



Design Appraisal Document

Lloyd's Register EMEA
Southampton Technical Support Office
Global Technology Centre
Boldrewood Innovation Campus
Southampton
SO16 7QF

Date
30 August 2016

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STSO/ENG/KK/WP26722260

Client : **Amiad Water Systems Ltd**
Manufacturer : **Amiad Water Systems Ltd**
Subject : **General Approval of 8 Omega Filters**

**8", 10" and 12" Omega I & IE Filters,
10", 12", 14" and 16" Omega II & IIE Filters,
14", 16", 18", 20" and 24" Omega III & IIIE Filters,
18", 20" and 24" Omega IV & IVE Filters.**

Valid Until 29 August 2021

This Design Appraisal Document cancels and supersedes Document No. ENG 17207197, Issue No. 6, dated 12nd November 2015

The Documents listed in paragraph 1 of the appendix have been examined for compliance with the design requirements of **Lloyd's Register Rules and Regulations for the Classification of Ships, Part 5, Chapter 11, Class 3 : July 2016** for the design conditions stated on the plans and are assigned an appraisal status as indicated subject to the following:-

1. All pressure retaining material certificates are to be to the satisfaction of the attending Surveyor in accordance with Lloyd's Register Rules Part 5 Chapter 11 Section 1.7.1
2. Filter component materials are to comply with specification, manufacture and testing requirements of Chapter 7 of the LR Rules for materials.
3. Nozzle Flange Standards are as per GA of the filter (drawing no. QP-0240-1, QP-0241-1, QP-0228-1, QP-0229-1, QP-0230, QP-0231-1, QP-0388, QP-0226, QP-0227 according to the Type of the Filter)
4. The leg length of each of the fillet welds for nozzle is to be not less than 1.4 times the actual thickness of the thinner of the parts being joined in accordance with Part 5, Chapter 10, Section 14.5.3 of LR Rules for Ships.
5. The design pressure of all filters is 10 Barg and the hydrostatic test pressure of all filters is 14.42 Barg.
6. Mountings are to be subjected to a hydraulic test of twice the approved design pressure as per Part 5

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

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Chapter 11 Section 10.2.1

7. Bolt tightening device should be used to ensure the bolting up the bolts are not overstressed.
8. Load cycles have not been considered in this appraisal as information submitted does not define.
9. External loads and/or moments caused by wind and ship motions have not been considered in this appraisal as information submitted does not define.
10. It is concluded that the NBR gasket material are used. The gasket factors have been extracted from the manufacturer's calculations.
11. The design appraisal of main flange is based on soft gasket case.
12. Should the manufacturer change the design or materials Lloyd's Register must be advised. Failure to do so will render this General Approval invalid.
13. The items referred to in this document are approved for installation in a ship classed by Lloyd's Register insofar as the above rules remain applicable and are not amended, and subject to the comments made in this design appraisal.

30 Aug 2016
K.S. Kwon

Southampton Technical Support Office
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LR031.2.2008

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Appendix

1. The documents listed below have been examined

Document No.	Rev.	Title	Status	Date
QP-0240-1	B	12" OMEGA-I 13.5K Filter	SI	20 th April 2015
QP-0241-1	B	12" OMEGA-IE 18K Filter	SI	20 th April 2015
DLN1.H080F.001	A	OMEGA-I/IE Bottom Housing 8" BW, 2 sheets	AQ	20 th April 2015
DLN1.H100F.001	B	OMEGA-I/IE Bottom Housing 10" BW, 2 sheets	AQ	20 th April 2015
DLN1.H120F.001	A	OMEGA-I/IE Bottom Housing 12" BW, 2 sheets	AQ	20 th April 2015
DLN1.H120F.001-3	0	Upper Flange for OMEGA-I/IE Housing BW	AQ	1 st September 2014
DLN1.H120F.001-5	B	Flushing Flange 3" OMEGA-I/IE	AQ	20 th April 2015
DLN1.H120F.001-6	A	Support Leg for OMEGA-I/IE Bottom Housing 12"	AQ	20 th April 2015
DLN1.H080F.002	B	OMEGA-I Upper Housing 8" BW, 2 sheets	AQ	20 th April 2015
DLN2.H080F.001	B	OMEGA-IE Upper Housing 8" BW, 2 sheets	AQ	20 th April 2015
DLN1.H100F.002	B	OMEGA-I Upper Housing 10" BW, 2 sheets	AQ	20 th April 2015
DLN2.H100F.001	B	OMEGA-IE Upper Housing 10" BW, 2 sheets	AQ	20 th April 2015
DLN1.H120F.002	B	OMEGA-I Upper Housing 12" BW, 2 sheets	AQ	20 th April 2015
DLN2.H120F.001	B	OMEGA-IE Upper Housing 12" BW, 2 sheets	AQ	20 th April 2015
DLN1.H120F.002-2	0	Bottom Partition Flange for OMEGA-I Upper Housing BW	AQ	1 st September 2014
DLN2-002085	A	Lid Weld Omega-I/IE BW	AQ	1 st September 2014
DLN2-002085-1	B	Lid Flange Omega-I/IE BW	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, I	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, IE	AQ	1 st September 2014
22/12/2014	0	12" OMEGA I/IE- CALCULATION FILE	SI	20 th April 2015
QP-0229-1	B	14" OMEGA-II 27K Filter	SI	20 th April 2015
QP-0228-1	B	14" OMEGA-IIIE 36K Filter	SI	20 th April 2015
DLN3.H100F.001	B	10" OMEGA-II/IIIE Bottom Housing, 2 sheets	AQ	20 th April 2015
DLN3.H120F.001	B	12" OMEGA-II/IIIE Bottom Housing, 2 sheets	AQ	20 th April 2015
DLN3.H140F.001	B	14" OMEGA-II/IIIE Bottom Housing, 2 sheets	AQ	20 th April 2015
DLN3.H140F.001-2	0	Upper Flange for OMEGA-II/IIIE Housing	AQ	1 st September 2014
DLN3.H140F.001-7	A	Support Leg for OMEGA-II/IIIE Bottom Housing	AQ	20 th April 2015
DLN3.H100F.002	B	10" OMEGA-II Upper Housing BW, 2 sheets	AQ	20 th April 2015
DLN4.H100F.001	C	10" OMEGA-IIIE Upper Housing BW, 2 sheets	AQ	20 th April 2015
DLN3.H120F.002	B	12" OMEGA-II Upper Housing BW, 2 sheets	AQ	20 th April 2015
DLN4.H120F.001	C	12" OMEGA-IIIE Upper Housing BW, 2 sheets	AQ	20 th April 2015
DLN3.H140F.002	B	14" OMEGA-II Upper Housing BW, 2 sheets	AQ	20 th April 2015
DLN4.H140F.003	C	14" OMEGA-IIIE Upper Housing BW, 2 sheets	AQ	20 th April 2015
DLN3.H140F.002-2	A	Bottom Partition Flange for OMEGA-II Upper Housing	AQ	20 th April 2015

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Document No.	Rev.	Title	Status	Date
DLN4-002076	D	Lid Weld Omega-II/IE BW	AQ	1 st September 2014
DLN4-002076-1	C	Lid Flange Omega-II/IE BW	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, II	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, IIE	AQ	1 st September 2014
27/02/2014	0	14" OMEGA II/IE- CALCULATION FILE	SI	1 st September 2014
QP-0575	0	16" OMEGA-IIE 36K Filter	SI	29 th August 2016
DLN3.H160F.006	A	16" OMEGA-II/IE Bottom Housing BW, 2 sheets	AQ	29 th August 2016
DLN4.H160F.002	0	16" Omega -IIE Upper Housing BW, 2 sheets	AQ	29 th August 2016
16/06/2016	0	16" OMEGA II/IE- CALCULATION FILE	SI	29 th August 2016
QP-0230	A	24" OMEGA-III 54K Filter	SI	1 st September 2014
QP-0231-1	B	24" OMEGA-III 72K Filter	SI	16 th April 2015
QP-0388	B	20" OMEGA-III ASA 150 Sigma BW SMBWG	SI	16 th April 2015
DLN5.H140F.001	0	14" OMEGA-III/III Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN5.H160F.001	0	16" OMEGA-III/III Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN5.H200F.001	A	20" OMEGA-III/III Bottom Housing, 2 sheets	AQ	16 th April 2015
DLN5.H240F.001	0	24" OMEGA-III/III Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN5.H240F.001	A	24" OMEGA-III/III Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN5.H240F.001-1	0	Upper Flange for OMEGA-III Housing	AQ	1 st September 2014
DLN5.H240F.001-2	0	48" Torispherical Head (t=14mm)	AQ	1 st September 2014
DLN1.H120F.001-5	0	Flushing Flange 3" OMEGA-I/IE	AQ	1 st September 2014
DLN5.H240F.001-4	0	Support Leg for OMEGA-III Bottom Housing	AQ	1 st September 2014
DLN5.H140F.002	A	14" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN6.H140F.001	A	14" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN5.H160F.002	A	16" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN6.H160F.001	A	16" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN5.H180F.002	A	18" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN6.H180F.001	A	18" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN5.H200F.002	A	20" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN6.H200F.001	A	20" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN5.H240F.002	A	24" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN6.H240F.001	A	24" OMEGA-III Upper Housing, 2 sheets	AQ	1 st September 2014
DLN5.H240F.001-2	0	48" Torispherical Head (t=14mm)	AQ	1 st September 2014
DLN5.H240F.002-1	A	Partition Flange for OMEGA-III Upper Housing	AQ	1 st September 2014
DLN5-003344-1	A	Lid Flange Omega-III	AQ	1 st September 2014

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Document No.	Rev.	Title	Status	Date
DLN5-003344	A	Lid Weld Omega-III/IIIE BW	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, III	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, IIIE	AQ	1 st September 2014
27/02/2014	0	24" OMEGA III/IIIE- CALCULATION FILE	SI	1 st September 2014
QP-0226	A	24" OMEGA-VI 81K Filter	SI	1 st September 2014
QP-0227	A	24" OMEGA-IVE 108K Filter	SI	1 st September 2014
DLN8.H180F.001	A	18" OMEGA-IV/IVE Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN8.H200F.001	A	20" OMEGA-IV/IVE Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN8.H240F.001	A	24" OMEGA-IV/IVE Bottom Housing, 2 sheets	AQ	1 st September 2014
DLN8.H240F.001-1	A	Upper Flange for OMEGA IVE Housing	AQ	1 st September 2014
DLN8.H240F.001-2	0	54" Torispherical Head (t=14mm)	AQ	1 st September 2014
DLN8.H240F.001-4	A	Support Leg for OMEGA-IVE Bottom Housing	AQ	1 st September 2014
DLN7.H180F.001	B	18" OMEGA-IV Upper Housing, 2sheets	AQ	1 st September 2014
DLN8.H180F.002	A	18" OMEGA-IVE Upper Housing, 2sheets	AQ	1 st September 2014
DLN7.H200F.001	A	20" OMEGA-IV Upper Housing, 2sheets	AQ	1 st September 2014
DLN8.H200F.002	A	20" OMEGA-IVE Upper Housing, 2sheets	AQ	1 st September 2014
DLN7.H240F.001	A	24" OMEGA-IV Upper Housing, 2sheets	AQ	1 st September 2014
DLN8.H240F.002	A	24" OMEGA-IVE Upper Housing, 2sheets	AQ	1 st September 2014
DLN8.H240F.002-1	A	Bottom Partition Flange for OMEGA-IVE Upper Housing	AQ	1 st September 2014
DLN8-002498	A	Lid Weld Omega-IVE	SI	1 st September 2014
DLN8-002498-1	A	Lid Flange Omega-IVE, 2sheets	SI	1 st September 2014
-	0	Omega Filters-BW Name Plate, IV	AQ	1 st September 2014
-	0	Omega Filters-BW Name Plate, IVE	AQ	1 st September 2014
27/02/2014	0	24" OMEGA IV/IVE- CALCULATION FILE	SI	1 st September 2014
QP-0501-1	0	OMEGA-I/IE Bottom Housing 12" BW	AQ	12 th November 2015
QP-0501-2	0	OMEGA-IE Upper Housing 12" BW	AQ	12 th November 2015
QP-0501-3	0	Lid Flange Omega-I/IE BW	AQ	12 th November 2015
QP-0501-4	0	Special Flushing Flange 3" OMEGA-I/IE	AQ	12 th November 2015

Appraisal Status Key

- AQ Approved subject to the matters raised that require resolution - and provided the arrangements are to the surveyor's satisfaction
- SI Retained as supporting documentation for information only

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