Airpack B.V. - Air Compressor –

Integrated Methanol and Ammonia Plant

17735-COM Welding Book PQR / WPS (K020)

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	12-12-2023	Issued for Information	S.K.	J.J.	S.K.

LIST OF REVISED PAGES

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3	X					**28**	X					**53**	X					**78**	X				
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18	X					**43**	X					**68**	X					**ATTACHMENT**					
19	X					**44**	X					**69**	X					**1**					
20	X					**45**	X					**70**	X					**2**					
21	X					**46**	X					**71**	X					**3**					
22	X					**47**	X					**72**	X					**4**					
23	X					**48**	X					**73**	X					**5**					
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WPS/PQR

VENDOR	Instrument air compressor package	P.o. No.	
		Document No.	
		Sheet No.	2 of 3
		Rev.No	0
CONTRACTOR / END USER	LIDCO, Pars SEE Zone, Assaluyeh, Integrated Methanol and Ammonia Plant 3000 MTPD MeOH / 900 MTPD NH3 PROJECT	Item Tag No.	K-020
		Service	

WPS REGISTER

Fabrication Application i.e. strucural / piping / vessel	Fabrication welding Code incl. issue year	Welding procedure specification (WPS) No. incl rev	WPS/PWR (no. Of pages)	welding process	Qualifiying 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
piping / vessel	ASME IX : 2021	P3000 rev 5	2	GTAW	1,5 - 19,06 mm	1/2 inch (min)	No	6G, 9,5 mm
piping / vessel	ASME IX : 2019	PGF-2000 rev 1	2	GTAW/FCAW	6 - 12 mm	2½ inch (min)	No	1G, 6 mm
piping / vessel	ASME IX : 2019	PGF-3000 rev 1	2	GTAW/FCAW	1,5 - 12 mm	2½ inch (min)	No	1G, 6 mm
structural	ASME IX : 2019	SP4000 rev 3	2	GTAW	3,0 - 8,00 mm	610 mm (min)	No	2F, 5 and 10 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	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

WPS

SKID

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

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

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT 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 soucre		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			

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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

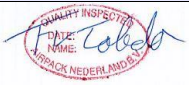
Applicable standard	
AWS D1.1 (Category B)	For thickness 3 to 19(mm): 0(°C). Preheat to 20(°C) if the base metal temperature is below 0(°C).
	Over 19 thru 38.1(mm): 10(°C).
	Over 38.1 thru 63.5(mm): 66(°C).
	Over 63.5(mm): 107(°C).

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	

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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 Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
GMAW	5.18	E70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	16,	-	-
GMAW						-	-	-	-
GMAW						-	-	-	-
Sup. filler	-	-	-	-	-	- None -			

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)	178 Method contact thermometer	178 Method contact thermometer	178 Method contact thermometer
Filler metal size	(mm)	1,2	1,2	1,2
Layer number		Root	Filler	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				
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
F. van Toledo	
Date	
Thursday, 29 September 2022	

Signature 2

Name	Signature
Date	

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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 Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
GMAW	5.18	E70C-6MH4	-	-	Lincoln, Outershield MC715-H	3,	40,	-	-
GMAW						-	-	-	-
GMAW						-	-	-	-
Sup. filler	-	-	-	-	-	- None -			

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)	200 Method contact thermometer	200 Method contact thermometer	200 Method contact thermometer
Filler metal size	(mm)	1,2	1,2	1,2
Layer number		Root	Filler	Cap
Position		H	H	H
Weld progression		Not applicable	Not applicable	Not applicable
Current/polarity		DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse 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
F. van Toledo	
Date	
Monday, 02 January 2023	

Signature 2

Name	Signature
Date	

WPS

CS PIPING

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

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:	Witout 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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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			

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

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:	Witout 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 Min.	As-welded Max.	With PWHT Min.	With PWHT 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			

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	PGF-2000 Revision 2	Qualified to	ASME Section ASME IX:2019
Date	Monday, 15 August 2022	Company name	Airpack Netherlands BV
Supporting PQR(s)	A0790094-10 – Rev 00		
Reference docs.			

Scope	Groove, fillet, 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. 2
Backing:	Witout backing		.
Retainers	None		
Notes			

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	1,50	12,04	-	-
Impact tested	6.02	12.04	-	-
Partial pen.	1.50	12,04	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
GTAW	5.18	ER70S-3	6	1	Lincoln Electric LNT 25 (solid wire)	No min.	4	-	-
FCAW	5.20	E71T-9M-J	8	1	Nippon steel, Nittetsu SD-3A	No min.	8.04	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	Not used	- None -			
Sup. filler	-	-	-	-	-	- None -			

WELDING PROCEDURE

		GTAW	FCAW
Welding process		GTAW	FCAW
Type		Manual	Semi-automatic
Minimum preheat temperature	(°C)	20	20
Maximum interpass temperature	(°C)	179	230
Tungsten size	(mm)	2,4	-
Tungsten type		SFA 5.12 EWCe-2	-
Filler metal size	(mm)	2,0	1,2
Layer number		All	All
Position		All	All
Weld progression		-	-
Current/polarity		DCEN	DCEP
Amperes		60 -75	250 – 265
Volts		10 -11	29-32
Travel speed	(mm/min)	55 – 65	335-420
Maximum heat input	(kJ/mm)	0,7224	1,4885
DC pulsing current		Not used	-
Wire feed speed		-	Not used
Arc transfer mode		-	Spray
Shielding: Gas type		Argon (A5.32 SG-A)	AC-2 (A5.32 SG-)
Flow rate	(l/min)	10-14	15-20
Trailing: Gas type		Not used	Not used
Flow rate	(l/min)	-	-
Backing: Gas type		Not used	Not used
Flow rate	(l/min)	-	-
String or weave		Stringer or Weave	Stringer or Weave
Orifice/gas cup size		8 mm	15
C.T.W.D.	(mm)	-	15-20
Multi/Single pass per side		Single pass	Multi passes
Maximum pass thickness	(mm)	-	12
Weld deposit chemistry		Not used	Not used
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	PGF-2000 Revision 2	Qualified to	ASME Section ASME IX:2019
Date	Monday, 15 August 2022	Company name	Airpack Netherlands BV

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	
Monday, 15 August 2022			

WPS

SS PIPING

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	P3000 Revision 5	Qualified to	ASME Section ASME IX:2019
Date	Monday, 28 June 2021	Company name	Airpack Netherlands BV
Supporting PQR(s)	RET0245029-001-21 – Rev 1		
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	Stainless steel (P8)	P-no. 8	Grp-no. 1
Welded to	Stainless steel (P8)	P-no. 8	Grp-no. 1
Backing:		P-no.	Grp-no.
Retainers	None		
Notes			

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	1,50	19,06	-	-
Impact tested	-	-	-	-
Partial pen.	1.50	19.06	-	-
Fillet welds	-	-	-	-

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS (QW-404)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
GTAW	5.9	ER316LSi	6	8	Lincoln Ellectric, LNT 316LSi (solid wire)	No min.	19.06	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	-	- None -			

THICKNESS RANGE QUALIFIED (mm)

WELDING PROCEDURE

Welding process		GTAW	
Type		Manual	
Minimum preheat/interpass temperature	(°C)	10	
Maximum interpass temperature	(°C)	150 Method contact thermometer	
Tungsten size	(mm)	2,4	
Tungsten type		SFA 5.12 EWCe-2	
Filler metal size	(mm)	2.0	2,4
Layer number		All	All
Position		All	All
Weld progression		Uphill	Uphill
Current/polarity		DCEN (straight polarity)	DCEN (straight polarity)
Amperes		75 - 90	85- 115
Volts		9 - 11	9 - 12
Travel speed	(mm/min)	40 - 60	30 - 70
Maximum heat input	(kJ/mm)	0,87	1,93
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		95%N2 Purity min. 99.998% – 5%H2 Purity min. 99.995%	
Flow rate	(l/min)	10 - 14	
String or weave		Stringer or Weave	
Orifice/gas cup size		9.5	
Multi/Single pass per side		Multi passes	
Weld deposit chemistry		-	
Notes		Backing shall be maintained until the weld has been completed. Oxygen level shall be below 0.05%	

WPS record number	P3000 Revision 5	Qualified to	ASME Section ASME IX:2019
Date	Monday, 28 June 2021	Company name	Airpack Netherlands BV

PREHEAT TABLE

Applicable standard	
ASME B31.3	Min. 10 °C

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	
Monday, 28 June 2021			

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	PGF-3000 Revision 0	Qualified to	ASME Section IX: 2019
Date	10/6/2020	Company name	Airpack Netherlands BV
Supporting PQR(s) Reference docs.	A0790094-11 - Rev 0		

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

BASE METALS (QW-403)

Type	Austenitic stainless steel	P-no. 8	Grp-no. 1
Welded to	Austenitic stainless steel	P-no. 8	Grp-no. 1
Backing:	None	P-no.	Grp-no.
Retainers Notes	None		

THICKNESS RANGE QUALIFIED (mm)

	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
Complete pen.	1.5	12.04	-	-
Impact tested	-	-	-	-
Partial pen.	1.5	12.04	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS (QW-404)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
GTAW	5.9	ER316LSi	6	8	Lincoln Electric, LNT 316LSi	no min.	4	-	-
FCAW	5.22	E316LT0-1	6	8	Kobelco welding, DW-316L	no min.	8	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	Not used	- None -			
Sup. filler	-	-	-	-	-	- None -			

WELDING PROCEDURE

		GTAW	FCAW
Welding process		GTAW	FCAW
Type		Manual	Semi-automatic
Minimum preheat/interpass temperature	(°C)	10	10
Maximum interpass temperature	(°C)	55	150
Tungsten size	(mm)	2,4	-
Tungsten type		SFA 5.12 EWCe-2	-
Filler metal size	(mm)	2,0	1,2
Layer number		All	All
Position		All	All
Weld progression		-	-
Current/polarity		DCEN	DCEP
Waveform control			
Energy	(J)		
Power	(J/s)		
Amperes		60 - 75	190 - 210
Volts		10 - 11	29.- 31
Travel speed	(mm/min)	20 - 35	375 - 420
Maximum heat input	(kJ/mm)	1.836	0.9305
DC pulsing current		Not used	-
Wire feed speed	(m/min)	-	Not used
Arc transfer mode		-	Spray
Shielding: Gas type		Argon (A5.32 SG-A)	AC-20 (A5.32 SG-)
Flow rate	(l/min)	12-15	15-20
Trailing: Gas type		Not used	Not used
Flow rate	(l/min)	-	-
Backing: Gas type		A5.32 SG-NH-5	A5.32 SG-NH-5
Flow rate	(l/min)	14-16	14-16
String or weave		Stringer or Weave	Stringer or Weave
Orifice/gas cup size		8 mm	16
C.T.W.D	(mm)	-	15-20
Multi/Single pass per side		Single pass	Multiple passes
Maximum pass thickness	(mm)	-	12
Weld deposit chemistry		Not used	Not used
Notes			

WPS record number	PGF-3000	Revision 0	Qualified to	ASME Section IX: 2019
Date	10/6/2020		Company name	Airpack Netherlands BV

TECHNIQUE (QW-410)

Peening	Not used
Surface preparation	Grinding and Brushing
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	Not used

NOTES

Signature 1

Name	Signature
F. van Toledo (Airpack)	
Date	
10/6/2020	

QUALITY INSPECTED DATE: NAME: AIRPACK NEDERLAND B.V.

Signature 2

Name	Signature
L. Knops (DNVGL)	
Date	
10/6/2020	

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	SP4000 Revision 3	Qualified to	ASME Section ASME IX:2019
Date	Monday, 15 August 2022	Company name	Airpack Netherlands BV
Supporting PQR(s)	RET 0278790/TK/004 Rev.1		
Reference docs.			

Scope	Fillet, no PWHT (As-welded)
Joint	Joint details for this welding procedure specification in:
	Production drawings, Engineering specifications

BASE METALS (QW-403)

Type	Plate	P-no. S355MC acc. EN 10149-2	Grp-	None
Welded to	Austenitic stainless steel	P-no. 8	Grp-	1
Backing:	No			
Retainers				
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	no min.	no max.	-	-

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
GTAW	5.9	ER309LSi	6	8	Lincoln Ellectric LNT 309LSi	-	-	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	-	- None -			

WELDING PROCEDURE

Welding process		GTAW
Type		Manual
Minimum preheat/interpass temperature	(°C)	10
Maximum interpass temperature	(°C)	10
Tungsten size	(mm)	2,4
Tungsten type		SFA 5.12 EWLa-1
Filler metal size	(mm)	2,4
Layer number		All
Position		All
Weld progression		-
Current/polarity		DCEN
Waveform control		Not Used
Energy	(J)	-
Power	(J/s)	-
Amperes		125 - 145
Volts		12 - 15
Travel speed	(mm/min)	40 - 55
Maximum heat input	(kJ/mm)	2,174
DC pulsing current		Not used
Shielding: Gas type		Argon (A5.32 SG-A) Purity min. 99.998%
Flow rate	(l/min)	10
Trailing: Gas type		None
Flow rate	(l/min)	-
Backing: Gas type		None
Flow rate	(l/min)	-
String or weave		Stringer or Weave
Orifice/gas cup size		9,5
Multi/Single pass per side		Single pass
Weld deposit chemistry		-
Notes		

WPS record number	SP4000 Revision 3	Qualified to	ASME Section ASME IX:2019
Date	Monday, 15 August 2022	Company name	Airpack Netherlands BV

TECHNIQUE (QW-410)

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

NOTES

Signature 1

Name	Signature
F. van Toledo	
Date	
Monday, 15 August 2022	

Signature 2

Name	Signature
Date	

PQR

SKID

VENDOR	Instrument air compressor package	P.o. No.	
		Document No.	
		Sheet No.	3 0f 3
		Rev.No	01
CONTRACTOR / END USER	LIDCO, Pars SEE Zone, Assaluyeh, Integrated Methanol and Ammonia Plant 3000 MTPD MeOH / 900 MTPD NH3 PROJECT	Item Tag No	K-020
		Service	

3.0 PQR REGISTER

Fabrication Application i.e. strucural / 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
piping / vessel	ASME IX : 2010 incl add. 2011	RET 0245029-001-21 rev 1	3	ARL 1559-5 rev 0	3	SL 12.6047-1A	No	1	P3000
piping / vessel	ASME IX : 2019	A0790094-10 rev 1	3	ARL 2542-1	3	ARJ001-20-09-42663-1	Yes, -40°C	4	PGF2000
piping / vessel	ASME IX : 2019	A0790094-11 rev 1	3	ARL 2542-4 rev1	3	ARJ001-20-09-42663-4	No	4	PGF3000
structural	ASME IX : 2015	RET 0278790-004 rev 1	3	ARL2064-4	3	ARJ001-16-01-18390-4	No	6	SP4000
structural	AWS D1.1 / D1.1M 2010	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 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	ARJ001-16-01-18390-3	Yes, -40°C	1	S2800

Airpack Netherlands BV

Groeneweegje 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)
	Plate	API 2W (50)	U	II	-	-	30	-
Welded to:	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

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

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	RET 0245029-001-25	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

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	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		
T. Lajos	ID Card 353992JA	W-104	Mechanical testing by	Schielab Breda (NLD)
			Laboratory test number	SL 12.6055-1
			Test file number	ARL1559-13
			Tests conducted by	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.

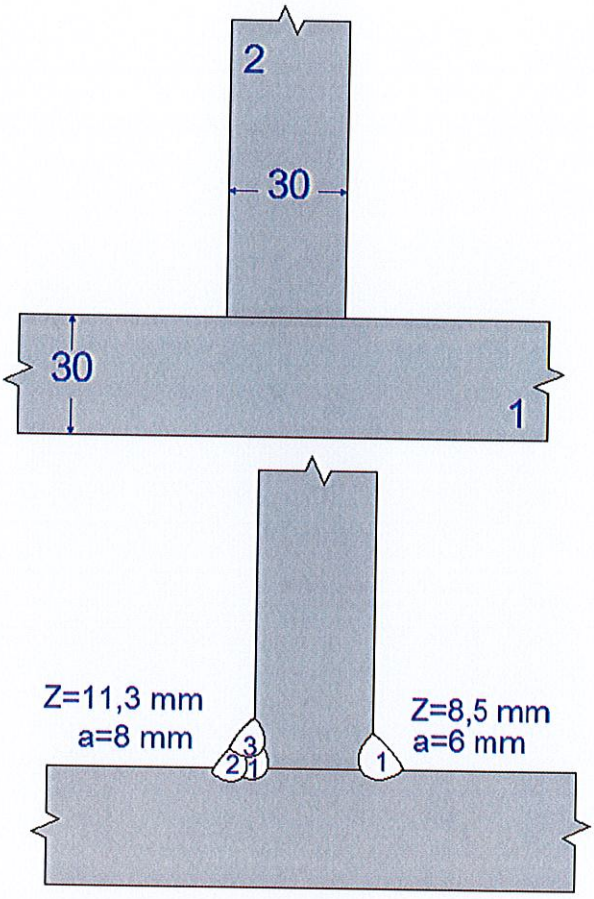
Signature 1

Name	Signature
Franky van Toledo	
Date	
8-6-2012	

Signature 2

Name	Signature
W. Komdeur (Lloyds)	Lloyd's Register Nederland B.V. A member of the Lloyd's Register group. Wim Komdeur Witnessed Approved Lloyd's Register
Date	
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/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	ARL1559-13	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

			Welded to:		
Product form		Plate	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

Airpack Netherlands BV

Groeneweegje 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

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		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

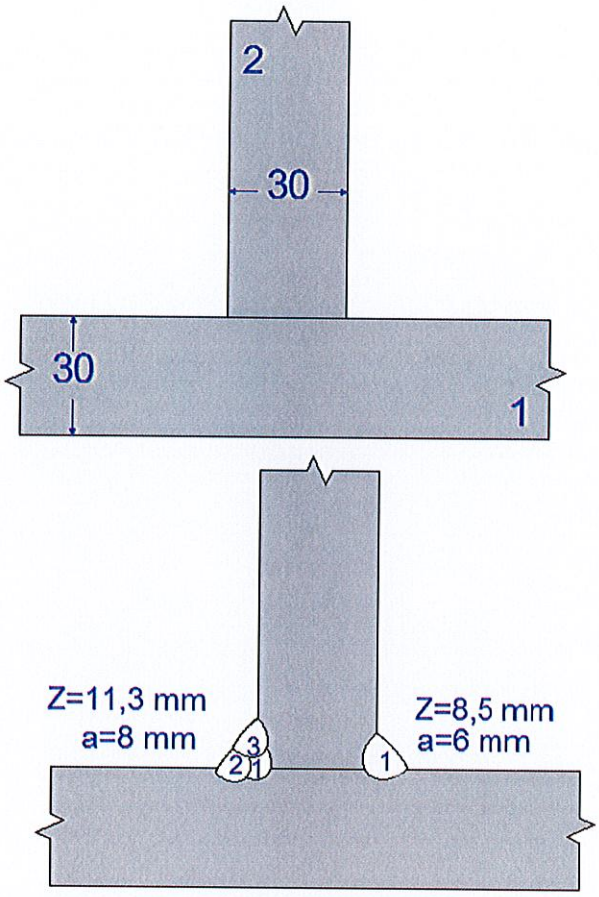
TECHNIQUE

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



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR)

WeldOffice WPS

PQR record number	RET0278790/TK/001	Revision 1	WPS record number	S2600	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)
	Plate	API 2W (50LS)	U	II	-	-	4	-
Welded to:	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		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	RET0278790/TK/001	Revision 1	WPS record number	S2600	Revision 1
Date	1-6-2016		Company name	Airpack Netherlands BV	
			Welding standard	AWS D1.1/D1.1M:2015	

TENSILE TESTS

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	20.01	3.83	76,638	-	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)	(% 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		
Dorreman M.	ID Card IKP0996J6	W-013	Mechanical testing by	Element Breda (NL)
			Laboratory test number	ARJ001-16-01-18390-1
			Test file number	ARL2064-1
			Tests conducted by	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 Structural Welding Code-Steel.

Signature 1

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

Signature 2

Name	Signature
T. Konings(Lloyds)	☐ Witnessed ☑ Reviewed ☐ Examined Ton Konings
Date	
1-6-2016	

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

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

			Welded to:			
Product form		Plate		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

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)	-	-	-

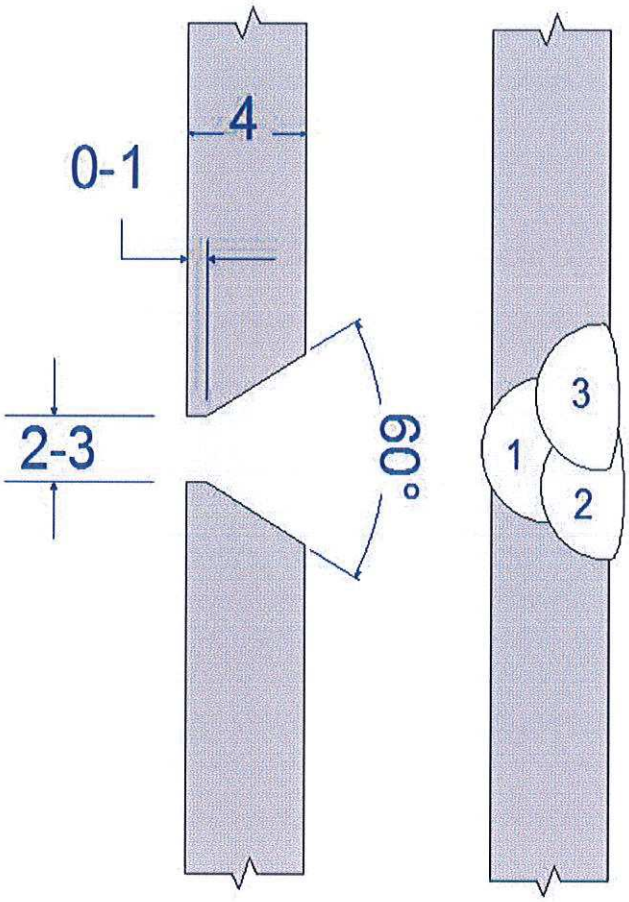
ELECTRICAL

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



Witnessed
Reviewed
Examined

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR)

WeldOffice WPS

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)
	Plate	API 2W (50LS)	U	II	-	-	8	-
Welded to:	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

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	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	

TENSILE TESTS

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	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)	(% Shear)	(mm)	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		
Dorreman M.	ID Card IKP0996J6	W-013	Mechanical testing by	Element Breda (NL)
			Laboratory test number	ARJ001-16-01-18390-2
			Test file number	ARL2064-2
			Tests conducted by	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 Structural Welding Code-Steel.

Signature 1

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

Signature 2

Name	Signature
T. Konings (Lloyds)	☐ Witnessed ☑ Reviewed ☐ Examined Ton Konings
Date	
1-6-2016	

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

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

			Welded to:			
Product form		Plate		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)	8		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

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)	-	-	-	-

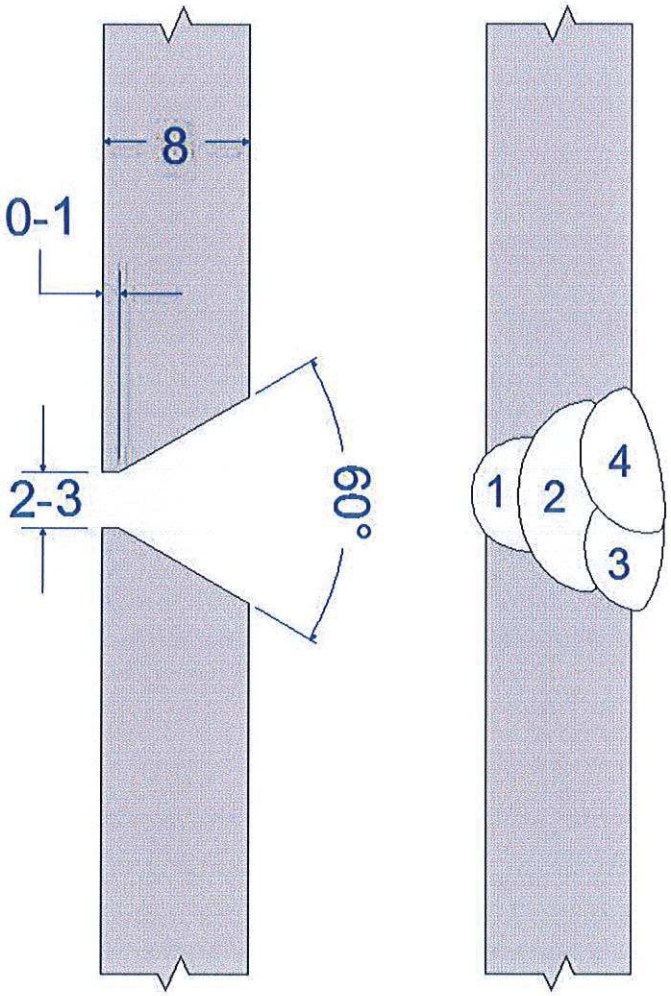
ELECTRICAL

Filler metal size	(mm)	1,2	1,2	1,2	1,2
Waveform control		Not Used	Not Used	Not Used	
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		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

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



Witnessed
Reviewed
Examined
Ton Konings
Lloyd's Register Nederland B.V.
Lloyd's Register Energy

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR)

WeldOffice WPS

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)
	Plate	API 2W (50)LS	U	II	-	-	20	-
Welded to:	Plate	API 2W (50)LS	U	II	-	-	20	-
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, 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.	(mm³)	-

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

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	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	

TENSILE TESTS

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	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)	Impact values (J)	(% 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		
Dorreman M.	ID Card IKP0996J6	W-013	Mechanical testing by	Element Breda (NL)
			Laboratory test number	ARJ001-16-01-18390-3
			Test file number	ARL2064-3
			Tests conducted by	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 Structural Welding Code-Steel.

Signature 1

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

Signature 2

Name	Signature
T. Konings (Lloyds)	☐ Witnessed ☑ Reviewed ☐ Examined Ton Konings Lloyd's Register Nederland B.V.
Date	
1-6-2016	

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL2064-3	Revision 1	Date	11-01-2016
PQR number	RET0278790/TK/003	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

			Welded to:			
Product form		Plate		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

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

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		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

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)	-	-	-			

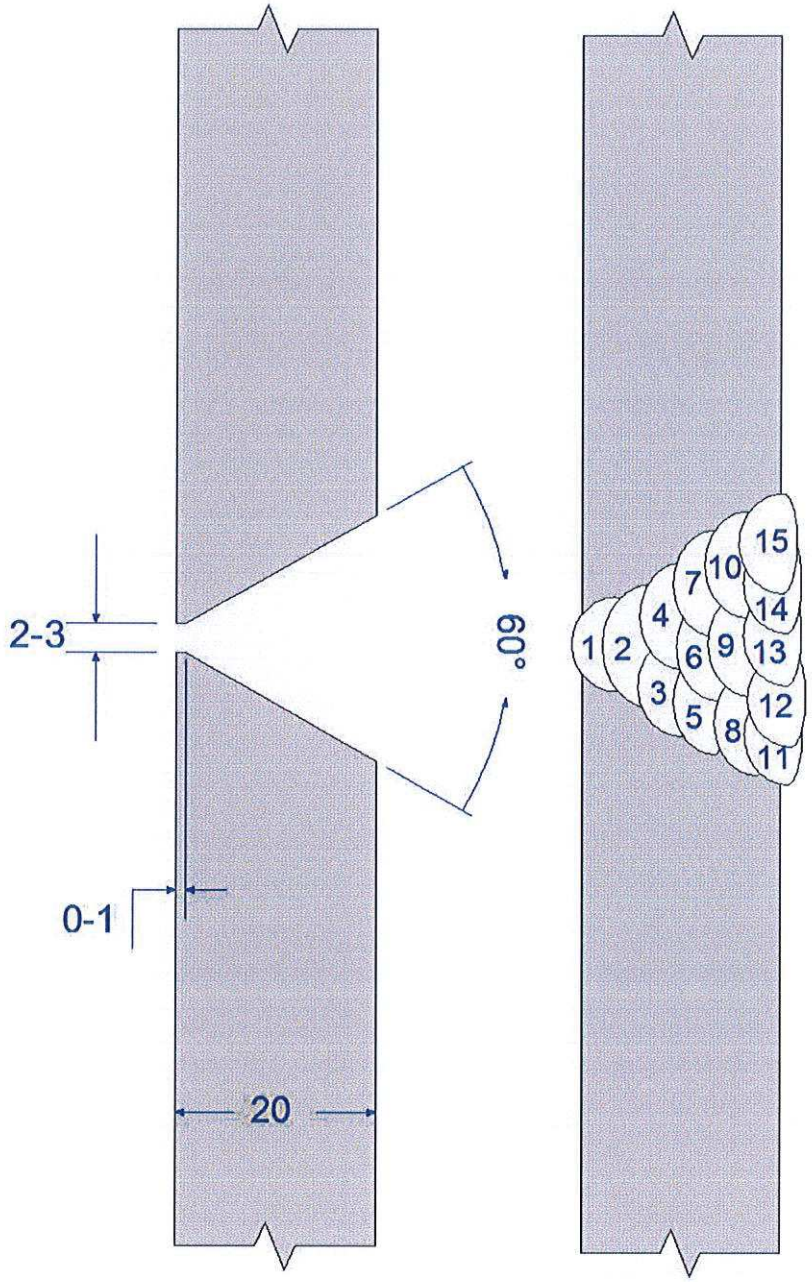
ELECTRICAL

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

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	ARL2064-3	Revision 1	Date	11-01-2016



Witnessed
Reviewed
Examined
Tom Konings
Lloyd's Register Energy

PQR

CS PIPING

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)
	Pipe/Tube	SA-333 (6)	1	1	63,50	Standard	5,16	73,03
Welded to:	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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

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

TENSILE TESTS (QW-150)

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	19.01	4.53	86,115	-	538 N/mm²	Ductile-Base Metal
2	19.02	4.73	89,965		527 N/mm²	Ductile-Base Metal

Comments

GUIDED BEND TESTS (QW-160)

Type of test	Acceptance criteria	Result	Comments
Face bend	QW 163	Acceptable	
Face bend	QW 163	Acceptable	
Root bend	QW 163	Acceptable	
Root bend	QW 163	Acceptable	

Comments

TOUGHNESS TESTS (QW-170)

Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	Impact values (J)	(% Shear)	(mm)	Drop weight break
1	Weld Metal	Charpy V	10 x 4	-55	52	-	-	-
2	Weld Metal	Charpy V	10 x 4	-55	19	-	-	-
3	Weld Metal	Charpy V	10 x 4	-55	55	-	-	-
4	HAZ	Charpy V	10 x 4	-55	74	-	-	-
5	HAZ	Charpy V	10 x 4	-55	61	-	-	-
6	HAZ	Charpy V	10 x 4	-55	58	-	-	-

Comments

CERTIFICATION

Welder's name	ID Number	Stamp number
A. Sumantri	ID Card IXH4P6551	A1

Mechanical testing by	Schielab BV Breda (NLD)
Laboratory test number	SL 12.6043-1A
Test file number	ARL1559-1
Tests conducted by	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 IX of the ASME Code.

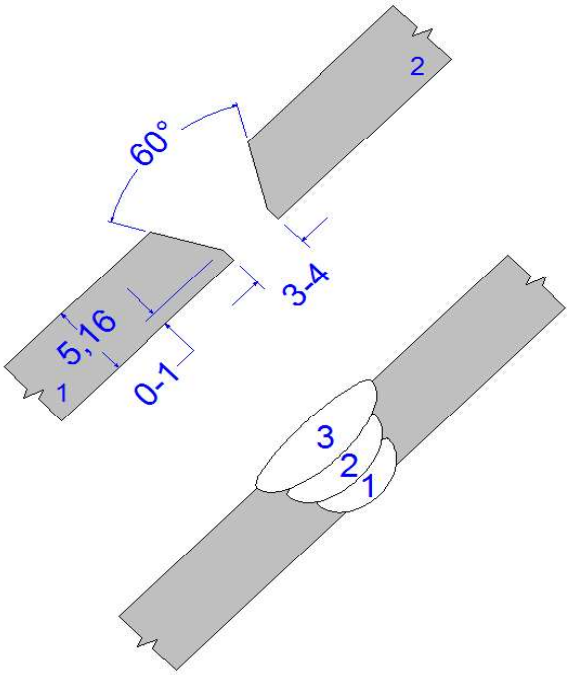
Signature 1

Name	Signature
Franky van Toledo	
Date	
8-6-2012	

Signature 2

Name	Signature
W. Komdeur Llyds	
Date	
8-6-2012	

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)

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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS

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

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

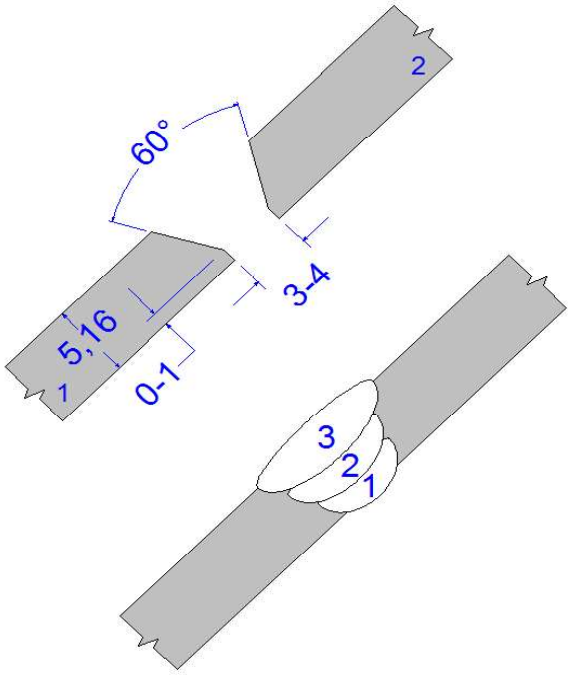
TECHNIQUE (QW-410)

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



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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	RET 0245029-001-19 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)
	Pipe/Tube	SA-350 (LF2)	1	2	63,50	Standard	5,16	73,03
Welded to:	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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

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

TENSILE TESTS (QW-150)

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	19.04	4.62	87,965	-	536 N/mm²	Ductile-Base Metal
2	19.05	4.64	88,392	-	537 N/mm²	Ductile-Weld

Comments

GUIDED BEND TESTS (QW-160)

Type of test	Acceptance criteria	Result	Comments
Root bend	QW 163	Acceptable	
Root bend	QW 163	Acceptable	
Face bend	QW 163	Acceptable	
Face bend	QW 163	Acceptable	

Comments

TOUGHNESS TESTS (QW-170)

Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	Impact values (J)	(% Shear)	(mm)	Drop weight break
1	Weld Metal	Charpy V	10 x 4	-55	20	-	-	-
2	Weld Metal	Charpy V	10 x 4	-55	43	-	-	-
3	Weld Metal	Charpy V	10 x 4	-55	34	-	-	-
4	HAZ	Charpy V	10 x 4	-55	43	-	-	-
5	HAZ	Charpy V	10 x 4	-55	10	-	-	-
6	HAZ	Charpy V	10 x 4	-55	34	-	-	-

Comments

CERTIFICATION

Welder's name	ID Number	Stamp number
A. Sumantri	ID Card IXH4P6551	A1

Mechanical testing by	Schielab BV Breda (NLD)
Laboratory test number	SL 12.6045-1A
Test file number	ARL1559-3
Tests conducted by	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 IX of the ASME Code.

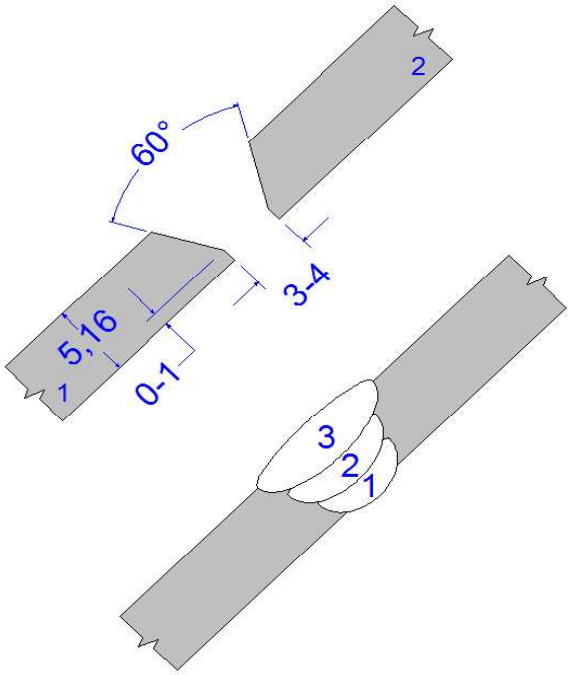
Signature 1

Name	Signature
Franky van Toledo	
Date	
8-6-2012	

Signature 2

Name	Signature
W. Komdeur (Lloyds)	Lloyd's Register Nederland B.V. A member of the Lloyd's Register group. Wim Komdeur Witnessed Lloyds Register
Date	
8-6-2012	

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

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

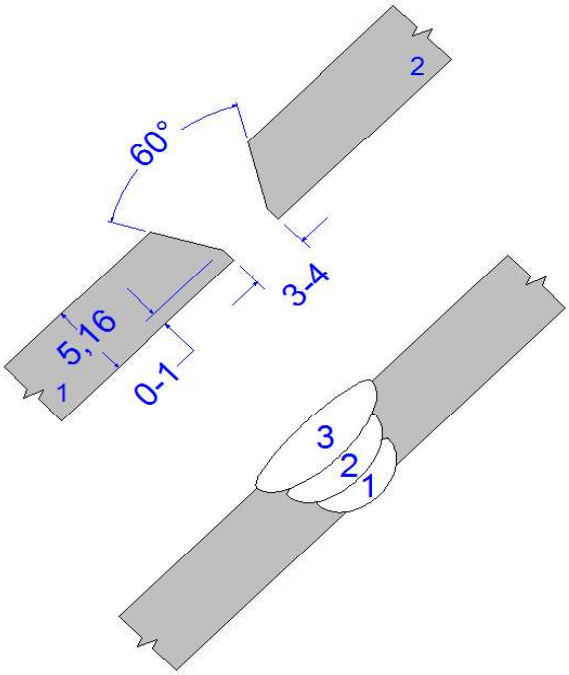
TECHNIQUE (QW-410)

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



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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	A0790094-10	Revision 0	WPS record number	PGF-2000	Revision 0
Date	10/6/2020		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX: 2019	

BASE METALS (QW-403)

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
	Pipe	SA-333 (6)	1	1	101.60	40	6.02	114.30
Welded to:	Pipe	SA-350 (LF2)	1	2	101.60	40	6.02	114.30
and tested:	Without PWHT, With impacts, With hardness							
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)	3-4		
Root face	(mm)	0-1		

WELDING PROCESSES

Welding process		GTAW	FCAW
Type		Manual	Semi-automatic

FILLER METALS (QW-404)

SFA specification		5.18	5.20
AWS classification		ER70S-3	E71T-9M-J
Filler metal F-number		6	6
Weld metal A-number		1	6
Filler metal nominal composition		Not used	Not used
Filler metal trade name		Lincoln Electric	Nippon Steel & Sumikin Welding
Filler metal size	(mm)	2,4	1,2
Deposited thickness	(mm)	2.00	4.02
Maximum pass thickness	(mm)	12	12
Weld deposit chemistry		Not used	Not used
Supplemental filler metal		-	Not used
Supplemental filler metal vol.	(mm³)	-	Not used

POSITION (QW-405)

Position		1G Rotated	1G Rotated
Weld progression		-	-

PREHEAT (QW-406)

Preheat temperature	(°C)	10	10
Maximum interpass temperature	(°C)	123	174

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)	AC-2 (A5.32 SG-)
	Flow rate	(l/min)	10-14	15-20
Trailing gas:	Type		Not used	Not used
	Flow rate	(l/min)	-	-
Backing gas:	Type		Not used	Not used
	Flow rate	(l/min)	-	-

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,4	1,2
Waveform control			
Energy	(J)		
Power	(J/s)		
Arc time	(sec)		
Weld bead length	(mm)		
Amperes		68	258 - 263
Volts		10.8	31.6
Travel speed	(mm/min)	61	335 - 421
Maximum heat input	(kJ/mm)	0.7224	1.4885
Tungsten size	(mm)	2,4	-
Tungsten type		SFA 5.12 EWCe-2	-
Current/polarity		DCEN	DCEP
DC pulsing current		Not used	-
Wire feed speed	(m/min)	-	0
Arc transfer mode		-	Spray

TECHNIQUE (QW-410)

String or weave		Stringer and Weave	Stringer and Weave
Orifice/gas cup size		8 mm	15
C.T.W.D	(mm)	-	15-20
Multi/Single pass per side		Single pass	Multiple passes
Peening		Not used	Not used
Initial/interpass cleaning		Brushing and Grinding	Brushing and Grinding
Back gouging method		Not used	Not used

Witnessed ☑ Reviewed
And found to comply with:
Date 7/10/20
Sign. K. Knobs

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	A0790094-10	Revision 0	WPS record number	PGF-2000	Revision 0
Date	10/6/2020		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX: 2019	

TENSILE TESTS (QW-150)

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
42663-1	18.95	5.15	97.593	-	558	Ductile-Base Metal
42663-1	18.98	5.31	100.784	-	548	Ductile-Base Metal

Comments: 2 reduced section tension tests per QW-151.2 and QW-462.1(b)

GUIDED BEND TESTS (QW-160)

Type of test	Acceptance criteria	Result	Comments
2 transverse face bends per QW-161.2 and QW-462.3(a)	QW-163	Acceptable	see - ASME IX - QW-451.1
2 transverse root bends per QW-161.3 and QW-462.3(a)	QW-163	Acceptable	see - ASME IX - QW-451.1

Comments:

TOUGHNESS TESTS (QW-170)

Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	Impact values (J)	(% Shear)	(mm)	Drop weight break
42663-WF	Weld Metal	V-notch	10 x 5	-40	49-62-56	-	-	-
42663-HA	HAZ A350	V-notch	10 x 5	-40	47-40-47	-	-	-
42663-HB	HAZ A333	V-notch	10 x 5	-40	71-77-66	-	-	-
42663-2A	FL +2 A350	V-notch	10 x 3.3	-40	25-51-51	-	-	-
42663-2B	FL +2 A333	V-notch	10 x 3.3	-40	51-50-48	-	-	-
42663-5A	FL +5 A350	V-notch	10 x 3.3	-40	29-33-41	-	-	-
42663-5B	FL +5 A333	V-notch	10 x 3.3	-40	56-58-50	-	-	-

Comments: Test method ASME IX QW-171

HARDNESS TEST

Type (Scale)	Distance from surface	SA-333 (6)	HAZ	Weld	HAZ	SA-350 (LF2)
Vickers (HV) Cap	1.5 - 2 mm	157-156-161	176-184-199-199-201	192-192-184	204-199-194-189-175	180-182-186
Vickers (HV) Cap	1.5 - 2 mm	169-171-174	190-197-200-202-203-	151-152-155	190-189-184-192-184	173-173-174

Comments: Test method ASME IX QW-171

OTHER TESTS

Type of test	Acceptance criteria	Result	Comments
Macroscopic examination	ASME IX	Acceptable	

Comments:

CERTIFICATION

Welder's name	ID Number	Stamp number		
A. Sumantri	ID Card IXH4P6551	W-102	Mechanical testing by	Element Breda (NLD)
			Laboratory test number	ARJ001-20-09-42663-1
			Test file number	ARL2542-1
			Tests conducted by	Daniel Schutt

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 IX of the ASME Code.

Witnessed Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

Signature 1		Signature 2	
Name	Signature	Name	Signature
F. van Toledo (Airpack)		L. Knops (DNVGL)	
Date		Date	
10/6/2020		10/6/2020	

PQR record number	A0790094-10	Revision 0	WPS record number	PGF-2000	Revision 0
Date	10/6/2020		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX: 2019	

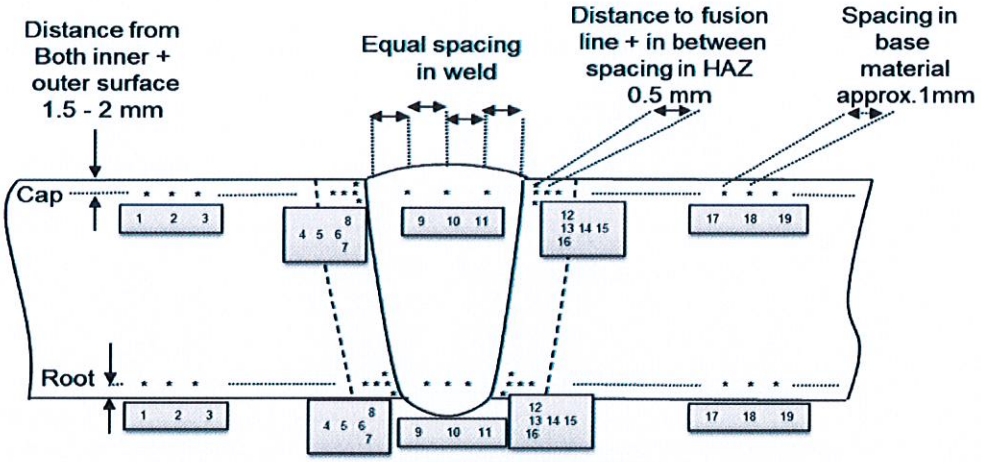
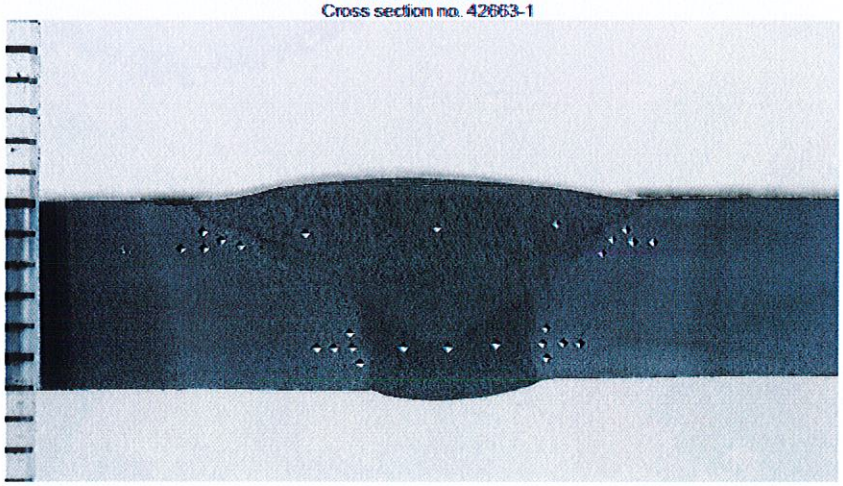


Fig. 1: Location of indentations.

SA-333Gr 6 side **SA-350(LF2) side**

MACRO PHOTO
Cross section no. 42663-1



Witnessed ☑ Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL2542-1	Revision 0	Date	9/22/2020
PQR number	A0790094-10	Revision 0	Welding standard	ASME Section IX: 2019
WPS number	PGF-2000	Revision 0	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GTAW	FCAW
Type	Manual	Semi-automatic

BASE METALS (QW-403)

Product form		Pipe	Welded to:	Product form	Pipe
Material control number		33058		Material control number	294658
Specification (type or grade)		SA-333 (6)		Specification (type or grade)	SA-350 (LF2)
Nominal composition		C-Mn-Si		Nominal composition	C-Mn-Si
Trade name		Artrom S.A.		Trade name	Donalam
P number		1		P number	1
G number		1		G number	2
AWS group number		U		AWS group number	U
Nominal pipe/tube size		101.60		Nominal pipe/tube size	101.60
Schedule		40		Schedule	40
Length	(mm)	150		Length	(mm) 150
Width (OD)	(mm)	114.30		Width (OD)	(mm) 114.30
Thickness	(mm)	6.02		Thickness	(mm) 6.02

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)	3-4		
Root face	(mm)	0-1		

CLEANING/ROOT TREATMENT

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

Witnessed Reviewed
And found to comply with:
Date: 7/10/20
Sign.: C. Knops

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL2542-1	Revision 0	Date	9/22/2020

PASS INFORMATION

Pass number	1	2	3
Layer number	1	2	3

WELDING PROCESSES

Welding process	GTAW	FCAW	FCAW
Type	Manual	Semi-automatic	Semi-automatic

FILLER METALS (QW-404)

Material control number		870264	01588	01588
SFA specification		5.18	5.20	5.20
AWS classification		ER70S-3	E71T-9M-J	E71T-9M-J
Filler metal F-number		6	6	6
Weld metal A-number		1		
Filler metal nominal composition		Not used	Not used	Not used
Filler metal trade name		Lincoln Electric	Nippon Steel & Sumikin Welding	Nippon Steel & Sumikin Welding
Filler metal size	(mm)	2,4	1,2	1,2
Length of filler metal consumed	(mm)	Not used	Not used	Not used
Deposited thickness	(mm)	2,02	2	2
Maximum pass thickness	(mm)	12	12	12
Weld deposit chemistry		Not used	Not used	Not used
Flux nominal composition		Not used	-	
Flux trade name		Not used	-	
Supplemental filler metal		-	Not used	Not used
Supplemental filler metal vol.	(mm³)	-	Not used	Not used

POSITION (QW-405)

Position	1G Rotated	1G Rotated	1G Rotated
Weld progression	-	-	-

PREHEAT (QW-406)

Preheat temperature	(°C)	10	10	10
Maximum interpass temperature	(°C)	10	123	174

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)	AC-2 (A5.32 SG-)	AC-2 (A5.32 SG-)
	Flow rate	(l/min)	10-14	15-20	15-20
Trailing gas:	Type		Not used	Not used	Not used
	Flow rate	(l/min)	-	-	-
Backing gas:	Type		Not used	Not used	Not used
	Flow rate	(l/min)	-	-	-

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,4	1,2	1,2
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
Arc time	(sec)	352	51	64
Weld bead length	(mm)	358	358	358
Amperes		68	258	263
Volts		10.8	31.6	31.6
Travel speed	(mm/min)	61	421	335
Maximum heat input	(kJ/mm)	0.7224	1.1619	1.4885
Tungsten size	(mm)	2,4	-	
Tungsten type		SFA 5.12 EWCe-2	-	
Current/polarity		DCEN	DCEP	DCEP
DC pulsing current		Not used	-	
Wire feed speed	(m/min)	-	Not used	Not used
Arc transfer mode		-	Spray	Spray

TECHNIQUE (QW-410)

String or weave		Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size		8 mm	15	15
C.T.W.D	(mm)	-	15-20	15-20
Multi/Single pass per side		Single pass	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		Not used	Not used	Not used

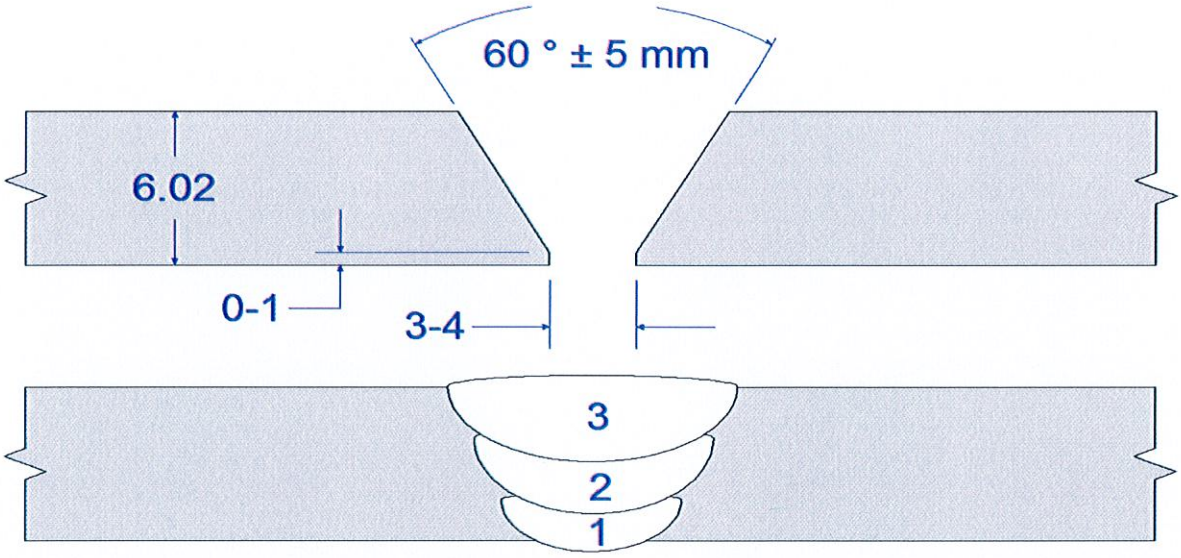
PASS PERFORMED/WITNESSED BY

Welders name	A. Sumantri	A. Sumantri	A. Sumantri
Recorded/witnessed by	L. Knops DNVGL	L. Knops DNVGL	L. Knops DNVGL
Date	9/22/2020	9/22/2020	9/22/2020
Data entry by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

Witnessed ☑ Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

PQRD number	ARL2542-1	Revision 0	Date	9/22/2020

SA-350 (LF2) pipe machined from bar.



Pipe diameter 114,3 mm

Witnessed ☑ Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

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Arjan Roza Lastechniek
G. Sterkenburgstraat 38
4268 GS MEEUWEN

Date(s) tested : 05-Oct-20
Date reported : 05-Oct-20
Element report number : ARJ001-20-09-42663-1

Customer reference : ARL2542

TEST REPORT

WELDING PROCEDURE QUALIFICATION TEST RECORD

Testing in accordance with	: ASME IX: 2019
Purchase order no.	: ARL2542-1
Manufacturer	: Airpack Nederland BV.
WPS	: PGF-2000
Description of sample(s)	: Pipe with Single-V-groove
Dimension(s)	: 4" Sch 40S (Ø 114,3 x 6,02 mm)
Material grade	: 1) P1 Gr.1 – P1 Gr. 1 2) P1 Gr.1 – P1 Gr. 2 (Machined from bar)
Material standard	: 1) ASTM SA A333 Gr. 6 2) ASTM SA A350 LF2 +N
Welding process(es)	: 1) GTAW (Root) : 2) FCAW (Filler and Cap)
Filler A-Number F-number	: 1) Root F-no.6 A-no 1 2) Filler and cap F-no.6
Filler Brand and type	: 1) Lincoln Electric LNT 25 (AWS A5.18: ER70S-3) : 2) Nittetsu, SF-3A (AWS A5.20: E71T-9M-J)
Shielding gas	: 1) A5.31 SG-A : 2) A5.32 SG-AC-20
Backing gas	: N.A.
Welding position	: 1G Rotated
Preheat / Interpass temp.	: 10 °C / 174°C
Joint type	: Single-V-groove
Welder	: Sumantri A.
Date / place of birth	: 23-02-1962 / Oost- en West-Souburg
Stamp. No. / ID	: A3 / ID Card

Note: *The above mentioned data is only for information and is no part of the examination in this test report*

TRANSVERSE TENSILE TEST ON WELD METAL

Test method: ASME IX QW-152 — Test temperature: R.T.

Specimen	Size [mm]	Tensile strength [MPa] Rm	Fracture location	Remark
42663-1	18.95 x 5.15	558	BM	--
42663-1	18.98 x 5.31	548	BM	--
Requirements ASTM A333 Gr.6;		≥ 415		--

Note: *BM= base material HAZ= heat affected zone WM= weld material*

element

Date(s) tested: 05-Oct-20
Date reported: 05-Oct-20
P.O. No.: ARL2542
Report No.: ARJ001-20-09-42663-1

MACRO EXAMINATION

Method: ASME IX QW 183			Magnification: 5x
Specimen	Etchant:	Observations:	Remark
42663-1	Nital	No significant inclusions or other defects	Acceptable

Note: *See macro photo page 3*

GUIDED BEND TEST

Test method: ASME IX QW-162						Test temperature: R.T.	
Specimen	Type	Size [mm]	Former [mm]	Roller distance [mm]	Bend Angle [°]	Results	Remark
42663-1	Face bend	40 x 6	24	40	180	Acceptable	--
42663-1	Face bend	40 x 6	24	40	180	Acceptable	--
42663-1	Root bend	40 x 6	24	40	180	Acceptable	--
42663-1	Root bend	40 x 6	24	40	180	Acceptable	--

HARDNESS MEASUREMENT

Test method: ASME IX QW-171
Location of indentations: as per ISO 9015-1 and fig. 1 below
Specimen: 42663-1

Location	BM			HAZ					WM			HAZ					BM		
Indent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Cap	157	156	161	176	184	199	199	201	192	192	184	204	199	194	189	175	180	182	186
Root	169	171	174	190	197	200	202	203	151	152	155	190	189	184	192	184	173	173	174

Note: *BM= base material HAZ= heat affected zone WM= weld material*

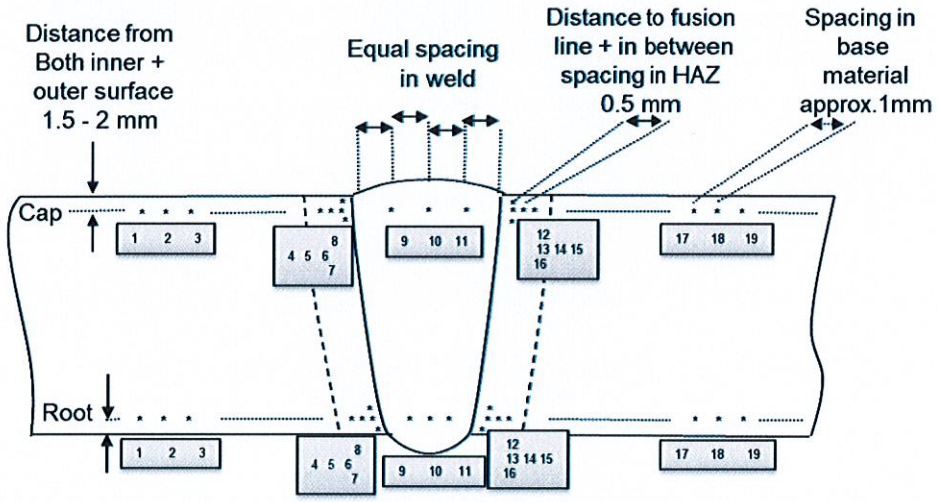


Fig. 1: Location of indentations.

element

Date(s) tested: 05-Oct-20
Date reported: 05-Oct-20
P.O. No.: ARL2542
Report No.: ARJ001-20-09-42663-1

CHARPY V-NOTCH IMPACT TEST

Test method: ASME IX QW-171

Specimen	Notch	Size [mm]	Temp [°C]	Absorbed Energy [J] Single		Average	
42663-WF	Midweld	10x5	-40	49	62	56	56
42663-HA	HAZ A350	10x5	-40	47	40	47	45
42663-HB	HAZ A333	10x5	-40	71	77	66	71
42663-2A	Fusion line +2mm A350	10x3.33	-40	25	51	51	42
42663-2B	Fusion line +2mm A333	10x3.33	-40	51	50	48	50
42663-5A	Fusion line +5mm A350	10x3.33	-40	29	33	41	34
42663-5B	Fusion line +5mm A333	10x3.33	-40	56	58	50	55

Note: *Values above 360 Joule exceed 80% of the machine capacity and should be considered as 'approximate values'.*

Witnessed ~~Reviewed~~
And found to comply with:
Date: 5/10/20
Sign: L. Knops

The above mentioned items satisfy the requirements.

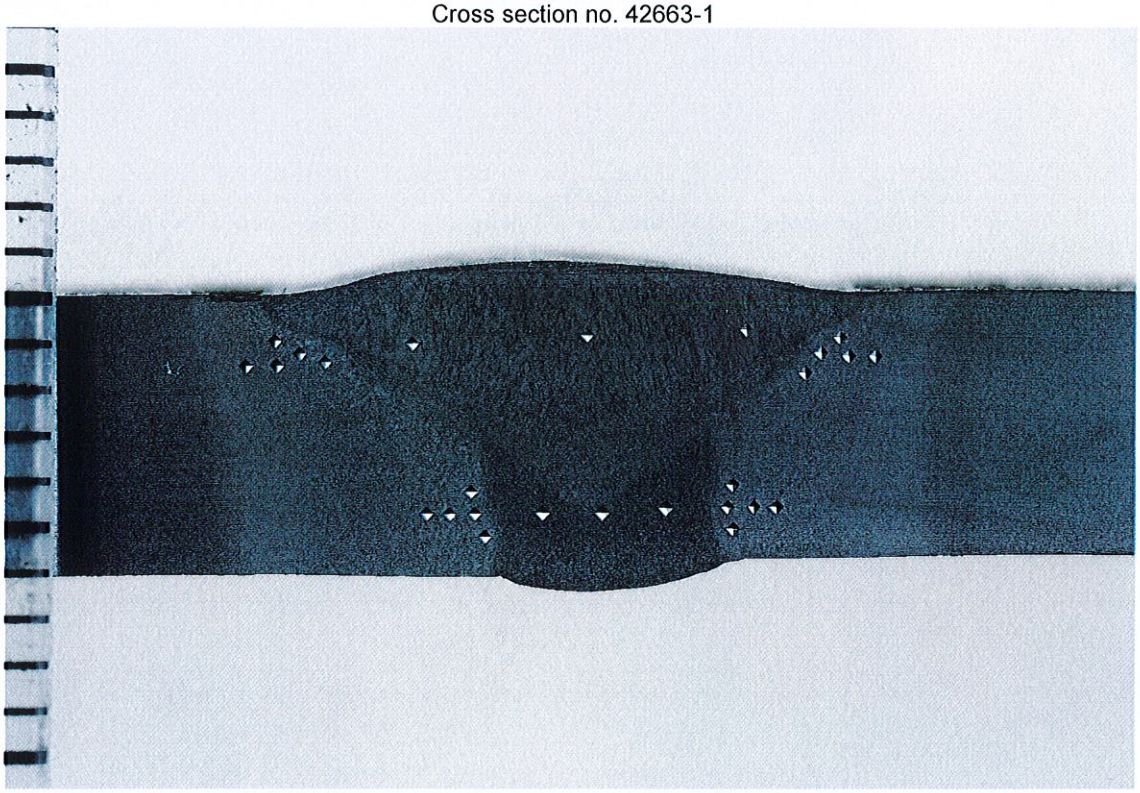
element™

Element Materials Technology Daniel Schutt

element

Date(s) tested:	05-Oct-20
Date reported:	05-Oct-20
P.O. No.:	ARL2542
Report No.:	ARJ001-20-09-42663-1

MACRO PHOTO
Cross section no. 42663-1



PQR

SS PIPING

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	RET 0245029-001-21 Revision 1	WPS record number	P3000 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)
	Pipe/Tube	SA-312 (TP316L)	8	1	63,50	160	9,53	73,03
Welded to:	Pipe/Tube	SA-312 (TP316L)	8	1	63,50	160	9,53	73,03

and tested:	Without PWHT
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		5.9	
AWS classification		ER316LSi	
Filler metal F-number		6	
Weld metal A-number		8	
Filler metal nominal composition		N.A.	
Filler metal trade name		Lincoln Electric, LNT 316LSi	
Filler metal size	(mm)	2,0	2,4
Deposited thickness	(mm)	9,53	
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)	132

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)	
	Flow rate	(l/min)	14	14
Trailing gas:	Type		None	
	Flow rate	(l/min)	-	-
Backing gas:	Type		95%N2 - 5%H2	
	Flow rate	(l/min)	12	12

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,0	2,4
Amperes		84	92 - 94
Volts		10,1	9,7 - 10,4
Travel speed	(mm/min)	58	30 - 62
Maximum heat input	(kJ/mm)	0,87	1,93
Tungsten size	(mm)	2,4	
Tungsten type		SFA 5.12 EWCe-2	
Current/polarity		DCEN (straight 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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	RET 0245029-001-21 Revision 1	WPS record number	P3000 Revision 1
Date	13-6-2012	Company name	Airpack Netherlands BV
		Welding standard	ASME Section IX:2010 including addenda 2011

TENSILE TESTS (QW-150)

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	19.00	9.42	178,980	-	555 N/mm²	
2	19.00	9.30	176,700	-	581 N/mm²	

Comments

GUIDED BEND TESTS (QW-160)

Type of test	Acceptance criteria	Result	Comments
Face bend	QW 163	Acceptable	
Face bend	QW 163	Acceptable	
Root bend	QW 163	Acceptable	
Root bend	QW 163	Acceptable	

Comments

CERTIFICATION

Welder's name	ID Number	Stamp number
A. Sumantri	ID Card IXH4P6551	A1

Mechanical testing by	Schielab BV Breda (NLD)
Laboratory test number	SL 12.6047-1A
Test file number	ARL1559-5
Tests conducted by	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 IX of the ASME Code.

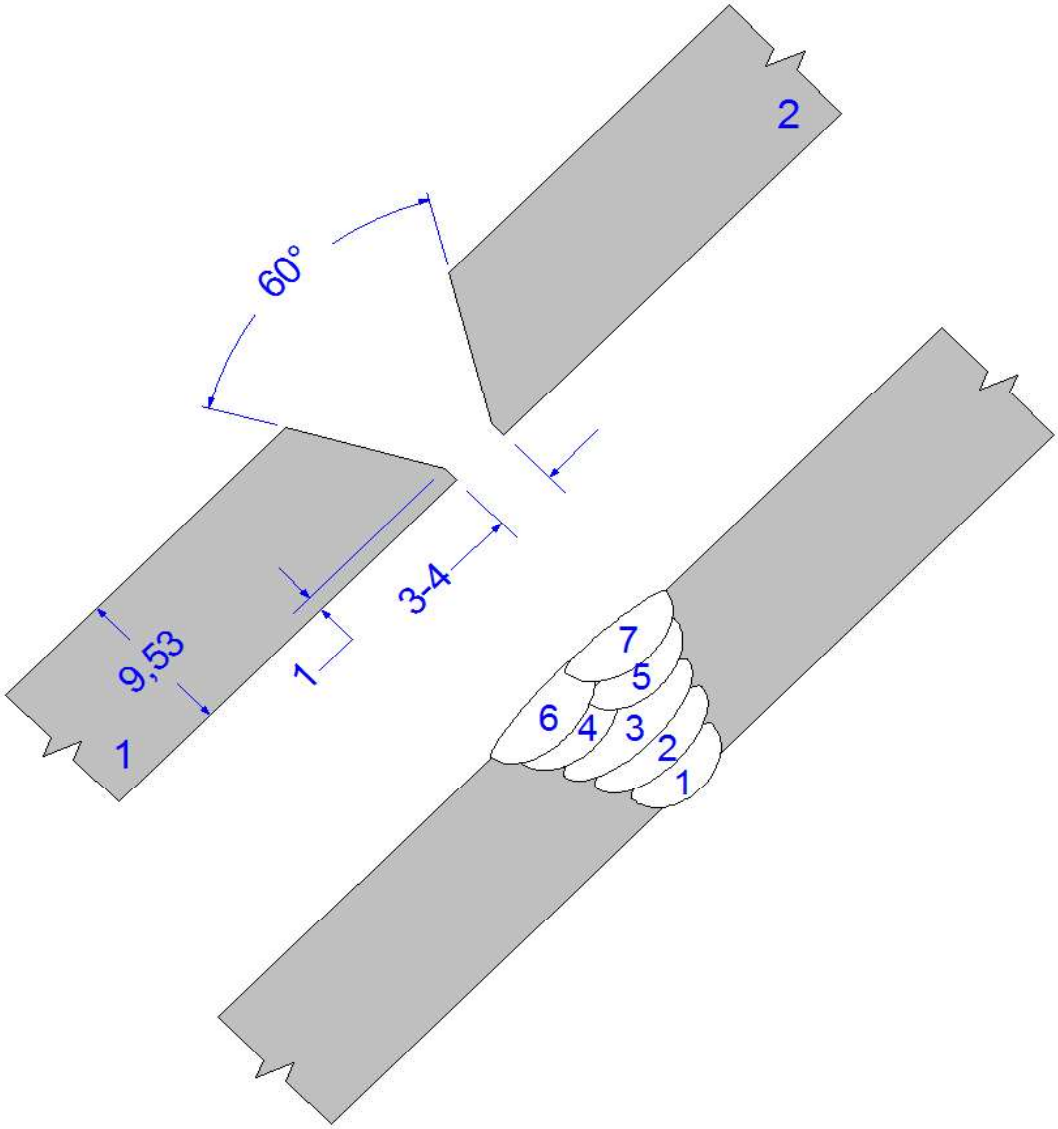
Signature 1

Name	Signature
Franky van Toledo	
Date	
8-6-2012	

Signature 2

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

PQR record number	RET 0245029-001-21	Revision 1	WPS record number	P3000	Revision 1
Date	13-6-2012		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX:2010 including addenda 2011	



Pipe diameter 2½" xSCH160 (73,03x9,53 mm)

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL1559-5	Revision 1	Date	29-5-2012
PQR number	RET 0245029-001-21	Revision 1	Welding standard	ASME Section IX:2010 including addenda 2011
WPS number	P3000	Revision 1	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GTAW
Type	Manual

BASE METALS (QW-403)

			Welded to:			
Product form		Pipe/Tube		Product form		Pipe/Tube
Material control number		3D995		Material control number		3D995
Specification (type or grade)		SA-312 (TP316L)		Specification (type or grade)		SA-312 (TP316L)
Nominal composition		16Cr-12Ni-2Mo		Nominal composition		16Cr-12Ni-2Mo
Trade name		Changshu Walsin Spec.		Trade name		Changshu Walsin Spec.
P number		8		P number		8
G number		1		G number		1
AWS group number		U		AWS group number		U
Nominal pipe/tube size		63,50		Nominal pipe/tube size		63,50
Schedule		160		Schedule		160
Length	(mm)	150		Length	(mm)	150
Width (OD)	(mm)	73,03		Width (OD)	(mm)	73,03
Thickness	(mm)	9,53		Thickness	(mm)	9,53

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

ASME - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL1559-5	Revision 1	Date	29-5-2012

PASS INFORMATION

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

WELDING PROCESSES

Welding process	GTAW	GTAW	GTAW	GTAW	GTAW	GTAW
Type	Manual	Manual	Manual	Manual	Manual	Manual

FILLER METALS (QW-404)

Material control number		80V7074	55072526	55072526	55072526	55072526	55072526
SFA specification		5.9	5.9	5.9	5.9	5.9	5.9
AWS classification		ER316LSi	ER316LSi	ER316LSi	ER316LSi	ER316LSi	ER316LSi
Filler metal F-number		6	6	6	6	6	6
Weld metal A-number		8	8	8	8	8	8
Filler metal nominal composition		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Filler metal trade name		Lincoln LNT 316LSi	Lincoln LNT 316LSi	Lincoln LNT 316LSi	Lincoln Electric, LNT 316LSi	Lincoln LNT 316LSi	Lincoln LNT 316LSi
Filler metal size	(mm)	2,0	2,4	2,4	2,4	2,4	2,4
Length of filler metal consumed	(mm)	-	-	-	-	-	-
Deposited thickness	(mm)	3	2	2	2	2	2
Maximum pass thickness	(mm)	4	4	4	4	4	4
Weld deposit chemistry		-	-	-	-	-	-
Flux nominal composition		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Flux trade name		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

POSITION (QW-405)

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

PREHEAT (QW-406)

Preheat temperature	(°C)	10	10	10	10	10	10
Maximum interpass temperature	(°C)	10	86	126	131	124	127

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)	Argon (A5.32 SG-A)
	Flow rate	(l/min)	14	14	14	14	14	14
Trailing gas:	Type		None	None	None	None	None	None
	Flow rate	(l/min)	-	-	-	-	-	-
Backing gas:	Type		95%N2 - 5%H2	95%N2 - 5%H2	95%N2 - 5%H2	95%H2 - 5%N2	95%H2 - 5%N2	95%N2 - 5%H2
	Flow rate	(l/min)	12	12	12	12	12	12

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,0	2,4	2,4	2,4	2,4	2,4
Amperes		84	92	94	94	94	94
Volts		10.1	9.7	10.1	9.7	10	10.4
Travel speed	(mm/min)	58	62	31	54	45	41
Maximum heat input	(kJ/mm)	0,8777	0,8636	1,8375	1,0131	1,2533	1,4306
Tungsten size	(mm)	2,4	2,4	2,4	2,4	2,4	2,4
Tungsten type		SFA 5.12 EWCe-2	SFA 5.12 EWCe-2	SFA 5.12 EWCe-2	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)	DCEN (straight polarity)	DCEN (straight polarity)	DCEN (straight polarity)
DC pulsing current		None	None	None	None	None	None

TECHNIQUE (QW-410)

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	9,5	9,5	9,5	9,5	9,5	9,5
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

PASS PERFORMED/WITNESSED BY

Welders name	A. Sumantri	A. Sumantri	A. Sumantri	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)	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	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)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL1559-5	Revision 1	Date	29-5-2012

PASS INFORMATION

Pass number		7
Layer number		5

WELDING PROCESSES

Welding process		GTAW
Type		Manual

FILLER METALS (QW-404)

Material control number		55072526
SFA specification		5.9
AWS classification		ER316LSi
Filler metal F-number		6
Weld metal A-number		8
Filler metal nominal composition		N.A.
Filler metal trade name		Lincoln LNT 316LSi
Filler metal size	(mm)	2,4
Length of filler metal consumed	(mm)	-
Deposited thickness	(mm)	3
Maximum pass thickness	(mm)	4
Weld deposit chemistry		-
Flux nominal composition		N.A.
Flux trade name		N.A.

POSITION (QW-405)

Position		6G
Weld progression		Uphill

PREHEAT (QW-406)

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

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		95%N2 - 5%H2
	Flow rate	(l/min)	12

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,4
Amperes		94
Volts		10.3
Travel speed	(mm/min)	30
Maximum heat input	(kJ/mm)	1,9364
Tungsten size	(mm)	2,4
Tungsten type		SFA 5.12 EWCe-2
Current/polarity		DCEN (straight polarity)
DC pulsing current		None

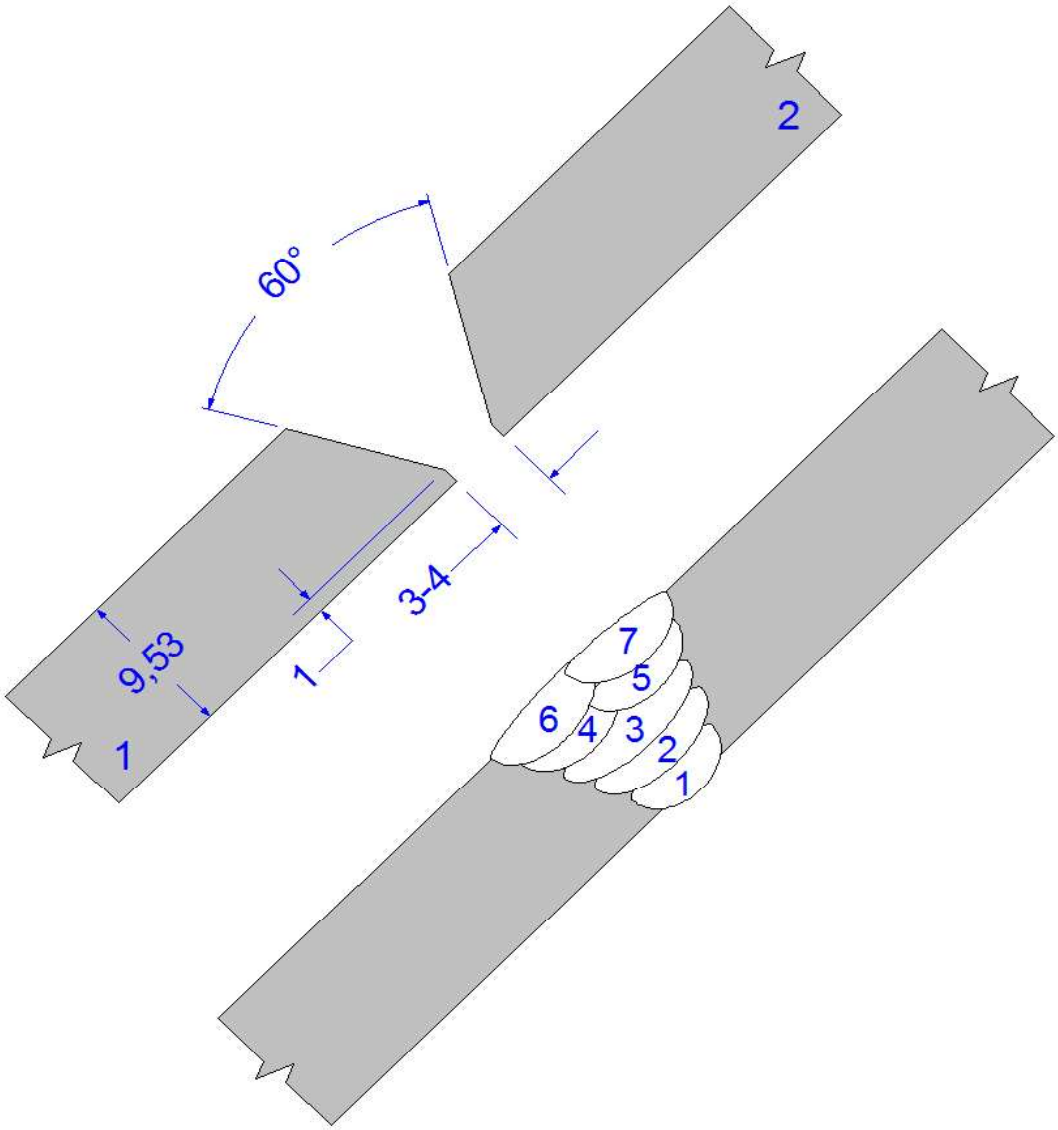
TECHNIQUE (QW-410)

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

PASS PERFORMED/WITNESSED BY

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

PQRD number	ARL1559-5	Revision 1	Date	29-5-2012



Pipe diameter 2½" xSCH160 (73,03x9,53 mm)

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	A0790094-11	Revision 1	WPS record number	PGF-3000	Revision 0
Date	10/6/2020		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX: 2019	

BASE METALS (QW-403)

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
	Pipe	SA-312 (TP316L)	8	1	101.60	40	6.02	114.30
Welded to:	Pipe	SA-312 (TP316L)	8	1	101.60	40	6.02	114.30
and tested:	Without PWHT, With hardness							
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)	3-4		
Root face (mm)	0-1		

WELDING PROCESSES

	GTAW	FCAW
Welding process	GTAW	FCAW
Type	Manual	Semi-automatic

FILLER METALS (QW-404)

SFA specification		5.9	5.22
AWS classification		ER316LSi	E316LT0-1
Filler metal F-number		6	6
Weld metal A-number		8	8
Filler metal nominal composition		Not used	Not used
Filler metal trade name		Lincoln Electric, LNT 316LSi	Kobelco welding, DW-316L
Filler metal size	(mm)	2,0	1,2
Deposited thickness	(mm)	2.00	4.00
Maximum pass thickness	(mm)	12	12
Weld deposit chemistry		Not used	Not used
Supplemental filler metal		-	Not used
Supplemental filler metal vol.	(mm³)	-	Not used

POSITION (QW-405)

Position		1G Rotated	1G Rotated
Weld progression		-	-

PREHEAT (QW-406)

Preheat temperature	(°C)	10	10
Maximum interpass temperature	(°C)	55	101

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)	AC-20 (A5.32 SG-)
	Flow rate	(l/min)	12-15	15-20
Trailing gas:	Type		Not used	Not used
	Flow rate	(l/min)	-	-
Backing gas:	Type		A5.32 SG-NH-5	A5.32 SG-NH-5
	Flow rate	(l/min)	14-16	14-16

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,0	1,2
Waveform control			
Energy	(J)		
Power	(J/s)		
Arc time	(sec)		
Weld bead length	(mm)		
Amperes		68	196 - 197
Volts		10.8	29.5 - 29.6
Travel speed	(mm/min)	24	376 - 421
Maximum heat input	(kJ/mm)	1.836	0.9305
Tungsten size	(mm)	2,4	-
Tungsten type		SFA 5.12 EWCe-2	-
Current/polarity		DCEN	DCEP
DC pulsing current		Not used	-
Wire feed speed	(m/min)	-	0
Arc transfer mode		-	Spray

TECHNIQUE (QW-410)

String or weave		Stringer and Weave	Stringer and Weave
Orifice/gas cup size		8 mm	16
C.T.W.D	(mm)	-	15-20
Multi/Single pass per side		Single pass	Multiple passes
Peening		Not used	Not used
Initial/interpass cleaning		Brushing and Grinding	Brushing and Grinding
Back gouging method		Not used	Not used

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

WeldOffice WPS

PQR record number	A0790094-11	Revision 1	WPS record number	PGF-3000	Revision 0
Date	10/6/2020		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX: 2019	

TENSILE TESTS (QW-150)

Reduced sectior

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
42663-4	18.98	5.83	110.653	-	592	Ductile-Weld
42663-4	19.01	5.39	102.464	-	539	Ductile-HAZ

Comments: 2 reduced section tension tests per QW-151.2 and QW-462.1(b)

GUIDED BEND TESTS (QW-160)

Type of test	Acceptance criteria	Result	Comments
2 transverse face bends per QW-161.2 and QW-462.3(a)	QW-163	Acceptable	see - ASME IX - QW-451.1
2 transverse root bends per QW-161.3 and QW-462.3(a)	QW-163	Acceptable	see - ASME IX - QW-451.1

Comments:

HARDNESS TEST

Type (Scale)	Distance from surface	SA-312 (TP316L)	HAZ	Weld	HAZ	SA-312 (TP316L)
Vickers (HV) root	1.5-2 mm	158-158-158	173-178-173-175-169	169-182-165	174-179-172-178-175	159-160-159
Vickers (HV) Cap	1.5-2 mm	164-165-164	182-181-179-177-185	188-189-191	182-176-187-187-187	162-163-163

Comments:

OTHER TESTS

Type of test	Acceptance criteria	Result	Comments
Macroscopic examination	ASME IX	Acceptable	See report ARJ001-20-09-42663-4 rev 1
Determination of the volume fraction ferrite	-	-	

Comments:

CERTIFICATION

Welder's name	ID Number	Stamp number		
A. Sumantri	ID Card IXH4P6551	W-102	Mechanical testing by	Element Breda (NLD)
			Laboratory test number	ARJ001-20-09-42663-4
			Test file number	ARL2542-4
			Tests conducted by	Daniel Schutt

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 IX of the ASME Code.

Witnessed Reviewed
And found to comply with:
05 NOV 2020
Date:
Sign: L. Knops

Signature 1

Name	Signature
F. van Toledo (Airpack)	
Date	
11/4/2020 (rev 1)	

QUALITY INSPECTED DATE: NAME: AIRPACK NEDERLAND B.V.

Signature 2

Name	Signature
L. Knops (DNVGL)	
Date	
11/4/2020 (rev 1)	

PQR record number	A0790094-11	Revision 1	WPS record number	PGF-3000	Revision 0
Date	10/6/2020		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section IX: 2019	

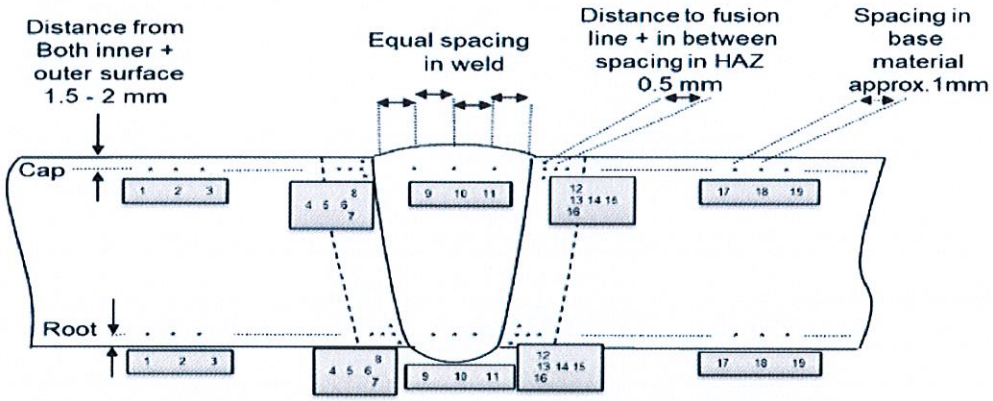
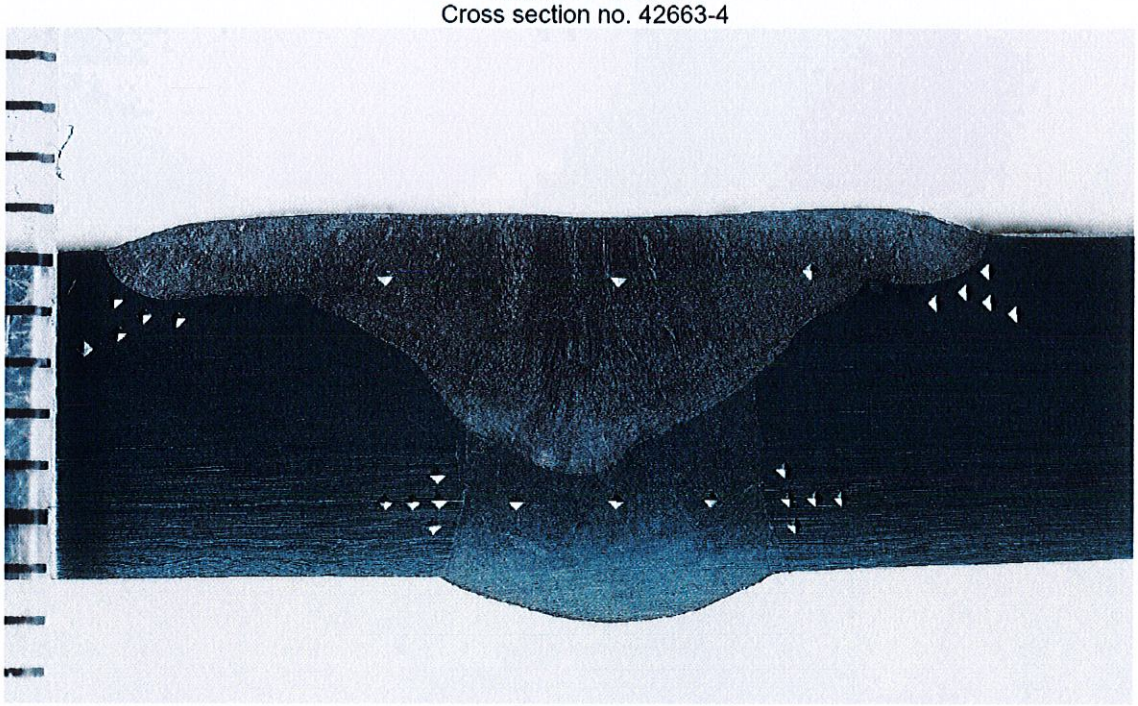


Fig. 1: Location of indentations.

MACRO PHOTO
Cross section no. 42663-4



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL2542-4	Revision 0	Date	10/6/2020
PQR number	A0790094-11	Revision 0	Welding standard	ASME Section IX: 2019
WPS number	PGF-3000	Revision 0	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GTAW	FCAW
Type	Manual	Semi-automatic

BASE METALS (QW-403)

			Welded to:		
Product form		Pipe		Product form	Pipe
Material control number		QS477		Material control number	QS477
Specification (type or grade)		SA-312 (TP316L)		Specification (type or grade)	SA-312 (TP316L)
Nominal composition		16Cr-12Ni-2Mo		Nominal composition	16Cr-12Ni-2Mo
Trade name		Salzgitter		Trade name	Salzgitter
P number		8		P number	8
G number		1		G number	1
AWS group number		U		AWS group number	U
Nominal pipe/tube size		101.60		Nominal pipe/tube size	101.60
Schedule		40		Schedule	40
Length	(mm)	150		Length	(mm) 150
Width (OD)	(mm)	114.30		Width (OD)	(mm) 114.30
Thickness	(mm)	6.02		Thickness	(mm) 6.02

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)	3-4		
Root face	(mm)	0-1		

CLEANING/ROOT TREATMENT

Surface preparation	Grinding and Brushing
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	Not used

Witnessed ☑ Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL2542-4	Revision 0	Date	10/6/2020

PASS INFORMATION

Pass number	1	2	3
Layer number	1	2	3

WELDING PROCESSES

Welding process	GTAW	FCAW	FCAW
Type	Manual	Semi-automatic	Semi-automatic

FILLER METALS (QW-404)

Material control number		30268743	KC19-410	KC19-410
SFA specification		5.9	5.22	5.22
AWS classification		ER316LSi	E316LT0-1	E316LT0-1
Filler metal F-number		6	6	6
Weld metal A-number		8	8	8
Filler metal nominal composition		Not used	Not used	Not used
Filler metal trade name		Lincoln Electric, LNT 316LSi	Kobelco welding, DW-316L	Kobelco welding, DW-316L
Filler metal size	(mm)	2,0	1,2	1,2
Length of filler metal consumed	(mm)	Not used	Not used	Not used
Deposited thickness	(mm)	2,02	2,0	2,0
Maximum pass thickness	(mm)	12	12	12
Weld deposit chemistry		Not used	Not used	Not used
Flux nominal composition		Not used	-	
Flux trade name		Not used	-	
Supplemental filler metal		-	Not used	Not used
Supplemental filler metal vol.	(mm³)	-	Not used	Not used

POSITION (QW-405)

Position	1G Rotated	1G Rotated	1G Rotated
Weld progression	-	-	-

PREHEAT (QW-406)

Preheat temperature	(°C)	10	10	10
Maximum interpass temperature	(°C)	10	55	101

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
	Flow rate	(l/min)	12-15	15-20	15-20
Trailing gas:	Type		Not used	Not used	Not used
	Flow rate	(l/min)	-	-	-
Backing gas:	Type		A5.32 SG-NH-5	(A5.32 SG-NH-5	A5.32 SG-NH-5
	Flow rate	(l/min)	14-16	14-16	14-16

ELECTRICAL (QW-409)

Filler metal size	(mm)	2,0	1,2	1,2
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
Arc time	(sec)	882	51	57
Weld bead length	(mm)	358	358	358
Amperes		68	196	197
Volts		10.8	29.5	29.6
Travel speed	(mm/min)	24	421	376
Maximum heat input	(kJ/mm)	1.836	0.824	0.9305
Tungsten size	(mm)	2,4	-	
Tungsten type		SFA 5.12 EWCe-2	-	
Current/polarity		DCEN	DCEP	DCEP
DC pulsing current		Not used	-	
Wire feed speed	(m/min)	-	Not used	Not used
Arc transfer mode		-	Spray	Spray

TECHNIQUE (QW-410)

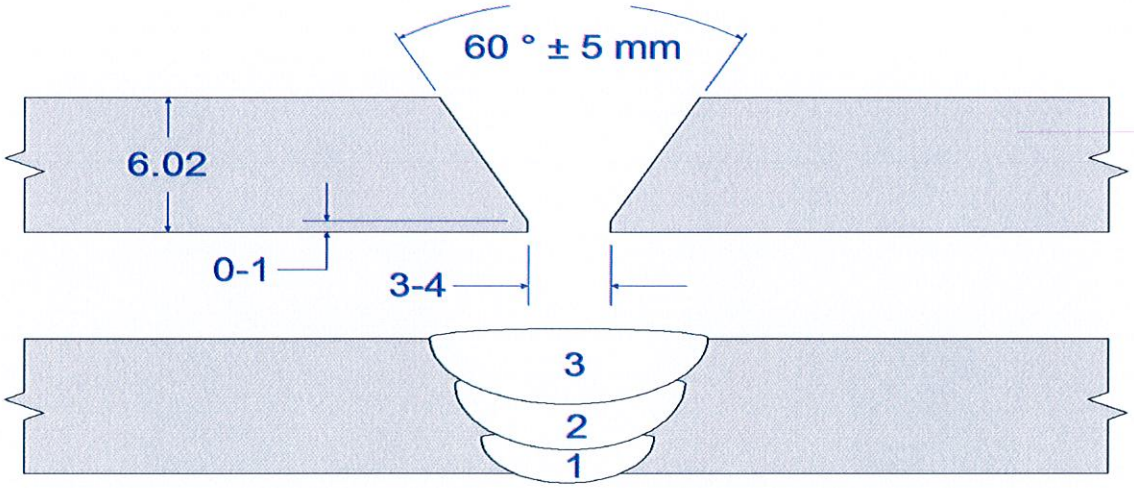
String or weave		Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size		8 mm	16	16
C.T.W.D	(mm)	-	15-20	15-20
Multi/Single pass per side		Single pass	Multiple passes	Multiple passes
Peening		Not used	Not used	Not used
Initial/interpass cleaning		Brushing and Grinding	Brushing and Grinding	Brushing and Grinding
Back gouging method		Not used	Not used	Not used

PASS PERFORMED/WITNESSED BY

Welders name	A. Sumantri	A. Sumantri	A. Sumantri
Recorded/witnessed by	L. Knops DNVGL	L. Knops DNVGL	L. Knops DNVGL
Date	9/22/2020	9/22/2020	9/22/2020
Data entry by	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)	A.J.H. Roza (IWT/IWI)

☐ Witnessed ☑ Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

PQRD number	ARL2542-4	Revision 0	Date	10/6/2020



Pipe diameter 114,3 mm

Witnessed ☑ Reviewed
And found to comply with:
Date: 7/10/20
Sign: L. Knops

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BTW NL8056.95.333.B01
KvK 24170257

Arjan Roza Lastechniek
G. Sterkenburgstraat 38
4268 GS MEEUWEN

Date(s) tested : 05-Oct-20
Date reported : 06-Oct-20
Element report number : ARJ001-20-09-42663-4 Rev.1

Customer reference : ARL2542

TEST REPORT

WELDING PROCEDURE QUALIFICATION TEST RECORD

Testing in accordance with	: ASME IX: 2019
Purchase order no.	: ARL2542-4
Manufacturer	: Airpack Nederland BV.
WPS	: PGF-3000
Description of sample(s)	: Pipe with Single-V-groove
Dimension(s)	: 4" Sch 40S (Ø 114,3 x 6,02 mm)
Material grade	: P8 Gr.1 – P8 Gr. 1
Material standard	: ASME SA 312M TP316L
Welding process(es)	: 1) GTAW (Root) : 2) FCAW (Filler and Cap)
Filler A-Number F-number	: 1) Root F-no.6 A-no. 8 2) Filler and cap F-no.6 A-no. 8
Filler Brand and type	: 1) Lincoln Electric, LNT 316LSi (AWS A5.9 ER316LSi) : 2) Kobelco Welding, DW-316L (AWS A5.22 E316LT0-1/4)
Shielding gas	: 1) A5.31 SG-A : 2 A5.32 SG-AC-20
Backing gas	: A5.32 SG-NH-5
Welding position	: 1G Rotated
Preheat / Interpass temp.	: 10 °C / 101 °C
Joint type	: Single-V-groove
Welder	: Sumantri A.
Date / place of birth	: 23-02-1962 / Oost- en West-Souburg
Stamp. No. / ID	: A3 / ID Card

Note: *The above mentioned data is only for information and is no part of the examination in this test report*

element

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TRANSVERSE TENSILE TEST ON WELD METAL

Test method: ASME IX QW-152				Test temperature: R.T.
Specimen	Size [mm]	Tensile strength [MPa] Rm	Fracture location	Remark
42663-4	18.98 x 5.83	592	WM	--
42663-4	19.01 x 5.69	539	HAZ	--
Requirements ASTM A312 TP316L;		≥ 485		--

Note: *BM= base material HAZ= heat affected zone WM= weld material*

MACRO EXAMINATION

Method: ASME IX QW 183			Magnification: 5x
Specimen	Etchant:	Observations:	Remark
42663-4	Nital	No significant inclusions or other defects	Acceptable

Note: *See macro photo page 4*

GUIDED BEND TEST

Test method: ASME IX QW-162							Test temperature: R.T.
Specimen	Type	Size [mm]	Former [mm]	Roller distance [mm]	Bend Angle [°]	Results	Remark
42663-4	Face bend	40 x 6	24	40	180	Acceptable	--
42663-4	Face bend	40 x 6	24	40	180	Acceptable	--
42663-4	Root bend	40 x 6	24	40	180	Acceptable	--
42663-4	Root bend	40 x 6	24	40	180	Acceptable	--

HARDNESS MEASUREMENT

Test method: ASME IX QW-171
Location of indentations: as per ISO 9015-1 and fig. 1 below
Specimen: 42663-4

Location	BM			HAZ					WM			HAZ					BM		
Indent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Cap	158	158	158	173	178	173	175	169	169	182	165	174	179	172	178	175	159	160	159
Root	164	165	164	182	181	179	177	185	188	189	191	182	176	187	187	187	162	163	163

Note: *BM= base material HAZ= heat affected zone WM= weld material*

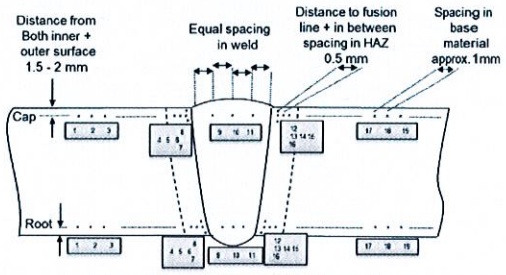

Fig. 1: Location of indentations.

element

Date(s) tested: 05-Oct-20
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FERRITE MEASUREMENTS

Test method: Element procedure SOP 30-01					
Equipment: Fisher Ferritscope MP30					
Results: % values					
Specimen: 42663-4					
Location	WM	WM	WM	WM	WM
Indent	1	2	3	4	5
Cap	7.6	7.7	7.5	7.1	7.9
Mid	5.3	7.3	6.6	7.3	7.7
Root	4.1	3.0	3.1	2.9	3.4

Witnessed Reviewed
And found to comply with:
Date: 05 NOV 2020
Sign: L. Knops

element
Sandra Wevers

The above mentioned items satisfy the requirements.

Element Materials Technology

element

Date(s) tested:	05-Oct-20
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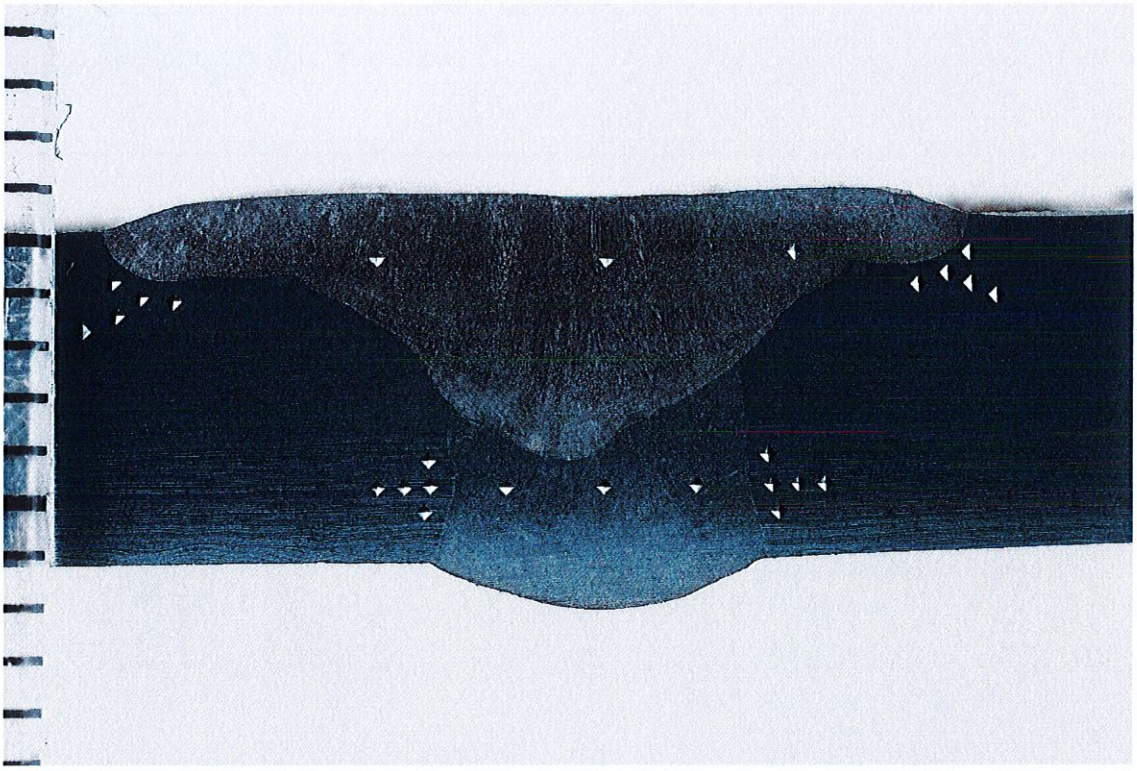
MACRO PHOTO

Cross section no. 42663-4



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	RET0278790/TK/004	Revision 1	WPS record number	SP4000	Revision 1
Date	1-6-2016		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section ASME IX:2015	

BASE METALS (QW-403)

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick. (mm)	Dia. (mm)
	Plate	S355MC acc. EN 10149-2	U	None	-	-	10	-
Welded to:	Pipe	SA-312 (TP316L)	8	1	38,10	80	5,08	48,26
and tested:	Without PWHT, Fillet-weld test							
Notes								

JOINTS (QW-402)

Joint design	Fillet weld	See addition information	See addition information

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

SFA specification		5.9
AWS classification		ER309LSi
Filler metal F-number		6
Weld metal A-number		8
Filler metal nominal composition		-
Filler metal trade name		Lincoln Ellectric LNT 309LSi
Filler metal size	(mm)	2,4
Deposited thickness	(mm)	0,00
Maximum pass thickness	(mm)	5
Weld deposit chemistry		-

POSITION (QW-405)

Position	2F
Weld progression	-

PREHEAT (QW-406)

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

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)
	Flow rate	(l/min)	10
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
Waveform control		Not Used
Energy	(J)	-
Power	(J/s)	-
Arc time	(sec)	-
Weld bead length	(mm)	-
Amperes		131
Volts		13,2
Travel speed	(mm/min)	47
Maximum heat input	(kJ/mm)	2,174
Tungsten size	(mm)	2,4
Tungsten type		SFA 5.12 EWLa-1
Current/polarity		DCEN
DC pulsing current		Not used

TECHNIQUE (QW-410)

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

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

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

WeldOffice WPS

PQR record number	RET0278790/TK/004	Revision 1	WPS record number	SP4000	Revision 1
Date	1-6-2016		Company name	Airpack Netherlands BV	
			Welding standard	ASME Section ASME IX:2015	

TENSILE TESTS (QW-150)

Reduced section

Specimen number	Width (mm)	Thickness (mm)	Area (mm²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
Comments						

GUIDED BEND TESTS (QW-160)

Type of test	Acceptance criteria	Result	Comments
Comments			

FILLET WELD TESTS (QW-180)

Type of test	Acceptance criteria	Result	Fillet leg size (mm) x (mm)
4x Macroscopic examination	ASME IX	Acceptable	4,2x4,2
Comments			

CERTIFICATION

Welder's name	ID Number	Stamp number		
Dorreman M.	ID Card IKP0996J6	W-013	Mechanical testing by	Element Breda (NLD)
			Laboratory test number	ARJ001-16-01-18390-4
			Test file number	ARL2064-4
			Tests conducted by	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 IX of the ASME Code.

Signature 1

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

Signature 2

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

Witnessed
Reviewed
Examined
Ton Konings
Lloyd's Register Energy

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS

PQRD number	ARL2064-4	Revision 1	Date	1-6-2016
PQR number	RET0278790/TK/004	Revision 1	Welding standard	ASME Section ASME IX:2015
WPS number	SP4000	Revision 1	Company name	Airpack Netherlands BV
			To be tested	Without PWHT

WELDING PROCESSES

Welding process	GTAW
Type	Manual

BASE METALS (QW-403)

			Welded to:			
Product form		Plate		Product form		Pipe
Material control number		140287		Material control number		470133
Specification (type or grade)		S355MC acc. EN 10149-2		Specification (type or grade)		SA-312 (TP316L)
Nominal composition		C-Mn		Nominal composition		16Cr-12Ni-2Mo
Trade name		Severstal		Trade name		Salzgitter
P number		U		P number		8
G number		None		G number		1
AWS group number		II		AWS group number		U
Nominal pipe/tube size		-		Nominal pipe/tube size		38,10
Schedule		-		Schedule		80
Length	(mm)	150		Length	(mm)	150
Width (OD)	(mm)	150		Width (OD)	(mm)	48,26
Thickness	(mm)	10		Thickness	(mm)	5,08

JOINTS (QW-402)

Joint design	Fillet weld	See addition information	See addition information

CLEANING/ROOT TREATMENT

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

PQRD number	ARL2064-4	Revision 1	Date	1-6-2016

PASS INFORMATION

Pass number	1
Layer number	1

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

Material control number		55E80442
SFA specification		5.9
AWS classification		ER309LSi
Filler metal F-number		6
Weld metal A-number		8
Filler metal nominal composition		-
Filler metal trade name		Lincoln Ellectric LNT 309LSi
Filler metal size	(mm)	2,4
Length of filler metal consumed	(mm)	-
Deposited thickness	(mm)	throat thickenss 3 mm
Maximum pass thickness	(mm)	5
Weld deposit chemistry		-
Flux nominal composition		-
Flux trade name		-

POSITION (QW-405)

Position	2F
Weld progression	-

PREHEAT (QW-406)

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

GAS (QW-408)

Shielding gas:	Type		Argon (A5.32 SG-A)
	Flow rate	(l/min)	10
Trailing gas:	Type		None
	Flow rate	(l/min)	-
Backing gas:	Type		None
	Flow rate	(l/min)	-

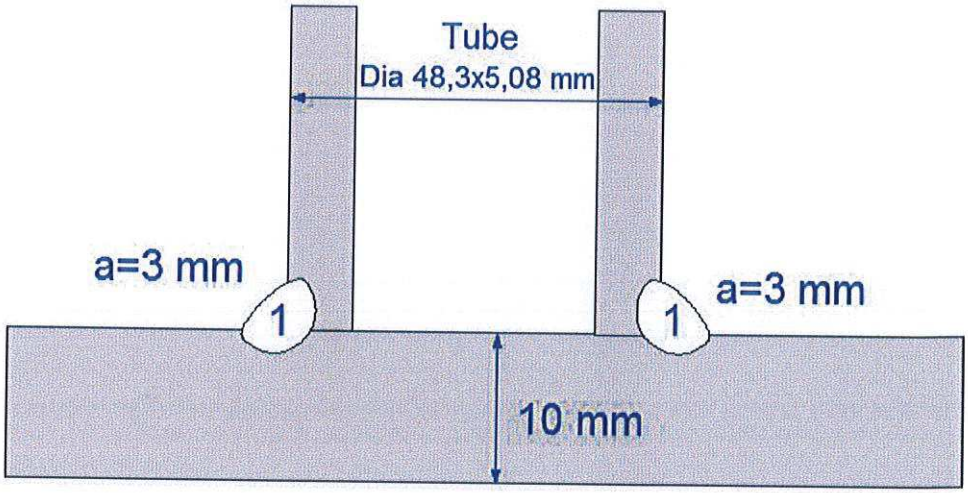
ELECTRICAL (QW-409)

Filler metal size	(mm)	2,4
Waveform control		Not Used
Energy	(J)	none
Power	(J/s)	none
Arc time	(sec)	none
Weld bead length	(mm)	none
Amperes		131
Volts		13.2
Travel speed	(mm/min)	47
Maximum heat input	(kJ/mm)	2,2075
Tungsten size	(mm)	2,4
Tungsten type		SFA 5.12 EWLa-1
Current/polarity		DCEN
DC pulsing current		Not used

TECHNIQUE (QW-410)

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

PQRD number	ARL2064-4	Revision 1	Date	1-6-2016



Witnessed
Reviewed
Examined
Ton Konings
Lloyd's Register Energy