



Vendor 	ABT 360 KT/Y PP PLANT Project		Owner  سراج گستران رجال SERAJ GOSTARAN REJAL <small>(سهامی خاص)</small>
	PQR / WPS		
	Vendor's Doc. No.: 23249-25 PPEC Doc. No.: L03-RE037-QC-WBK-001	Rev.: 00	

PPEC REQ. NO. : L03-RE037-QC-WBK-001

ITEM NO. :



TOTAL PAGES : 61

- **NO COMMENTS** : Documents/Drawings Were Checked By PPEC And Further Step Can Be Followed.
- **COMMENTED AS MARKED:** Documents/Drawings Were Checked By PPEC And Marked Comments Must Be Considered By Vendor. Vendor Shall Revise Documents/Drawing As Per Comments And The New Revision Of Documents/Drawings Must Be Revised Prior To Fabrication.
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- **ACCEPTABLE WITH COMMENTS:** Documents/Drawings Were Checked By PPEC And Comments Must Be Considered By Vendor. Fabrication Can Proceed Accordingly. Revised Document To Be Issued Either For Review Or As Final Certified. However PPEC Will Check The Revised Document For Proper Incorporation Of Comments.
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Name : Signature: Date :	Req. No. :	Seq. No.:
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PPEC review & comments does not absolve the vendor of the responsibility for the corrected design, manufacturing and operation of the equipment

00	31-03-2025	Issue for Engineering	S.K.	S.K.	J.J.	
REV.	DATE	Description	Prepared by	Checked by	Approved by	Authorized by

Vendor	ABT 360 KT/Y PP PLANT		Contractor (DEC)	Owner
	PQR/WPS			
	Vendor's Doc. No.: 2 3 2 4 9 - 2 5	Rev.: 00		
PPEC Doc. No.: L03-RE037-QC-WBK-001				
				 سراج گستران رجال SERAJ GOSTARAN REJAL (سهامی خاص)

PAGE NO.		CHANGE INDEX DURING FORMAL ISSUE						REASON OF LATEST CHANGE
		FIRST ISSUE	SECOND ISSUE	THIRTH ISSUE	FOURTH ISSUE	FIFTH ISSUE	SIXTH ISSUE	
		REV.00	REV.01	REV.02	REV.03	REV.04	REV.05	
1		X						
2		X						
3		X						
4		X						
5		X						
6		X						
7		X						
8		X						
9		X						
10		X						
11		X						
12		X						
13		X						
14		X						
15		X						
16		X						
17		X						
18		X						
19		X						
20		X						
21		X						
22		X						
23		X						
24		X						
25		X						
26		X						
27		X						
28		X						
29		X						
30		X						
31		X						
32		X						
33		X						
34		X						
35		X						
36		X						
37		X						
38		X						
39		X						
61		X						

WPS REGISTER

Fabrication Application i.e. structural / piping / vessel	Fabrication welding Code incl. issue year	Welding procedure specification (WPS) No. incl rev	WPS/PWR (no. Of pages)	welding process	Qualifying material thickness range	Qualifying diameter (piping / Tubular)	Post weld heat treatment (PWHT) Applicable (Yes/No)	Coupon welding position and thickness
piping / vessel	ASME IX : 2021	P2000 rev 5	2	GTAW	1,5 - 10,32 mm	1/2 inch (min)	No	6G, 5,2 mm
piping / vessel	ASME IX : 2021	P2500 rev 5	2	GTAW	1,5 - 10,32 mm	1/2 inch (min)	No	6G, 5,2 mm
structural	AWS D1.1 / D1.1M 2010	S2300 rev 5	2	GMAW	3,0 - no max.	600 mm (min)	No	2F, 30 mm
structural	AWS D1.1 / D1.1M 2010	S2400 rev 2	2	GMAW	3,0 - no max.	600 mm (min)	No	3F, 30 mm
structural	AWS D1.1 / D1.1M 2010	S2500 rev 1	2	GMAW	3,0 - no max.	600 mm (min)	No	4F, 30 mm
structural	AWS D1.1 / D1.1M 2010	S2600 rev 5	2	GMAW	3,0 - 8,00 mm	600 mm (min)	No	2G, 4 mm
structural	AWS D1.1 / D1.1M 2010	S2700 rev 5	2	GMAW	8,0 - 16,00 mm	600 mm (min)	No	2G, 8 mm
structural	AWS D1.1 / D1.1M 2010	S2800 rev 3	2	GMAW	16,00 - 40,00 mm	600 mm (min)	No	2G, 20 mm

3.0 PQR REGISTER

Fabrication Application i.e. structural / piping / vessel	Fabrication welding Code incl. issue year	Weldin procedure qualification record (PQR) no. Incl rev	PQR (no. Of pages)	PQRD welding data record	PQRD no of pages	Mechanical test no.	Impact tested	No of test pages	WPS Reference
piping / vessel	ASME IX : 2010 incl add. 2011	RET 0245029-001-17 rev 0	3	ARL 1559-1 rev 0	3	SL 12.6043-1A	Yes, -55°C	2	P2000
piping / vessel	ASME IX : 2010 incl add. 2011	RET 0245029-001-19 rev 0	3	ARL 1559-3 rev 0	3	SL 12.6045-1A	Yes, -55°C	2	P2500
structural	AWS D1.1 / D1.1M 201C	RET 0245029-001-25 rev 1	3	ARL 1559-13 rev 1	3	SL 12-6055-1	No	1	S2300
structural	AWS D1.1 / D1.1M 201C	RET 0245029-001-26 rev 1	3	ARL 1559-14 rev 1	3	SL 12-6056-1	No	1	S2400
structural	AWS D1.1 / D1.1M 2015	RET 0278790-TK-001 rev 1	2	ARL 2064-1 rev 1	3	ARJ001-16-01-18390-1	Yes, -40°C	4	S2600
structural	AWS D1.1 / D1.1M 2015	RET 0278790-TK-002 rev 1	2	ARL 2064-2 rev 1	3	ARJ001-16-01-18390-2	Yes, -40°C	4	S2700
structural	AWS D1.1 / D1.1M 2015	RET 0278790-TK-003 rev 1	3	ARL 2064-3 rev 1	3	ARJ001-16-01-18390-2	Yes, -40°C	1	S2800

PQR record number	RET0278790/TK/003	Revision 1	WPS record number	S2800	Revision 1
Date	1-6-2016		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2015	

BASE METALS

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Plate	API 2W (50)LS	U	II	-	-	20	-
and tested:	Plate	API 2W (50)LS	U	II	-	-	20	-
Notes	Without PWHT, With impacts, With hardness							

JOINTS

Joint design		Single-V-groove	See addition information	See addition information
Backing:		None		
Retainers		None		
Groove angle	(deg.)	60		
Root opening	(mm)	2-3		
Root face	(mm)	0-1		

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

FILLER METALS

SFA specification	5.18
AWS classification	E70C-6MH4
Filler metal F-number	6
Weld metal A-number	-
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln, OS MC715-H
Filler metal size (mm)	1,2
Deposited thickness (mm)	24,00
Maximum pass thickness (mm)	5
Weld deposit chemistry	-
Supplemental filler metal	-
Supplemental filler metal vol. (mm ³)	-

POSITION

Position	2G
Weld progression	-

PREHEAT

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	196

GAS

Shielding gas:	Type	AC-20 (A5.32 SG-)
	Flow rate (l/min)	15
Trailing gas:	Type	None
	Flow rate (l/min)	-
Backing gas:	Type	None
	Flow rate (l/min)	-

ELECTRICAL

Filler metal size (mm)	1,2
Waveform control	Not Used
Energy (J)	Not Used
Power (J/s)	Not Used
Arc time (sec)	Not Used
Weld bead length (mm)	Not Used
Amperes	122 - 233
Volts	15,8 - 26,8
Travel speed (mm/min)	125 - 577
Maximum heat input (kJ/mm)	2,9078
Current/polarity	DCEP (reverse polarity)
Wire feed speed (m/min)	0
Arc transfer mode	Short-circuiting, Spray, Globular

TECHNIQUE

String or weave	Stringer and Weave
Orifice/gas cup size	15
C.T.W.D. (mm)	15
Multi/single electrode	Single electrode
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None



PQR record number Date	RET0278790/TK/003 1-6-2016	Revision 1	WPS record number Company name Welding standard	S2800 Airpack Netherlands BV AWS D1.1/D1.1M:2015	Revision 1
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TENSILE TESTS							Reduced section
Specimen number	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location	
1	20,02	19,75	380,00	-	513	Ductile-BM	
2	20,04	19,43	380,76	-	518	Ductile-BM	
Comments							

GUIDED BEND TESTS			
Type of test	Acceptance criteria	Result	Comments
side bend	AWS D1.1	Acceptable	
side bend	AWS D1.1	Acceptable	
side bend	AWS D1.1	Acceptable	
side bend	AWS D1.1	Acceptable	
Comments			

TOUGHNESS TESTS								
Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	(J)	Impact values (% Shear)	(mm)	Drop weight break
1	Weld Metal	Charpy V	10 x 10	-40	106/108/92	-	-	No
2	HAZ	Charpy V	10 x 10	-40	188/174/262	-	-	No
3	HAZ + 1 mm	Charpy V	10 x 10	-40	318/323/299	-	-	No
4	HAZ + 2 mm	Charpy V	10 x 10	-40	374/377/338	-	-	No
5	HAZ + 2 mm	Charpy V	10 x 10	-40	360/357/375	-	-	No
Comments								

HARDNESS TEST						
Type (Scale)	Distance from surface	API 2W (50)LS	HAZ	Weld	HAZ	API 2W (50)LS
Vickers (HV)	Cap area 1-2 mm	175-179-177	173-179-188-196-187	208-188-211-210-212	199-195-191-189-179	177-174-176
Vickers (HV)	Root area 1-2 mm	174-176-174	171-178-189-186-183	186-186-180-180-179	173-176-176-175-174	173-170-171
Vickers (HV)	Cap area 1-2 mm	175-179-179	176-177-186-203-179	206-202-214-208-205	196-195-194-192-189	174-174-177
Vickers (HV)	Root area 1-2 mm	179-178-179	172-178-176-182-178	184-186-184-190-189	174-179-178-176-171	176-175-175
Comments						

OTHER TESTS			
Type of test	Acceptance criteria	Result	Comments
2x Macroscopic examination	AWS D1.1	Acceptable	
RT examination	AWS D1.1	Acceptable	
MT examination	AWS D1.1	Acceptable	
Comments			

CERTIFICATION				
Welder's name	ID Number	Stamp number	Mechanical testing by Laboratory test number Test file number Tests conducted by	Element Breda (NL) ARJ001-16-01-18390-3 ARL2064-3 A. Karstjanje
Dorremans M.	ID Card IKP0996J6	W-013		

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1 Structural Welding Code-Steel.

Signature 1

Name	Signature
F. van Toledo	
Date	
1-6-2016	

Signature 2

Name	Signature
T. Konings (Lloyds)	
Date	
1-6-2016	



PQRD number	ARL2064-3	Revision 1	Date	11-01-2016
PQR number	RET0278790/TK003	Revision 1	Welding standard	AWS D1.1/D1.1M:2015
WPS number	S2800	Revision 1	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

Product form	Plate	Welded to:	Product form	Plate
Material control number	815634 272762/1		Material control number	815634 272762/1
Specification (type or grade)	API 2W (50)LS		Specification (type or grade)	API 2W (50)LS
Nominal composition	C-Mn		Nominal composition	C-Mn
Trade name	Voestalpine Grobblech		Trade name	Voestalpine Grobblech
P number	U		P number	U
G number			G number	
AWS group number	II		AWS group number	II
Nominal pipe/tube size	-		Nominal pipe/tube size	-
Schedule	-		Schedule	-
Length (mm)	500		Length (mm)	500
Width (OD) (mm)	200		Width (OD) (mm)	200
Thickness (mm)	20		Thickness (mm)	20

JOINTS

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	60		
Root opening (mm)	2-3		
Root face (mm)	0-1		

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQRD number	ARL2064-3	Revision 1	Date	11-01-2016
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PASS INFORMATION

Pass number	1	2	3	4	5	6
Layer number	1	2	3	3	4	5

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW	GMAW	GMAW	GMAW
Type	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic

FILLER METALS

Material control number	P1FC150311	P1FC150311	P1FC150311	P1FC150311	P1FC150311	P1FC150311
SFA specification	5.18	5.18	5.18	5.18	5.18	5.18
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4
Filler metal F-number	6	6	6	6	6	6
Weld metal A-number	-	-	-	-	-	-
Filler metal nominal composition	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H
Filler metal size (mm)	1,2	1,2	1,2	1,2	1,2	1,2
Length of filler metal consumed (mm)	-	-	-	-	-	-
Deposited thickness (mm)	4	4	4	4	4	4
Maximum pass thickness (mm)	5	5	5	5	5	5
Weld deposit chemistry	-	-	-	-	-	-
Supplemental filler metal	-	-	-	-	-	-
Supplemental filler metal vol. (mm³)	-	-	-	-	-	-

POSITION

Position	2G	2G	2G	2G	2G	2G
Weld progression	-	-	-	-	-	-

PREHEAT

Preheat temperature (°C)	10	10	10	10	10	10
Maximum interpass temperature (°C)	10	35	56	84	106	119

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15	15	15	15
Trailing gas: Type	None	None	None	None	None	None
Flow rate (l/min)	-	-	-	-	-	-
Backing gas: Type	None	None	None	None	None	None
Flow rate (l/min)	-	-	-	-	-	-

ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2	1,2	1,2	1,2
Waveform control	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Energy (J)	-	-	-	-	-	-
Power (J/s)	-	-	-	-	-	-
Arc time (sec)	-	-	-	-	-	-
Weld bead length (mm)	-	-	-	-	-	-
Amperes	122	219	227	223	233	233
Volts	15,8	26,0	26,0	26,0	26,0	26,6
Travel speed (mm/min)	125	430	360	259	336	297
Maximum heat input (kJ/mm)	0,9252	0,7945	0,9837	1,3432	1,0818	1,2238
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-	-	-	-
Arc transfer mode	Short-circuiting	Spray	Spray	Spray	Spray	Spray

TECHNIQUE

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	15	15	15	15	15	15
C.T.W.D (mm)	15	15	15	15	15	15
Multi/single electrode	Single electrode	Single electrode	Single electrode	Single electrode	Single electrode	Single electrode
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None	None	None	None

PQRD number	ARL2064-3	Revision 1	Date	11-01-2016
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PASS INFORMATION

Pass number	7	8	9	10	11	12
Layer number	5	5	5	5	6	6

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW	GMAW	GMAW	GMAW
Type	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic

FILLER METALS

Material control number	P1FC150311	P1FC150311	P1FC150311	P1FC150311	P1FC150311	P1FC150311
SFA specification	5.18	5.18	5.18	5.18	5.18	5.18
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4
Filler metal F-number	6	6	6	6	6	6
Weld metal A-number	-	-	-	-	-	-
Filler metal nominal composition	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H
Filler metal size (mm)	1,2	1,2	1,2	1,2	1,2	1,2
Length of filler metal consumed (mm)	-	-	-	-	-	-
Deposited thickness (mm)	4	4	4	4	4	4
Maximum pass thickness (mm)	5	5	5	5	5	5
Weld deposit chemistry	-	-	-	-	-	-
Supplemental filler metal	-	-	-	-	-	-
Supplemental filler metal vol. (mm³)	-	-	-	-	-	-

POSITION

Position	2G	2G	2G	2G	2G	2G
Weld progression	-	-	-	-	-	-

PREHEAT

Preheat temperature (°C)	10	10	10	10	10	10
Maximum interpass temperature (°C)	106	98	116	137	153	159

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15	15	15	15
Trailing gas: Type	None	None	None	None	None	None
Flow rate (l/min)	-	-	-	-	-	-
Backing gas: Type	None	None	None	None	None	None
Flow rate (l/min)	-	-	-	-	-	-

ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2	1,2	1,2	1,2
Waveform control	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Energy (J)	-	-	-	-	-	-
Power (J/s)	-	-	-	-	-	-
Arc time (sec)	-	-	-	-	-	-
Weld bead length (mm)	-	-	-	-	-	-
Amperes	226	233	227	217	224	222
Volts	26.6	26.6	26.6	26.7	26.6	26.8
Travel speed (mm/min)	248	577	443	291	527	351
Maximum heat input (kJ/mm)	1,4544	0,6445	0,8178	1,1946	0,6784	1,017
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-	-	-	-
Arc transfer mode	Spray	Spray	Spray	Spray	Spray	Globular

TECHNIQUE

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size (mm)	15	15	15	15	15	15
C.T.W.D	15	15	15	15	15	15
Multi/single electrode	Single electrode	Single electrode	Single electrode	Single electrode	Single electrode	Single electrode
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None	None	None	None

PQRD number	ARL2064-3	Revision 1	Date	11-01-2016
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PASS INFORMATION

Pass number	13	14	15			
Layer number	6	6	6			

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW			
Type	Semi-automatic	Semi-automatic	Semi-automatic			

FILLER METALS

Material control number	P1FC150311	P1FC150311	P1FC150311			
SFA specification	5.18	5.18	5.18			
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4			
Filler metal F-number	6	6	6			
Weld metal A-number	-	-	-			
Filler metal nominal composition	N.A.	N.A.	N.A.			
Filler metal trade name	Lincoln, OS MC715-H	Lincoln, OS MC715-H	Lincoln, OS MC715-H			
Filler metal size (mm)	1,2	1,2	1,2			
Length of filler metal consumed (mm)	-	-	-			
Deposited thickness (mm)	4	4	4			
Maximum pass thickness (mm)	5	5	5			
Weld deposit chemistry	-	-	-			
Supplemental filler metal	-	-	-			
Supplemental filler metal vol. (mm³)	-	-	-			

POSITION

Position	2G	2G	2G			
Weld progression	-	-	-			

PREHEAT

Preheat temperature (°C)	10	10	10			
Maximum interpass temperature (°C)	178	196	169			

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)			
Flow rate (l/min)	15	15	15			
Trailing gas: Type	None	None	None			
Flow rate (l/min)	-	-	-			
Backing gas: Type	None	None	None			
Flow rate (l/min)	-	-	-			

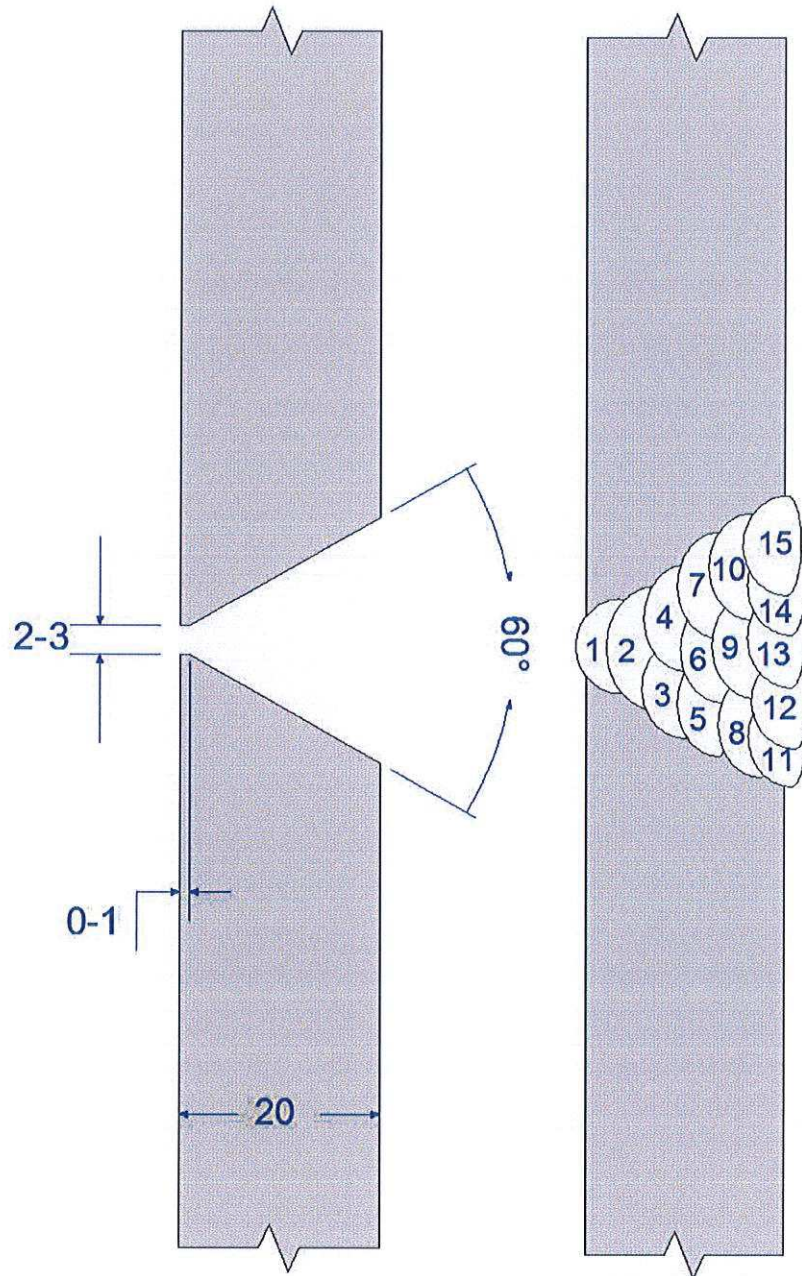
ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2			
Waveform control	Not Used	Not Used	Not Used			
Energy (J)	-	-	-			
Power (J/s)	-	-	-			
Arc time (sec)	-	-	-			
Weld bead length (mm)	-	-	-			
Amperes	220	210	194			
Volts	26,8	26,8	21,7			
Travel speed (mm/min)	387	382	430			
Maximum heat input (kJ/mm)	0,9141	0,884	0,5685			
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)			
Wire feed speed (m/min)	-	-	-			
Arc transfer mode	Globular	Globular	Globular			

TECHNIQUE

Stringer or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave			
Orifice/gas cup size	15	15	15			
C.T.W.D (mm)	15	15	15			
Multi/single electrode	Single electrode	Single electrode	Single electrode			
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes			
Peening	Not used	Not used	Not used			
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding			
Back gouging method	None	None	None			

PQRD number	ARL2064-3	Revision 1	Date	11-01-2016
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WPS record number	P2000	Revision 5	Qualified to	ASME Section ASME IX:2021
Date	Tuesday, 25 January 2022		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0245029-001-17 - Rev 0			
Reference docs.				

Scope	Welding instruction piping Groove, no PWHT (As-welded), impact testing
Joint	Joint details for this welding procedure specification in: Production drawings,

BASE METALS (QW-403)

Type	Carbon steel (P1)	P-no. 1	Grp-no. 1
Welded to	Carbon steel (P1)	P-no. 1	Grp-no. 1
Backing:	Without backingP-no.		
Retainers			
Notes			

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	1,50	10,32	-	-
Impact tested	2.58	10.32	-	-
Partial pen.	1.50	10.32	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	½"	no max.	-	-

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GTAW	5.18	ER70S-3	6	1	Lincoln Ellectric LNT 25 (solid wire)	1.5	10.32	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	-	- None -			

WELDING PROCEDURE

Welding process	GTAW								
Type	Manual								
Minimum preheat temperature (°C)	20								
Maximum interpass temperature (°C)	221 Method contact thermometer								
Tungsten size (mm)	2,4								
Tungsten type	SFA 5.12 EWCE-2								
Filler metal size (mm)	2,4								
Layer number	All								
Position	All								
Weld progression	Uphill								
Current/polarity	DCEN (straight polarity)								
Amperes	90 -120								
Volts	9 -11								
Travel speed (mm/min)	30 - 70								
Maximum heat input (kJ/mm)	1,8165								
DC pulsing current	None								
Shielding: Gas type	Argon (A5.32 SG-A) Purity min. 99.998%								
Flow rate (l/min)	12 - 16								
Trailing: Gas type	None								
Flow rate (l/min)	None								
Backing: Gas type	None								
Flow rate (l/min)	None								
String or weave	Stringer or Weave								
Orifice/gas cup size	9.5								
Multi/Single pass per side	Multi passes								
Weld deposit chemistry	-								
Notes	When, before welding, the base metal temperature is below 0°C, the base metal shall be preheated to at least 20°								

WPS record number	P2000	Revision 5	Qualified to	ASME Section ASME IX:2021
Date	Tuesday, 25 January 2022		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
ASME B31.1	Base metal p1: Min. 95 °C for thickness >25 mm and specified maximum carbon content > 0.30% Base metal p1: Min. 10 °C for thickness >25 mm and specified maximum carbon content ≤ 0.30% Base metal p1: Min. 10 °C for thickness ≤25 mm maximum carbon content no additional limits.
ASME B31.3	Base metal p1: Min. 95 °C for thickness >25 mm and specified maximum carbon content > 0.30% Base metal p1: Min. 10 °C for thickness >25 mm and specified maximum carbon content ≤ 0.30% Base metal p1: Min. 10 °C for thickness ≤25 mm maximum carbon content no additional limits.

TECHNIQUE (QW-410)

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Grinding and Brushing
Back gouging method	None
Closed to out chamber	None
Use of thermal processes	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Tuesday, 25 January 2022			

WPS record number	P2500	Revision 5	Qualified to	ASME Section ASME IX:2021
Date	Tuesday, 25 January 2022		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0245029-001-19 – Rev 0			
Reference docs.				

Scope	Welding instruction piping Groove, no PWHT (As-welded), impact testing
Joint	Joint details for this welding procedure specification in: Production drawings,

BASE METALS (QW-403)

Type	Carbon steel (P1)	P-no. 1	Grp-no. 2
Welded to	Carbon steel (P1)	P-no. 1	Grp-no. 2
Backing:	Without backing		.
Retainers			
Notes			

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	1,50	10,32	-	-
Impact tested	2.58	10.32	-	-
Partial pen.	1.50	10.32	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	½"	no max.	-	-

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GTAW	5.18	ER70S-3	6	1	Lincoln Ellectric LNT 25 (solid wire)	1.5	10.32	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	-	- None -			

WELDING PROCEDURE

Welding process	GTAW			
Type	Manual			
Minimum preheat temperature (°C)	20			
Maximum interpass temperature (°C)	223 Method contact thermometer			
Tungsten size (mm)	2,4			
Tungsten type	SFA 5.12 EWCe-2			
Filler metal size (mm)	2,4			
Layer number	All			
Position	All			
Weld progression	Uphill			
Current/polarity	DCEN (straight polarity)			
Amperes	90 -115			
Volts	9 -12			
Travel speed (mm/min)	30 - 70			
Maximum heat input (kJ/mm)	1,65			
DC pulsing current	None			
Shielding: Gas type	Argon (A5.32 SG-A)			
Flow rate (l/min)	14			
Trailing: Gas type	None			
Flow rate (l/min)	None			
Backing: Gas type	None			
Flow rate (l/min)	None			
String or weave	Stringer or Weave			
Orifice/gas cup size	9.5			
Multi/Single pass per side	Multi passes			
Weld deposit chemistry	-			
Notes	When, before welding, the base metal temperature is below 0°C, the base metal shall be preheated to at least 20°			

WPS record number	P2500	Revision 5	Qualified to	ASME Section ASME IX:2021
Date	Tuesday, 25 January 2022		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
ASME B31.1	Base metal p1: Min. 95 °C for thickness >25 mm and specified maximum carbon content > 0.30% Base metal p1: Min. 10 °C for thickness >25 mm and specified maximum carbon content ≤ 0.30% Base metal p1: Min. 10 °C for thickness ≤25 mm maximum carbon content no additional limits.
ASME B31.3	Base metal p1: Min. 95 °C for thickness >25 mm and specified maximum carbon content > 0.30% Base metal p1: Min. 10 °C for thickness >25 mm and specified maximum carbon content ≤ 0.30% Base metal p1: Min. 10 °C for thickness ≤25 mm maximum carbon content no additional limits.

TECHNIQUE (QW-410)

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Grinding and Brushing
Back gouging method	None
Closed to out chamber	None
Use of thermal processes	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Tuesday, 25 January 2022			

WPS record number	S2300	Revision 6	Qualified to	AWS D1.1/D1.1M:2020
Date	Tuesday, 03 January 2023		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0245029-001-25 – Rev 1			
Reference docs.	Test record: ARL 1559-13			

Scope	Fillet welds single layer a = ≤ 6 mm and multi-layer fillet welds a = ≥ 8 mm without PWHT, Fillet-weld test
Joint	Joint details for this welding procedure specification in: Production drawings,

BASE METALS

Type	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Welded to	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Backing:	None
Retainers	
Notes	

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	-	-	-	-
Impact tested	-	-	-	-
Partial pen.	-	-	-	-
Fillet welds	3,0	No max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	600.	no max.	-	-

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GMAW	5.18	ER70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	No max.	-	-
Note	-	-	-	-	-	Single pass a=6 mm and smaller Multi pass a=8 mm and larger			

WELDING PROCEDURE

Welding process	GMAW								
Type	Semi-automatic								
Minimum preheat/interpass temperature (°C)	10								
Maximum interpass temperature (°C)	112 Method contact thermometer								
Filler metal size (mm)	1,2								
Layer number	All								
Position	F, H								
Weld progression	-								
Current/polarity	DCEP (Reverse polarity)								
Amperes	1 Single Layer 220 – 269 1 Multi layer 222 – 271 2 Multi layer 213 -260 3 Multi layer 216 -264								
Volts	1 Single Layer 24,5 – 28,2 1 Multi layer 24,5 – 28,2 2 Multi layer 24,7 -28,4 3 Multi layer 24,5 – 28,2								
Travel speed (mm/min)	1 Single Layer 236 – 293 1 Multi layer 236 – 293 2 Multi layer 293 - 488 3 Multi layer 286 -477								
Maximum heat input (kJ/mm)	1 Single Layer 1,23 1 Multi layer 1,24 2 Multi layer 0,96 3 Multi layer 0,99								
Arc transfer mode	Spray								
Shielding: Gas type	AC-20 (A5.32 SG)								
Flow rate (l/min)	12-22								
Trailing: Gas type	None								
Flow rate (l/min)	None								
Backing: Gas type	None								
Flow rate (l/min)	None								
String or weave	Stringer and Weave								
Orifice/gas cup size	15								
C . T . W . D (mm)	15								
Multi/Single pass per side	Single or Multi passes								
Multi/Single electrode	Single electrode								
Maximum pass thickness (mm)	5								
Weld deposit chemistry	-								
Power source	CV								

WPS record number	S2300	Revision 6	Qualified to	AWS D1.1/D1.1M:2020
Date	Tuesday, 03 January 2023		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
AWS D1.1 (Category A)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C). Over 19 thru 38.1(mm): 66(°C) Over 38.1 thru 63.5(mm): 107(°C) Over 63.5 (mm): 150(°C)

TECHNIQUE

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Grinding and Brushing
Back gouging method	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Tuesday, 03 January 2023			

WPS record number	S2400	Revision 4	Qualified to	AWS D1.1/D1.1M:2010
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0245029-001-26 – Rev 1			
Reference docs.				

Scope	Fillet welds single layer a = ≤ 6 mm and multi-layer fillet welds a = ≥ 8 mm Fillet, no PWHT (As-welded)
Joint	Joint details for this welding procedure specification in: Production drawings

BASE METALS

Type	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Welded to	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Backing:	None
Retainers	None
Notes	

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	-	-	-	-
Impact tested	-	-	-	-
Partial pen.	-	-	-	-
Fillet welds	No min.	No max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	600.	no max.	-	-

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GMAW	5.18	ER70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	No max.	-	-
Note	-	-	-	-	-	Single pass a=6 mm and smaller Multi pass a=8 mm and larger			

WELDING PROCEDURE

Welding process	GMAW			
Type	Semi-automatic			
Minimum preheat/interpass temperature (°C)	10			
Maximum interpass temperature (°C)	188 Method contact thermometer			
Filler metal size (mm)	1,2			
Layer number	All			
Position	V			
Weld progression	Uphill			
Current/polarity	DCEP (Reverse polarity)			
Amperes	127 – 157			
Volts	14.7 – 17.1			
Travel speed (mm/min)	54 – 112			
Maximum heat input (kJ/mm)	1,88			
Arc transfer mode	Short-circuit			
Shielding: Gas type	AC-20 (A5.32 SG)			
Flow rate (l/min)	12-22			
Trailing: Gas type	None			
Flow rate (l/min)	None			
Backing: Gas type	None			
Flow rate (l/min)	None			
String or weave	Stringer and Weave			
Orifice/gas cup size	15			
C . T . W . D (mm)	15			
Multi/Single pass per side	Single or Multi passes			
Multi/Single electrode	Single electrode			
Maximum pass thickness (mm)	5			
Weld deposit chemistry	-			
Power source	CV			

WPS record number	S2400	Revision 4	Qualified to	AWS D1.1/D1.1M:2010
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
AWS D1.1 (Category A)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C). Over 19 thru 38.1(mm): 66(°C) Over 38.1 thru 63.5(mm): 107(°C) Over 63.5 (mm): 150(°C)

TECHNIQUE (QW-410)

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Grinding and Brushing
Back gouging method	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Thursday, 29 September 2022			

WPS record number	S2500	Revision 3	Qualified to	AWS D1.1/D1.1M:2010
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0245029-001-27 – Rev 1			
Reference docs.				

Scope	Fillet welds single layer a = ≤ 6 mm and multi-layer fillet welds a = ≥ 8 mm Fillet, no PWHT (As-welded)
Joint	Joint details for this welding procedure specification in: Production drawings,

Type	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II	<div>THICKNESS RANGE QUALIFIED</div> <table><tr><th rowspan="2"></th><th colspan="2">As-welded</th><th colspan="2">With PWHT</th></tr><tr><th>Min.</th><th>Max.</th><th>Min.</th><th>Max.</th></tr><tr><td>Complete pen.</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Impact tested</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Partial pen.</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Fillet welds</td><td>3 mm</td><td>No max.</td><td>-</td><td>-</td></tr></table>		As-welded		With PWHT		Min.	Max.	Min.	Max.	Complete pen.	-	-	-	-	Impact tested	-	-	-	-	Partial pen.	-	-	-	-	Fillet welds	3 mm	No max.	-	-
	As-welded			With PWHT																											
	Min.		Max.	Min.	Max.																										
Complete pen.	-		-	-	-																										
Impact tested	-		-	-	-																										
Partial pen.	-	-	-	-																											
Fillet welds	3 mm	No max.	-	-																											
Welded to	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II																														
Backing:	None																														
Retainers	None																														
Notes																															

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	600.	no max.	-	-

FILLER METALS

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GMAW	5.18	ER70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	No max.	-	-
Note	-	-	-	-	-	Single pass a=6 mm and smaller Multi pass a=8 mm and larger			

WELDING PROCEDURE

Welding process	GMAW			
Type	Semi-automatic			
Minimum preheat/interpass temperature (°C)	10			
Maximum interpass temperature (°C)	128 Method contact thermometer			
Filler metal size (mm)	1,2			
Layer number	All			
Position	O			
Weld progression	-			
Current/polarity	DCEP (Reverse polarity)			
Amperes	204 – 233			
Volts	24 – 26,1			
Travel speed (mm/min)	330 – 490			
Maximum heat input (kJ/mm)	1,106			
Arc transfer mode	Spray			
Shielding: Gas type	AC-20 (A5.32 SG)			
Flow rate (l/min)	12-22			
Trailing: Gas type	None			
Flow rate (l/min)	None			
Backing: Gas type	None			
Flow rate (l/min)	None			
String or weave	Stringer and Weave			
Orifice/gas cup size	15			
C . T . W . D (mm)	15			
Multi/Single pass per side	Multi passes			
Multi/Single electrode	Single electrode			
Maximum pass thickness (mm)	5			
Weld deposit chemistry	-			
Power source	CV			

WPS record number	S2500	Revision 3	Qualified to	AWS D1.1/D1.1M:2010
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
AWS D1.1 (Category A)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C). Over 19 thru 38.1(mm): 66(°C) Over 38.1 thru 63.5(mm): 107(°C) Over 63.5 (mm): 150(°C)

TECHNIQUE

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Grinding and Brushing
Back gouging method	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Thursday, 29 September 2022			

WPS record number	S2600	Revision 5	Qualified to	AWS D1.1/D1.1M:2020
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0278790/TK/001 - Rev 1			
Reference docs.				

Scope	Groove, no PWHT (As-welded), impact testing
Joint	Joint details for this welding procedure specification in: Production drawings

BASE METALS

Type	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Welded to	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Backing:	None
Retainers	None
Notes	

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	3,	8,	-	-
Impact tested	3,	8,	-	-
Partial pen.	3,	8,	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	600,	no max.	-	-

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GMAW	5.18	E70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	8,	-	-
GMAW						-	-	-	-
GMAW						-	-	-	-
Sup. filler						- Required -			
Suppl. filler metal vol. (mm³)	-								

WELDING PROCEDURE

Welding process		GMAW	GMAW	GMAW
Type		Semi-automatic	Semi-automatic	Semi-automatic
Minimum preheat/interpass temperature (°C)		10	10	10
Maximum interpass temperature (°C)		124 Method contact thermometer	124 Method contact thermometer	124 Method contact thermometer
Filler metal size (mm)		1,2	1,2	1,2
Layer number		Root	Fill	Cap
Position		F,H	F,H	F,H
Weld progression		Not applicable	Not applicable	Not applicable
Current/polarity		DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Waveform control		Not Used	Not Used	Not Used
Energy (J)		Not Used	Not Used	Not Used
Power (J/s)		Not Used	Not Used	Not Used
Amperes		80 - 100	175 - 185	175 - 185
Volts		14 - 16	19 - 21	19 - 21
Travel speed (mm/min)		110 - 120	460 - 500	440 - 470
Maximum heat input (kJ/mm)		0,57 - 0,70	0,40 - 0,49	0,44 - 0,53
Wire feed speed (m/min)		Not used	Not used	Not used
Arc transfer mode		Short-circuiting	Globular	Globular
Shielding: Gas type		AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)		14 - 16	14 - 16	14 - 16
Trailing: Gas type		None	None	None
Flow rate (l/min)		-	-	-
Backing: Gas type		None	None	None
Flow rate (l/min)		-	-	-
String or weave		Stringer or Weave	Stringer or Weave	Stringer or Weave
Orifice/gas cup size		15	15	15
C.T.W.D (mm)		15	15	15
Multi/Single pass per side		Single pass	Multiple passes	Multiple passes
Multi/single electrode		Single electrode	Single electrode	Single electrode
Maximum pass thickness (mm)		5	5	5
Weld deposit chemistry		-	-	-
Power Source		CV	CV	CV

WPS record number	S2600	Revision 5	Qualified to	AWS D1.1/D1.1M:2020
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
AWS D1.1 (Category B)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C). Over 19 thru 38.1(mm): 10(°C). Over 38.1 thru 63.5(mm): 66(°C). Over 63.5(mm): 107(°C).

TECHNIQUE

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

NOTES

Signature 1

Name	Signature
F. van Toledo	
Date	
Thursday, 29 September 2022	

Signature 2

Name	Signature
Date	

WPS record number	S2700	Revision 5	Qualified to	AWS D1.1/D1.1M:2020
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0278790/TK/002 - Rev 1			
Reference docs.				

Scope	General instruction welding structural for skids Groove, fillet, no PWHT (As-welded), impact testing
Joint	Joint details for this welding procedure specification in: Production drawings

BASE METALS

Type	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Welded to	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Backing:	None P-no. Grp-no.
Retainers	None
Notes	

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	3,	16,	-	-
Impact tested	8,	16,	-	-
Partial pen.	3,	16,	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	600,	no max.	-	-

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GMAW	5.18	E70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	16,	-	-
GMAW						-	-	-	-
GMAW						-	-	-	-
Sup. filler	-	-	-	-	-	- None -			

WELDING PROCEDURE

	GMAW	GMAW	GMAW
Welding process	Semi-automatic	Semi-automatic	Semi-automatic
Type	10	10	10
Minimum preheat/interpass temperature (°C)	178 Method contact thermometer	178 Method contact thermometer	178 Method contact thermometer
Maximum interpass temperature (°C)	1,2	1,2	1,2
Filler metal size (mm)	Root	Filler	Cap
Layer number	F, H	F, H	F, H
Position	Not applicable	Not applicable	Not applicable
Weld progression	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Current/polarity			
Waveform control			
Energy (J)			
Power (J/s)			
Amperes	117 - 143	190 - 210	190 - 210
Volts	15 - 17	21 - 23	22 - 24
Travel speed (mm/min)	135 - 150	320 - 350	350 - 390
Maximum heat input (kJ/mm)	0,8 - 1,0	0,7 - 0,8	0,6 - 0,8
Wire feed speed (m/min)	0,	0	0
Arc transfer mode	Short-circuiting	Globular	Globular
Shielding: Gas type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	12- 22	12 - 22	12 - 2
Trailing: Gas type	None	None	None
Flow rate (l/min)	-	-	-
Backing: Gas type	None	None	None
Flow rate (l/min)	-	-	-
String or weave	Stringer and Weave	Stringer or Weave	Stringer or Weave
Orifice/gas cup size	15	15	15
C.T.W.D (mm)	15	15	15
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes
Multi/single electrode	Single electrode	Single electrode	Single electrode
Maximum pass thickness (mm)	5	5	5
Weld deposit chemistry	-	-	-
Power source	CV	CV	CV

WPS record number	S2700	Revision 5	Qualified to	AWS D1.1/D1.1M:2020
Date	Thursday, 29 September 2022		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
AWS D1.1 (Category B)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C). Over 19 thru 38.1(mm): 10(°C). Over 38.1 thru 63.5(mm): 66(°C). Over 63.5(mm): 107(°C).

TECHNIQUE

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Thursday, 29 September 2022			

Signature 2

WPS record number	S2800	Revision 6	Qualified to	AWS D1.1/D1.1M:2020
Date	Monday, 02 January 2023		Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0278790/TK/003 - Rev 1			
Reference docs.				

Scope	General instruction welding structural for skids Groove, fillet, no PWHT (As-welded), impact testing
Joint	Joint details for this welding procedure specification in: Production drawings

BASE METALS

Type	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Welded to	Plate: API 2W (50) AWS D1.1 Grp-no II / ISO 15608 Grp-no II
Backing:	None P-no. Grp-no.
Retainers	None
Notes	

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	3,	40,	-	-
Impact tested	16,	40.	-	-
Partial pen.	3,	40,	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	600,	no max.	-	-

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GMAW	5.18	E70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	40,	-	-
GMAW						-	-	-	-
GMAW						-	-	-	-
Sup. filler	-	-	-	-	-	- None -			

WELDING PROCEDURE

	GMAW	GMAW	GMAW
Welding process	Semi-automatic	Semi-automatic	Semi-automatic
Type	10	10	10
Minimum preheat/interpass temperature (°C)	200 Method contact thermometer	200 Method contact thermometer	200 Method contact thermometer
Maximum interpass temperature (°C)	1,2	1,2	1,2
Filler metal size (mm)	Root	Filler	Cap
Layer number	H	H	H
Position	Not applicable	Not applicable	Not applicable
Weld progression	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Current/polarity			
Waveform control			
Energy (J)			
Power (J/s)			
Amperes	110 - 140	215- 240	190 - 225
Volts	15 - 17	25 - 27	21 - 26
Travel speed (mm/min)	135 - 150	250 - 500	290 - 500
Maximum heat input (kJ/mm)	0,8 - 1,0	0,6 - 1,4	0,5 - 1,1
Wire feed speed (m/min)	0,	0	0
Arc transfer mode	Short-circuiting	Spray	Globular
Shielding: Gas type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	12- 22	12 - 22	12 - 2
Trailing: Gas type	None	None	None
Flow rate (l/min)	-	-	-
Backing: Gas type	None	None	None
Flow rate (l/min)	-	-	-
String or weave	Stringer and Weave	Stringer or Weave	Stringer or Weave
Orifice/gas cup size	15	15	15
C.T.W.D (mm)	15	15	15
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes
Multi/single electrode	Single electrode	Single electrode	Single electrode
Maximum pass thickness (mm)	6	6	6
Weld deposit chemistry	-	-	-
Power Source	CV	CV	CV

WPS record number	S2800	Revision 6	Qualified to	AWS D1.1/D1.1M:2020
Date	Monday, 02 January 2023		Company name	Airpack Netherlands BV

PREHEAT TABLE


Applicable standard	
AWS D1.1 (Category B)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C). Over 19 thru 38.1(mm): 10(°C). Over 38.1 thru 63.5(mm): 66(°C). Over 63.5(mm): 107(°C).

TECHNIQUE

Peening	Not used
Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

NOTES

Signature 1

Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Monday, 02 January 2023			

Signature 2

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Procedure Qualification Record (PQR) - QW-483

WeldOffice WPS



PQR record number	RET 0245029-001-17	Revision 0	WPS record number	P2000	Revision 1
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX:2010 including addenda 2011	

BASE METALS (QW-403)

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Pipe/Tube	SA-333 (6)	1	1	63,50	Standard	5,16	73,03
	Pipe/Tube	SA-333 (6)	1	1	63,50	Standard	5,16	73,03
and tested:	Without PWHT, With impacts							
Notes								

JOINTS (QW-402)

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	60		
Root opening (mm)	4		
Root face (mm)	0-1		

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

SFA specification	5.18
AWS classification	ER70S-3
Filler metal F-number	6
Weld metal A-number	1
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln Electric, LNT 25
Filler metal size (mm)	2,4
Deposited thickness (mm)	5,16
Maximum pass thickness (mm)	4
Weld deposit chemistry	-

POSITION (QW-405)

Position	6G
Weld progression	Uphill

PREHEAT (QW-406)

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	166

GAS (QW-408)

Shielding gas: Type	Argon (A5.32 SG-A)
Flow rate (l/min)	14
Trailing gas: Type	None
Flow rate (l/min)	-
Backing gas: Type	None
Flow rate (l/min)	-

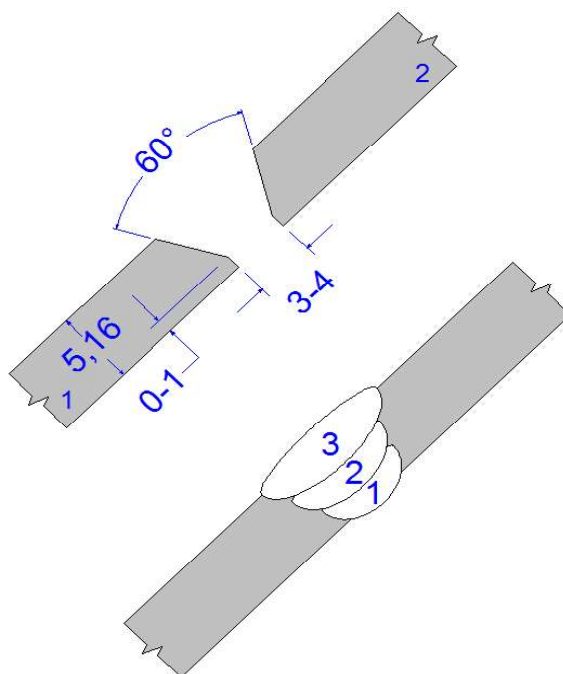
ELECTRICAL (QW-409)

Filler metal size (mm)	2,4
Amperes	97 - 101
Volts	9,6 - 10,3
Travel speed (mm/min)	33 - 69
Maximum heat input (kJ/mm)	1,8165
Tungsten size (mm)	2,4
Tungsten type	SFA 5.12 EWCe-2
Current/polarity	DCEN (straight polarity)
DC pulsing current	None

TECHNIQUE (QW-410)

String or weave	Stringer and Weave
Orifice/gas cup size	9,5
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQR record number	RET 0245029-001-17	Revision 0	WPS record number	P2000	Revision 1
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX:2010 including addenda 2011	



Pipe diameter 2½" x STD (73,0,3x5,15 mm)

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



PQRD number	ARL1559-1	Revision 0	Date	29-5-2012
PQR number	RET 0245029-001-17	Revision 0	Welding standard	ASME Section IX:2010 including addenda 2011
WPS number	P2000	Revision 1	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GTAW
Type	Manual

BASE METALS (QW-403)

Product form	Pipe/Tube
Material control number	353566
Specification (type or grade)	SA-333 (6)
Nominal composition	C-Mn-Si
Trade name	Vallourec & Mannesmann
P number	1
G number	1
AWS group number	U
Nominal pipe/tube size	63,50
Schedule	Standard
Length (mm)	150
Width (OD) (mm)	73,03
Thickness (mm)	5,16

Welded to:

Product form	Pipe/Tube
Material control number	353566
Specification (type or grade)	SA-333 (6)
Nominal composition	C-Mn-Si
Trade name	Vallourec & Mannesmann
P number	1
G number	1
AWS group number	U
Nominal pipe/tube size	63,50
Schedule	Standard
Length (mm)	150
Width (OD) (mm)	73,03
Thickness (mm)	5,16

JOINTS (QW-402)

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	60		
Root opening (mm)	4		
Root face (mm)	0-1		

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQRD number	ARL1559-1	Revision 0	Date	29-5-2012
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PASS INFORMATION

Pass number	1	2	3
Layer number	1	2	3

WELDING PROCESSES

Welding process	GTAW	GTAW	GTAW
Type	Manual	Manual	Manual

FILLER METALS (QW-404)

Material control number	334136	334136	334136
SFA specification	5.18	5.18	5.18
AWS classification	ER70S-3	ER70S-3	ER70S-3
Filler metal F-number	6	6	6
Weld metal A-number	1	1	1
Filler metal nominal composition	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln Electric, LNT 25	Lincoln Electric, LNT 25	Lincoln Electric, LNT 25
Filler metal size (mm)	2,4	2,4	2,4
Length of filler metal consumed (mm)	-	-	-
Deposited thickness (mm)	3	3	3
Maximum pass thickness (mm)	4	4	4
Weld deposit chemistry	-	-	-
Flux nominal composition	N.A.	N.A.	N.A.
Flux trade name	N.A.	N.A.	N.A.

POSITION (QW-405)

Position	6G	6G	6G
Weld progression	Uphill	Uphill	Uphill

PREHEAT (QW-406)

Preheat temperature (°C)	10	10	10
Maximum interpass temperature (°C)	10	112	166

GAS (QW-408)

Shielding gas: Type	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)
Flow rate (l/min)	14	14	14
Trailing gas: Type	None	None	None
Flow rate (l/min)	-	-	-
Backing gas: Type	None	None	None
Flow rate (l/min)	-	-	-

ELECTRICAL (QW-409)

Filler metal size (mm)	2,4	2,4	2,4
Amperes	97	101	97
Volts	10.1	9.6	10.3
Travel speed (mm/min)	64	69	33
Maximum heat input (kJ/mm)	0,9185	0,8431	1,8165
Tungsten size (mm)	2,4	2,4	2,4
Tungsten type	SFA 5.12 EWCe-2	SFA 5.12 EWCe-2	SFA 5.12 EWCe-2
Current/polarity	DCEN (straight polarity)	DCEN (straight polarity)	DCEN (straight polarity)
DC pulsing current	None	None	None

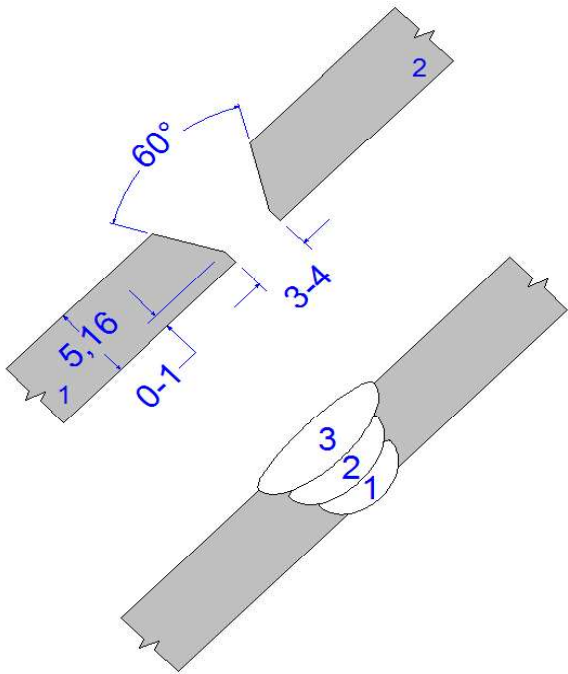
TECHNIQUE (QW-410)

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	9,5	9,5	9,5
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None

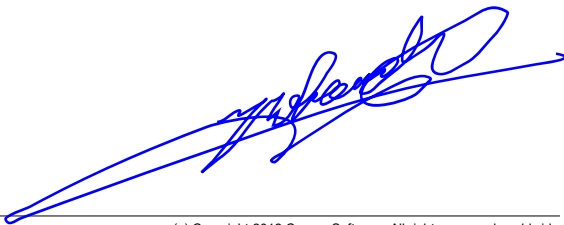
PASS PERFORMED/WITNESSED BY

Welders name	A. Sumantri	A. Sumantri	A. Sumantri
Recorded/witnessed by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)
Date	29-5-2012	29-5-2012	29-5-2012
Data entry by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

PQRD number	ARL1559-1	Revision 0	Date	29-5-2012
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Pipe diameter 2½" x STD (73,0,3x5,15 mm)



PQR record number	RET 0245029-001-19	Revision 0	WPS record number	P2500	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX:2010 including addenda 2011	

BASE METALS (QW-403)

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Pipe/Tube	SA-350 (LF2)	1	2	63,50	Standard	5,16	73,03
	Pipe/Tube	SA-350 (LF2)	1	2	63,50	Standard	5,16	73,03
and tested:	Without PWHT, With impacts							
Notes								

JOINTS (QW-402)

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	30		
Root opening (mm)	4		
Root face (mm)	0-1		

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

SFA specification	5.18
AWS classification	ER70S-3
Filler metal F-number	6
Weld metal A-number	1
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln Electric, LNT 25
Filler metal size (mm)	2,4
Deposited thickness (mm)	5,16
Maximum pass thickness (mm)	4
Weld deposit chemistry	-

POSITION (QW-405)

Position	6G
Weld progression	-

PREHEAT (QW-406)

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	167

GAS (QW-408)

Shielding gas: Type	Argon (A5.32 SG-A)
Flow rate (l/min)	14
Trailing gas: Type	None
Flow rate (l/min)	-
Backing gas: Type	None
Flow rate (l/min)	-

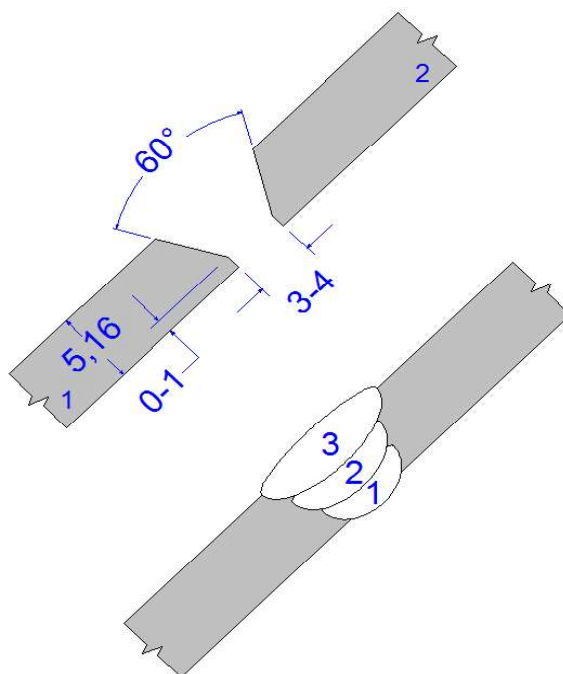
ELECTRICAL (QW-409)

Filler metal size (mm)	2,4
Amperes	93 - 98
Volts	9,6 - 10,6
Travel speed (mm/min)	37 - 58
Maximum heat input (kJ/mm)	1,65
Tungsten size (mm)	2,4
Tungsten type	SFA 5.12 EWCe-2
Current/polarity	DCEN (straight polarity)
DC pulsing current	None

TECHNIQUE (QW-410)

String or weave	Stringer and Weave
Orifice/gas cup size	9,5
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQR record number	RET 0245029-001-19	Revision 0	WPS record number	P2500	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX:2010 including addenda 2011	



Pipe diameter 2½" x STD (73,0,3x5,15 mm)

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



PQRD number	ARL1559-3	Revision 0	Date	29-5-2012
PQR number	RET 0245029-001-19	Revision 0	Welding standard	ASME Section IX:2010 including addenda 2011
WPS number	P2500	Revision 0	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GTAW
Type	Manual

BASE METALS (QW-403)

Product form	Pipe/Tube
Material control number	29685
Specification (type or grade)	SA-350 (LF2)
Nominal composition	C-Mn-Si
Trade name	Sochorvá válcovna S.A.
P number	1
G number	2
AWS group number	U
Nominal pipe/tube size	63,50
Schedule	Standard
Length (mm)	150
Width (OD) (mm)	73,03
Thickness (mm)	5,16

Welded to:

Product form	Pipe/Tube
Material control number	29685
Specification (type or grade)	SA-350 (LF2)
Nominal composition	C-Mn-Si
Trade name	Sochorvá válcovna S.A.
P number	1
G number	2
AWS group number	U
Nominal pipe/tube size	63,50
Schedule	Standard
Length (mm)	150
Width (OD) (mm)	73,03
Thickness (mm)	5,16

JOINTS (QW-402)

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	60		
Root opening (mm)	4		
Root face (mm)	0-1		

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQRD number	ARL1559-3	Revision 0	Date	29-5-2012
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PASS INFORMATION

Pass number	1	2	3
Layer number	1	2	3

WELDING PROCESSES

Welding process	GTAW	GTAW	GTAW
Type	Manual	Manual	Manual

FILLER METALS (QW-404)

Material control number	334136	334136	334136
SFA specification	5.18	5.18	5.18
AWS classification	ER70S-3	ER70S-3	ER70S-3
Filler metal F-number	6	6	6
Weld metal A-number	1	1	1
Filler metal nominal composition	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln Electric, LNT 25	Lincoln Electric, LNT 25	Lincoln Electric, LNT 25
Filler metal size (mm)	2,4	2,4	2,4
Length of filler metal consumed (mm)	-	-	-
Deposited thickness (mm)	3	3	3
Maximum pass thickness (mm)	4	4	4
Weld deposit chemistry	-	-	-
Flux nominal composition	N.A.	N.A.	N.A.
Flux trade name	N.A.	N.A.	N.A.

POSITION (QW-405)

Position	6G	6G	6G
Weld progression	-	-	-

PREHEAT (QW-406)

Preheat temperature (°C)	10	10	10
Maximum interpass temperature (°C)	10	154	167

GAS (QW-408)

Shielding gas: Type	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)
Flow rate (l/min)	14	14	14
Trailing gas: Type	None	None	None
Flow rate (l/min)	-	-	-
Backing gas: Type	None	None	None
Flow rate (l/min)	-	-	-

ELECTRICAL (QW-409)

Filler metal size (mm)	2,4	2,4	2,4
Amperes	93	98	96
Volts	9.6	9.9	10.6
Travel speed (mm/min)	58	54	37
Maximum heat input (kJ/mm)	0,9236	1,078	1,6502
Tungsten size (mm)	2,4	2,4	2,4
Tungsten type	SFA 5.12 EWCe-2	SFA 5.12 EWCe-2	SFA 5.12 EWCe-2
Current/polarity	DCEN (straight polarity)	DCEN (straight polarity)	DCEN (straight polarity)
DC pulsing current	None	None	None

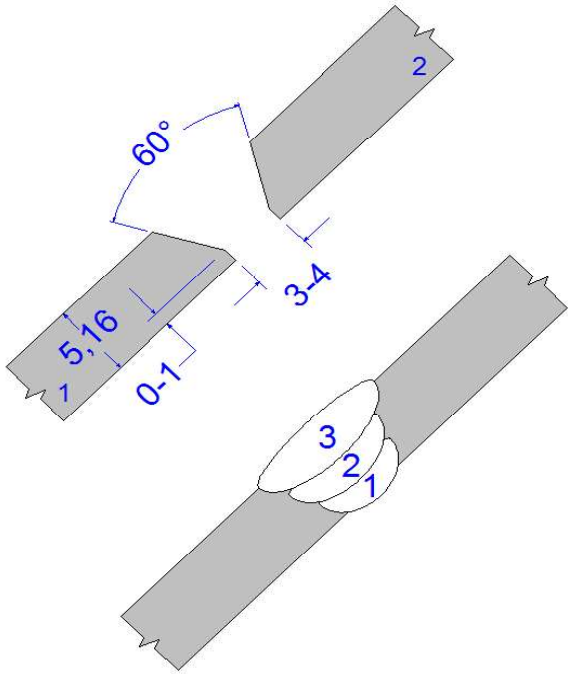
TECHNIQUE (QW-410)

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	9,5	9,5	9,5
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None

PASS PERFORMED/WITNESSED BY

Welders name	A. Sumantri	A. Sumantri	A. Sumantri
Recorded/witnessed by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)
Date	29-5-2012	29-5-2012	29-5-2012
Data entry by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

PQRD number	ARL1559-3	Revision 0	Date	29-5-2012
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Pipe diameter 2½" x STD (73,0,3x5,15 mm)



Airpack Netherlands BV

Groenewegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR)

WeldOffice WPS



PQR record number	RET 0245029-001-25	Revision 1	WPS record number	S2300	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2010	

BASE METALS

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Plate	API 2W (50)	U	II	-	-	30	-
	Plate	API 2W (50)	U	II	-	-	30	-
and tested:	Without PWHT, Fillet-weld test							
Notes								

JOINTS

Joint design	Fillet weld	See addition information	See addition information
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WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

FILLER METALS

SFA specification	5.18
AWS classification	E70C-6MH4
Filler metal F-number	6
Weld metal A-number	-
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2
Deposited thickness (mm)	8,00
Maximum pass thickness (mm)	5
Weld deposit chemistry	-
Supplemental filler metal	-
Supplemental filler metal vol. (mm³)	-

POSITION

Position	2F
Weld progression	-

PREHEAT

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	112

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)
Flow rate (l/min)	15
Trailing gas: Type	None
Flow rate (l/min)	-
Backing gas: Type	None
Flow rate (l/min)	-

ELECTRICAL

Filler metal size (mm)	1,2
Amperes	237 - 245
Volts	26,4 - 26,6
Travel speed (mm/min)	315 - 391
Maximum heat input (kJ/mm)	1,2421
Current/polarity	DCEP (reverse polarity)
Wire feed speed (m/min)	0
Arc transfer mode	Spray

TECHNIQUE

String or weave	Stringer and Weave
Orifice/gas cup size	15
C.T.W.D (mm)	15
Multi/single electrode	Single electrode
Multi/Single pass per side	Single and Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

Airpack Netherlands BV

Groenewegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR) - Test results (as welded)

WeldOffice WPS



PQR record number	RET 0245029-001-25	Revision 1	WPS record number	S2300	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2010	

TENSILE TESTS

Specimen number	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
Comments						

GUIDED BEND TESTS

Type of test	Acceptance criteria	Result	Comments
Comments			

FILLET WELD TESTS

Type of test	Acceptance criteria	Result	Fillet leg size (mm) x (mm)
3x Macroscopic examination multiple pass	AWS D1.1	Acceptable	a=8 mm
3x Macroscopic examination single pass	AWS D1.1	Acceptable	a=6 mm
Comments			

CERTIFICATION

Welder's name	ID Number	Stamp number	Mechanical testing by	
T. Lajos	ID Card 353992JA	W-104	Laboratory test number	Schielab Breda (NLD)
			Test file number	SL 12.6055-1
			Tests conducted by	ARL1559-13
				A. Karstanje

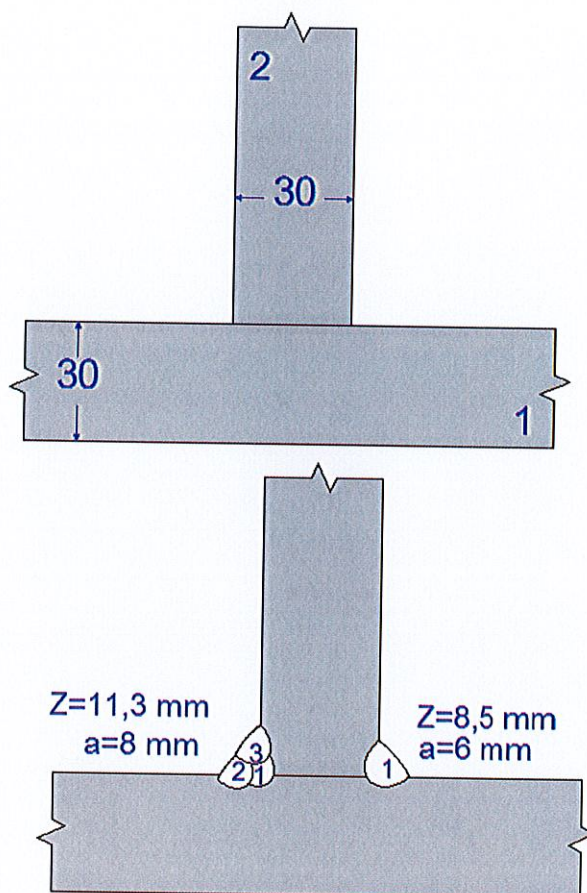
We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1-2010 Structural Welding Code-Steel.

Signature 1

Name	Signature	Name	Signature
Franky van Toledo		W. Komdeur (Lloyds)	
Date		Date	
8-6-2012		8-6-2012	



PQR record number	RET 0245029-001-25	Revision 1	WPS record number	S2300	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D 1.1M:2010	



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



PQRD number	ARL1559-13	Revision 1	Date	29-5-2012
PQR number	RET 0245029-001-25	Revision 1	Welding standard	AWS D1.1/D1.1M:2010
WPS number	S2300	Revision 0	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

Product form	Plate
Material control number	362705
Specification (type or grade)	API 2W (50)
Nominal composition	C-Mn
Trade name	Dillinger Hutte
P number	U
G number	
AWS group number	II
Nominal pipe/tube size	-
Schedule	-
Length	(mm) 350
Width (OD)	(mm) 150
Thickness	(mm) 30

Welded to:

Product form	Plate
Material control number	362705
Specification (type or grade)	API 2W (50)
Nominal composition	C-Mn
Trade name	Dillinger Hutte
P number	U
G number	
AWS group number	II
Nominal pipe/tube size	-
Schedule	-
Length	(mm) 350
Width (OD)	(mm) 150
Thickness	(mm) 30

JOINTS

Joint design	Fillet weld	See addition information	See addition information

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

Airpack Netherlands BV

Groenewegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS



PQRD number	ARL1559-13	Revision	1	Date	29-5-2012
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PASS INFORMATION

Pass number	1 single layer	1 Multi layer	1 Multi layer	2 Multi layer
Layer number	1	1	2	2

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW	GMAW
Type	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic

FILLER METALS

Material control number	P1FC110214	P1FC110214	P1FC110214	P1FC110214
SFA specification	5.18	5.18	5.18	5.18
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4
Filler metal F-number	6	6	6	6
Weld metal A-number	-	-	-	-
Filler metal nominal composition	N.A.	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2	1,2	1,2	1,2
Length of filler metal consumed (mm)	-	-	-	-
Deposited thickness (mm)	4	4	4	4
Maximum pass thickness (mm)	5	5	5	5
Weld deposit chemistry	-	-	-	-
Supplemental filler metal	-	-	-	-
Supplemental filler metal vol. (mm³)	-	-	-	-

POSITION

Position	2F	2F	2F	2F
Weld progression	-	-	-	-

PREHEAT

Preheat temperature (°C)	10	10	10	10
Maximum interpass temperature (°C)	10	10	85	112

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15	15
Trailing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-
Backing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-

ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2	1,2
Amperes	245	247	237	240
Volts	26.4	26.4	26.6	26.4
Travel speed (mm/min)	315	315	391	382
Maximum heat input (kJ/mm)	1,232	1,2421	0,9674	0,9952
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-	-
Arc transfer mode	Spray	Spray	Spray	Spray

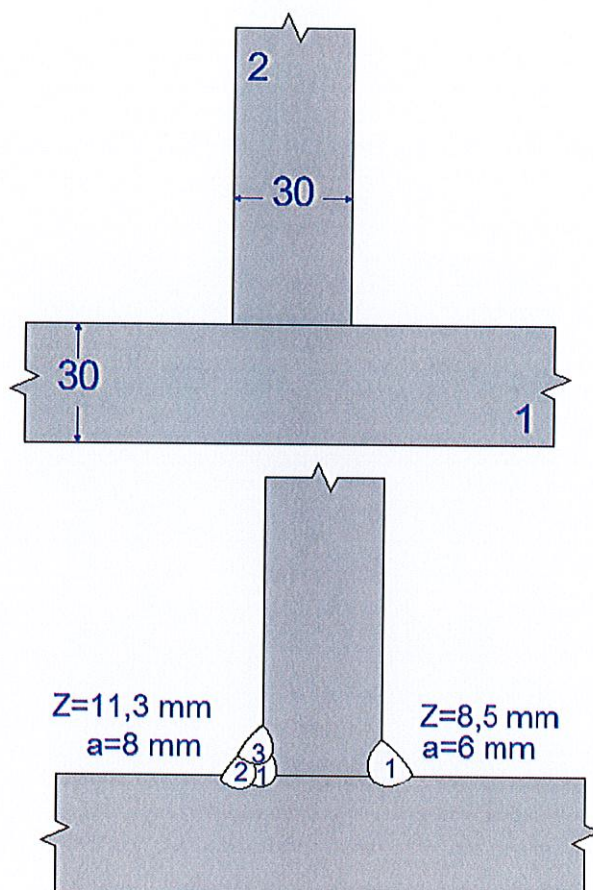
TECHNIQUE

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	15	15	15	15
C.T.W.D (mm)	15	15	15	15
Multi/single electrode	Single electrode	Single electrode	Single electrode	Single electrode
Multi/Single pass per side	Multiple passes	Single pass	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None	None

PASS PERFORMED/WITNESSED BY

Welders name	T. Lajos	T. Lajos	T. Lajos	T. Lajos
Recorded/witnessed by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)
Date	29-5-2012	29-5-2012	29-5-2012	29-5-2012
Data entry by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

PQRD number	ARL1559-13	Revision 1	Date	29-5-2012
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Airpack Netherlands BV

Groenewegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR)

WeldOffice WPS



PQR record number	RET 0245029-001-26	Revision 1	WPS record number	S2400	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2010	

BASE METALS

	Product form	Specification (type or grade)	P no.	Grp.-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Plate	API 2W (50)	U	II	-	-	30	-
	Plate	API 2W (50)	U	II	-	-	30	-
and tested:	Without PWHT, Fillet-weld test							
Notes								

JOINTS

Joint design	Fillet weld	See addition information	See addition information
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WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

FILLER METALS

SFA specification	5.18
AWS classification	E70C-6MH4
Filler metal F-number	6
Weld metal A-number	-
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2
Deposited thickness (mm)	8,00
Maximum pass thickness (mm)	5
Weld deposit chemistry	-
Supplemental filler metal	-
Supplemental filler metal vol. (mm ³)	-

POSITION

Position	3F
Weld progression	Uphill

PREHEAT

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	132

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)
Flow rate (l/min)	15
Trailing gas: Type	None
Flow rate (l/min)	-
Backing gas: Type	None
Flow rate (l/min)	-

ELECTRICAL

Filler metal size (mm)	1,2
Amperes	142 - 143
Volts	15,9 - 16
Travel speed (mm/min)	72 - 90
Maximum heat input (kJ/mm)	1,88
Current/polarity	DCEP (reverse polarity)
Wire feed speed (m/min)	0
Arc transfer mode	Short-circuiting

TECHNIQUE

String or weave	Stringer and Weave
Orifice/gas cup size	15
C.T.W.D (mm)	15
Multi/single electrode	Single electrode
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR) - Test results (as welded)

WeldOffice WPS



PQR record number	RET 0245029-001-26	Revision 1	WPS record number	S2400	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2010	

TENSILE TESTS

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location

Comments

GUIDED BEND TESTS

Type of test	Acceptance criteria	Result	Comments

Comments

FILLET WELD TESTS

Type of test	Acceptance criteria	Result	Fillet leg size (mm) x (mm)
3x Macroscopic examination multiple pass	AWS D1.1	Acceptable	a=8 mm
3x Macroscopic examination single pass	AWS D1.1	Acceptable	a=6 mm

Comments

CERTIFICATION

Welder's name	ID Number	Stamp number	Mechanical testing by	
T. Lajos	ID Card 353992JA	W-104	Laboratory test number	Schielab Breda (NLD)
			Test file number	SL 12.6056-1
			Tests conducted by	ARL1559-14
				A. Karstanje

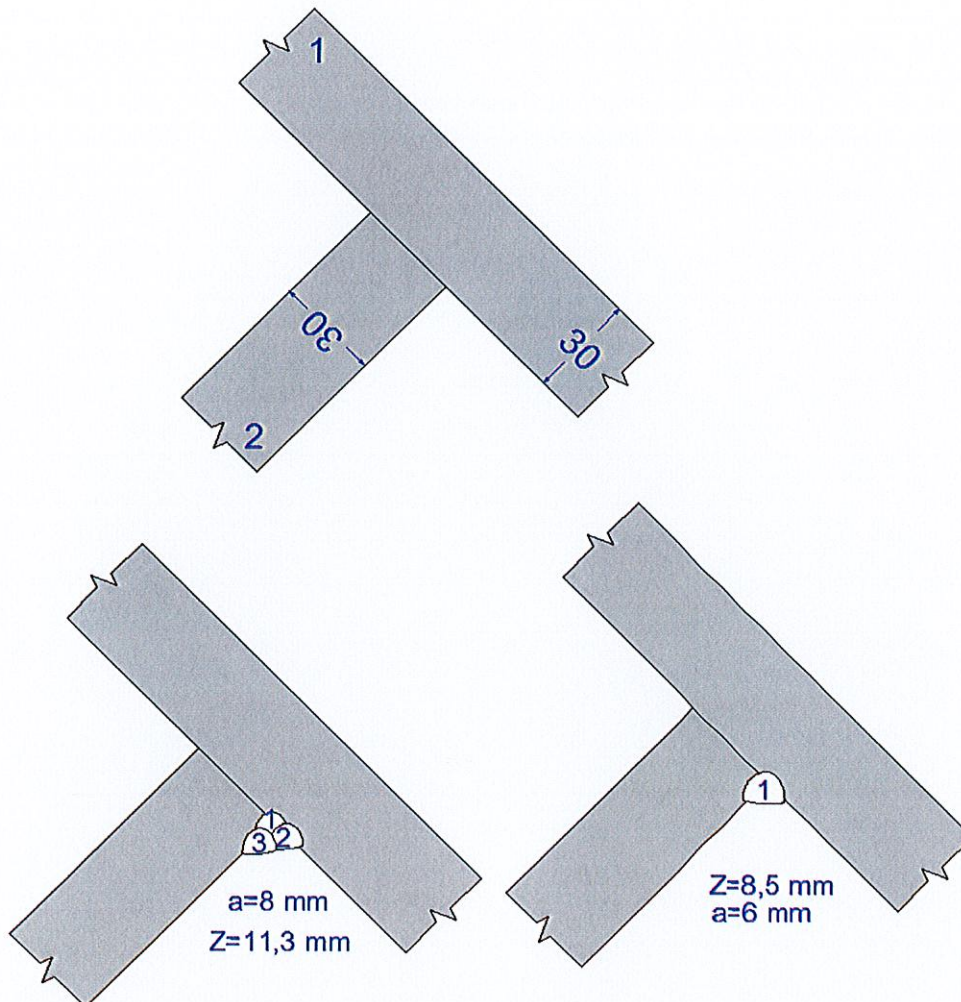
We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1-2010 Structural Welding Code-Steel.

Signature 1

Name	Signature	Name	Signature
Franky van Toledo		W. Komdeur (Lloyds)	
Date		Date	
8-6-2012		8-6-2012	



PQR record number	RET 0245029-001-26	Revision 1	WPS record number	S2400	Revision 0
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2010	



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



PQRD number	ARL1559-14	Revision 1	Date	29-5-2012
PQR number	RET 0245029-001-26	Revision 1	Welding standard	AWS D1.1/D1.1M:2010
WPS number	S2400	Revision 0	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

Product form	Plate	Welded to:	Product form	Plate
Material control number	362705		Material control number	362705
Specification (type or grade)	API 2W (50)		Specification (type or grade)	API 2W (50)
Nominal composition	C-Mn		Nominal composition	C-Mn
Trade name	Dillinger Hutte		Trade name	Dillinger Hutte
P number	U		P number	U
G number			G number	
AWS group number	II		AWS group number	II
Nominal pipe/tube size	-		Nominal pipe/tube size	-
Schedule	-		Schedule	-
Length	(mm) 350		Length	(mm) 350
Width (OD)	(mm) 150		Width (OD)	(mm) 150
Thickness	(mm) 30		Thickness	(mm) 30

JOINTS

Joint design	Fillet weld	See addition information	See addition information

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQRD number	ARL1559-14	Revision	1	Date	29-5-2012
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PASS INFORMATION

Pass number	1 single layer	1 multi layer	1 multi layer	2 multi layer
Layer number	1	1	2	2

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW	GMAW
Type	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic

FILLER METALS

Material control number	P1FC110214	P1FC110214	P1FC110214	P1FC110214
SFA specification	5.18	5.18	5.18	5.18
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4
Filler metal F-number	6	6	6	6
Weld metal A-number	-	-	-	-
Filler metal nominal composition	N.A.	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2	1,2	1,2	1,2
Length of filler metal consumed (mm)	-	-	-	-
Deposited thickness (mm)	4	4	4	4
Maximum pass thickness (mm)	5	5	5	5
Weld deposit chemistry	-	-	-	-
Supplemental filler metal	-	-	-	-
Supplemental filler metal vol. (mm ³)	-	-	-	-

POSITION

Position	3F	3F	3F	3F
Weld progression	Uphill	Uphill	Uphill	Uphill

PREHEAT

Preheat temperature (°C)	10	10	10	10
Maximum interpass temperature (°C)	10	10	87	132

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15	15
Trailing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-
Backing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-

ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2	1,2
Amperes	142	143	143	142
Volts	15,9	16	16	16
Travel speed (mm/min)	72	73	90	75
Maximum heat input (kJ/mm)	1,8815	1,8805	1,5253	1,8176
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-	-
Arc transfer mode	Short-circuiting	Short-circuiting	Short-circuiting	Short-circuiting

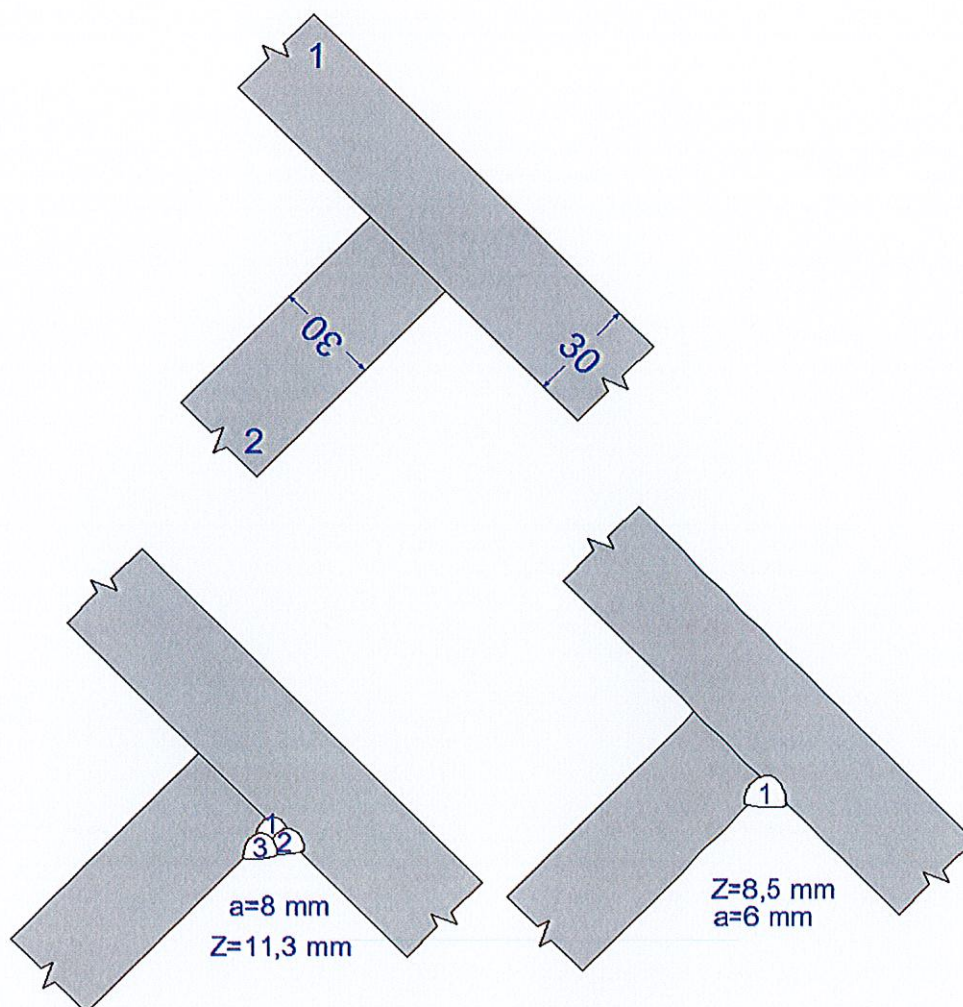
TECHNIQUE

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	15	15	15	15
C.T.W.D (mm)	15	15	15	15
Multi/single electrode	Single electrode	Single electrode	Single electrode	Single electrode
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None	None

PASS PERFORMED/WITNESSED BY

Welders name	T. Lajos	T. Lajos	T. Lajos	T. Lajos
Recorded/witnessed by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)
Date	29-5-2012	29-5-2012	29-5-2012	29-5-2012
Data entry by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

PQRD number	ARL1559-14	Revision 1	Date	29-5-2012
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PQR record number Date	RET0278790/TK/001 1-6-2016	Revision 1	WPS record number Company name Welding standard	S2600 Airpack Netherlands BV AWS D1.1/D1.1M:2015	Revision 1
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BASE METALS

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Plate	API 2W (50LS)	U	II	-	-	4	-
	Plate	API 2W (50LS)	U	II	-	-	4	-
and tested:	Without PWHT, With impacts, With hardness							
Notes								

JOINTS

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	60		
Root opening (mm)	2-3		
Root face (mm)	0-1		

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

FILLER METALS

SFA specification	5.18
AWS classification	E70C-6MH4
Filler metal F-number	6
Weld metal A-number	-
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2
Deposited thickness (mm)	4,00
Maximum pass thickness (mm)	3
Weld deposit chemistry	-
Supplemental filler metal	-
Supplemental filler metal vol. (mm³)	-

POSITION

Position	2G
Weld progression	-

PREHEAT

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	124

GAS

Shielding gas:	Type	AC-20 (A5.32 SG-)
	Flow rate (l/min)	15
Trailing gas:	Type	None
	Flow rate (l/min)	-
Backing gas:	Type	None
	Flow rate (l/min)	-

ELECTRICAL

Filler metal size (mm)	1,2
Waveform control	Not Used
Energy (J)	Not Used
Power (J/s)	Not Used
Arc time (sec)	Not Used
Weld bead length (mm)	Not Used
Amperes	87 - 183
Volts	14,5 - 20,1
Travel speed (mm/min)	117 - 485
Maximum heat input (kJ/mm)	0,45 - 0,64
Current/polarity	DCEP (reverse polarity)
Wire feed speed (m/min)	0
Arc transfer mode	Short-circuiting, Globular

TECHNIQUE

String or weave	Stringer and Weave
Orifice/gas cup size (mm)	15
C.T.W.D (mm)	15
Multi/single electrode	Single electrode
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None



PQR record number Date	RET0278790/TK/001 1-6-2016	Revision 1	WPS record number Company name Welding standard	S2600 Airpack Netherlands BV AWS D1.1/D1.1M:2015	Revision 1
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TENSILE TESTS						Reduced section
Specimen number	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	20.01	3.83	76,838	-	527	Ductile-BM
2	20.02	3.82	76,476	-	502	Ductile-BM
Comments						

GUIDED BEND TESTS			
Type of test	Acceptance criteria	Result	Comments
Root bend	AWS D1.1	Acceptable	
Root bend	AWS D1.1	Acceptable	
Face bend	AWS D1.1	Acceptable	
Face bend	AWS D1.1	Acceptable	
Comments			

TOUGHNESS TESTS								
Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	Impact values (J)	Impact values (% Shear)	(mm)	Drop weight break
1	Weld Metal	Charpy V	10 x 3	-40	29/34/36	-	-	No
2	HAZ	Charpy V	10 x 3	-40	34/48/38	-	-	No
3	HAZ + 1 mm	Charpy V	10 x 3	-40	55/47/48	-	-	No
4	HAZ + 2 mm	Charpy V	10 x 3	-40	52/52/53	-	-	No
5	HAZ + 5 mm	Charpy V	10 x 3	-40	48/48/51	-	-	No
Comments								

HARDNESS TEST						
Type (Scale)	Distance from surface	API 2W (50LS)	HAZ	Weld	HAZ	API 2W (50LS)
Vickers (HV)	Cap area 1-2 mm	170-172-170	192-208-218-218-214	203-211-211-211-208	209-207-203-208-208	169-167-167
Vickers (HV)	Cap area 1-2 mm	166-167-167	192-204-212-211-206	207-203-207-205-200	216-214-216-211-194	170-170-169
Comments						

OTHER TESTS			
Type of test	Acceptance criteria	Result	Comments
2x Macroscopic examination	AWS D1.1	Acceptable	
RT examination	AWS D1.1	Acceptable	
MT examination	AWS D1.1	Acceptable	
Comments			

CERTIFICATION				
Welder's name	ID Number	Stamp number	Mechanical testing by Laboratory test number Test file number Tests conducted by	Element Breda (NL) ARJ001-16-01-18390-1 ARL2064-1 A. Karstanje
Dorremans M.	ID Card IKP0996J6	W-013		

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1 Structural Welding Code-Steel.

Signature 1

Name
F. van Toledo
Date
1-6-2016

Signature 2

Name
T. Konings(Lloyds)
Date
1-6-2016



PQRD number	ARL2064-1	Revision 1	Date	11-01-2016
PQR number	RET0278790/TK/001	Revision 1	Welding standard	AWS D1.1/D1.1M:2015
WPS number	S2600	Revision 1	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

Product form	Plate	Welded to:	Product form	Plate
Material control number	816729 293819/1		Material control number	816729 293819/1
Specification (type or grade)	API 2W (50LS)		Specification (type or grade)	API 2W (50LS)
Nominal composition	C-Mn		Nominal composition	C-Mn
Trade name	Voestalpine Grobblech		Trade name	Voestalpine Grobblech
P number	U		P number	U
G number			G number	
AWS group number	II		AWS group number	II
Nominal pipe/tube size	-		Nominal pipe/tube size	-
Schedule	-		Schedule	-
Length	(mm) 500		Length	(mm) 500
Width (OD)	(mm) 200		Width (OD)	(mm) 200
Thickness	(mm) 4		Thickness	(mm) 4

JOINTS

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle	(deg.) 60		
Root opening	(mm) 2-3		
Root face	(mm) 0-1		

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQRD number	ARL2064-1	Revision 1	Date	11-01-2016
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PASS INFORMATION

Pass number	1	2	3
Layer number	1	2	2

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW
Type	Semi-automatic	Semi-automatic	Semi-automatic

FILLER METALS

Material control number	P1FC150311	P1FC150311	P1FC150311
SFA specification	5.18	5.18	5.18
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4
Filler metal F-number	6	6	6
Weld metal A-number	-	-	-
Filler metal nominal composition	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2	1,2	1,2
Length of filler metal consumed (mm)	-	-	-
Deposited thickness (mm)	2	2	2
Maximum pass thickness (mm)	3	3	3
Weld deposit chemistry	-	-	-
Supplemental filler metal	-	-	-
Supplemental filler metal vol. (mm³)	-	-	-

POSITION

Position	2G	2G	2G
Weld progression	-	-	-

PREHEAT

Preheat temperature (°C)	10	10	10
Maximum interpass temperature (°C)	10	69	124

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15
Trailing gas: Type	None	None	None
Flow rate (l/min)	-	-	-
Backing gas: Type	None	None	None
Flow rate (l/min)	-	-	-

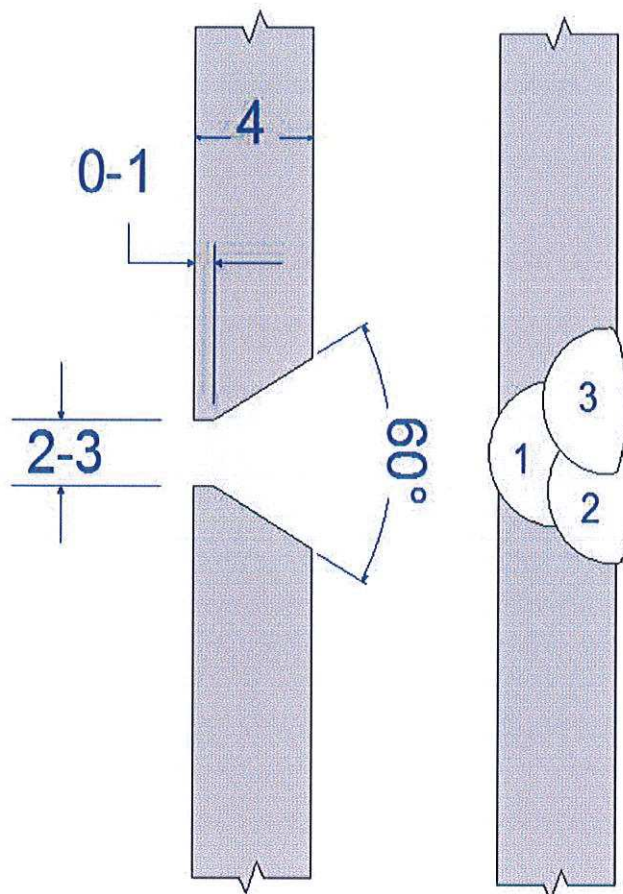
ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2
Waveform control	Not Used	Not Used	Not Used
Energy (J)	-	-	-
Power (J/s)	-	-	-
Arc time (sec)	-	-	-
Weld bead length (mm)	-	-	-
Amperes	87	182	183
Volts	14.5	20.1	20.1
Travel speed (mm/min)	117	485	450
Maximum heat input (kJ/mm)	0,6469	0,4526	0,4904
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-
Arc transfer mode	Short-circuiting	Globular	Globular

TECHNIQUE

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	15	15	15
C.T.W.D (mm)	15	15	15
Multi/single electrode	Single electrode	Single electrode	Single electrode
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None

PQRD number	ARL2064-1	Revision 1	Date	11-01-2016
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PQR record number	RET0278790/TK/002	Revision 1	WPS record number	S2700	Revision 1
Date	31-5-2016		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2015	

BASE METALS

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
Welded to:	Plate	API 2W (50LS)	U	II	-	-	8	-
	Plate	API 2W (50LS)	U	II	-	-	8	-
and tested:	Without PWHT, With impacts, With hardness							
Notes								

JOINTS

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle (deg.)	60		
Root opening (mm)	2-3		
Root face (mm)	0-1		

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

FILLER METALS

SFA specification	5.18
AWS classification	E70C-6MH4
Filler metal F-number	6
Weld metal A-number	-
Filler metal nominal composition	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2
Deposited thickness (mm)	6,00
Maximum pass thickness (mm)	3
Weld deposit chemistry	-
Supplemental filler metal	-
Supplemental filler metal vol. (mm³)	-

POSITION

Position	2G
Weld progression	-

PREHEAT

Preheat temperature (°C)	10
Maximum interpass temperature (°C)	178

GAS

Shielding gas:	Type	AC-20 (A5.32 SG-)
	Flow rate (l/min)	15
Trailing gas:	Type	None
	Flow rate (l/min)	-
Backing gas:	Type	None
	Flow rate (l/min)	-

ELECTRICAL

Filler metal size (mm)	1,2
Waveform control	Not Used
Energy (J)	Not Used
Power (J/s)	Not Used
Arc time (sec)	Not Used
Weld bead length (mm)	Not Used
Amperes	130 - 197
Volts	15,9 - 22,2
Travel speed (mm/min)	142 - 383
Maximum heat input (kJ/mm)	0,67 - 0,87
Current/polarity	DCEP (reverse polarity)
Wire feed speed (m/min)	0
Arc transfer mode	Short-circuiting, Globular

TECHNIQUE

String or weave	Stringer and Weave
Orifice/gas cup size	15
C.T.W.D (mm)	15
Multi/single electrode	Single electrode
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None



PQR record number Date	RET0278790/TK/002 31-5-2016	Revision 1	WPS record number Company name Welding standard	S2700 Airpack Netherlands BV AWS D1.1/D1.1M:2015	Revision 1
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TENSILE TESTS						Reduced section
Specimen number	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	20.03	7.23	144,817	-	529	Ductile-BM
2	20.03	7.28	145,818	-	530	Ductile-BM
Comments						

GUIDED BEND TESTS			
Type of test	Acceptance criteria	Result	Comments
Face bend	AWS D1.1	Acceptable	
Face bend	AWS D1.1	Acceptable	
Root bend	AWS D1.1	Acceptable	
Root bend	AWS D1.1	Acceptable	
Comments			

TOUGHNESS TESTS							
Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	Impact values (J)	Impact values (% Shear)	Drop weight break
1	Weld Metal	Charpy V	10 x 5	-40	56/56/60	-	No
2	HAZ	Charpy V	10 x 5	-40	51/69/60	-	No
3	HAZ + 1 mm	Charpy V	10 x 5	-40	115/104/84	-	No
4	HAZ + 2 mm	Charpy V	10 x 5	-40	104/99/100	-	No
5	HAZ + 5 mm	Charpy V	10 x 5	-40	119/115/104	-	No
Comments							

HARDNESS TEST						
Type (Scale)	Distance from surface	API 2W (50LS)	HAZ	Weld	HAZ	API 2W (50LS)
Vickers (HV)	Cap area 1-2 mm	166-164-164	184-193-204-205-204	213-214-217-199-211	205-199-198-196-186	167-170-170
Vickers (HV)	Root area 1-2 mm	171-169-165	186-198-206-206-188	173-184-186-186-187	187-186-186-188-170	165-166-164
Vickers (HV)	Cap area 1-2 mm	165-168-167	197-206-211-211-211	220-221-207-208-219	209-211-207-209-198	168-165-166
Vickers (HV)	Root area 1-2 mm	167-170-164	187-199-196-191-207	192-196-188-194-189	178-186-180-175-174	162-163-166
Comments						

OTHER TESTS			
Type of test	Acceptance criteria	Result	Comments
2x Macroscopic examination	AWS D1.1	Acceptable	
RT examination	AWS D1.1	Acceptable	
MT examination	AWS D1.1	Acceptable	
Comments			

CERTIFICATION				
Welder's name	ID Number	Stamp number	Mechanical testing by	Element Breda (NL)
Dorremans M.	ID Card IKP0996J6	W-013	Laboratory test number	ARJ001-16-01-18390-2
			Test file number	ARL2064-2
			Tests conducted by	A. Karstjanje

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of section 4 of ANSI/AWS D1.1 Structural Welding Code-Steel.

Signature 1

Name	Signature	Name	Signature
F. van Toledo		T. Konings (Lloyds)	
Date		Date	
1-6-2016		1-6-2016	



PQRD number	ARL2064-2	Revision 1	Date	11-01-2016
PQR number	RET0278790/TK/002	Revision 1	Welding standard	AWS D1.1/D1.1M:2015
WPS number	S2700	Revision 1	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

Product form	Plate
Material control number	816729 293819/1
Specification (type or grade)	API 2W (50LS)
Nominal composition	C-Mn
Trade name	Voestalpine Grobblech
P number	U
G number	
AWS group number	II
Nominal pipe/tube size	-
Schedule	-
Length	(mm) 500
Width (OD)	(mm) 200
Thickness	(mm) 8

Welded to:

Product form	Plate
Material control number	816729 293819/1
Specification (type or grade)	API 2W (50LS)
Nominal composition	C-Mn
Trade name	Voestalpine Grobblech
P number	U
G number	
AWS group number	II
Nominal pipe/tube size	-
Schedule	-
Length	(mm) 500
Width (OD)	(mm) 200
Thickness	(mm) 8

JOINTS

Joint design	Single-V-groove	See addition information	See addition information
Backing:	None		
Retainers	None		
Groove angle	(deg.) 60		
Root opening	(mm) 2-3		
Root face	(mm) 0-1		

CLEANING/ROOT TREATMENT

Surface preparation	Grinding
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

PQRD number	ARL2064-2	Revision 1	Date	11-01-2016
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PASS INFORMATION

Pass number	1	2	3	4
Layer number	1	2	3	3

WELDING PROCESSES

Welding process	GMAW	GMAW	GMAW	GMAW
Type	Semi-automatic	Semi-automatic	Semi-automatic	Semi-automatic

FILLER METALS

Material control number	P1FC150311	P1FC150311	P1FC150311	P1FC150311
SFA specification	5.18	5.18	5.18	5.18
AWS classification	E70C-6MH4	E70C-6MH4	E70C-6MH4	E70C-6MH4
Filler metal F-number	6	6	6	6
Weld metal A-number	-	-	-	-
Filler metal nominal composition	N.A.	N.A.	N.A.	N.A.
Filler metal trade name	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H	Lincoln, Outershield MC715-H
Filler metal size (mm)	1,2	1,2	1,2	1,2
Length of filler metal consumed (mm)	-	-	-	-
Deposited thickness (mm)	2	2	2	2
Maximum pass thickness (mm)	3	3	3	3
Weld deposit chemistry	-	-	-	-
Supplemental filler metal	-	-	-	-
Supplemental filler metal vol. (mm³)	-	-	-	-

POSITION

Position	2G	2G	2G	2G
Weld progression	-	-	-	-

PREHEAT

Preheat temperature (°C)	10	10	10	10
Maximum interpass temperature (°C)	10	69	129	178

GAS

Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15	15
Trailing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-
Backing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-

ELECTRICAL

Filler metal size (mm)	1,2	1,2	1,2	1,2
Waveform control	Not Used	Not Used	Not Used	Not Used
Energy (J)	-	-	-	-
Power (J/s)	-	-	-	-
Arc time (sec)	-	-	-	-
Weld bead length (mm)	-	-	-	-
Amperes	130	196	197	194
Volts	15,9	21,7	22,2	22,2
Travel speed (mm/min)	142	340	383	355
Maximum heat input (kJ/mm)	0,8734	0,7506	0,679	0,7214
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-	-
Arc transfer mode	Short-circuiting	Globular	Globular	Globular

TECHNIQUE

String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size (mm)	15	15	15	15
C.T.W.D (mm)	15	15	15	15
Multi/single electrode	Single electrode	Single electrode	Single electrode	Single electrode
Multi/Single pass per side	Multiple passes	Multiple passes	Multiple passes	Multiple passes
Peening	Not used	Not used	Not used	Not used
Initial/interpass cleaning	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method	None	None	None	None

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