



LIDCO, Pars SEE Zone, Assaluyeh,
Integrated Methanol and Ammonia
Plant 3000 MTPD MeOH / 900 MTPD NH3 PROJECT



Welding Book PQR / WPS

Document No. 17735-25

Project No.	Vendor Doc.	P.O. No.	Department	Document Type	Serial No	Revision	Page
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**Airpack B.V. - Air Compressor –
Integrated Methanol and Ammonia Plant
17735-COM Welding Book PQR / WPS (K020)**

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Welding Book PQR / WPS

Document No. 17735-25

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2	X	X	X			27	X	X	X			52	X	X	X			77	X				
3	X	X	X			28	X	X	X			53	X	X	X			78	X				
4	X	X	X			29	X	X	X			54	X	X	X			79	X				
5	X	X	X			30	X	X	X			55	X	X	X			80	X				
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8	X	X	X			33	X	X	X			58	X	X	X			83	X				
9	X	X	X			34	X	X	X			59	X	X	X			84	X				
10	X	X	X			35	X	X	X			60	X	X	X			85	X				
11	X	X	X			36	X	X	X			61	X	X	X			86	X				
12	X	X	X			37	X	X	X			62	X	X	X			87	X				
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15	X	X	X			40	X	X	X			65	X	X	X			90	X				
16	X	X	X			41	X	X	X			66	X					91	X				
17	X	X	X			42	X	X	X			67	X					98	X				
18	X	X	X			43	X	X	X			68	X					ATTACHMENT					
19	X	X	X			44	X	X	X			69	X					1					
20	X	X	X			45	X	X	X			70	X					2					
21	X	X	X			46	X	X	X			71	X					3					
22	X	X	X			47	X	X	X			72	X					4					
23	X	X	X			48	X	X	X			73	X					5					
24	X	X	X			49	X	X	X			74	X					6					
25	X	X	X			50	X	X	X			75	X					7					

WPS/

PQR

WPS

SKID

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) Reference docs.	RET0278790/TK/001 - Rev 1			

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

BASE METALS

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

THICKNESS RANGE QUALIFIED (mm)

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

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS

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

WELDING PROCEDURE

	GMAW	GMAW	GMAW
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

Signature 2

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

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) Reference docs.	RET0278790/TK/002 - Rev 1			

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

BASE METALS

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

THICKNESS RANGE QUALIFIED (mm)

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

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS

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

WELDING PROCEDURE

	GMAW	GMAW	GMAW
Welding process	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

Signature 2

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

WPS

CS PIPING

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) Reference docs.	RET0245029-001-17 – Rev 0			

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

BASE METALS (QW-403)

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

THICKNESS RANGE QUALIFIED (mm)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	1,50	10,32	-	-
Impact tested	2,58	10,32	-	-
Partial pen.	1,50	10,32	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

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

WELDING PROCEDURE

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



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

PREHEAT TABLE


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

TECHNIQUE (QW-410)

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

NOTES

Signature 1

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

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

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

BASE METALS (QW-403)

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

THICKNESS RANGE QUALIFIED (mm)

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

DIAMETER RANGE QUALIFIED (mm)

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

FILLER METALS (QW-404)

THICKNESS RANGE QUALIFIED (mm)

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

WELDING PROCEDURE

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



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

PREHEAT TABLE

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

TECHNIQUE (QW-410)

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

NOTES

Signature 1

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

WPS

SS PIPING

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) Reference docs.	RET0245029-001-21 – Rev 1			

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)

THICKNESS RANGE QUALIFIED (mm)

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

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			

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) Reference docs.	RET 0278790/TK/004 Rev.1			

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		With PWHT	
						Min.	Max.	Min.	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

Signature 2

Signature 1		Signature 2	
Name	Signature	Name	Signature
F. van Toledo			
Date		Date	
Monday, 15 August 2022			

PQR

SKID

Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Procedure Qualification Record (PQR)

WeldOffice WPS



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

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

JOINTS

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

Welding process Type	GMAW Semi-automatic
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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)
Trailing gas: Type	None
	Flow rate (l/min)
Backing gas: Type	None
	Flow rate (l/min)

ELECTRICAL

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

TECHNIQUE

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

Airpack Netherlands BV

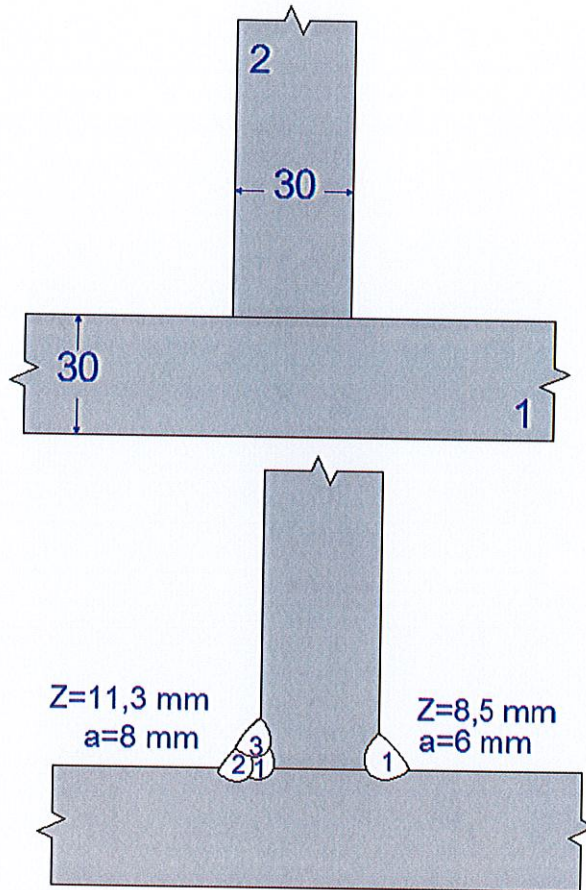
Groenewegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Additional information (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	



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



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

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

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

Welded to:

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

JOINTS

Joint design	Fillet weld	See addition information	See addition information

CLEANING/ROOT TREATMENT

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

Airpack Netherlands BV

Groenewegje 19 - 25, 4301 RN Zierikzee, The Netherlands

AWS - Welding parameters - (PQRD Welding Data Record)

WeldOffice WPS



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

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

WELDING PROCESSES

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

FILLER METALS

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

POSITION

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

PREHEAT

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

GAS

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

ELECTRICAL

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

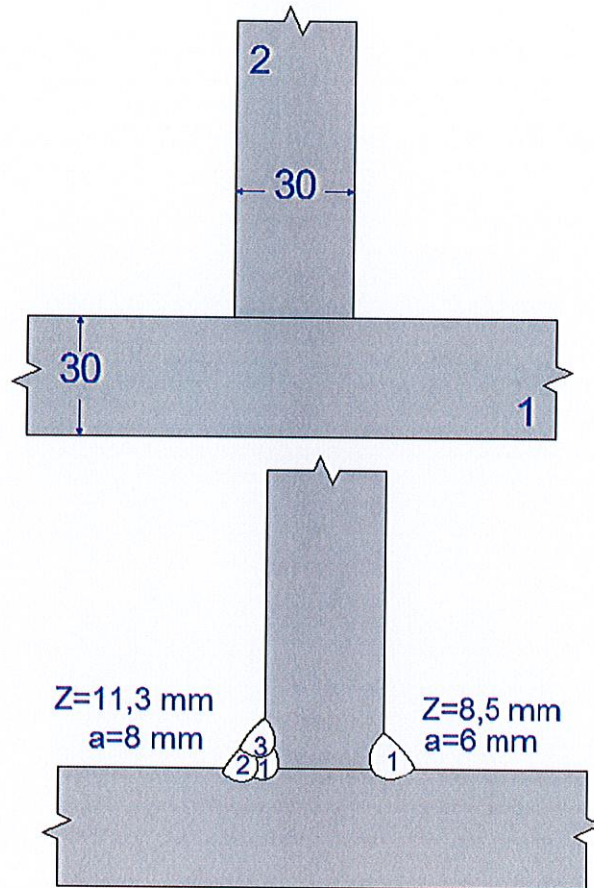
TECHNIQUE

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

PASS PERFORMED/WITNESSED BY

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

PQRD number	ARL1559-13	Revision 1	Date	29-5-2012
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PQR record number Date	RET0278790/TK/001 1-6-2016	Revision 1	WPS record number Company name Welding standard	S2600 Airpack Netherlands BV AWS D1.1/D1.1M:2015	Revision 1
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BASE METALS

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

JOINTS

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

WELDING PROCESSES

Welding process Type	GMAW Semi-automatic
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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. (mm ³)	-

POSITION

Position Weld progression	2G -
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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



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

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

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


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

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


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

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

Signature 1

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

Signature 2

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



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

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

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

JOINTS

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

CLEANING/ROOT TREATMENT

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

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

Pass number	1	2	3
Layer number	1	2	2

WELDING PROCESSES

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

FILLER METALS

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

POSITION

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

PREHEAT

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

GAS

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

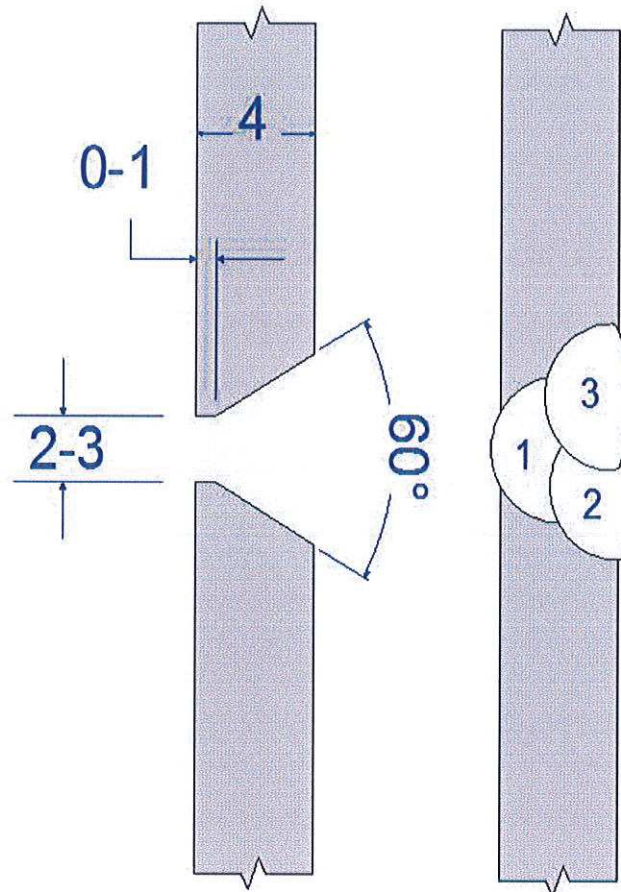
ELECTRICAL

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

TECHNIQUE

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

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

BASE METALS

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

JOINTS

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

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

FILLER METALS

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

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 - 0,67
Current/polarity	DCEP (reverse polarity)
Wire feed speed (m/min)	0
Arc transfer mode	Short-circuiting, Globular

TECHNIQUE

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

PQR record number Date	RET0278790/TK002 31-5-2016	Revision 1	WPS record number Company name Welding standard	S2700 Airpack Netherlands BV AWS D1.1/D1.1M:2015	Revision 1
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TENSILE TESTS						Reduced section
Specimen number	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	20.03	7.23	144,817	-	529	Ductile-BM
2	20.03	7.28	145,818	-	530	Ductile-BM

Comments

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

Comments

TOUGHNESS TESTS								
Specimen number	Notch location	Notch type	Specimen size (mm) x (mm)	Test temperature (°C)	Impact values			Drop weight break
					(J)	(% Shear)	(mm)	
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
	Root area 1-2 mm	171-169-165	186-198-206-206-188	173-184-186-188-187	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
	Root area 1-2 mm	167-170-164	187-199-196-191-207	192-196-188-194-189	178-186-180-175-174	162-163-166

Comments

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

Comments

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

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

Signature 2

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



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

WELDING PROCESSES

Welding process	GMAW
Type	Semi-automatic

BASE METALS

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

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

JOINTS

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

See addition information

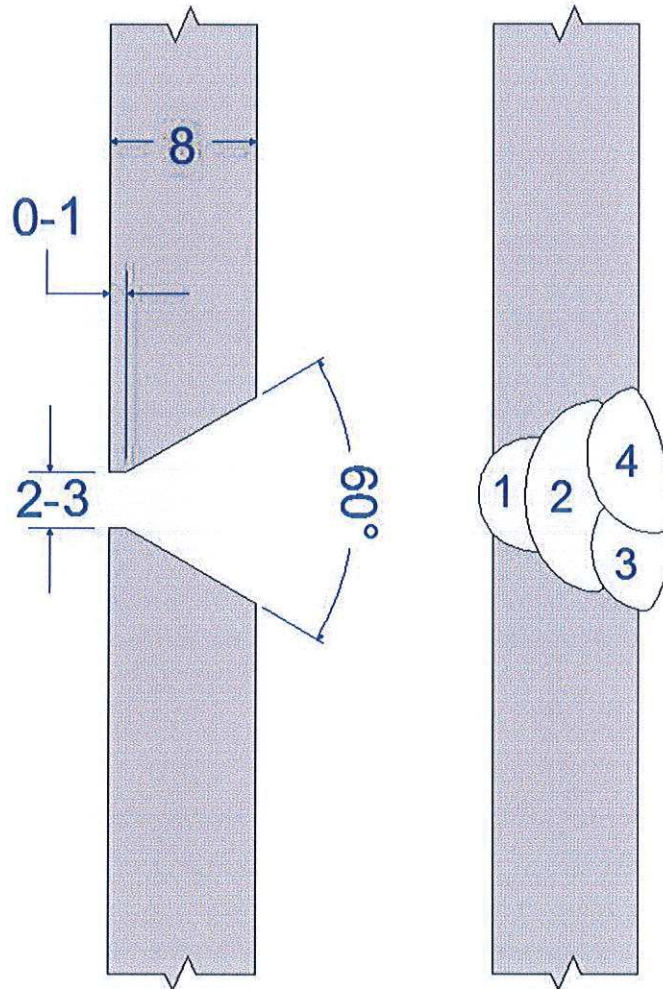
See addition information

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. (mm ²)	-	-	-	-
POSITION				
Position	2G	2G	2G	2G
Weld progression	-	-	-	-
PREHEAT				
Preheat temperature (°C)	10	10	10	10
Maximum interpass temperature (°C)	10	69	129	178
GAS				
Shielding gas: Type	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)	AC-20 (A5.32 SG-)
Flow rate (l/min)	15	15	15	15
Trailing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-
Backing gas: Type	None	None	None	None
Flow rate (l/min)	-	-	-	-
ELECTRICAL				
Filler metal size (mm)	1,2	1,2	1,2	1,2
Waveform control	Not Used	Not Used	Not Used	Not Used
Energy (J)	-	-	-	-
Power (J/s)	-	-	-	-
Arc time (sec)	-	-	-	-
Weld bead length (mm)	-	-	-	-
Amperes	130	196	197	194
Volts	15,9	21,7	22,2	22,2
Travel speed (mm/min)	142	340	383	355
Maximum heat input (kJ/mm)	0,8734	0,7506	0,679	0,7214
Current/polarity	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)	DCEP (reverse polarity)
Wire feed speed (m/min)	-	-	-	-
Arc transfer mode	Short-circuiting	Globular	Globular	Globular
TECHNIQUE				
String or weave	Stringer and Weave	Stringer and Weave	Stringer and Weave	Stringer and Weave
Orifice/gas cup size	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
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PQR

CS PIPING

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

BASE METALS (QW-403)

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

JOINTS (QW-402)

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

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

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

POSITION (QW-405)

Position	6G
Weld progression	Uphill

PREHEAT (QW-406)

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

GAS (QW-408)

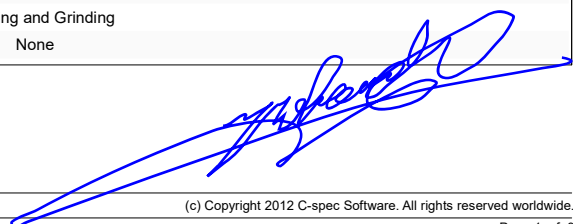
Shielding gas: Type	Argon (A5.32 SG-A)
Flow rate (l/min)	14
Trailing gas: Type	None
Flow rate (l/min)	-
Backing gas: Type	None
Flow rate (l/min)	-

ELECTRICAL (QW-409)

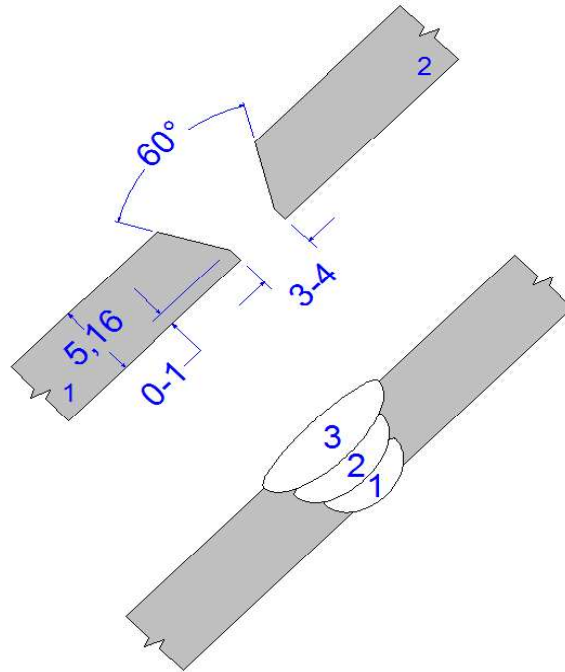
Filler metal size (mm)	2,4
Amperes	97 - 101
Volts	9,6 - 10,3
Travel speed (mm/min)	33 - 69
Maximum heat input (kJ/mm)	1,8165
Tungsten size (mm)	2,4
Tungsten type	SFA 5.12 EWCe-2
Current/polarity	DCEN (straight polarity)
DC pulsing current	None

TECHNIQUE (QW-410)

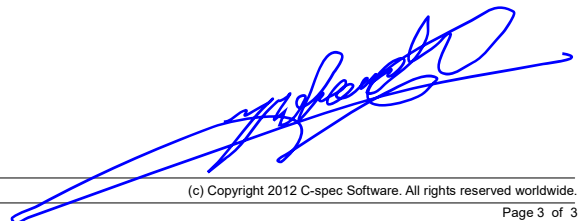
String or weave	Stringer and Weave
Orifice/gas cup size	9,5
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None



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



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



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



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

WELDING PROCESSES

Welding process	GTAW
Type	Manual

BASE METALS (QW-403)

Product form	Pipe/Tube	Welded to:	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

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

Pass number	1	2	3
Layer number	1	2	3

WELDING PROCESSES

Welding process	GTAW	GTAW	GTAW
Type	Manual	Manual	Manual

FILLER METALS (QW-404)

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

POSITION (QW-405)

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

PREHEAT (QW-406)

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

GAS (QW-408)

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

ELECTRICAL (QW-409)

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

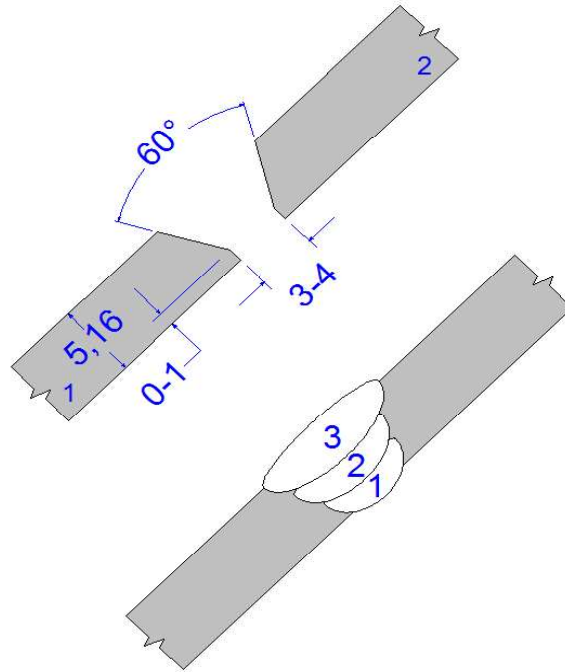
TECHNIQUE (QW-410)

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

PASS PERFORMED/WITNESSED BY

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

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



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

BASE METALS (QW-403)

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

JOINTS (QW-402)

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

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

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

POSITION (QW-405)

Position	6G
Weld progression	-

PREHEAT (QW-406)

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

GAS (QW-408)

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

ELECTRICAL (QW-409)

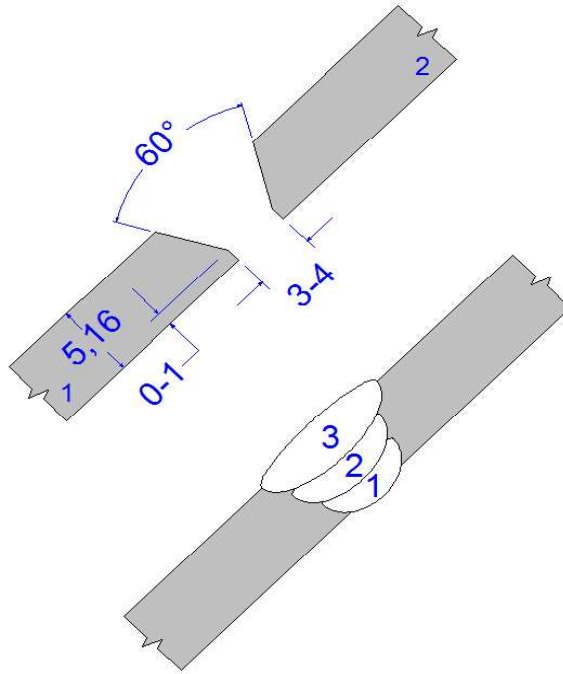
Filler metal size (mm)	2,4
Amperes	93 - 98
Volts	9,6 - 10,6
Travel speed (mm/min)	37 - 58
Maximum heat input (kJ/mm)	1,65
Tungsten size (mm)	2,4
Tungsten type	SFA 5.12 EWCe-2
Current/polarity	DCEN (straight polarity)
DC pulsing current	None

TECHNIQUE (QW-410)

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



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



Pipe diameter 2 1/2" x STD (73,0,3x5,15 mm)



Airpack Netherlands BV

Groeneweegje 19 - 25, 4301 RN Zierikzee, The Netherlands

ASME - Welding conditions - (PQRD Welding Data Record)

WeldOffice WPS



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

WELDING PROCESSES

Welding process	GTAW
Type	Manual

BASE METALS (QW-403)

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

Welded to:

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

JOINTS (QW-402)

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

CLEANING/ROOT TREATMENT

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

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

Pass number	1	2	3
Layer number	1	2	3

WELDING PROCESSES

Welding process	GTAW	GTAW	GTAW
Type	Manual	Manual	Manual

FILLER METALS (QW-404)

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

POSITION (QW-405)

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

PREHEAT (QW-406)

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

GAS (QW-408)

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

ELECTRICAL (QW-409)

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

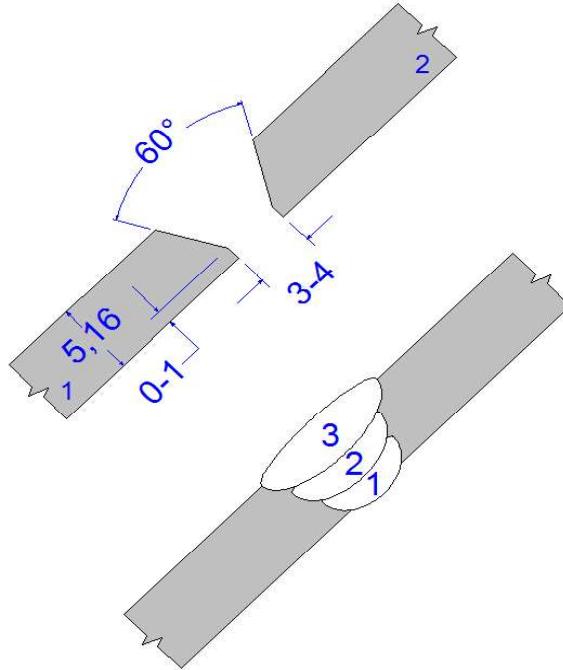
TECHNIQUE (QW-410)

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


PASS PERFORMED/WITNESSED BY

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

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



PQR

SS PIPING

Airpack Netherlands BV

Groenewegje 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)
Welded to:	Pipe/Tube	SA-312 (TP316L)	8	1	63,50	160	9,53	73,03
	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 (mm ²)	Ultimate total load (N)	Ultimate unit stress (MPa)	Type of failure and location
1	19.00	9.42	178,980	-	555 N/mm ²	
2	19.00	9.30	176,700	-	581 N/mm ²	

Comments	
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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	
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CERTIFICATION

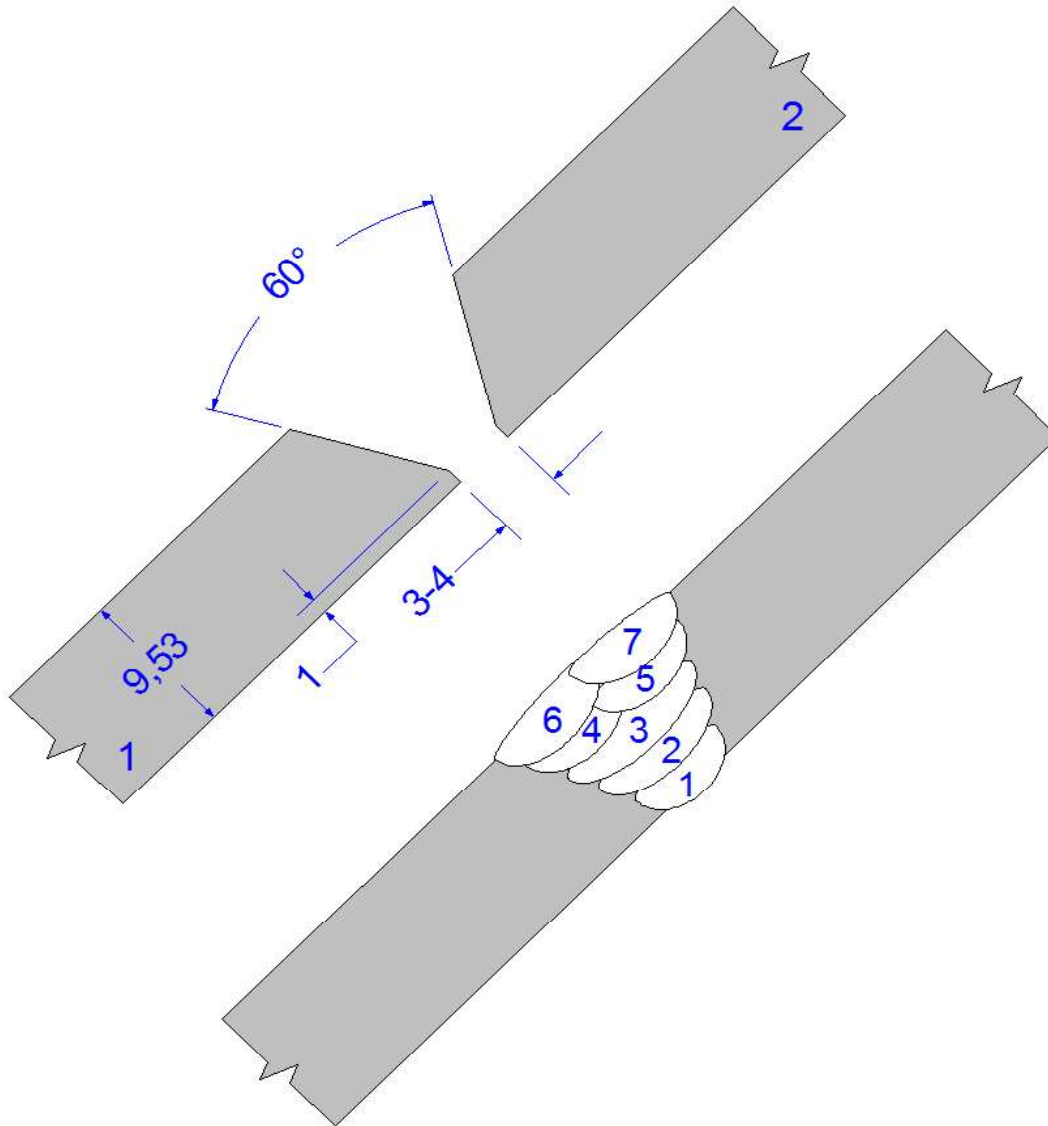
Welder's name	ID Number	Stamp number	Mechanical testing by	
A. Sumantri	ID Card IXH4P6551	A1	Laboratory test number	Schielab BV Breda (NLD)
			Test file number	SL 12.6047-1A
			Tests conducted by	ARL1559-5 A. Karstanje

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.

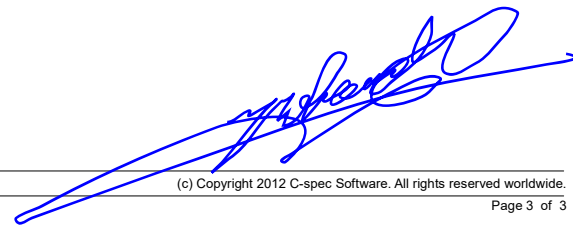
Signature 1

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

Product form	Pipe/Tube	Welded to:	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

Airpack Netherlands BV

Groenewegje 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
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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)

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

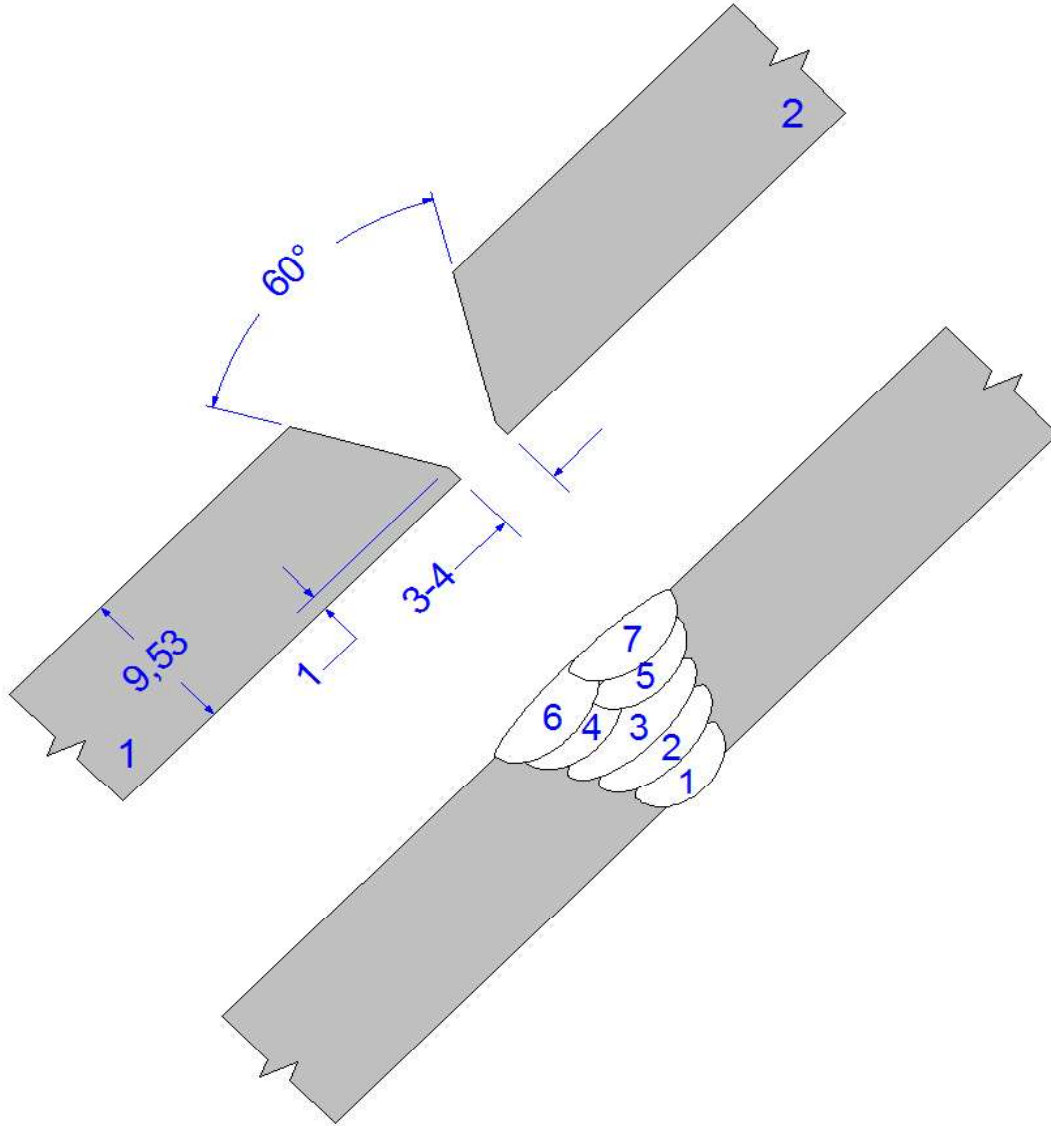
TECHNIQUE (QW-410)

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





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)
Welded to:	Plate	S355MC acc. EN 10149-2	U	None	-	-	10	-
	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
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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)

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

Comments

GUIDED BEND TESTS (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	Mechanical testing by	Element Breda (NLD)
Dorreman M.	ID Card IKP0996J6	W-013	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	

<input type="checkbox"/> Witnessed <input checked="" type="checkbox"/> Reviewed <input type="checkbox"/> Examined <input type="checkbox"/> Ion Konings	 Lloyds Register Energy
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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)

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

JOINTS (QW-402)

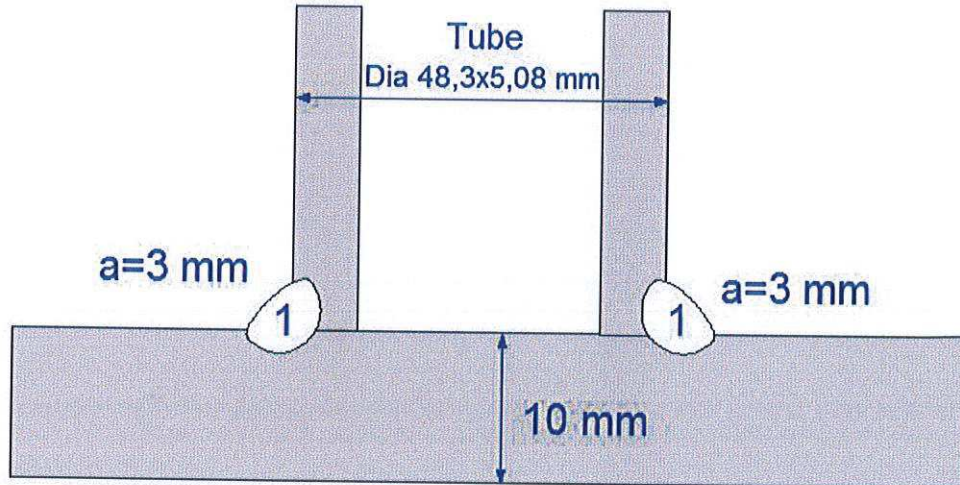
Joint design	Fillet weld	See addition information	See addition information

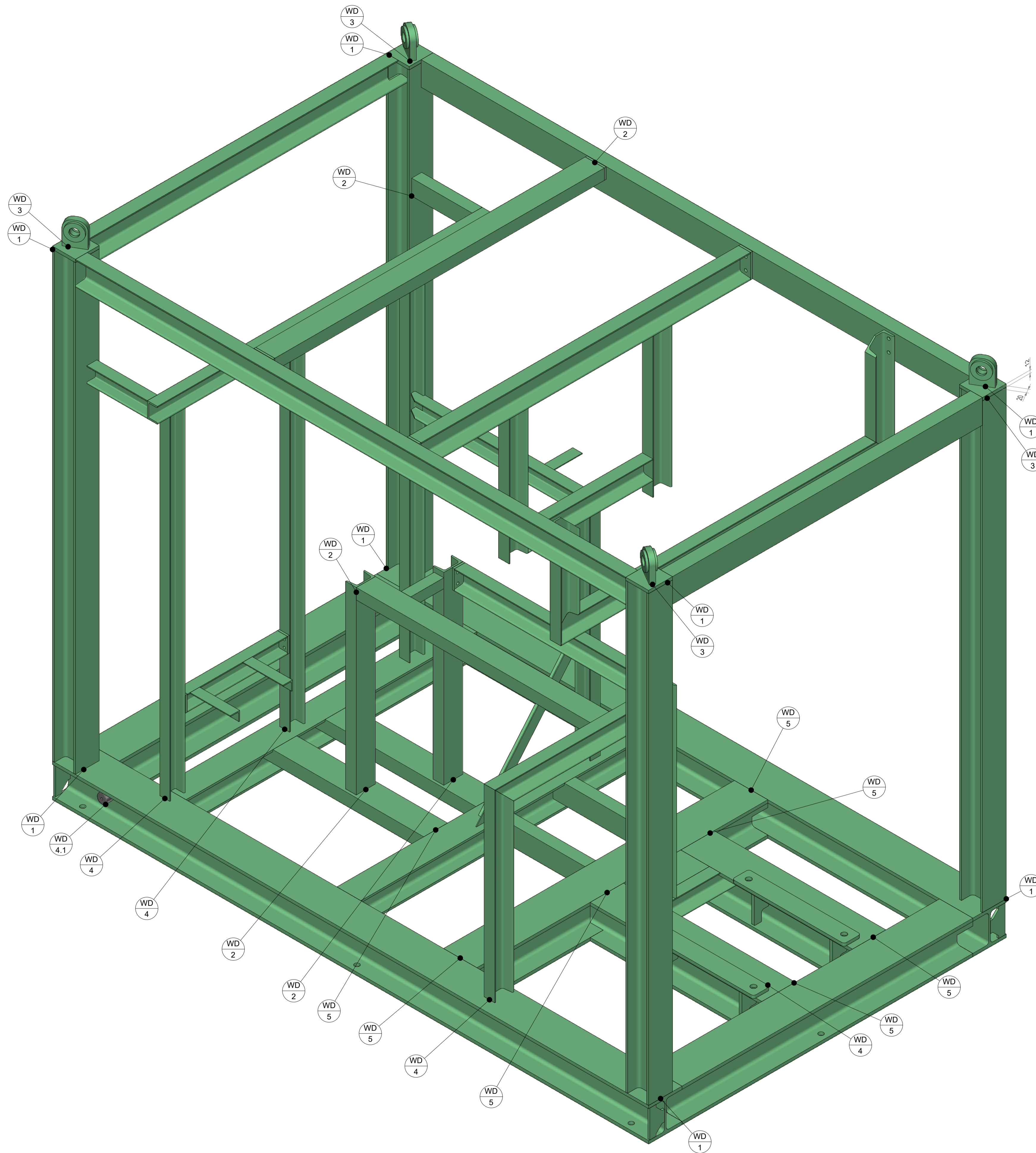
CLEANING/ROOT TREATMENT

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

PQRD number	ARL2064-4	Revision 1	Date	1-8-2016
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 Electric LNT 309LSi
Filler metal size (mm)				2,4
Length of filler metal consumed (mm)				-
Deposited thickness (mm)				throat thickness 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 EWL-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

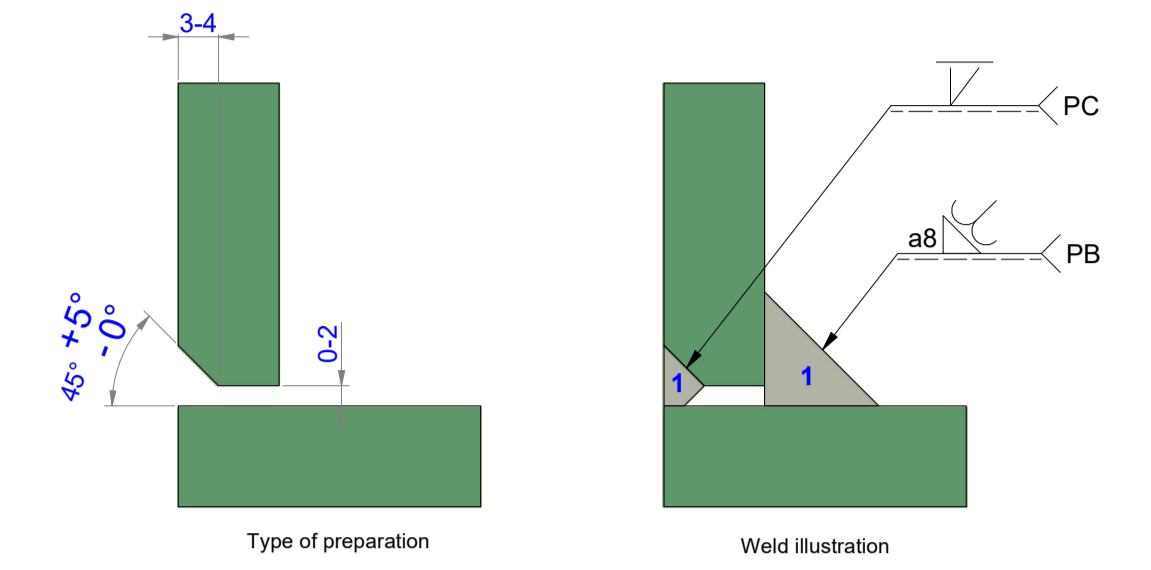
PQRD number	ARL2064-4	Revision 1	Date	1-6-2016
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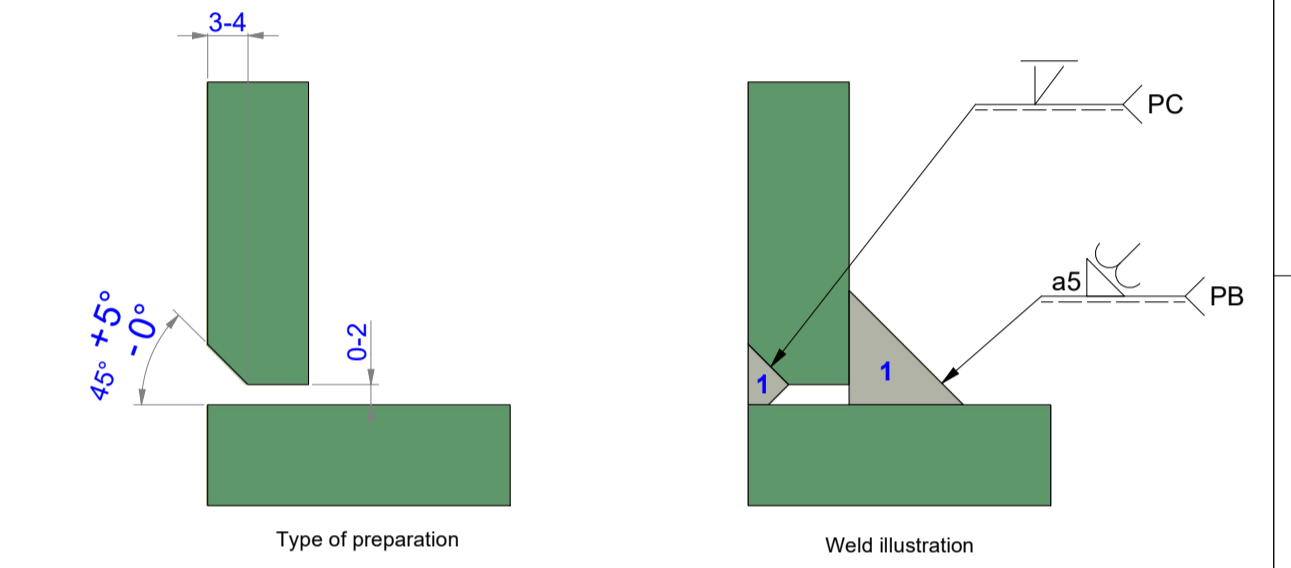
WD-1

PQR/ WPS reference:
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 PQR/ WPS-S2600
 PQR/ WPS-S2700



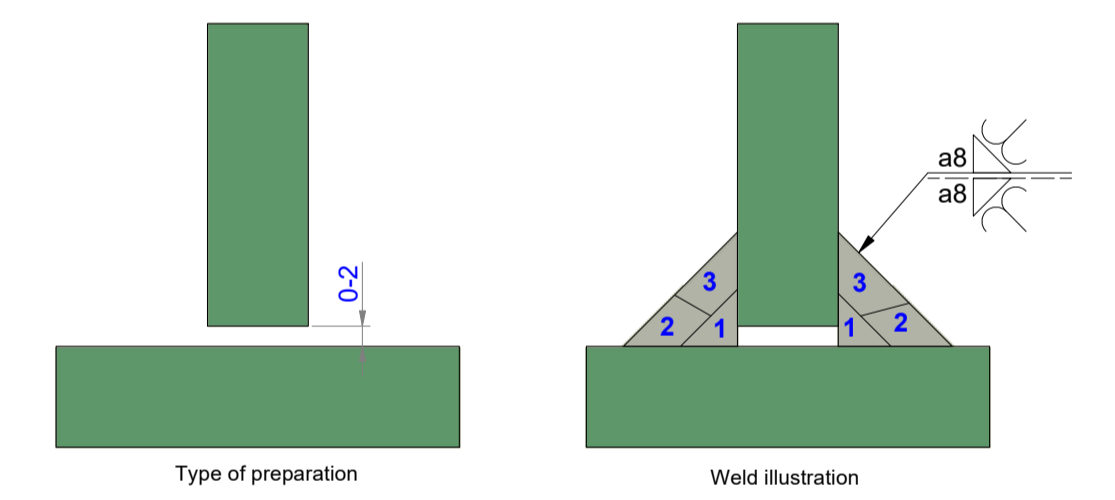
WD-2

PQR/ WPS reference:
 PQR/ WPS-S2300
 PQR/ WPS-S2600
 PQR/ WPS-S2700



WD-3

PQR/ WPS reference:
 PQR/ WPS-S2300

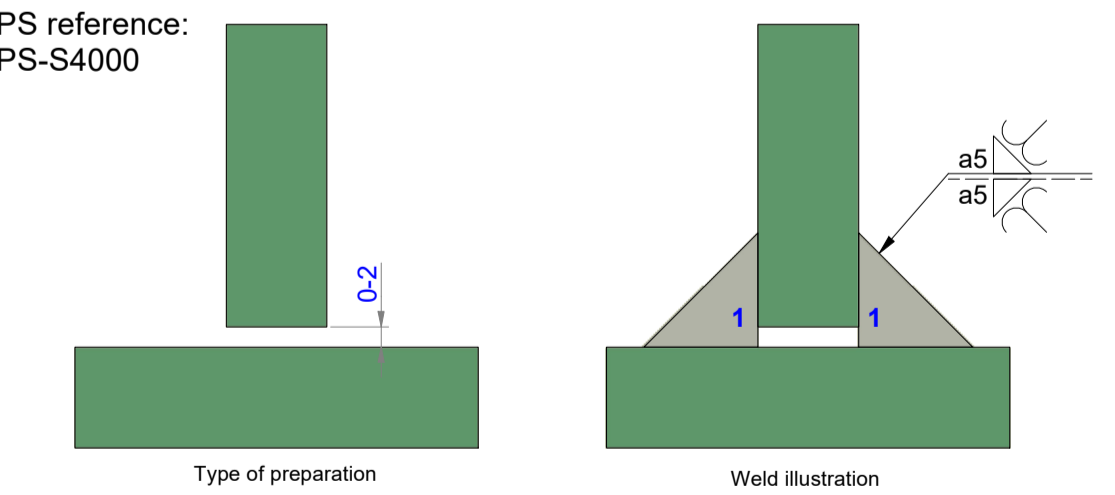


WD-4

PQR/ WPS reference:
 PQR/ WPS-S2300

WD-4.1

PQR/ WPS reference:
 PQR/ WPS-S4000

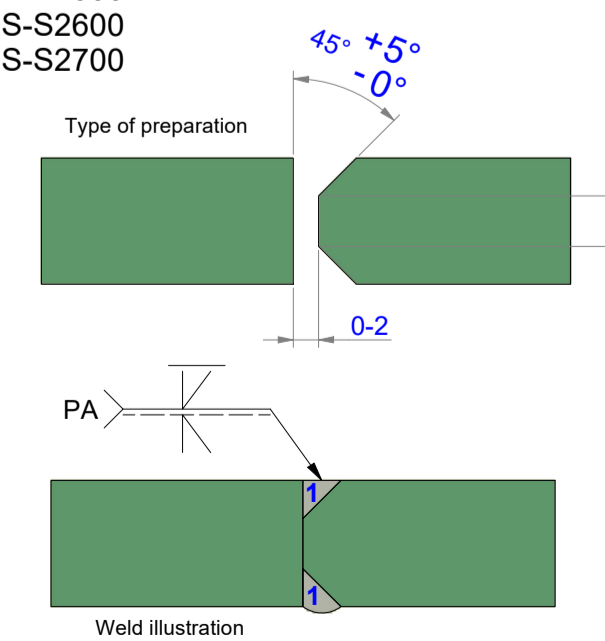


NOTE:

Material of construction: S235JR
 Material Thickness: Min. 6 mm and max. 20 mm

WD-5

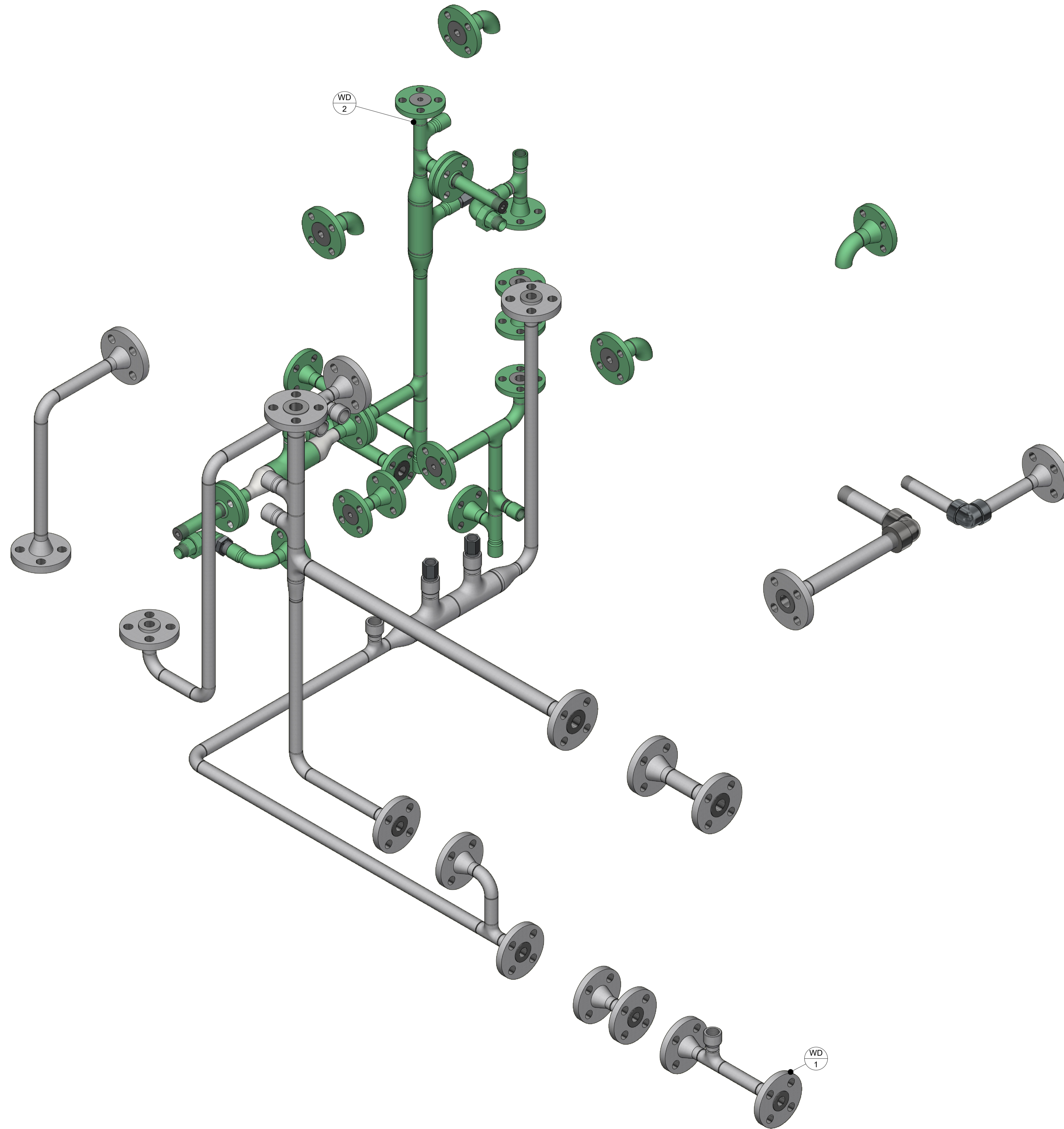
PQR/ WPS reference:
 PQR/ WPS-S2300
 PQR/ WPS-S2600
 PQR/ WPS-S2700



Subject		Projection	This drawing is owned by Airpack and shall not be printed or copied in any other way than with Airpack's PERMISSION
Weld Map Skid			
Client	Lavan Industry Development Company (LIDCO)	MODIFICATIONS	
Client Ref.	Weldmap	Date	20-3-2024
Client Doc. No.	17735-25B	Drawn by	FvT
		Checked by	SK
		Plant Location	
		Scale	
		Airpack Ref.	17735-COM
		Drawing No.	17735-25B Weldmap Skid



Airpack Nederland BV
 Groeneveldje 25
 4321 RN Zierikzee
 The Netherlands
 Telephone (31) (0) 111 - 415455
 E-mail: airpack@airpack.nl
 URL: http://www.airpack.nl



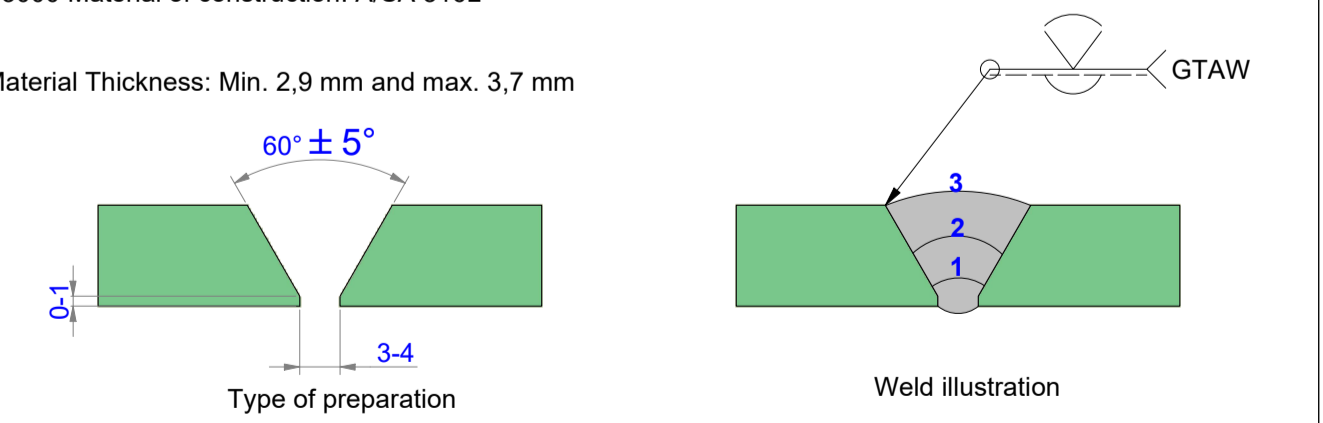
Type-1

WPS/PQR reference:
 P2000 Material of construction: A/SA 106-B / A/SA 234 WPB
 P2500 Material of construction: A/SA 105N

Type-2

WPS/PQR reference:
 P3000 Material of construction: A/SA 316L

Material Thickness: Min. 2,9 mm and max. 3,7 mm



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Weld Map Piping			
Client	Lavan Industry Development Company (LIDCO)	MODIFICATIONS	
Client Ref.	Weldmap	Date	20-3-2024
Client Doc. No.	17735-25A	Drawn by	FvT
 Airpack Nederland BV Groeneveldje 25 4321 RN Zierikzee The Netherlands Telephone (31) 0 11 - 415455 E-mail: airpack@airpack.nl URL: http://www.airpack.nl		Checked by	
		Plant Location	
		Scale	
		Airpack Ref.	17735-COM
		Drawing No.	17735-25A Weldmap Piping Sheet 1 of 1