



Marine Design Appraisal Document

Lloyd's Register EMEA
 Hamburg Design Support Office
 Am Sandtorkai 41
 20457 Hamburg
 Telephone +49 (0)40 328107 - 0 Fax +49 (0)40 328107 - 480
 Email: hamburg-design-support@lr.org

Date
21 October 2013

Please quote this reference number on all future communications
HPC1340030/7314-13/WG

**HYDRAULIC CYLINDERS FOR
 WORKTABLE
 MANUFACTURED BY
 RUHFUS SYSTEMHYDRAULIK, NEUSS, GERMANY
 DRG NO 50-2036-1-0, 502037-1-0, 50-2038-1-0, 50-2039-1-0
 IHC P/N NO 65577, 67418, 65576 AND 67417**

1 The documents listed in paragraph 1 of the appendix have been examined for compliance with **Chapter 3, Section 3 (as applicable) of the Code for Lifting Appliances in a Marine Environment, August 2009 (including notices 1 to 5)** and are assigned an appraisal status as indicated, in accordance with the following conditions:-

2 Details

The structural aspects of the hydraulic cylinders have been approved for the following design criteria:

Drawing No. 50-		2036-1-0	2037-1-0	2038-1-0	2039-1-0
Working pressure (compression)	[bar]	120	120	160	160
Working pressure (tension)	[bar]	325	325	325	325
Test pressure (compression)	[bar]	180	180	240	240
Test pressure (tension)	[bar]	487.5	487.5	487.5	487.5
Max compression force	[kN]	456	456	608	608
Max tension force	[kN]	582	582	582	582
Max. stroke	[mm]	4700	4700	3570	3570
Weight of hydraulic cylinder	[kg]	2260	2277	1825	1825
Min. design temperature	[°C]	-10°C	-10°C	-10°C	-10°C

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd's Register EMEA
 Is a subsidiary of Lloyd's Register Group Limited

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register 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 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.

Lloyd's Register EMEA
Hamburg Design Support Office
Am Sandtorkai 41
20457 Hamburg
Telephone +49 (0)40 328107 - 0 Fax +49 (0)40 328107 - 480
Email: hamburg-design-support@lr.org

Date
21 October 2013

Please quote the document number on all future communications
HPC1340030/7314-13/WG

3 Comments

- 3.1 The loadings summarized in Section 2 needs to be verified with the loading from the equipment these cylinders are intended for and it is concluded that the hydraulic cylinders are not subjected to other loads than internal pressure, axial compression forces only as per Section 2. The compression forces as per Section 2 are always to be higher than the factored forces resulting from the substation crane operation acting at the hydraulic cylinder. **AQS**
- 3.2 The structural integrity of the hydraulic cylinders is to be demonstrated during testing of the equipment the hydraulic cylinders will be attached to. This is to be done in accordance with Chapter 9 of the Code for Lifting Appliances in a Marine Environment as applicable to the surveyor's satisfaction. The hydraulic cylinders are to be further tested using the test pressure as stated in Section 2 of this Design Appraisal Document. **AQS**
- 3.3 The rod end of all cylinders (e.g. item 6 on Drg. No. 50-2036-1-0) has been approved for a thickness $t=90$ mm as stated by the manufacturer.
- 3.4 The cylinder is to be equipped with valves which hold the load in position in case of loss of the hydraulic pressure.
- 3.5 It is further concluded that all welding will be in compliance with an approved weld procedure. The welds, weld preparations and NDE are to be to the surveyor's satisfaction.
- 3.6 The Minimum Design Temperature is concluded to be -10°C
- 3.7 The materials are to comply with the Charpy V-notch test requirements of Table 3.2.17, 3.2.18 and 3.2.19 of Lloyd's Registers Code for Lifting Appliances in a Marine Environment (Notice No. 3).
- 3.8 Fatigue and dynamic aspects have not been considered for this approval.
- 3.9 Any amendments made by Lloyd's Register in the technical documentation are to be taken into consideration.
- 3.10 The requirements of the appropriate National Authorities and any Safety at Work regulations should be complied with as applicable. **AQS**

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group Limited

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register 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 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.

Lloyd's Register EMEA
Hamburg Design Support Office
Am Sandtorkai 41
20457 Hamburg
Telephone +49 (0)40 328107 - 0 Fax +49 (0)40 328107 - 480
Email: hamburg-design-support@lr.org

Date
21 October 2013

Please quote this reference number on all future communications
HPC1340030/7314-13/WG

3 Comments, continued

3.11 The following material properties have been used as specified by the manufacturer:

Drawing No. 50-	2036-1-0	2037-1-0	2038-1-0	2039-1-0
Cylinder tube yield strength [MPa]	345	345	345	345
Cylinder tube Ultimate Tensile Strength [MPa]	490	490	490	490
Rod yield strength [MPa]	600	600	600	600
Rod Ultimate Tensile Strength [MPa]	750	750	750	750
End eye material yield strength [MPa]	265	265	265	265
End eye material Tensile Strength [MPa]	450	450	450	450

AQS

Walter Gentzcke
Senior Surveyor
Lifting Appliances
Hamburg Design Support Office
Lloyd's Register EMEA
T +49 (0)40 328107-434
E walter.gentzcke@lr.org

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group Limited

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register 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 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.

Lloyd's Register EMEA
 Hamburg Design Support Office
 Am Sandtorkai 41
 20457 Hamburg
 Telephone +49 (0)40 328107 - 0 Fax +49 (0)40 328107 - 480
 Email: hamburg-design-support@lr.org

Date
21 October 2013

Please quote this reference number on all future communications
HPC1340030/7314-13/WG

Appendix

1. The document(s) listed below has/have been examined

Document No.	Rev. / Date	Title	Status	Date
Cylinder 502036-1-0		(EB65577)		
-	-	Calculation Sheet for Hydraulic Cylinder (7 pages)	SIM	21.10.2013
50-20-36-1-0	-	AFT Table Cylinder Starboard Side	AM	21.10.2013
-	-	Parts list (2 pages)	SI	21.10.2013
Cylinder 502037-1-0		(EB67418)		
-	-	Calculation Sheet for Hydraulic Cylinder (7 pages)	SIM	21.10.2013
50-20-37-1-0	-	AFT Table Cylinder Starboard Side	AM	21.10.2013
-	-	Parts list (2 pages)	SI	21.10.2013
Cylinder 502038-1-0		(EB65576)		
-	-	Calculation Sheet for Hydraulic Cylinder (7 pages)	SIM	21.10.2013
50-20-38-1-0	-	AFT Table Cylinder Starboard Side	AM	21.10.2013
-	-	Parts list (2 pages)	SI	21.10.2013
Cylinder 502039-1-0		(EB67417)		
-	-	Calculation Sheet for Hydraulic Cylinder (7 pages)	SIM	21.10.2013
50-20-39-1-0	-	AFT Table Cylinder Starboard Side	AM	21.10.2013
-	-	Parts list (2 pages)	SI	21.10.2013

2. Documents not mentioned above are not required for appraisal or as supporting documentation and have not been retained.

Appraisal Status Codes

AM	Approved as amended - provided the arrangements are to the surveyor's satisfaction
AQS	Details to be submitted by the client to the local surveyor's Office responsible for surveying the building and the arrangements verified in accordance with the Rule/Regulations requirements by the surveyor.
SI	Retained as supporting documentation for information only
SIM	Retained as supporting documentation as amended for information only

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd's Register EMEA
 Is a subsidiary of Lloyd's Register Group Limited

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register 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 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.