001	1	A-FRAME & WINCH GA	RI	20/05/09
HH64AF-002	0	JAGUAR & TMS SNUBBER	RI	20/05/09
HH64AF-003	0	JAGUAR & TMS SNUBBER	RI	20/05/09
HH64AF-004	1	JAGUAR SKID FRONT ELEVATION	RI	20/05/09
HH64AF-005	1	JAGUAR SKID FRONT ELEVATION	RI	20/05/09
HH64AF-006	3	JAGUAR BASE	A	20/05/09
HH64AF-007	2	DECK FASTENINGS	AC	20/05/09
HH64AF-008	0	SEAWARD (FRONT) PADEYE	X	20/05/09
HH64AF-009	2	VERTICAL BOOM MEMBER PROFILE DETAIL	A	20/05/09
HH64AF-010	2	VERTICAL BOOM MEMBER	A	20/05/09
HH64AF-011	1	MAIN BOOM	A	20/05/09
HH64AF-012	0	MAIN BOOM SECTIONS	A	20/05/09
HH64AF-013	1	TELE BOOM SECTION	A	20/05/09
HH64AF-014	0	BOOM PINS	A	20/05/09
HH64AF-015	3	COMMANCHE BOOM CYL ROD PAY EYE DETAIL	A	20/05/09
HH64AF-016	1	MAIN LIFT PAD EYE	A	20/05/09
HH64AF-017	1	STABILISING CYLINDER PAD EYES	RI	20/05/09
HH64AF-018	3	MAIN HYDRAULIC CYLINDER	AC	20/05/09
HH64AF-019	1	CYLINDER BASE REAR PAD EYE	A	20/05/09
HH64AF-021	0	BOOM MAIN SWIVEL BEARING HOUSING	A	20/05/09
HH64AF-022	1	A-FRAME TELE PAD EYE	A	20/05/09
HH64AF-024	3	JAGUAR ROD END PAD EYES	A	20/05/09
HH64AF-025	0	JAGUAR CYLINDER (Email 7 May 09)	A	20/05/09
HH64AF-027	0	TELE CYLINDER ROD END PAD EYES	A	20/05/09
HH64AF-028	1	JAG CYLINDER END PAD EYES	AC	20/05/09
HH64AF-029	0	PITCH CYLINDER TOP PADEYE	X	20/05/09
HH64AF-030	2	TELE CYLINDER PADEYE POSITION	RI	20/05/09
HH64AF-032	2	AHC END BOOM PAD EYE	A	20/05/09
09/393	0	AHC LYNX R.O.V. LAUNCH SKID HH64 FRAME Calcs	RI	20/05/09

Lloyd's Register EMEA
 is a member of the Lloyd's Register Group

Lloyd's Register, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register Group'. The Lloyd's Register Group assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register Group entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

2. Condition of Acceptance

3. Design Criteria

The A-frame and skid structure has been examined for unmanned launch/recovery operations in open sea conditions up to and including sea state 7, for the following design criteria;

SWL Operating Condition	SWL (Tonnes)	Fd	Fh	Heel/Trim	Off/Side Lead
Submerged depth > 1000m	4.4	1.2	2.00	12°/6° *	12°/12°
Submerged	7.9	1.2	2.72	12°/6° *	12°/12°
Air/Water Interface	5.5	1.2	2.72	12°/6° *	12°/12°
Outboard in air - unlatched	5.5	1.2	2.50	12°/6°	-
Outboard in air - latched	5.5	1.2	2.00	12°/6°	-
Inboard latched	5.5	1.05	1.70	12°/6°	-

* Heel and trim applied in these instances to self weight components only.

R.O.V. Weight in Air : 5500 kg
 R.O.V. Weight submerged : 2500 kg
 Maximum weight of snubber unit on cross head..... : 500 kg
 Maximum deployed length of umbilical (2.50 kg/m air 1.80kg/m water)..... : 3000 m
 Minimum design temperature..... : -20 °C

Winch Position

The winch position is restricted such that the hoisting wire angle is not less than 23° degrees relative to the horizontal, when the appliance is lifting or deploying the ROV.

4. Drawing HH62-001 Rev 0. Sheet 1

The drawing indicates a minimum design temperature of -20 °C. For rolled S355 plates and sections subject to welding and tension the following Charpy toughness criteria are applicable

10 < t <= 30 mm thick -34 Joules when tested at -20° C.

30 < t <= 55 mm thick 34 Joules when tested at -40° C

It should be noted that these requirements are also applicable to the structural components of the hydraulic cylinders as well as the lifting frame structure.

5. Drawing No. HH64AF-007 Rev 2

The M20 holding down bolts are to be a minimum of Grade 10.9.

6. Drawing No. HH64AF-018 Rev 3

There are discrepancies between the dimensions of the end fittings shown on this drawing and those shown on HH64AF-024 Rev 3 and HH64AF-028 Rev 1. On the basis of the comments on the cylinder drawing, the dimensions shown on the individual parts drawings HH64AF-028 & HH64AF-024 are taken as accurate.

See comment on drawing HH64AF-028 Rev 1 with respect to the toughness of components.

7. Drawing No. HH64AF-028 Rev 1.

The material stated as S355 K2 is required to achieve 34 when tested at -40° C. The same toughness is also required for the 48mm thick cylinder end to which the cylinder end pad eye is welded.

- 8. The design is based upon the main hydraulic cylinder bottoming out when deployed outboard as the design pressure of 250 bar is not sufficient to resist the maximum dynamic load when fully deployed. However the hydraulic system sizing and relief valves settings are to be sufficient to ensure that pressures beyond the design pressure cannot be realized in both the main luffing cylinders and the telescopic cylinders during operation.
- 9. The hoist rope is to have a minimum breaking load of 57.9 tonnes.
- 10. The attachment to, and the adequacy of the supporting structure in way of the lifting frame is to be to the Surveyor's satisfaction.
- 11. The installation is to be tested in accordance with Chapter 9 of the Lloyd's Register Code for Lifting Appliances in a Marine Environment to the Surveyors satisfaction.

In preparing this report, the undersigned surveyor is acting as an independent person in accordance with the applicable policy on conflict of interest.



Tom Corrigan
Lead Specialist
Oil & Gas, London
Lloyd's Register EMEA

Appraisal Status Key

- A Approved/Accepted
- AC Approved/Accepted with conditions
- RI Retained as supporting documentation for information only
- X Not required