

Inspection Services Design Appraisal Document

Lloyd's Register Quality Assurance, Inc.
MSIS- Inspection
1330 Enclave Parkway
Suite 200
Houston
Texas 77077 USA

Date
20 June 2017

Quote this reference on all future communications
ECD1620038/001/GN issue 2

Client : The Hellan Strainer Company
Subject : WSA, D, Q and TS Series Strainers
Pressure Equipment Type : Piping Accessory
PED Category : IV
Module : B(P) + F

1. The documents listed below, have been examined for compliance with the design requirements of the ASME Section VIII Div.1 – 2015, ASME B 16.1- 2015 and ASME B 31.3 – 2014 in support of the **essential safety requirements** of the **Pressure Equipment Directive 2014/68/EU** for the design conditions stated in the documentation and are assigned an appraisal status as shown.

2. Key Design Parameters

2.1. 14, 16 and 20" WSA Strainers

2.1.1. Design Conditions

Design Pressure Barg (psi)	Design Temperature Maximum °C (° F)	Design Temperature Minimum °C (° F)
10.34 (150)	93.3 (200)	Minus 28.8 (- 20)
9.3 (135)	148.8 (300)	Minus 28.8 (- 20)
8.27 (120)	204.4 (400)	Minus 28.8 (- 20)

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2.1.2. Materials

	CS	SS
Body , dished ends and body flange	SA 516 Gr 70	SA 240 TP 316
Nozzles	SA 675 Gr 60 SA 105 SA 106 Gr B SA 234 WPB	SA 312 TP 316 SA 182 F 316 SA 479 TP 316
Body Bolting	SA 193 Gr B8M Class1	SA 193 Gr B8M Class1

2.2. D series Strainers Design Conditions

Design Pressure Temperature rating	Design Temperature Maximum °C (° F)	Design Temperature Minimum °C (° F)	
150# as per ASME B 16.5	204.4 (400)	Minus 28.8 (- 20)	SA 216 WCB, SA 352LCB, SA 351 CF8M and SA 995 Gr 6A
300# limited to 450 PSI	204.4 (400)	Minus 28.8 (- 20)	SA 216 WCB, SA 352LCB, SA 351 CF8M and SA 995 Gr

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			6A
ASME B 16.1- 2015 Class 125 rating	176.67 (350)	Minus 28.8 (- 20)	Body Cast Iron SA 278 Gr 30 with flanges as per SA 126 Gr A

2.3. Q series Strainers Design Conditions

Design Pressure Temperature rating	Design Temperature Maximum °C (° F)	Design Temperature Minimum °C (° F)	
150# as per ASME B 16.5	204.4 (400)	Minus 28.8 (- 20)	SA 216 WCB, SA 352LCB
ASME B 16.1- 2015 Class 125 rating	176.67 (350)	Minus 28.8 (- 20)	Body Cast Iron SA 278 Gr 30 with flanges as per SA 126 Gr A

2.4. TS Strainers Design Conditions

Design Pressure Barg (PSI)	Design Temperature Maximum °C (° F)	Design Temperature Minimum °C (° F)	
19.65 (285)	204.4 (400)	Minus 28.8 (- 20)	SA 216 WCB
19.65 (285)	204.4 (400)	Minus 46 (- 50)	SA 352 LCB

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18.97 (275)	204.4 (400)	Minus 28.8 (- 20)	SA 351 CF8M
11.04 (160)	176.67 (350)	Minus 28.8 (- 20)	Cast Iron SA 278 Gr 30

3. The following comment(s) need to be resolved.
 - 3.1. WSA Strainers – socket head screws SA 574 Gr 4137,4140,4142& 4145 conclude these are non pressure part bolting , if pressure part bolting , please submit PMAs
 - 3.2. D strainers – SA 278 Gr 30 material is not covered in ASME B 16.1- 2015 and accordingly we conclude material will be dual certified as SA 278 Gr.30/ ASTM 126 Class A/B for flange rating acceptance.
 - 3.3. D- Strainers please submit calculations for SB 148 strainers to establish the pressure temperature rating and clarify the pressure temperature rating for SB 148 material.
 - 3.4. D- Strainers-please submit the PMA for SB 148.
 - 3.5. D- Strainers SA 995 Gr 4A (CD3MN) is not considered as part of PED approval since calculations do not indicate allowable stress values or the material is not listed in ASME B 16.5.
 - 3.6. D & Q- Strainers Chapter 1 , Cast Iron flanges 160 psi is allowed as per ASME B 16.1-2015 upto 200 °F and not upto 210 °F. Please correct the table to indicate upto 200 °F.
4. The following point(s) are advised for information.
 - 4.1. We note from Risk analysis that the user should address as part of installation several key risk items, a copy of risk analysis should be provided to the end user.
 - 4.2. We note that safety devices are not provided and this is addressed as part of installation and end user should be advised accordingly
 - 4.3. Reference Document: TECHNICAL CONSTRUCTION FILE CONTENTS

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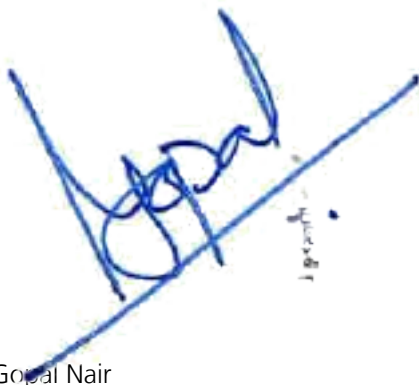
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The technical file for CE marking

Section	Contents	Rev
1	Technical File PEDQF-5	B
2	PED Categorisation	-
3	Design Calculations	-
4	EC Declaration of Conformity PEDQF01	N/A
5	Essential Safety Requirements PEDQF-3	B
6	Risk Analysis PED QF-4	A
7	PMA's	-
8	Name Plates for CULZEAN No. 1 & 2 - Doc. No. NP515599-5	6



Gopal Nair
Principal Specailist
Inspection Services - MSIS
Phone 281 649 2246
Phone - Cell -281 610 2695
Gopal.nair@lr.org

Lloyd's Register Quality Assurance, Inc.
1330 Enclave Parkway
Suite 200, Houston, Texas, 77077

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5. PMA Approval

	Material Specification	PMA#	Rev	Temp. °C Max / Min	Notes
#	SA-182 Gr F55	SA-182 Gr F55	0	204.4 / Minus 45.6	LRV Approval 26 July 2016
#	SA-240 UNS32760	SA-240 UNS32760	0	204.4 / Minus 45.6	LRV Approval 26 July 2016
#	SA-240 UNS32750	SA-240 UNS32750	0	204.4 / Minus 45.6	LRV Approval 26 July 2016
#	SA-479 UNS32760	SA-479 UNS32760	0	204.4 / Minus 45.6	LRV Approval 26 July 2016
#	SA-479 UNS32750	SA-479 UNS32750	0	204.4 / Minus 45.6	LRV Approval 26 July 2016
#	SA-276 UNS32760	SA-276 UNS32760	0	204.4 / Minus 45.6	LRV Approval 26 July 2016
#	SA-995 Gr. 6A – CD3MWCuN	SA-995 Gr. 6A	0	204.4 / Minus 45.6	LRV Approval Oct 7 2016
#	SA193-B7	SA-193 B7	0	204.4 / Minus 45.6	LRV Approval Oct 7 2016
#	SA194-Gr 2H	SA-194 Gr 2H	0	204.4 / Minus 45.6	LRV Approval Oct 7 2016
#	SA216-WCB	SA216-WCB	0	204.4 / Minus 28.9	LRV Approval Oct 7 2016
#	ASTM278-Gr30	ASTM278-Gr30	0	176.7/Minus 28.9	LRV Approval Oct 7 2016
#	SA351-GRCF8M	SA351-GRCF8M	0	204.4 / Minus 28.9	LRV Approval Oct 7 2016
#	SA352-LCB	SA352-LCB	0	204.4 / Minus 45.6	LRV Approval Oct 7 2016
#	<i>SA106 Gr B</i>	<i>SA106 Gr B</i>	<i>1</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA105</i>	<i>SA105</i>	<i>2</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA 479 S31600</i>	<i>SA 479 316</i>	<i>0</i>	<i>204.4 / Minus 196</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA516 Gr 70</i>	<i>SA516 Gr 70</i>	<i>2</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA675 Gr 70</i>	<i>SA675 Gr 70</i>	<i>0</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA675 Gr 65</i>	<i>SA675 Gr 65</i>	<i>0</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA675 Gr 60</i>	<i>SA675 Gr 60</i>	<i>0</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA 182 S31600</i>	<i>SA 182 316</i>	<i>1</i>	<i>204.4 / Minus 196</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA 312 TP 31600</i>	<i>SA 312 TP 316</i>	<i>0</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA 403 316</i>	<i>SA 403 TP 316</i>	<i>0</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA 240 S31600</i>	<i>SA 240 S31600</i>	<i>1</i>	<i>204.4 / Minus 196</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA234 WPB</i>	<i>SA 234 WPB</i>	<i>0</i>	<i>204.4 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>A126 Class A</i>	<i>A126 Class A</i>	<i>0</i>	<i>180 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>A126 Class B</i>	<i>A126 Class B</i>	<i>0</i>	<i>180 / Minus 28.9</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA194 Gr 2H</i>	<i>SA194 Gr 2H</i>	<i>0</i>	<i>204.4 / Minus 45.6</i>	<i>LRV Approval June 20 2017</i>
#	<i>SA193 Gr B8M Class 1</i>	<i>SA193 Gr B8M Class 1</i>	<i>0</i>	<i>204.4 / Minus 196</i>	<i>LRV Approval June 20 2017</i>

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#	<i>SA351 CD3MWCuN</i>	<i>SA351 CD3MWCuN</i>	1	204.4 / Minus 45.6	LRV Approval June 20 2017
#	<i>SA36</i>	<i>SA36</i>	2	204.4/ Minus 28.9	LRV Approval June 20 2017

5.1. The above is a complete list of PMAs approved and it is to be ensured that materials for PED strainers are procured from the above list only.

6. List of Documents:

Document(s):	Issue / Revision	Status	Date
<i>Dual Basket Strainers Calculations</i>	5	AQ	20 June 2017
<i>140 WSA-PED-211 – 14" Welded Strainer</i>	2	AQ	20 June 2017
<i>WSA 14 INCH CARBON STEEL STRAINER CS and SS calculations</i>	4/11/2017	SI	20 June 2017
<i>160 WSA-PED-211 – 16" Welded Strainer</i>	1	AQ	20 June 2017
<i>WSA 16 INCH CARBON STEEL STRAINER CS and SS calculations</i>	4/11/2017	SI	20 June 2017
<i>200 WSA-PED-211 – 20" Welded Strainer</i>	1	AQ	20 June 2017
<i>WSA 20 INCH CARBON STEEL STRAINER CS and SS calculations</i>	4/11/2017	SI	20 June 2017
<i>Q strainers Calculations</i>	4/24/2017	AQ	20 June 2017
<i>TS Strainer Calculations</i>	4/24/2017	AQ	20 June 2017

marked in bold and italics have been dealt with in this submission

Appraisal Status Key

AM Approved as amended for PMAs approval.
AQ Approved / Examined subject to matters identified which require resolution
SI Retained as supporting documentation for information only

All statuses that aren't applicable shall be removed from the table above

Distribution

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