Minimikrav på utbildning, övning examinering och kvalificering av:

Internationell svetsare (IW)

Dessa riktlinjer del I och II, ersätter dokument IAB-089-2003/EWF-452-467-480-481, Rev 3 januari 2005

Riktlinjer från International Institute of Welding, IIW

International Authorisation Board (IAB) utarbetade av IAB Group A, WG A3a

Del II

Detta är den officiella versionen av dokument IAB-089r4-12, del ll, delvis översatt till svenska. För översättningen svarar Svetskommissionen. Svetskommissionen är av IIW auktoriserat nationellt organ.

Innehåll del II

Förord

Detta dokument bygger på Europasvetsareserien som utvecklats av European Federation for Welding, Joining and Cutting (EWF), genom en överenskommelse först undertecknad den 19 juli, 1997, vid International Institute of Weldings årsmöte i San Francisco, Kalifornien, USA, och som därefter har vidareutvecklats. Det fastslås i den överenskommelsen att IIW-diplom för internationell svetsare är likvärdigt med EWF-diplom för europasvetsare med samma omfattning.

Detta dokument – känt i WG#A3a som "Bratislavaöverenskommelsen" – återspeglar resultaten av ingående diskussioner om grunderna för svetsteknik och skicklighet och publicerades till slut efter ett möte med arbetsgruppen i Bratislava, Slovakien.

Detta dokument är delat i två delar, I och II.

Del I innehåller utbildningsystemet

Del II innehåller detaljer om provobjekt och svetsdatablad att användas vid examinering med provobjekt

Alla EWF ANB (auktoriserat nationellt organ) tillåts utfärda EWF-diplom likvärdiga med de IIW-diplom som utfärdats av samma ANB

Kopior av detta dokument finns hos IIWs IAB-sekretariat eller dess utsedda representant.

Användningen av denna utbildningsriktlinje är begränsad till de organisationer som godkänts av ANB som godkänd utbildningsanordnare (ATB).

16 Regler och instruktioner för provobjekten

Syftet med provobjekten är att pröva svetsaren, inte bara i skicklighet i svetsning utan också i hans förmåga i ritningsläsning (inklusive kännedom om svetsbeteckningar), häftning och i att följa givna instruktioner (dvs. svetsdatablad)
Svetsaren får ritningar och svetsdatablad och plåtdetaljerna måttskurna och fogberedda. Han har att välja tillsatsmaterial från ett urval av olika tillsatsmaterial för aktuell svetsmetod. Han måste kontrollera mot svetsdatabladet för att välja rätt tillsatsmaterial. Om svetsaren börjar svetsa med fel tillsatsmaterial avbryts provet och underkänns.

När svetsaren är redo att börja skall han först häfta samman alla detaljer enligt de ritningar han fått. Provobjektet skall svetsas i stående läge som det visas på ritningen. Det är endast tillåtet att vrida provobjektet runt dess vertikala axel.

Alla nödvändiga verktyg för att genomföra de olika momenten skall finnas tillgängliga för svetsaren.

Svetsaren ges en viss maximal tid för att slutföra provobjektet vilken framgår av nedanstående tabell, När den maximala tiden gått ut skall svetsaren sluta svetsa. Om svetsaren inte lyckas färdigställa provobjektet inom den maximala tiden underkänns provet.
Om svetsare slutfört provobjektet i tid skall det provas genom visuell kontroll av auktoriserad examinator. En svets i provbjektet för plåtnivån skall dessutom provas med radiografisk undersökning (se sammanställningsritning)
Svetsaren godkänns om svetsfelen ligger inom kvalitetsnivå B i EN ISO 5817, förutom för följande feltyper: 501 (smältdike), 502 (svetsråge stumsvets), 503 (svetsråge kälsvets), 504 (rotvulst), 505 (felaktig fattningskant) and 5214 (för stort a-mått), där nivå C skall gälla.

Provobjekten är bestämda till sin allmänna geometri och svetsar. Objektets dimensioner kan anpassas till lokala behov. Svetsdatabladen i uppsättningen av dokument för provobjekten är exempel som kan ändras för att passa lokala behov.

Svetstid för provobjekten (timmar)*	111	135	141
IFW	6	4	6
IPW	8	6	8
ITW	8	6	8

*Den maximalt tillåtna tiden kan justeras av den godkända utbildningsanordnaren (ATB) om provobjektets dimensioner ändras.

17 Dokument för provobjekt för stål, materialgrupperna 1, 2 och 3

För var och en av de tre svetsmetoderna 111, 135 och 141 finns tre olika uppsättningar dokument för provobjekten för internationell kälsvetsare, IFW, internationell plåtsvetsare, IPW och internationell rörsvetsare, ITW. Uppsättningarna innehåller alla nödvändiga dokument för svetsaren (totalt nio uppsättningar).

Uppsättningarna innehåller:

1: Sammanställningsritning
2: Detaljritningar
3: Svetsdatablad

Geometrin för provobjekten för IFW och IPW densamma för de tre svetsmetoderna (111, 135 and 141). Endast svetsdatabladen är olika.

Geometrin för provobjekten för ITW är identisk för svetsmetod 111 och 141, men skiljer sig något för svetsmetod 135.

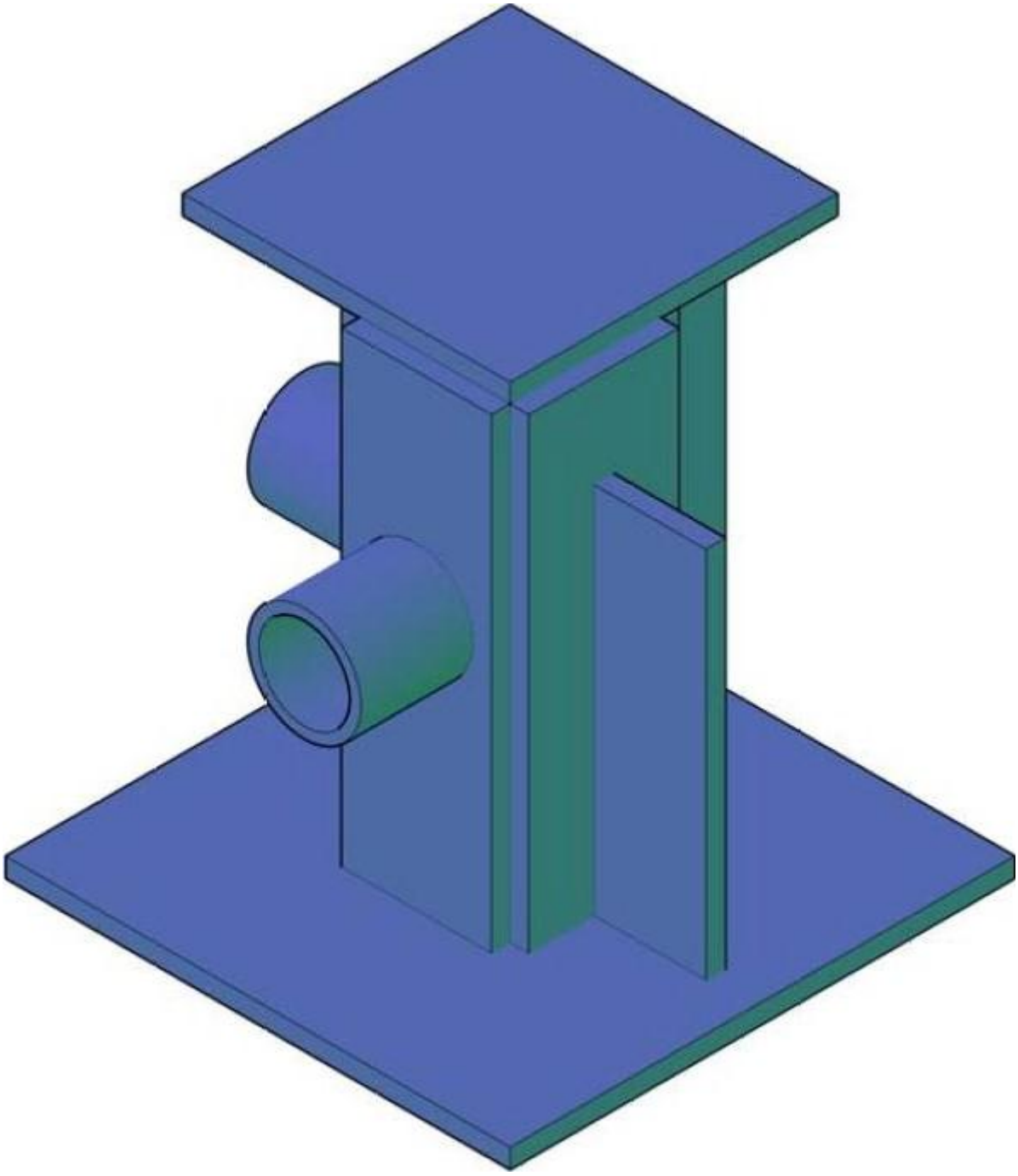
Sammanställningsritningarna är gjorda I A3-format och detaljritningarna i A4-format. Om sammanställningsritningarna skrivs ut på A4-pappar kan vissa detaljer vara svåra att läsa.

Fogberedningen skall göras genom maskinbearbetning/fräsning/slipning till mått enligt ritning. Utbildningsanordnaren skall ge kandidaten detaljerna fogberedda. Misslyckande med att montera och häfta detaljerna enligt ritning skall resultera i att provet underkänns.

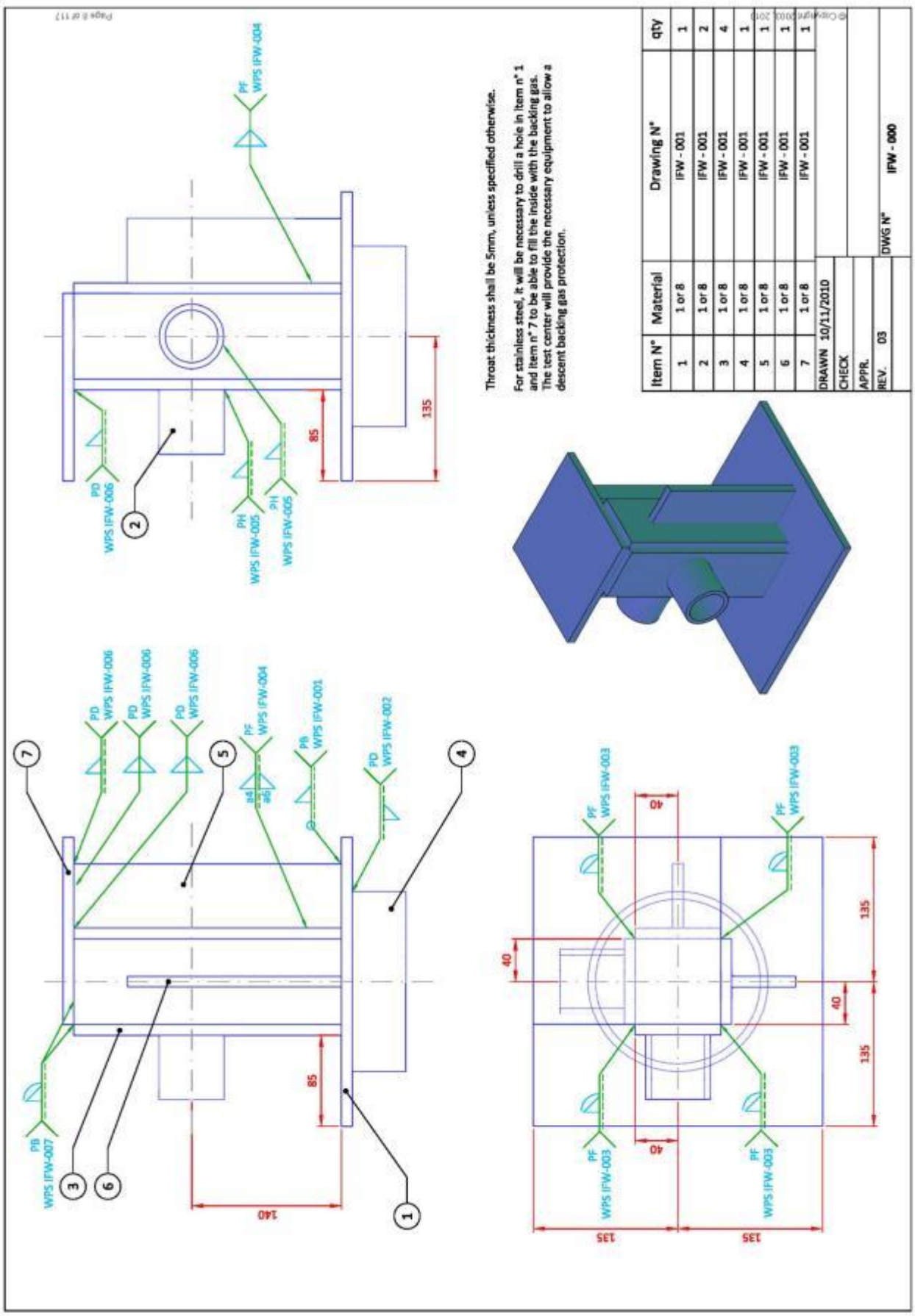
17.1 Welding Process 111

17.1.1 **IFW** Test Object-111

Material groups 1, 2 and 3



Important note: The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.


Throat thickness shall be 5mm, unless specified otherwise.
For stainless steel, it will be necessary to drill a hole in item n° 1 and item n° 7 to be able to fill the inside with the backing gas. The test center will provide the necessary equipment to allow a descent backing gas protection.
Item N° | Material | Drawing N° | qty
1 | 1 or 8 | IFW - 001 | 1
2 | 1 or 8 | IFW - 001 | 2
3 | 1 or 8 | IFW - 001 | 4
4 | 1 or 8 | IFW - 001 | 1
5 | 1 or 8 | IFW - 001 | 1
6 | 1 or 8 | IFW - 001 | 1
7 | 1 or 8 | IFW - 001 | 1
DRAWN 10/11/2010
CHECK
APPR.
REV. 03
DWG N° IFW - 000
PF WPS IFW-004
PD WPS IFW-006
PH WPS IFW-005
PB WPS IFW-007
PD WPS IFW-002
PF WPS IFW-003
135
85
140
40

Item N° acc. drawing IFW-000	Plate / Tube	Length [mm]	Width [mm]	Thickness [mm]	Diameter [mm]
1	P	270	270	10	
2	T	60		5.5	60.3
3	P	250	80	10	
4	T	50		7.1	168.3
5	P	60	250	10	
6	P	60	200	10	
7	P	175	175	10	

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 10/11/2010	
Check	
Appr.	Drawing N°
Rev. 02	**IFW-001**

ATB

WPS-Nr.	111 IFW-001	date	2011-10-24
		rev.	5

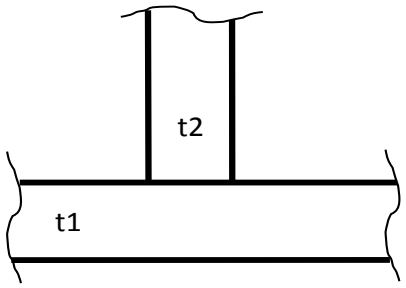
WELDING PROCEDURE SPECIFICATION

ISO 15609-1

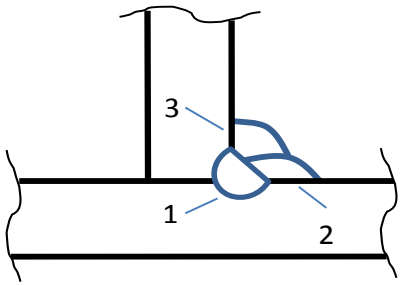
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PB
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	3,2	3,2	
Welding current (A) :	125-155	105-135	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	111 IFW-002	date	24-10-2011
		rev.	5

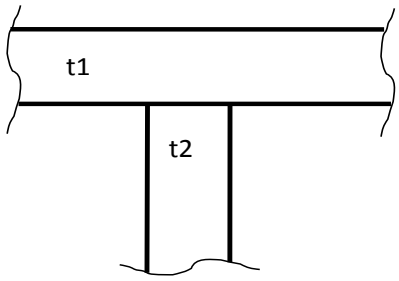
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

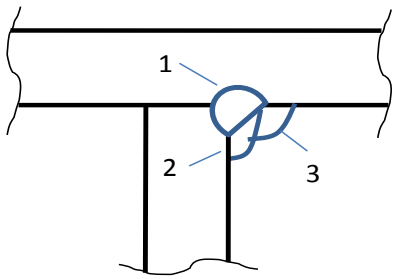
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PD
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	7,1
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	3,2	3,2	
Welding current (A) :	125-155	105-135	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	111 IFW-003	date	24-10-2011
		rev.	5

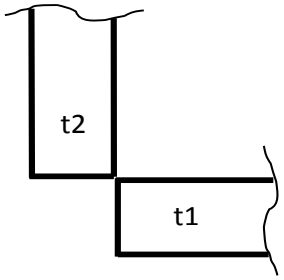
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

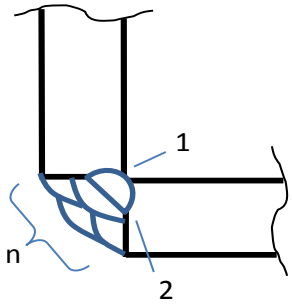
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PF
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	2,5	3,2 or 2,5	
Welding current (A) :	60-80	80-120	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	111 IFW-004	date	24-10-2011
		rev.	5

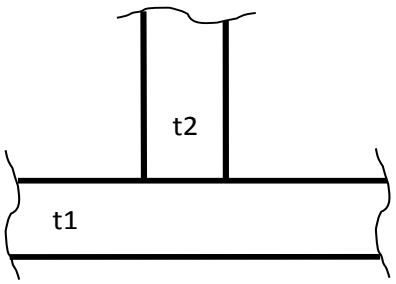
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

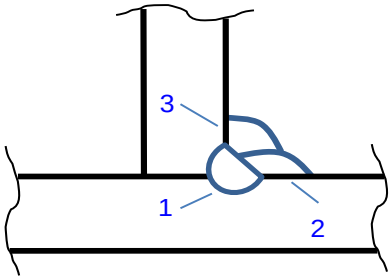
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PF
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	3,2	3,2	
Welding current (A) :	80-120	80-120	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	111 IFW-005	date	24-10-2011
		rev.	5

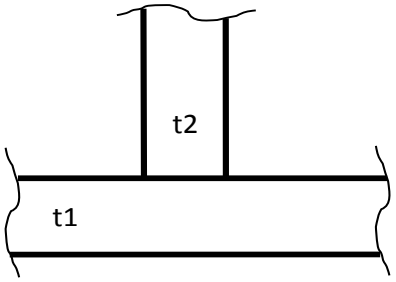
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

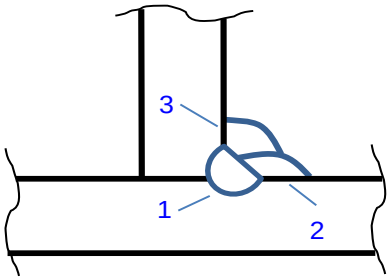
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PH
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	5,5
Outside pipe diameter (mm):	60,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	2,5	2,5	
Welding current (A) :	50-80	65-95	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	111 IFW-006	date	24-10-2011
		rev.	5

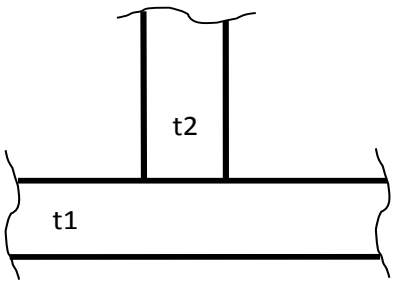
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

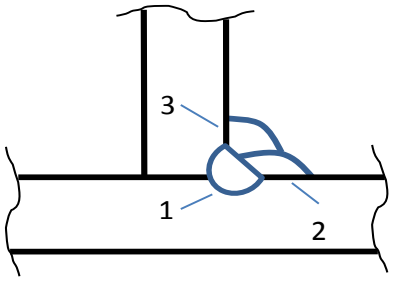
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PD
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	3,2	3,2	
Welding current (A) :	125-155	105-135	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	111 IFW-007	date	24-10-2011
		rev.	5

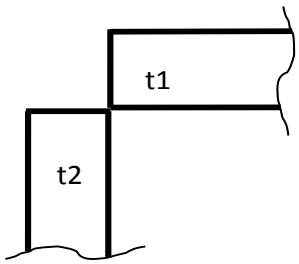
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

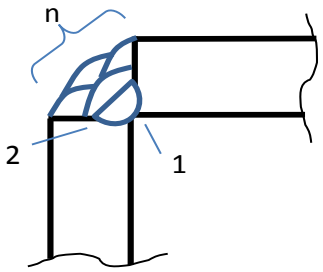
Parent material :	S235
to parent material :	S235
Parent material standard :	EN 10025-2
ISO/TR15608 Group nr. :	1,1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PB
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



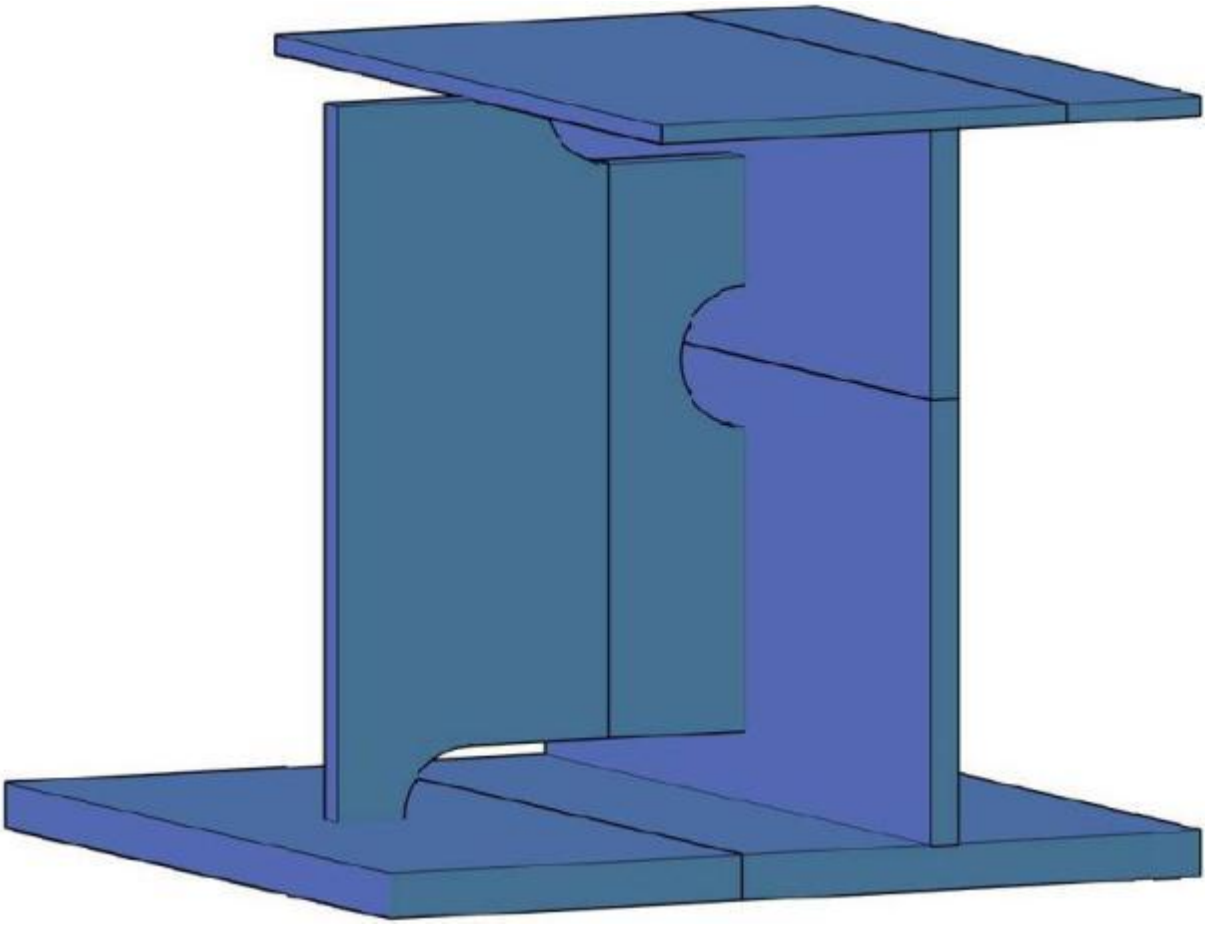
welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	3,2	3,2	
Welding current (A) :	125-155	105-135	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

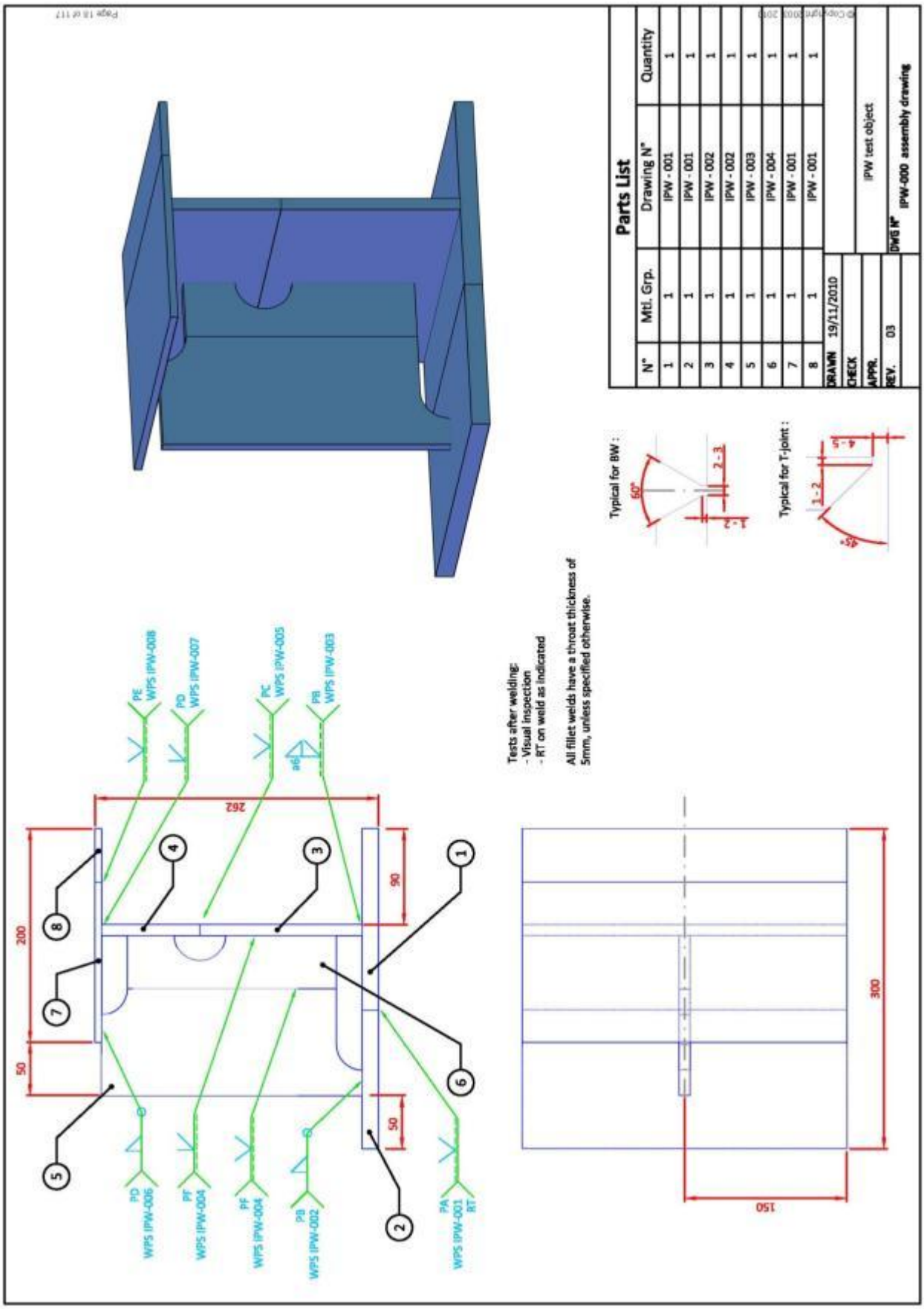
17.1.2 IPW Test Object – 111

Material groups 1, 2 and 3

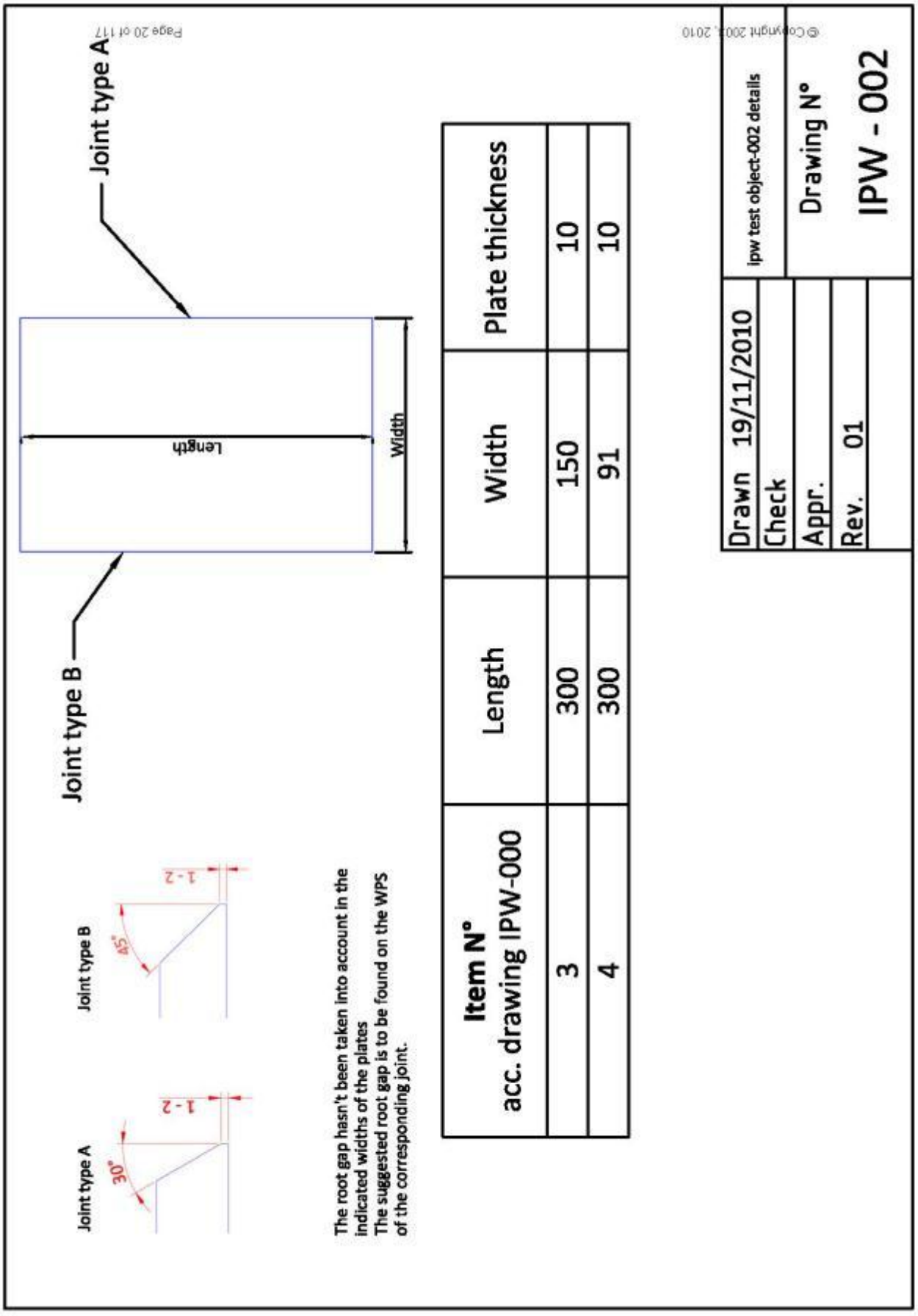


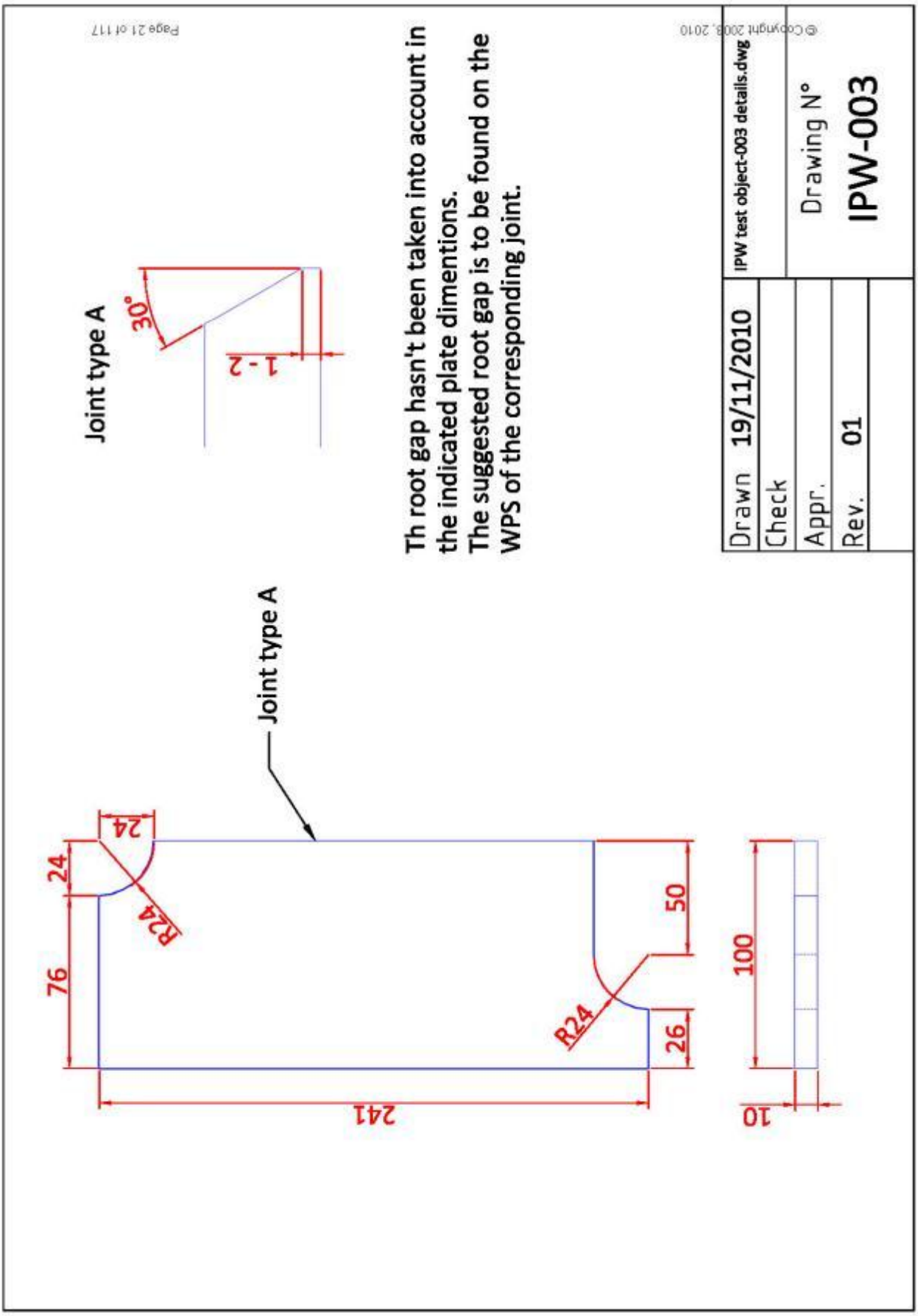
Important notes:

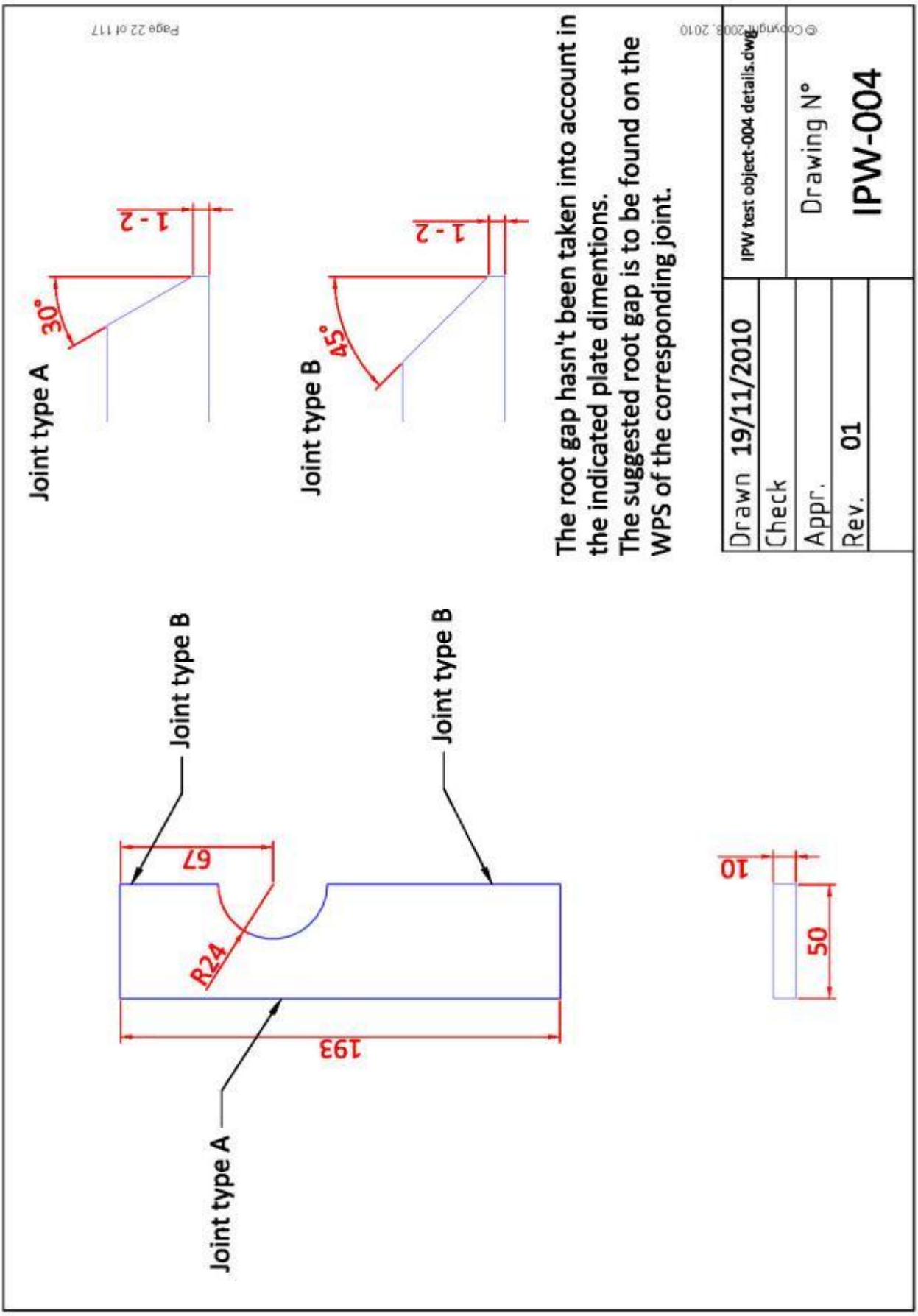
The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.


Parts List
N° | Mtl. Grp. | Drawing N° | Quantity
1 | 1 | IPW - 001 | 1
2 | 1 | IPW - 001 | 1
3 | 1 | IPW - 002 | 1
4 | 1 | IPW - 002 | 1
5 | 1 | IPW - 003 | 1
6 | 1 | IPW - 004 | 1
7 | 1 | IPW - 001 | 1
8 | 1 | IPW - 001 | 1
DRAWN 19/11/2010
CHECK
APPR.
REV. 03
IPW test object
DWG N° IPW-000 assembly drawing
Typical for BW :
Typical for T-joint :
Tests after welding:
- Visual inspection
- RT on weld as indicated
All fillet welds have a throat thickness of 5mm, unless specified otherwise.
262
200
50
90
50
300
150
PE WPS IPW-008
PD WPS IPW-007
PC WPS IPW-005
PB WPS IPW-003
PD WPS IPW-006
PF WPS IPW-004
PF WPS IPW-004
PB WPS IPW-002
PA WPS IPW-001 RT

Page 19 of 117
Joint type A
Length
Width
Item N°
acc. drawing IPW-000
Length
Width
Plate thickness
1
300
170
15
2
300
130
15
7
300
150
6
8
300
50
6
The root gap hasn't been taken into account in the indicated widths of the plates
The suggested root gap is to be found on the WPS of the corresponding joint.
Joint type A
30°
1 - 2
Drawn 19/11/2010
Check
Appr.
Rev. 01
ipw test object-001 details
Drawing N°
IPW - 001
©Copyright 2002 - 2010


Joint type A
Joint type B
Length
Width
Joint type B
45°
1 - 2
Joint type A
30°
1 - 2
The root gap hasn't been taken into account in the indicated widths of the plates
The suggested root gap is to be found on the WPS of the corresponding joint.
Item N° acc. drawing IPW-000
Length
Width
Plate thickness
3
300
150
10
4
300
91
10
Drawn 19/11/2010
Check
Appr.
Rev. 01
ipw test object-002 details
Drawing N°
IPW - 002
Page 20 of 117
©Copyright 2007 - 2010


Joint type A
30°
1 - 2
Th root gap hasn't been taken into account in the indicated plate dimentions.
The suggested root gap is to be found on the WPS of the corresponding joint.
Drawn 19/11/2010
Check
Appr.
Rev. 01
IPW test object-003 details.dwg
Drawing N°
IPW-003
Joint type A
24
24
R24
76
50
R24
26
241
100
10


Joint type A
30°
1 - 2
Joint type B
45°
1 - 2
The root gap hasn't been taken into account in the indicated plate dimentions.
The suggested root gap is to be found on the WPS of the corresponding joint.
Drawn 19/11/2010
Check
Appr.
Rev. 01
IPW test object-004 details.dwg
Drawing N°
IPW-004
Joint type B
Joint type B
67
R24
193
Joint type A
10
50

ATB

WPS-Nr.	IPW-001	date	26-10-2011
		rev.	2

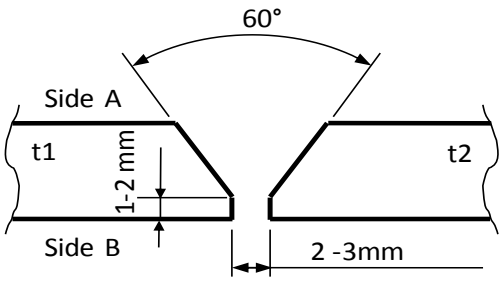
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

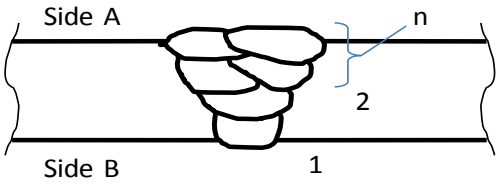
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PA
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	15
t2	15
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	85-95	110-130	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-002	date	26-10-2011
		rev.	2

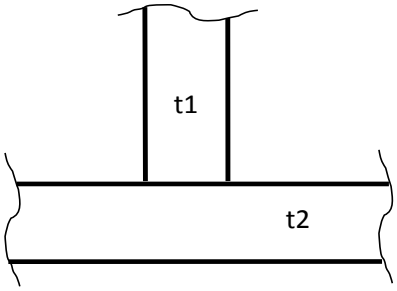
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

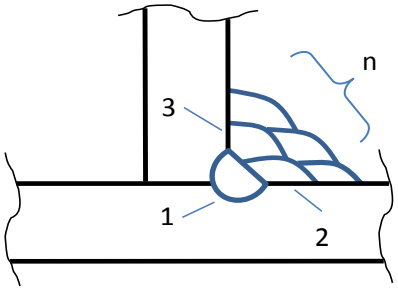
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PB
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	15
Outside pipe diameter (mm):	-
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	135-145	115-125	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-003	date	26-10-2011
		rev.	2

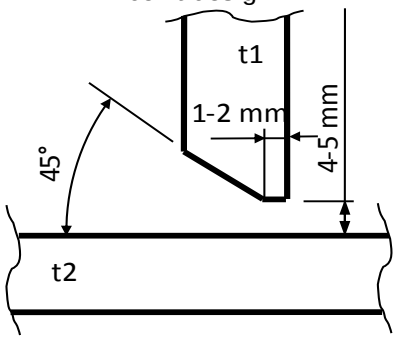
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

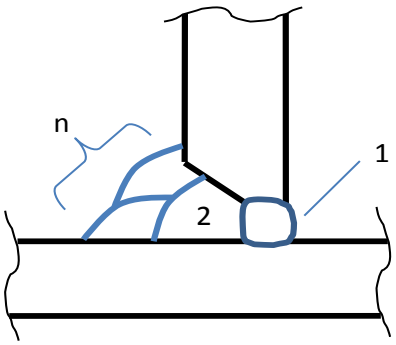
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PB
Shielding gas :	N/A
type flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	15
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	90-110	110-130	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	IPW-004	date	26-10-2011
		rev.	2

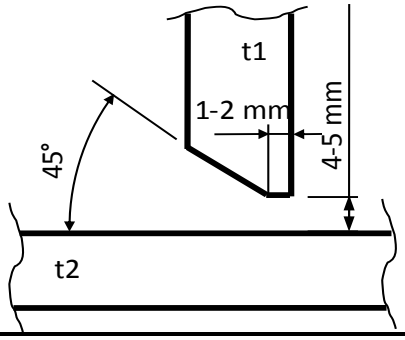
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

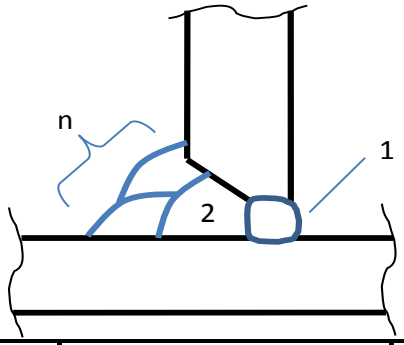
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PF
Shielding gas :	N/A
type flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	55-65	115-125	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-005	date	26-10-2011
		rev.	2

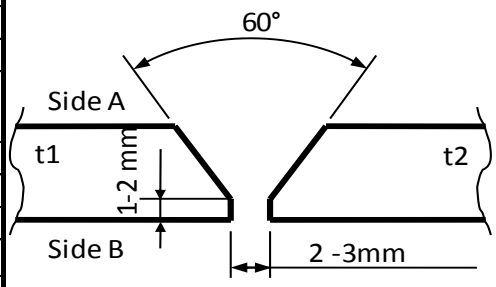
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

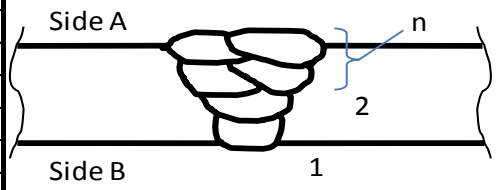
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PC
Shielding gas :	N/A
type flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	-
Backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	65-85	75-85	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-006	date	26-10-2011
		rev.	2

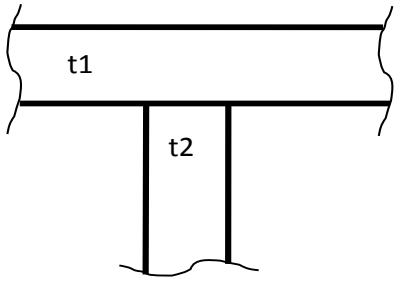
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

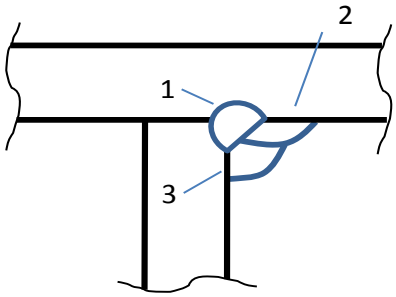
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PD
Shielding gas :	N/A
type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	115-125	110-120	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-007	date	26-10-2011
		rev.	2

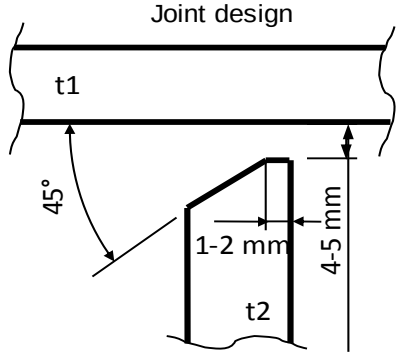
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

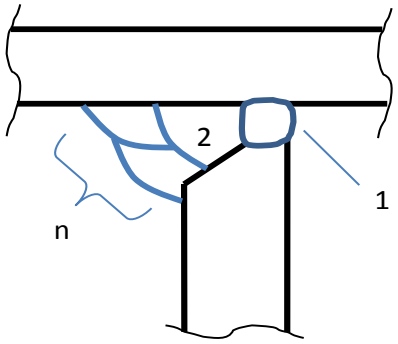
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PD
Shielding gas :	N/A
type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	90-100	115-125	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-008	date	26-10-2011
		rev.	2

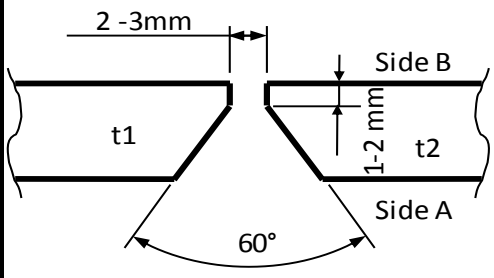
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

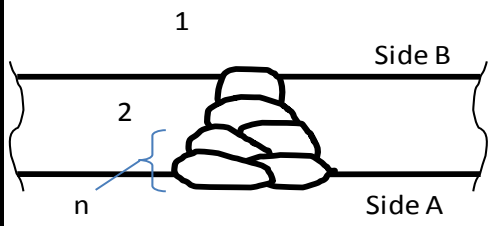
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PE
Shielding gas :	N/A
type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	6
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



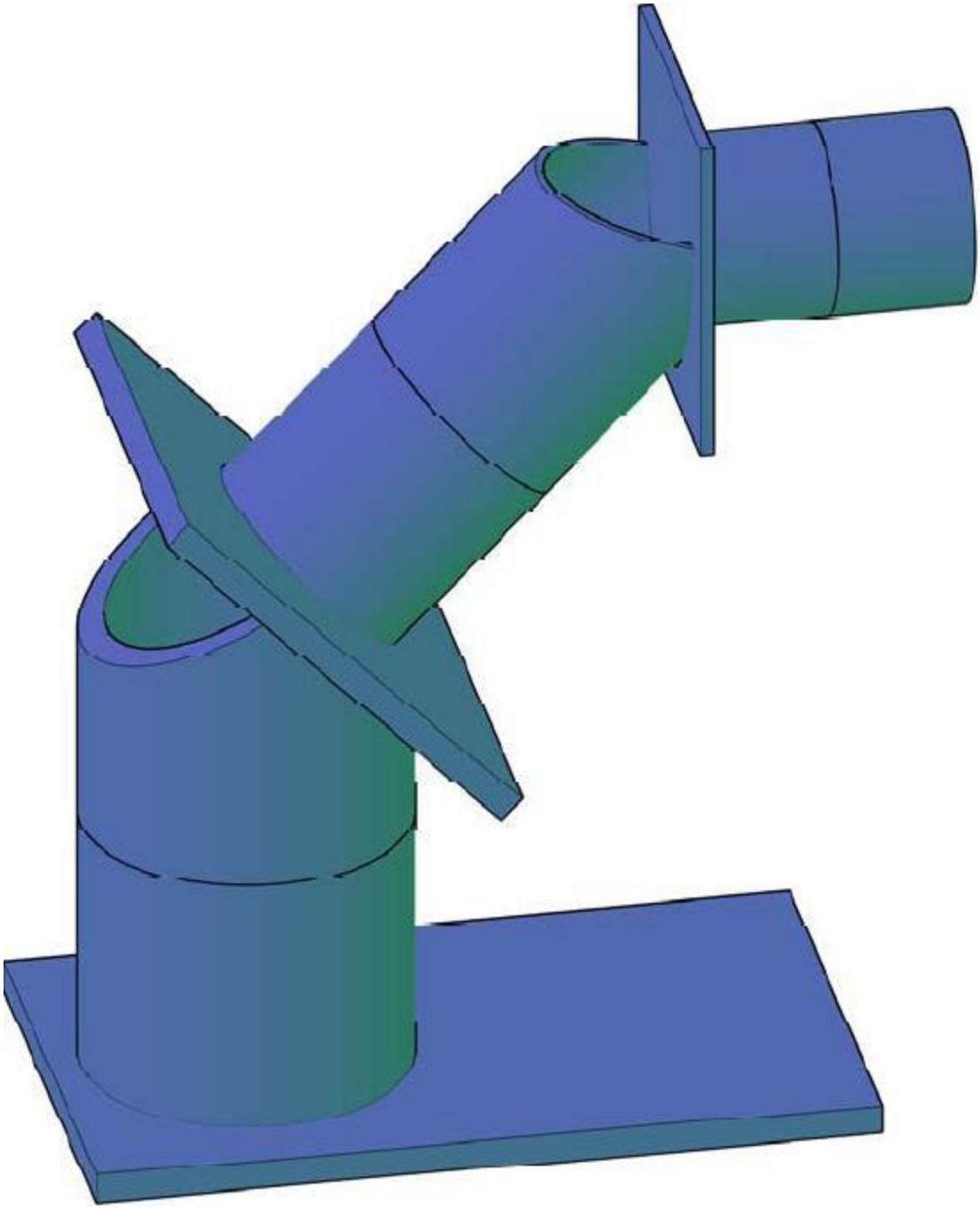
Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	60-80	90-100	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

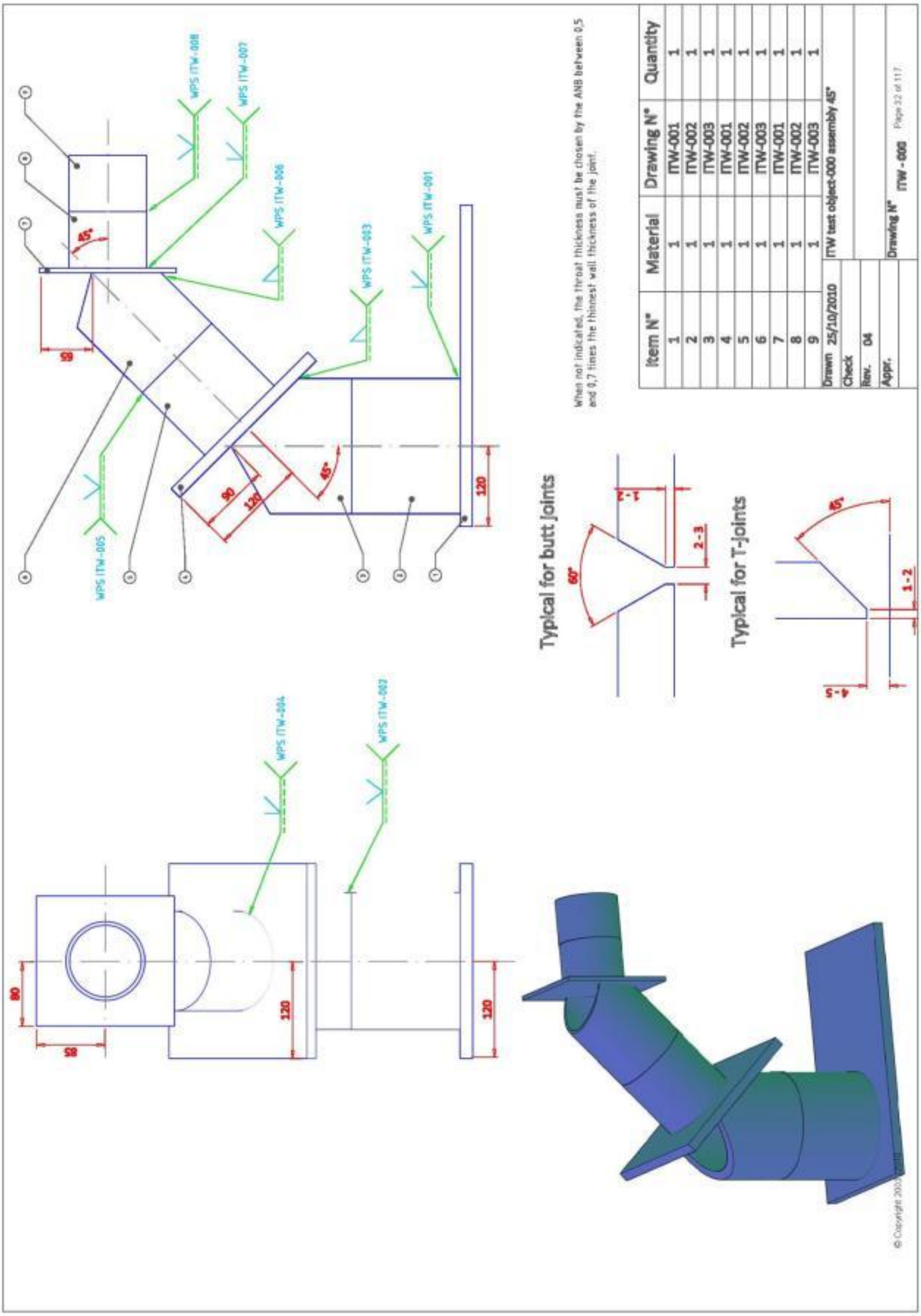
17.1.3 ITW Test Object – 111

Material groups 1, 2 and 3



Important notes:

The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.



Item N°	Material	Drawing N°	Quantity
1	1	ITW-001	1
2	1	ITW-002	1
3	1	ITW-003	1
4	1	ITW-001	1
5	1	ITW-002	1
6	1	ITW-003	1
7	1	ITW-001	1
8	1	ITW-002	1
9	1	ITW-003	1

Item N° acc. drawing ITW-000 and drawing ITW 135-000	Plate / Tube	Length	Width	Plate thickness
1	Plate	400	240	15
4	Plate	240	240	15
7	Plate	170	160	6

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn	22/09/2011	ITW test object-001 details.dwg
Check		
Appr.		Drawing N°
Rev.	02	ITW-001

Item N° acc. drawing ITW-000	Plate / Tube	Length	Diameter	Wall thickness
2	T	135	168.3	10.97
5	T	110	114.3	6.02
8	T	70	60.3	5.50
9	T	70	60.3	5.50

Item N° acc. drawing ITW 135-000	Plate / Tube	Length	Diameter	Wall thickness
2	T	135	168.3	10.97
5	T	110	114.3	6.02
8	T	70	88.9	5.50
9	T	70	88.9	5.50

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 22/09/2011		ITW test object-002 details	
Check			
Appr.		Drawing N°	
Rev. 02		ITW-002	

Item N° acc. drawing ITW-000 and drawing ITW 135-000	Plate / Tube	Length	Diameter	Wall thickness
3	T	150	168.3	10,97
6	T	150	114.3	6.02

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 22/09/2011	ITW test object-003 details	
Check		Drawing N° ITW-003
Appr.		
Rev. 02		

ATB

WPS-Nr.	ITW-001	date	26-10-2011
		rev.	3

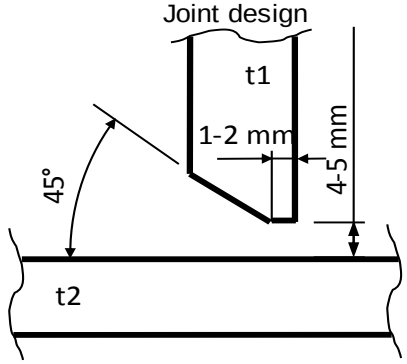
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

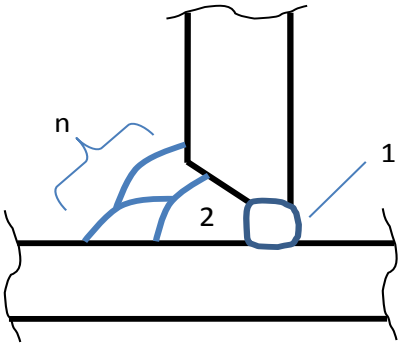
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PB
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10,97
t2	15
Outside pipe diameter (mm):	168,3
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2 / 4,00	
Welding current (A) :	65-85	125-135 / 155-165	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-002	date	26-10-2011
		rev.	3

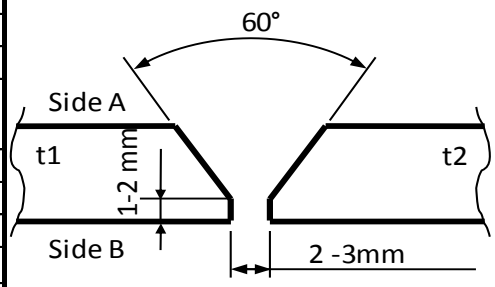
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

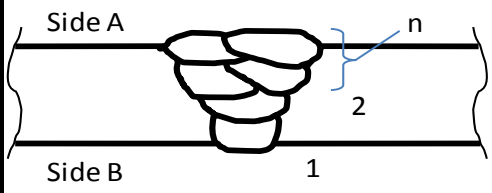
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PC
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10,97
t2	10,97
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	65-85	115-125	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	ITW-003	date	26-10-2011
		rev.	3

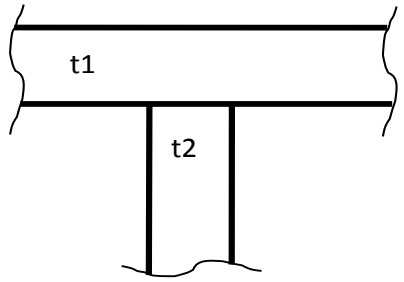
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

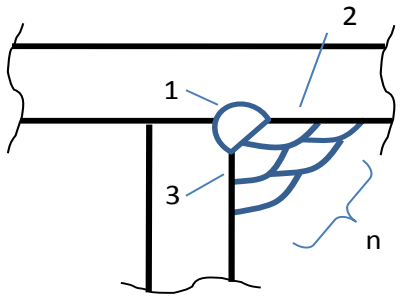
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
EN15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PD 045
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	15
t2	10,97
Outside pipe diameter (mm):	168,3
backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	3,2	3,2	
Welding current (A) :	95-105	95-105	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-004	date	26-10-2011
		rev.	3

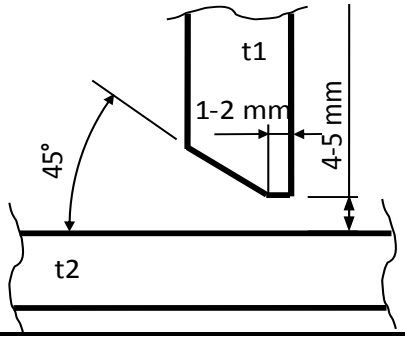
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

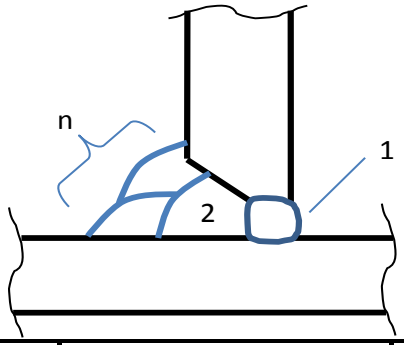
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
EN15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PB 045
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6,02
t2	15
Outside pipe diameter (mm):	114,9
backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	3,2	
Welding current (A) :	60-70	95-105	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-005	date	26-10-2011
		rev.	3

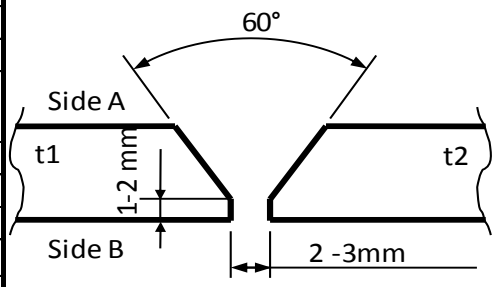
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

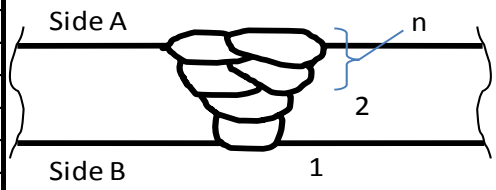
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
EN15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	H-L045
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6,02
t2	6,02
Outside pipe diameter (mm):	114,3
backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	2,5	
Welding current (A) :	55-65	70-80	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-006	date	26-10-2011
		rev.	3

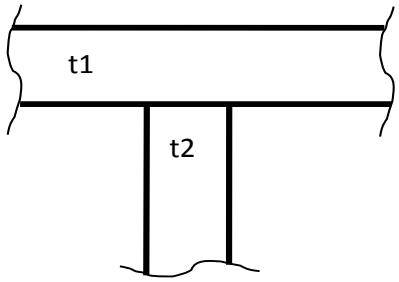
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

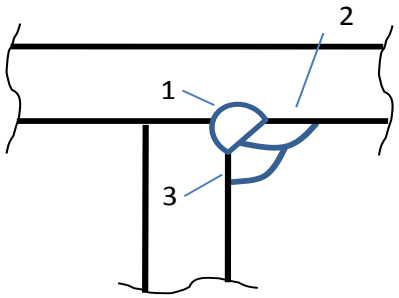
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
EN15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PF
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	6,02
Outside pipe diameter (mm):	114,3
backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - 3	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Size of filler material (diameter mm) :	2,5	2,5	
Welding current (A) :	70-80	70-80	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-007	date	26-10-2011
		rev.	3

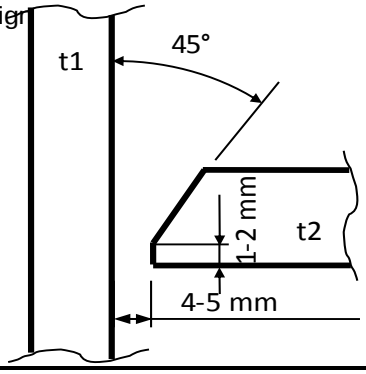
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

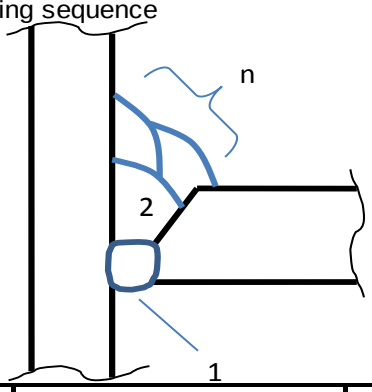
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
EN15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PH
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	5,5
Outside pipe diameter (mm):	60,3
backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	2,5	
Welding current (A) :	60-70	65-75	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	ITW-008	date	26-10-2011
		rev.	3

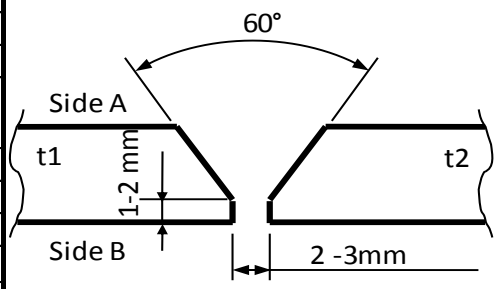
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

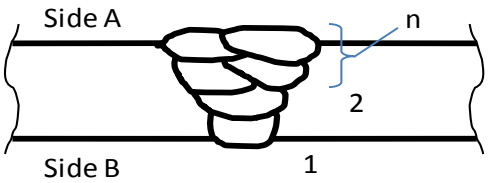
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
EN15608 Group nr. :	1.1
Welding process :	111
Filler material :	Basic electrode
	Free choice of brand
Welding position :	PH
Shielding gas :	N/A
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	5,5
t2	5,5
Outside pipe diameter (mm):	60,3
backing :	N/A
Gouging / grinding :	N/A
single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

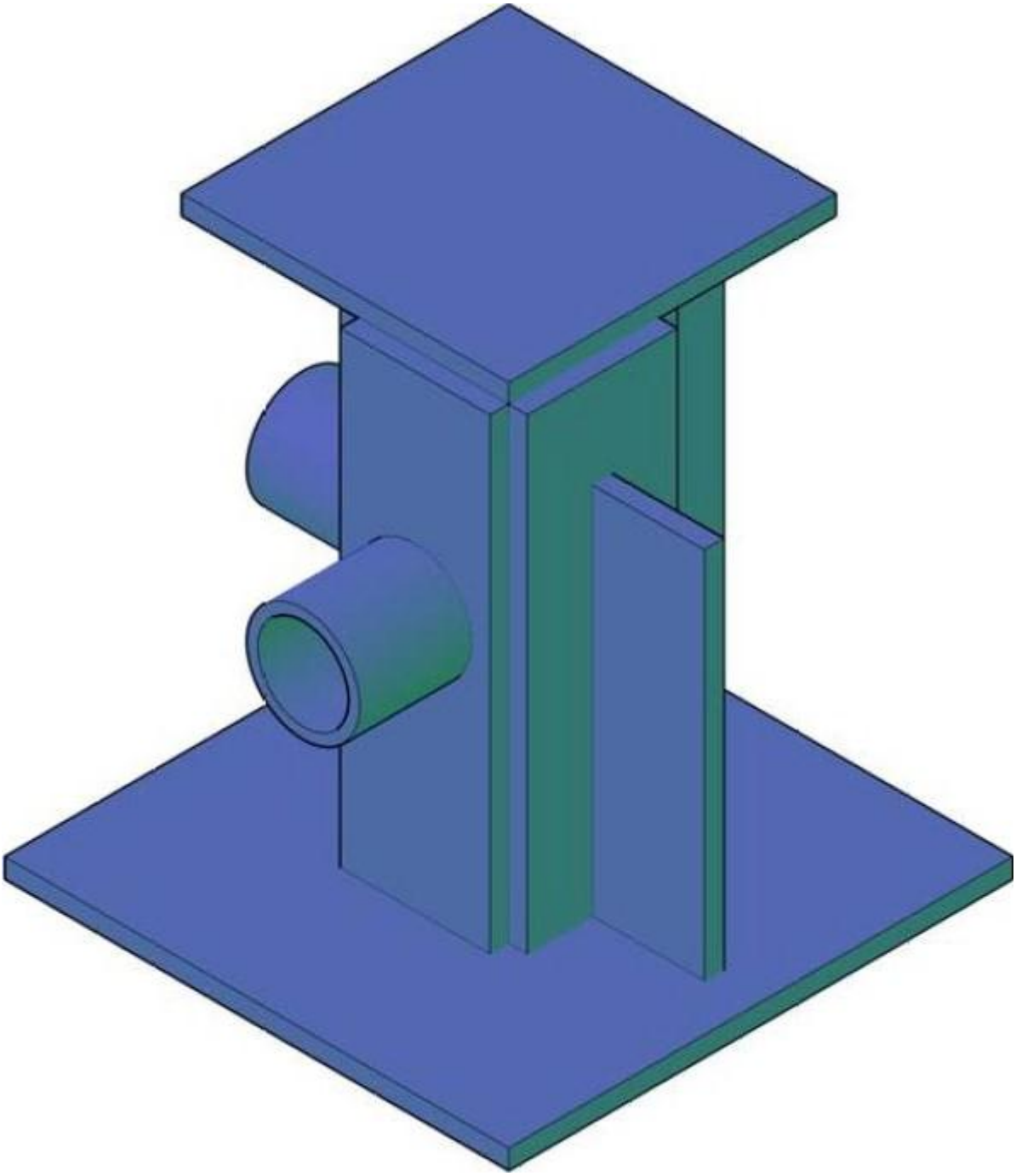
Run number :	1	2 - n	
Welding process :	111	111	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	+	
Size of filler material (diameter mm) :	2,5	2,5	
Welding current (A) :	50-60	55-65	
Arc voltage (V) :	-	-	
Travel speed (cm/min) :	-	-	
Distance contact tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	EN ISO 2560-A - E42 3 B or E42 2 B		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	N/A	N/A	
Type of tungsten electrode :	N/A	N/A	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

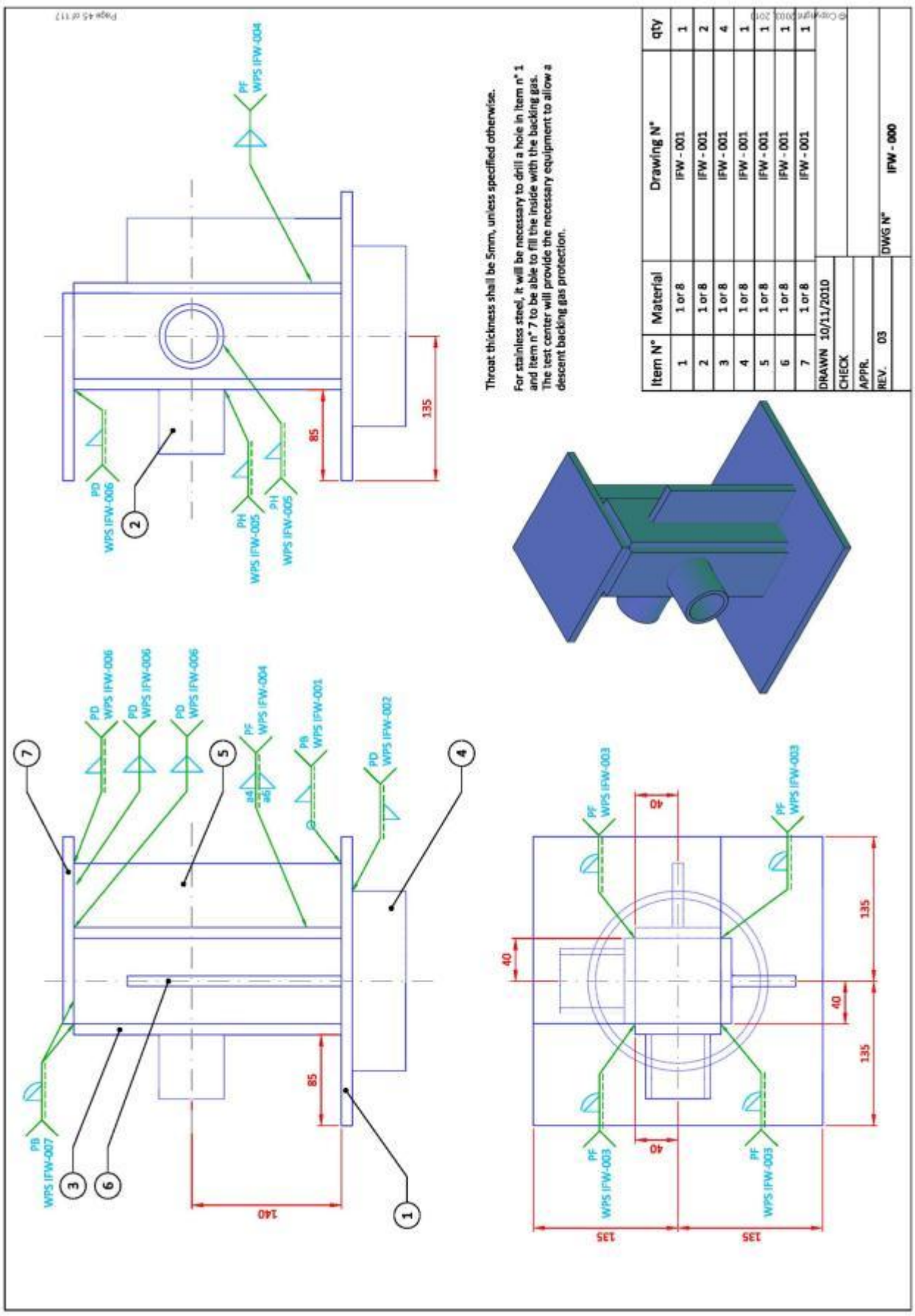
17.2 Welding Process 135

17.2.1 **IFW** Test Object-135

Material groups 1, 2 and 3



Important note: The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.


Throat thickness shall be 5mm, unless specified otherwise.
For stainless steel, it will be necessary to drill a hole in item n° 1 and item n° 7 to be able to fill the inside with the backing gas. The test center will provide the necessary equipment to allow a descent backing gas protection.
Item N° | Material | Drawing N° | qty
1 | 1 or 8 | IFW - 001 | 1
2 | 1 or 8 | IFW - 001 | 2
3 | 1 or 8 | IFW - 001 | 4
4 | 1 or 8 | IFW - 001 | 1
5 | 1 or 8 | IFW - 001 | 1
6 | 1 or 8 | IFW - 001 | 1
7 | 1 or 8 | IFW - 001 | 1
DRAWN 10/11/2010
CHECK
APPR.
REV. 03
DWG N° IFW - 000
PF WPS IFW-004
PD WPS IFW-006
PH WPS IFW-005
PB WPS IFW-007
PD WPS IFW-001
PD WPS IFW-002
PF WPS IFW-003
85
135
140
40

Item N° acc. drawing IFW-000	Plate / Tube	Length [mm]	Width [mm]	Thickness [mm]	Diameter [mm]
1	P	270	270	10	
2	T	60		5.5	60.3
3	P	250	80	10	
4	T	50		7.1	168.3
5	P	60	250	10	
6	P	60	200	10	
7	P	175	175	10	

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 10/11/2010	
Check	
Appr.	Drawing N°
Rev. 02	IFW-001

ATB

WPS-Nr.	IFW-001	date	25-10-2011
		rev.	2

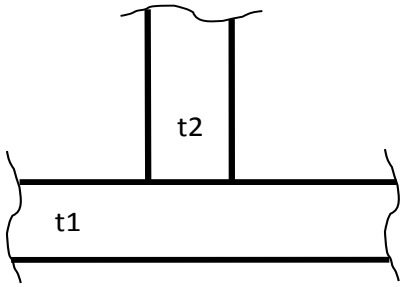
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

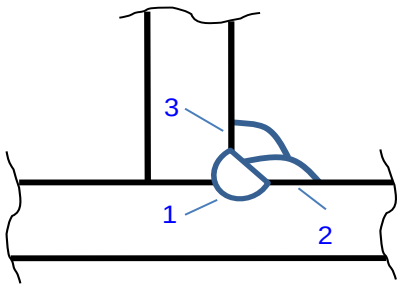
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PB
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	180-210	170-200	
Wire feed speed (m/min), informative:	8-10	7-9	
Arc voltage (V) :	23-27	22,5-26,5	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-002	date	25-10-2011
		rev.	2

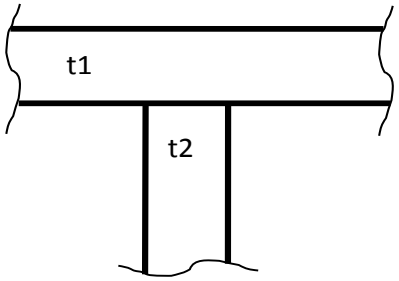
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

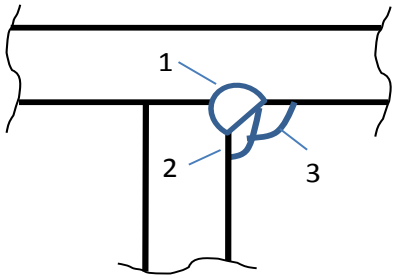
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PD
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	7,1
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	180-210	170-200	
Wire feed speed (m/min), informative:	8-10	7-9	
Arc voltage (V) :	23-27	22,5-26,5	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-003	date	25-10-2011
		rev.	2

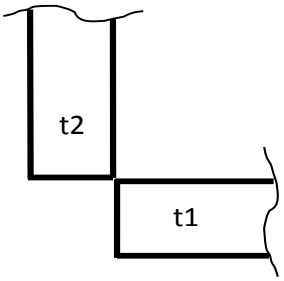
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

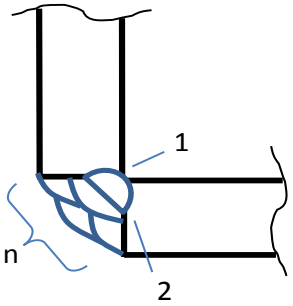
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PF
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	125-155	145-175	
Wire feed speed (m/min), informative:	4-6	5-7	
Arc voltage (V) :	20-24	20,5-24,5	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	IFW-004	date	25-10-2011
		rev.	2

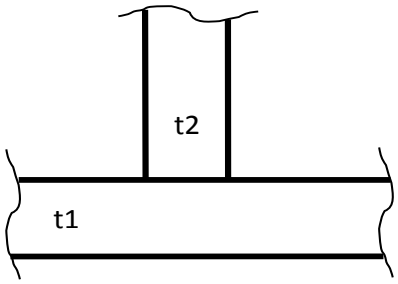
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

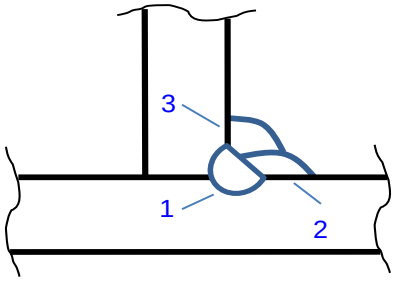
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PF
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	125-155	125-155	
Wire feed speed (m/min), informative:	4-6	4-6	
Arc voltage (V) :	20-24	20-24	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	IFW-005	date	25-10-2011
		rev.	2

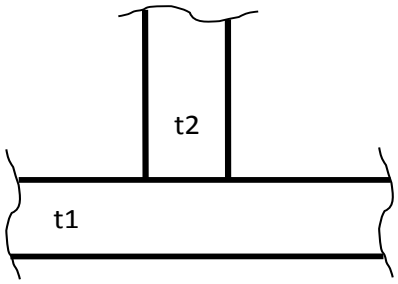
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

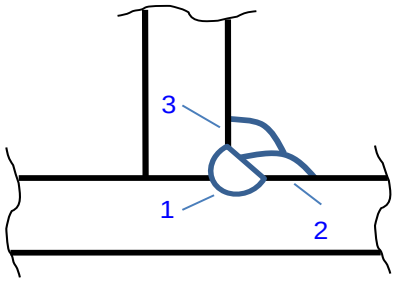
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PF (PH)
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	5,5
Outside pipe diameter (mm):	60,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	135-165	135-165	
Wire feed speed (m/min), informative:	4,5-6,5	4,5-6,5	
Arc voltage (V) :	20-24	20-24	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-006	date	25-10-2011
		rev.	2

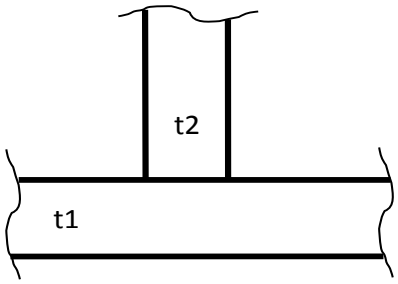
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

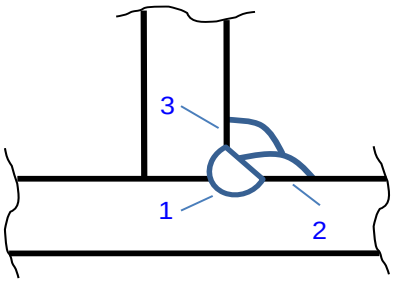
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PD
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	180-210	170-200	
Wire feed speed (m/min), informative:	8-10	7-9	
Arc voltage (V) :	23-27	22,5-26,5	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-007	date	25-10-2011
		rev.	2

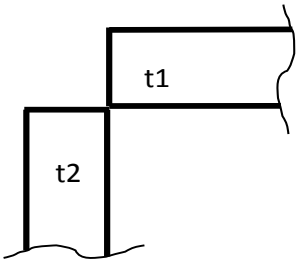
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

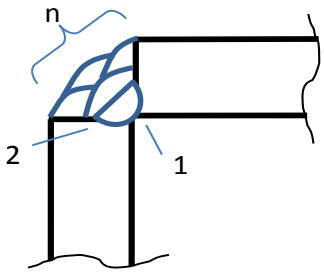
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PB
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



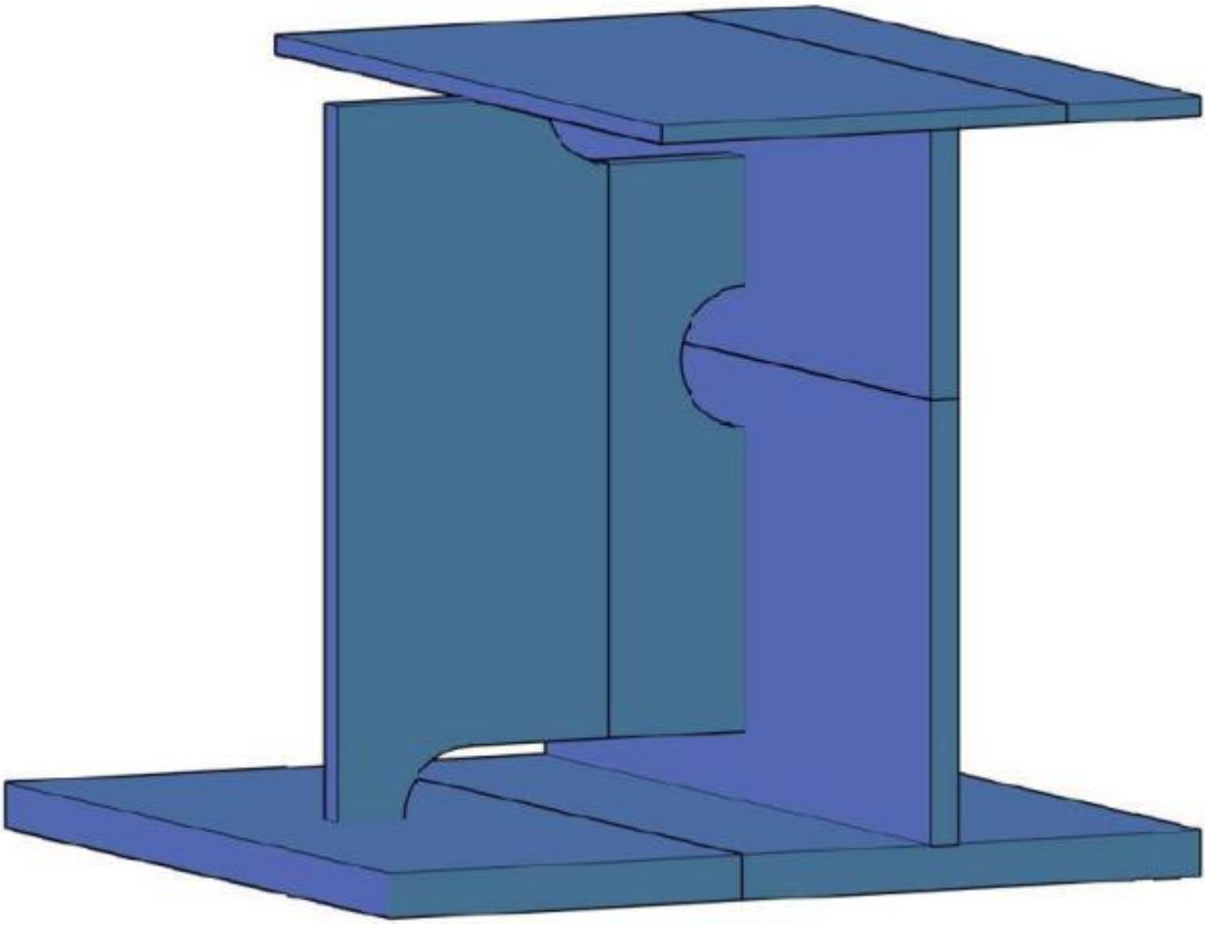
Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	150-180	150-180	
Wire feed speed (m/min), informative:	5-7	5-7	
Arc voltage (V) :	21-25	21-25	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :			
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341-A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

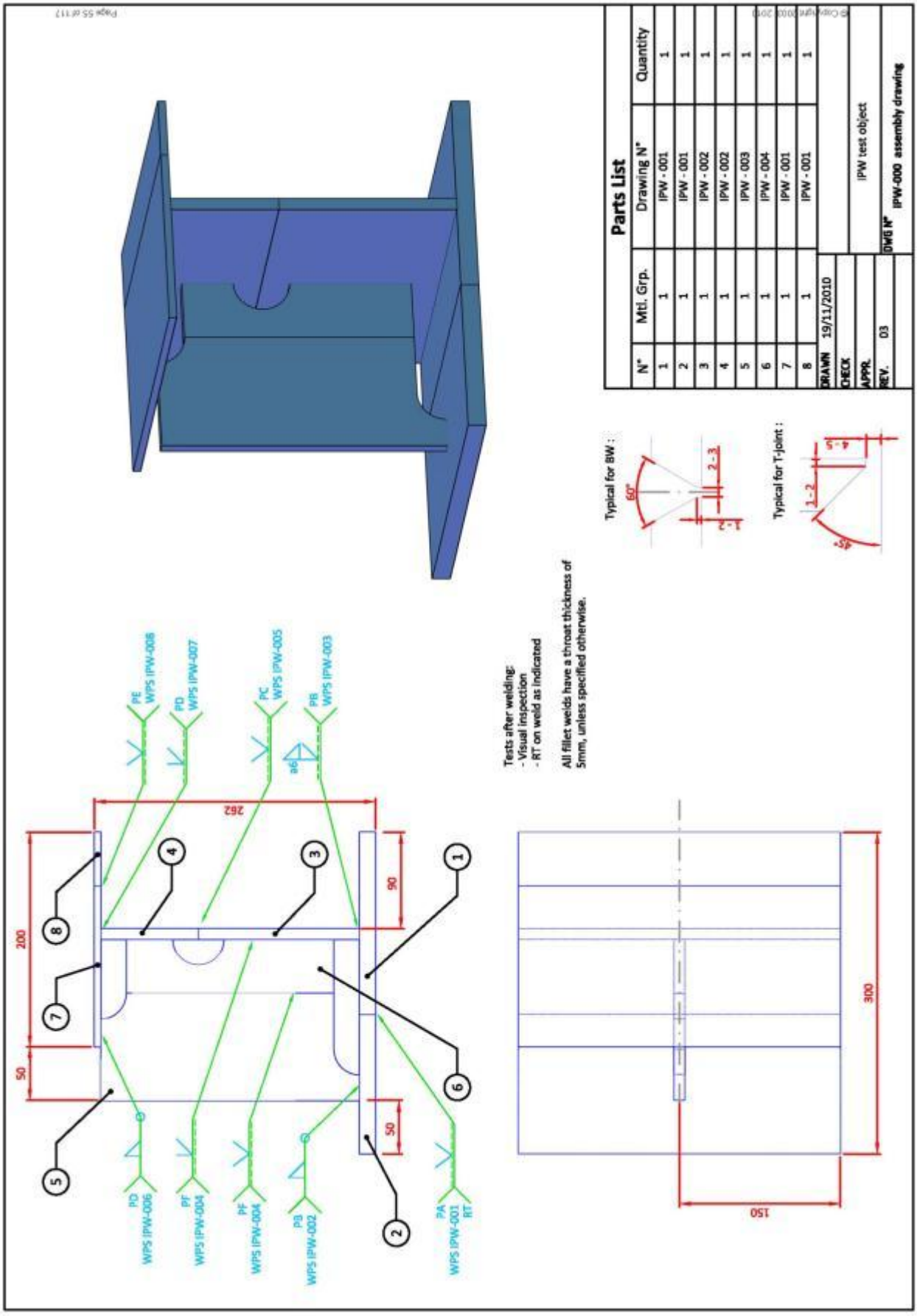
Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

17.2.2 IPW Test Object – 135

Material groups 1, 2 and 3



Important notes:
The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.


Parts List
N° | Mtl. Grp. | Drawing N° | Quantity
1 | 1 | IPW - 001 | 1
2 | 1 | IPW - 001 | 1
3 | 1 | IPW - 002 | 1
4 | 1 | IPW - 002 | 1
5 | 1 | IPW - 003 | 1
6 | 1 | IPW - 004 | 1
7 | 1 | IPW - 001 | 1
8 | 1 | IPW - 001 | 1
DRAWN 19/11/2010
CHECK
APPR.
REV. 03
IPW test object
DWG N° IPW-000 assembly drawing
Typical for BW :
Typical for T-joint :
Tests after welding:
- Visual inspection
- RT on weld as indicated
All fillet welds have a throat thickness of 5mm, unless specified otherwise.
PE WPS IPW-008
PD WPS IPW-007
PC WPS IPW-005
PB WPS IPW-003
PD WPS IPW-006
PF WPS IPW-004
PF WPS IPW-004
PB WPS IPW-002
PA WPS IPW-001 RT
262
200
50
90
50
300
150

Joint type A
Length
Width
Joint type A
30°
1 - 2
The root gap hasn't been taken into account in the indicated widths of the plates
The suggested root gap is to be found on the WPS of the corresponding joint.
Item N° acc. drawing IPW-000
Length
Width
Plate thickness
1 300 170 15
2 300 130 15
7 300 150 6
8 300 50 6
Drawn 19/11/2010
Check
Appr.
Rev. 01
ipw test object-001 details
Drawing N°
IPW - 001
© Copyright 2002 - 2010
Page 56 of 117

Page 57 of 117
Joint type A
Joint type B
Length
Width
Joint type B
45°
1 - 2
Joint type A
30°
1 - 2
The root gap hasn't been taken into account in the indicated widths of the plates
The suggested root gap is to be found on the WPS of the corresponding joint.
Item N° acc. drawing IPW-000
Length
Width
Plate thickness
3
300
150
10
4
300
91
10
Drawn 19/11/2010
Check
Appr.
Rev. 01
ipw test object-002 details
Drawing N°
IPW - 002
© Copyright 2002, 2010

Page 58 of 117
Joint type A
30°
1 - 2
Th root gap hasn't been taken into account in the indicated plate dimentions.
The suggested root gap is to be found on the WPS of the corresponding joint.
© Copyright 2008, 2010
IPW test object-003 details.dwg
Drawing N°
IPW-003
Drawn 19/11/2010
Check
Appr.
Rev. 01
Joint type A
24
24
R24
76
50
R24
26
241
100
10

Page 59 of 117
Joint type A
30°
1 - 2
Joint type B
45°
1 - 2
The root gap hasn't been taken into account in the indicated plate dimentions.
The suggested root gap is to be found on the WPS of the corresponding joint.
©Copyright 2008, 2010
IPW test object-004 details.dwg
Drawing N°
IPW-004
Drawn 19/11/2010
Check
Appr.
Rev. 01
Joint type B
Joint type B
67
R24
193
Joint type A
10
50

ATB

WPS-Nr.	IPW-001	date	2011-10-28
		rev.	2

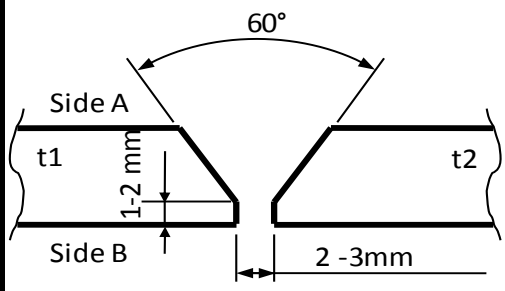
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

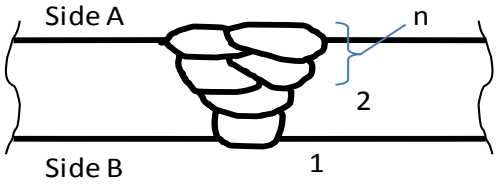
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PA
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	15
t2	15
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	170-200	
Wire feed speed (m/min), informative:	3-4	7-9	
Arc voltage (V) :	18-20	22-26	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-002	date	28-10-2011
		rev.	2

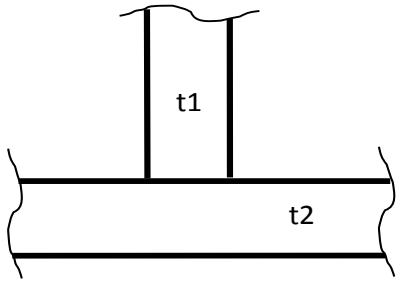
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

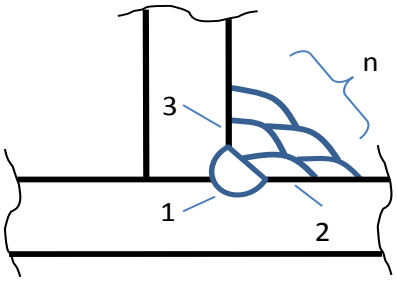
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PB
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	15
Outside pipe diameter (mm):	-
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	175-205	175-205	
Wire feed speed (m/min), informative:	7-10	7-10	
Arc voltage (V) :	23-27	23-27	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	IPW-003	date	28-10-2011
		rev.	2

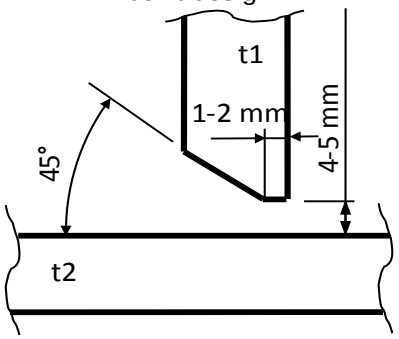
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

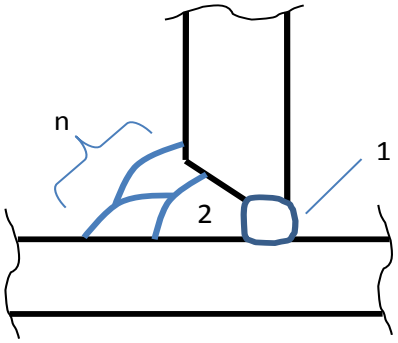
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PB
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	15
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	150-180	175-205	
Wire feed speed (m/min), informative:	5-7	7-10	
Arc voltage (V) :	23-25	22-27	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	IPW-004	date	28-10-2011
		rev.	2

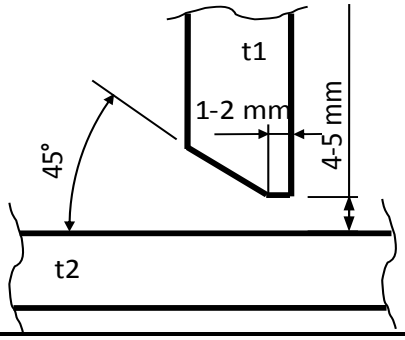
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

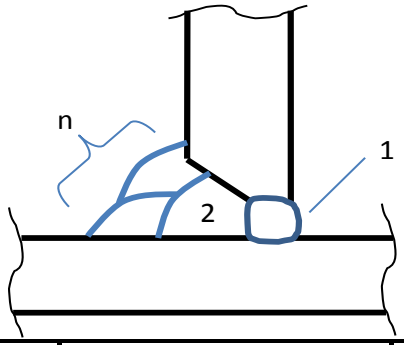
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PF
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	110-140	125-155	
Wire feed speed (m/min), informative:	3,5-4,5	4-6	
Arc voltage (V) :	18-20	20-22	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-005	date	28-10-2011
		rev.	2

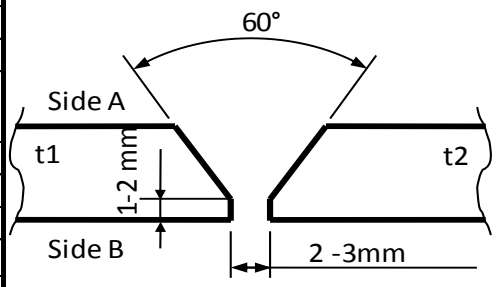
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

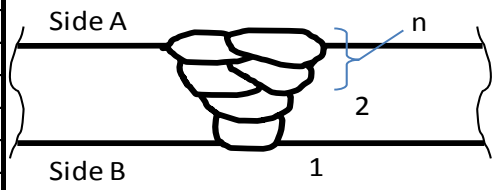
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PC
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	-
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	170-200	
Wire feed speed (m/min), informative:	3-4	7-9	
Arc voltage (V) :	18-20	20-24	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-006	date	28-10-2011
		rev.	2

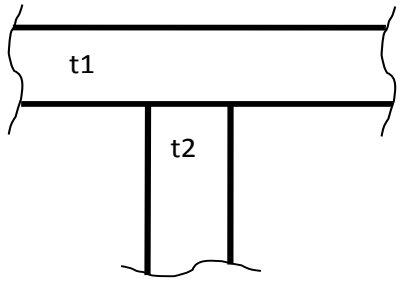
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

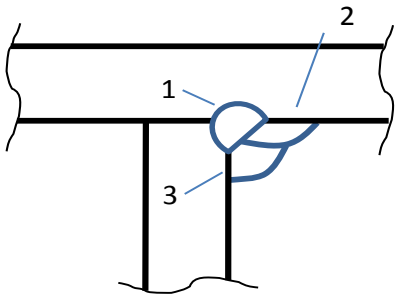
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PD
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - 3	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	165-195	165-195	
Wire feed speed (m/min), informative:	6-9	6-9	
Arc voltage (V) :	21-25	21-25	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	IPW-007	date	28-10-2011
		rev.	2

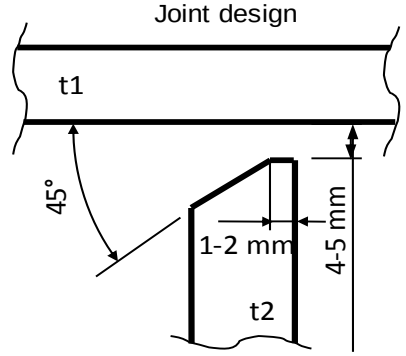
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

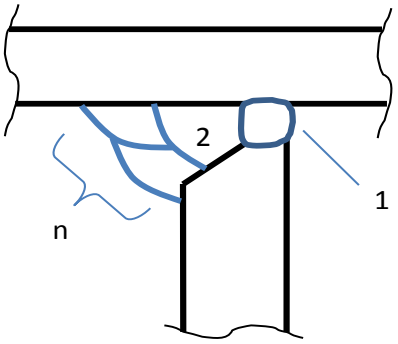
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PD
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	125-155	155-185	
Wire feed speed (m/min), informative:	4-6	6-8	
Arc voltage (V) :	20-22	21-25	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-008	date	28-10-2011
		rev.	2

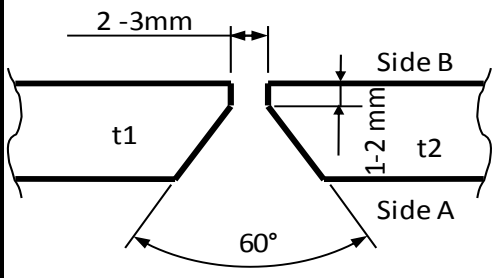
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

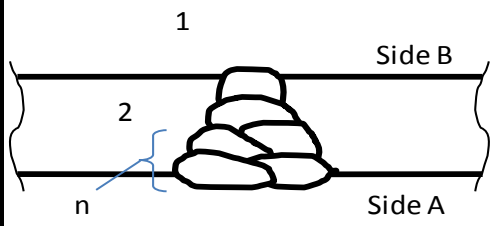
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PE
Shielding gas :	ISO 14175 : M21
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	6
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



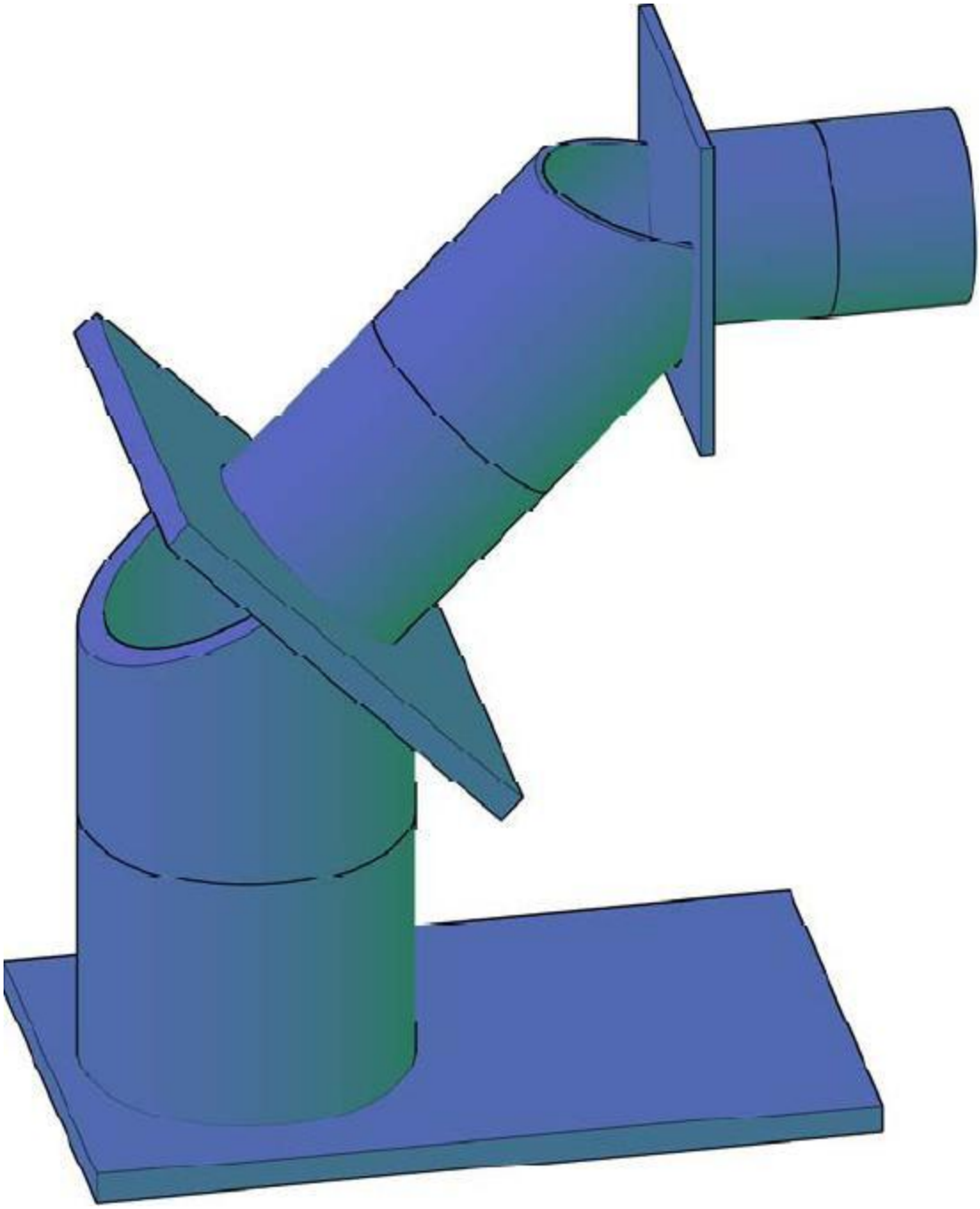
Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	125-155	
Wire feed speed (m/min), informative:	3-4	4-6	
Arc voltage (V) :	18-20	20-22	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

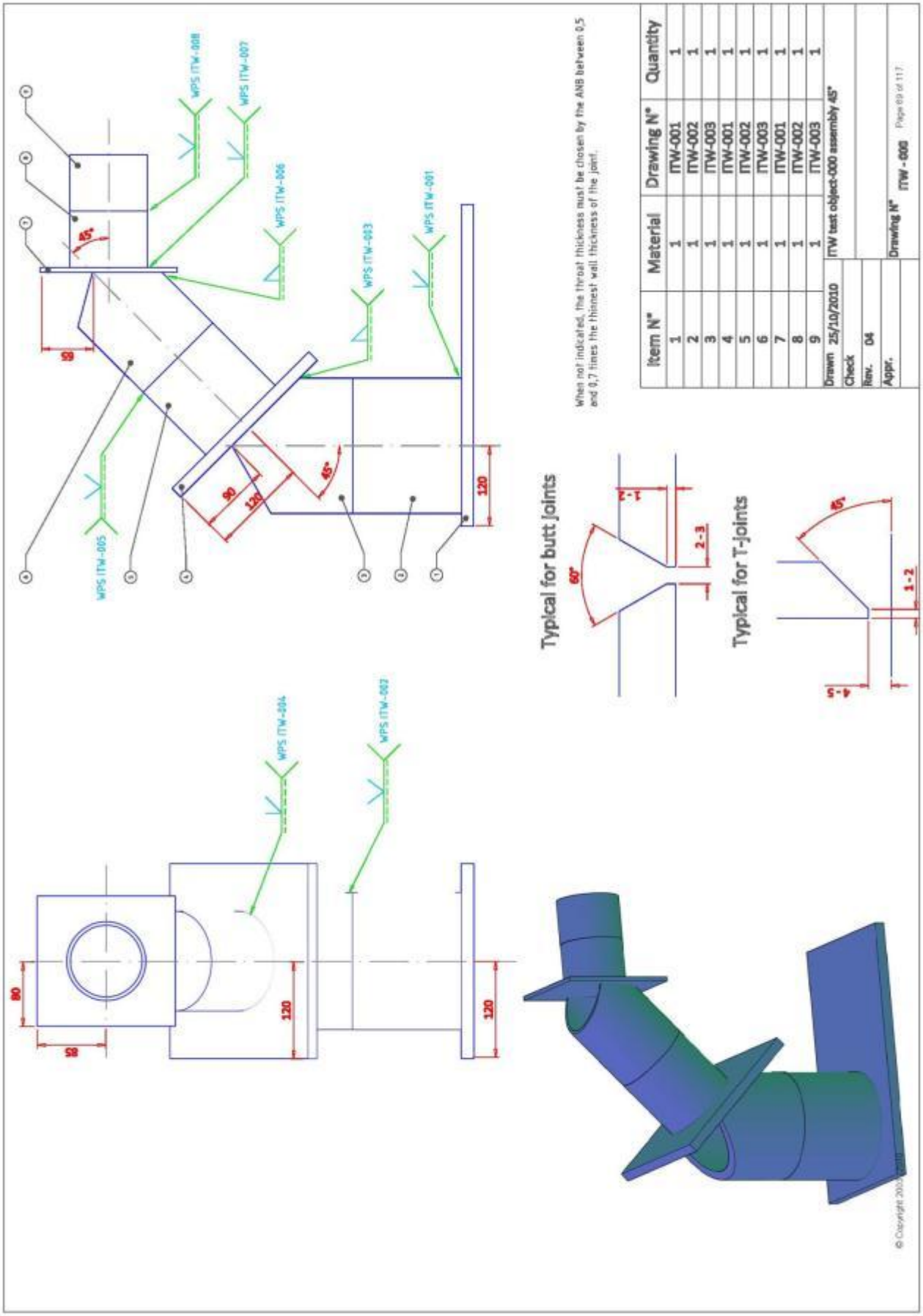
Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

17.2.3 ITW Test Object – 135

Material groups 1, 2 and 3



Important notes:
The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details become badly or not visible.


When not indicated, the throat thickness must be chosen by the ANB between 0,5 and 0,7 times the thinnest wall thickness of the joint.
Item N° | Material | Drawing N° | Quantity
1 | 1 | ITW-001 | 1
2 | 1 | ITW-002 | 1
3 | 1 | ITW-003 | 1
4 | 1 | ITW-001 | 1
5 | 1 | ITW-002 | 1
6 | 1 | ITW-003 | 1
7 | 1 | ITW-001 | 1
8 | 1 | ITW-002 | 1
9 | 1 | ITW-003 | 1
Drawn 25/10/2010
ITW test object-000 assembly 45°
Check
Rev. 04
Appr.
Drawing N° ITW - 000
Page 69 of 117
WPS ITW-008
WPS ITW-007
WPS ITW-006
WPS ITW-003
WPS ITW-001
WPS ITW-005
45°
58
80
120
120
Typical for butt joints
60°
2 - 1
2 - 3
Typical for T-joints
45°
1 - 2
4 - 5
WPS ITW-004
WPS ITW-007
80
58
120
120
© Copyright 2010

Item N° acc. drawing ITW-000 and drawing ITW 135-000	Plate / Tube	Length	Width	Plate thickness
1	Plate	400	240	15
4	Plate	240	240	15
7	Plate	170	160	6

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 22/09/2011	ITW test object-001 details.dwg
Check	
Appr.	Drawing N°
Rev. 02	ITW-001

Item N° acc. drawing ITW-000	Plate / Tube	Length	Diameter	Wall thickness
2	T	135	168.3	10.97
5	T	110	114.3	6.02
8	T	70	60.3	5.50
9	T	70	60.3	5.50

Item N° acc. drawing ITW 135-000	Plate / Tube	Length	Diameter	Wall thickness
2	T	135	168.3	10.97
5	T	110	114.3	6.02
8	T	70	88.9	5.50
9	T	70	88.9	5.50

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn	22/09/2011	ITW test object-002 details	
Check			
Appr.		Drawing N°	
Rev.	02	ITW-002	

Item N° acc. drawing ITW-000 and drawing ITW 135-000	Plate / Tube	Length	Diameter	Wall thickness
3	T	150	168.3	10,97
6	T	150	114.3	6.02

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 22/09/2011	ITW test object-003 details
Check	
Appr.	Drawing N°
Rev. 02	ITW-003

ATB

WPS-Nr.	ITW-001	date	28-10-2011
		rev.	2

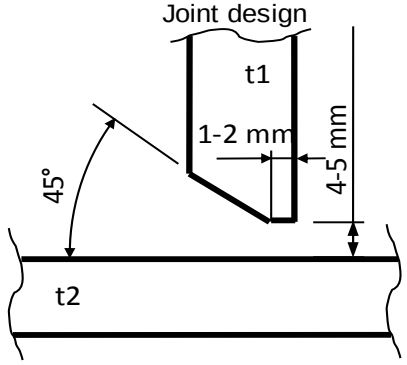
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

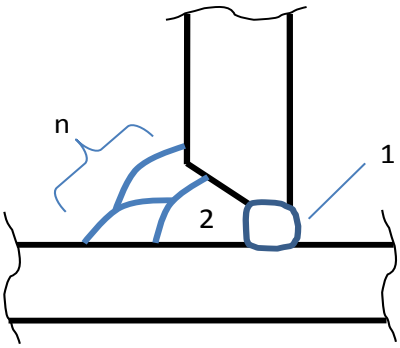
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PB
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	10,97
t2	15
Outside pipe diameter (mm):	168,3
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	145-175	170-200	
Wire feed speed (m/min), informative:	5-7	7-9	
Arc voltage (V) :	20-24	22-26	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-002	date	28-10-2011
		rev.	2

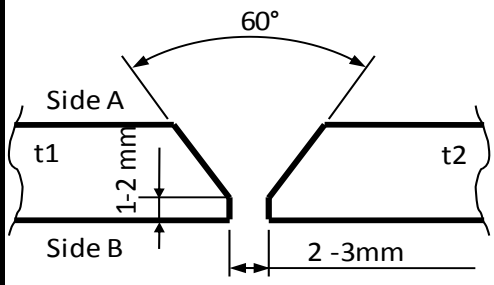
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

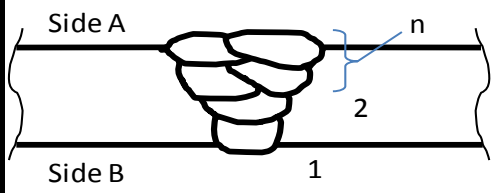
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PC
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	10,97
t2	10,97
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	110-150	175-195	
Wire feed speed (m/min), informative:	3-5	7-8	
Arc voltage (V) :	18-20	21-25	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-003	date	28-10-2011
		rev.	2

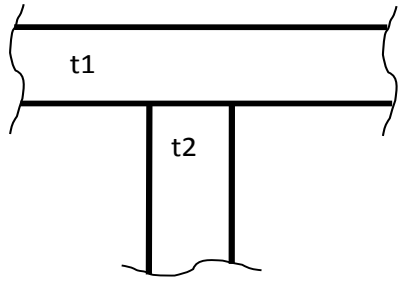
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

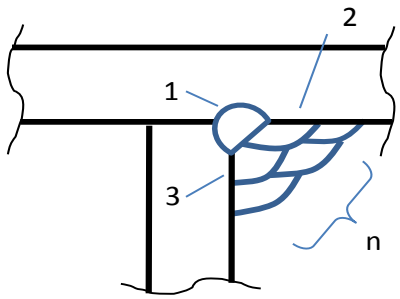
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PD 045
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	15
t2	10,97
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	180-210	180-210	
Wire feed speed (m/min), informative:	8-10	8-10	
Arc voltage (V) :	23-27	23-27	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-004	date	28-10-2011
		rev.	2

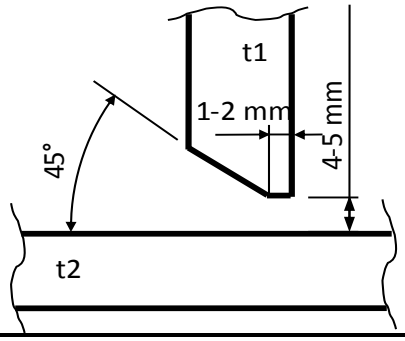
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

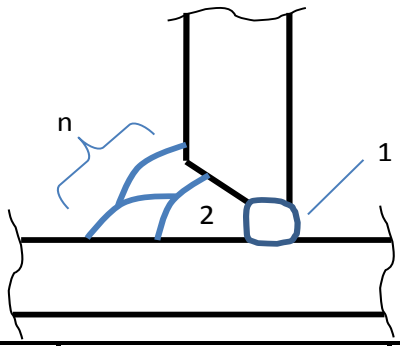
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PB 045
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6,02
t2	15
Outside pipe diameter (mm):	114,9
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	150-180	
Wire feed speed (m/min), informative:	3-4	5-7	
Arc voltage (V) :	18-20	20-24	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	ITW-005	date	28-10-2011
		rev.	2

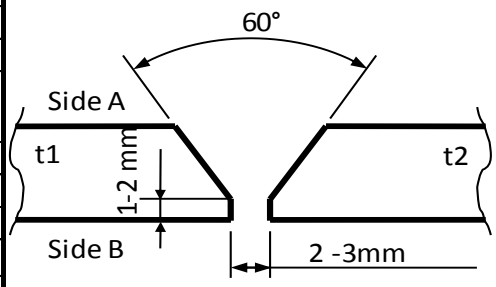
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

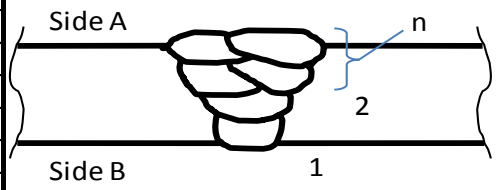
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	H-L045
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6,02
t2	6,02
Outside pipe diameter (mm):	114,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	125-155	
Wire feed speed (m/min), informative:	3-4	4-6	
Arc voltage (V) :	18-20	20-23	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	ITW-006	date	28-10-2011
		rev.	2

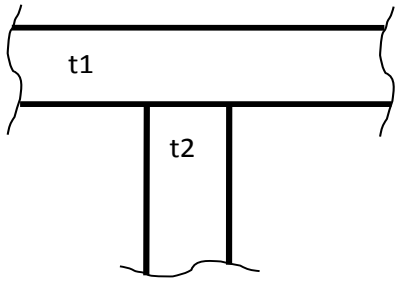
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

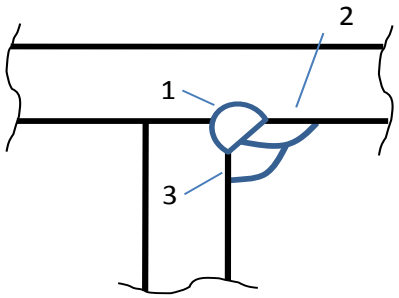
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PF
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	6,02
Outside pipe diameter (mm):	114,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - 3	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	155-185	155-185	
Wire feed speed (m/min), informative:	6-8	6-8	
Arc voltage (V) :	21-23	21-23	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	ITW-007	date	28-10-2011
		rev.	2

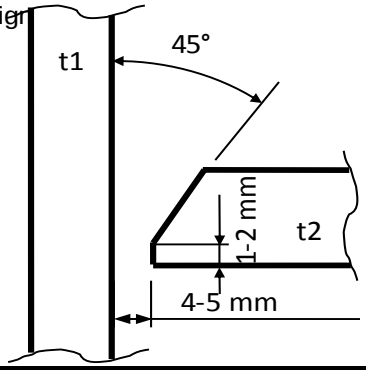
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

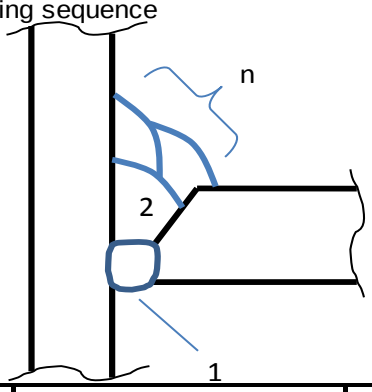
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PH
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	5,5
Outside pipe diameter (mm):	89,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	150-180	
Wire feed speed (m/min), informative:	3-5	5-7	
Arc voltage (V) :	18-20	21-25	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-008	date	28-10-2011
		rev.	2

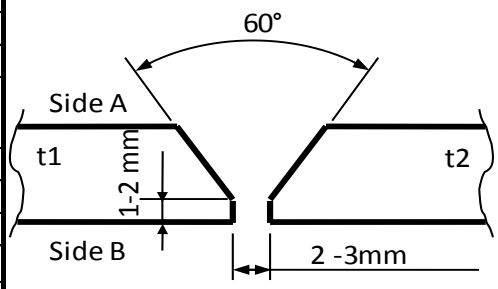
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

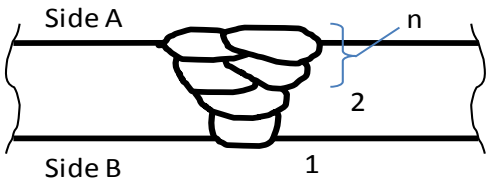
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Proces :	135
Filler material :	any brand
Welding position :	PH
Shielding gas :	ISO 14175 : M21
Type flux :	N/A
Preheat :	none
Material thickness (mm): t1	5,5
t2	5,5
Outside pipe diameter (mm):	89,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

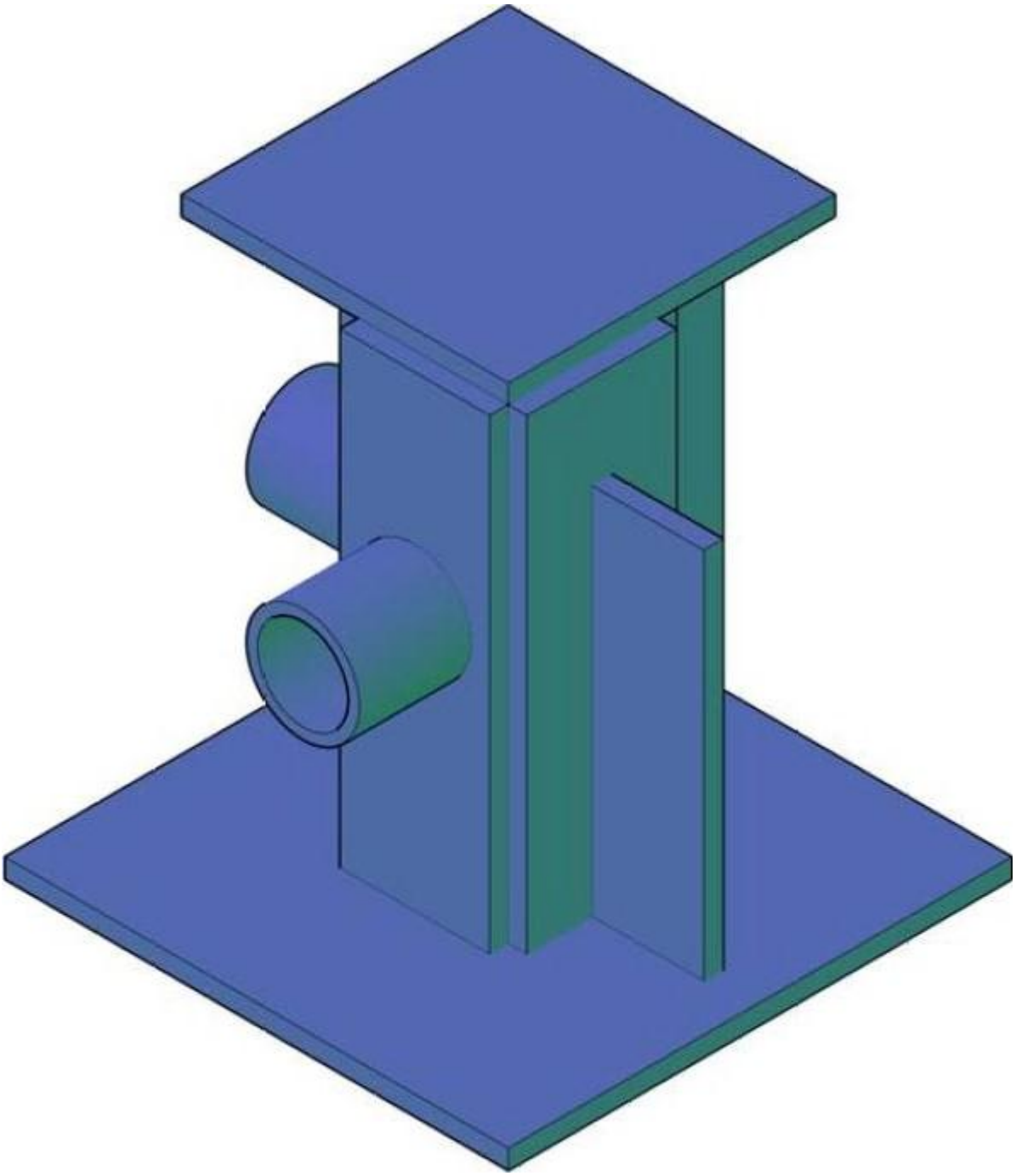
Run number :	1	2 - n	
Welding process :	135	135	
Type of Current (AC/DC) :	DC	DC	
Polarity (+/-)	+	+	
Diameter of filler material (mm) :	1,0	1,0	
Welding current (A) :	100-130	125-155	
Wire feed speed (m/min), informative:	3-4	4-6	
Arc voltage (V) :	18-20	20-22	
Travel speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	N/A	N/A	
Backing gas flow rate (l/min) :	N/A	N/A	
Filler material designation :	ISO 14341 - A-3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Transfer mode			

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

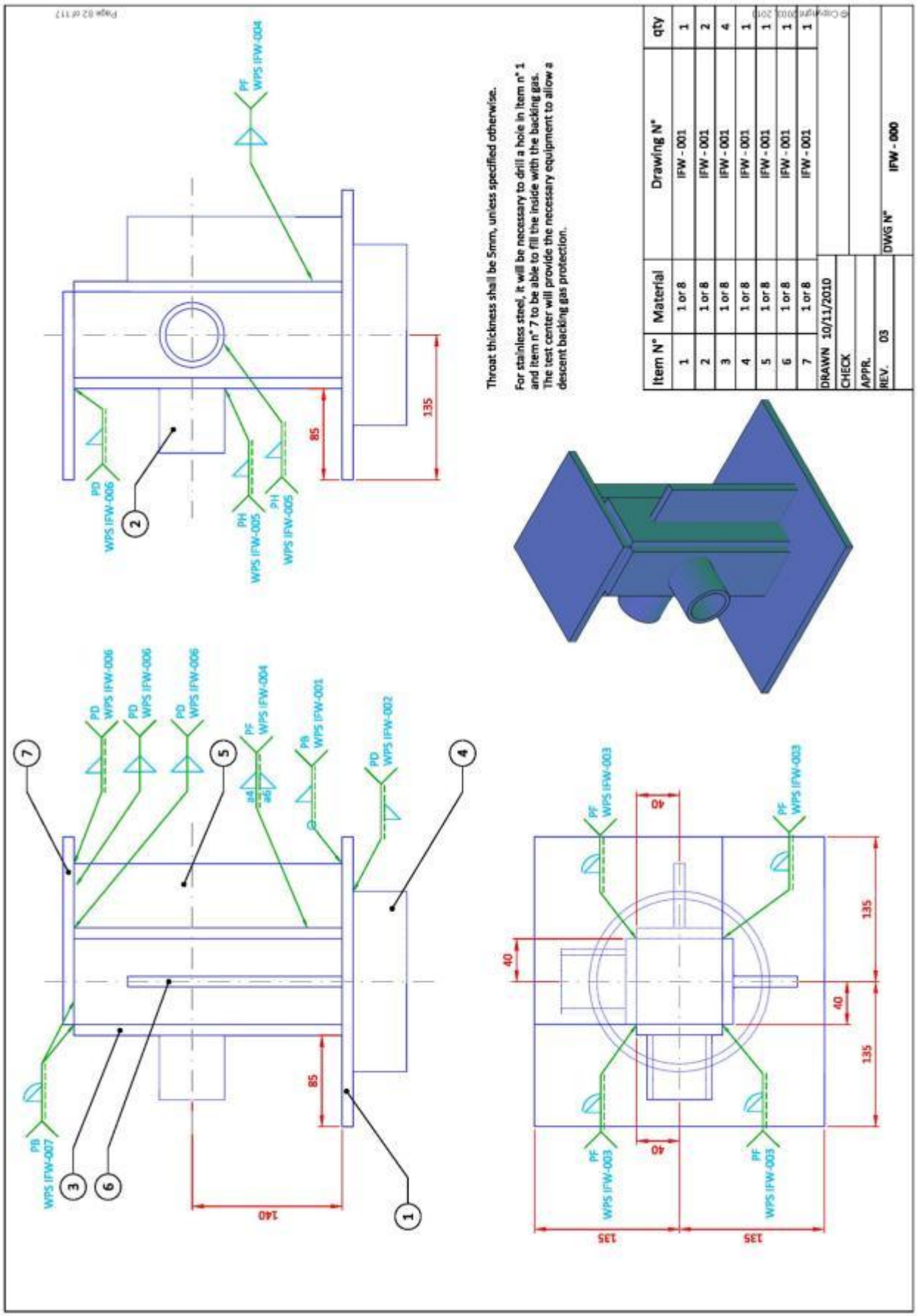
17.3 Welding Process 141

17.3.1 **IFW** Test Object-141

Material groups 1, 2 and 3



Important note: The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.


Throat thickness shall be 5mm, unless specified otherwise.
For stainless steel, it will be necessary to drill a hole in item n° 1 and item n° 7 to be able to fill the inside with the backing gas. The test center will provide the necessary equipment to allow a descent backing gas protection.
Item N° | Material | Drawing N° | qty
1 | 1 or 8 | IFW - 001 | 1
2 | 1 or 8 | IFW - 001 | 2
3 | 1 or 8 | IFW - 001 | 4
4 | 1 or 8 | IFW - 001 | 1
5 | 1 or 8 | IFW - 001 | 1
6 | 1 or 8 | IFW - 001 | 1
7 | 1 or 8 | IFW - 001 | 1
DRAWN 10/11/2010
CHECK
APPR.
REV. 03
DWG N° IFW - 000
PF WPS IFW-004
PD WPS IFW-006
PH WPS IFW-005
PB WPS IFW-007
PD WPS IFW-001
PD WPS IFW-002
PF WPS IFW-003
135
85
140
40

Item N° acc. drawing IFW-000	Plate / Tube	Length [mm]	Width [mm]	Thickness [mm]	Diameter [mm]
1	P	270	270	10	
2	T	60		5.5	60.3
3	P	250	80	10	
4	T	50		7.1	168.3
5	P	60	250	10	
6	P	60	200	10	
7	P	175	175	10	

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 10/11/2010	
Check	
Appr.	Drawing N°
Rev. 02	**IFW-001**

ATB

WPS-Nr.	IFW-001	date	24-10-2011
		rev.	2

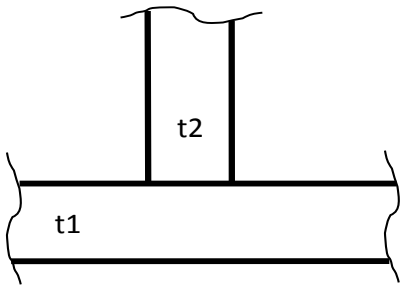
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

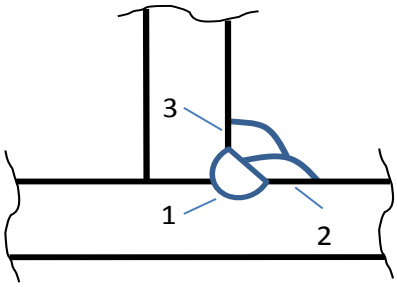
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PB
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	160-190	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-002	date	24-10-2011
		rev.	2

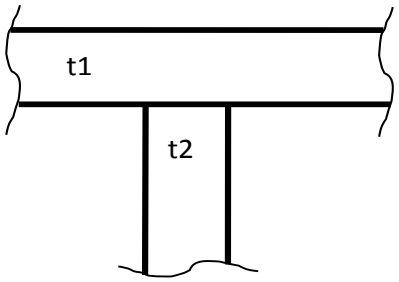
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

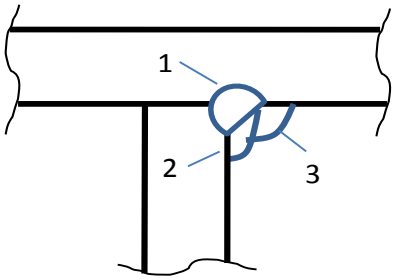
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PD
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	7,1
Outside pipe diameter (mm):	168,3
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	160-190	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-003	date	24-10-2011
		rev.	2

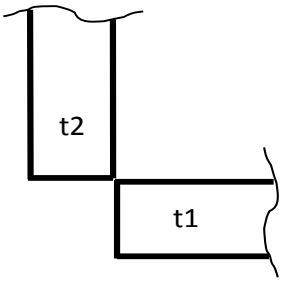
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

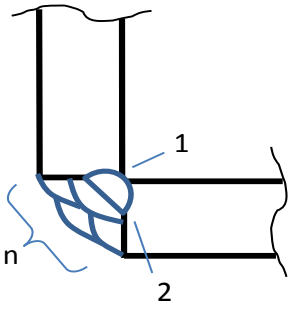
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	105-135	125-155	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-004	date	24-10-2011
		rev.	2

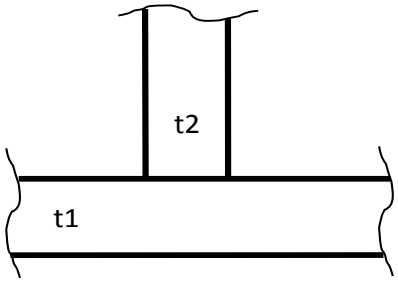
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

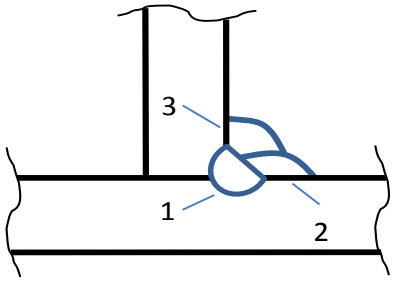
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	160-190	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-005	date	24-10-2011
		rev.	2

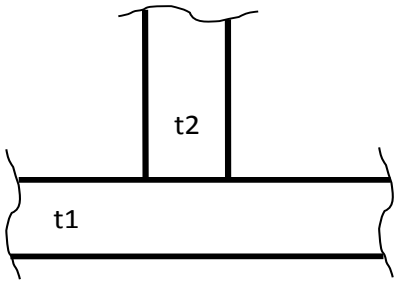
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

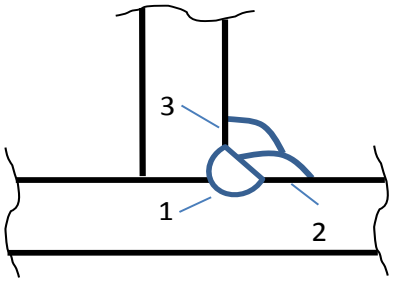
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF tube (PH)
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	5,5
Outside pipe diameter (mm):	60,3
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	125-155	125-155	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-006	date	24-10-2011
		rev.	2

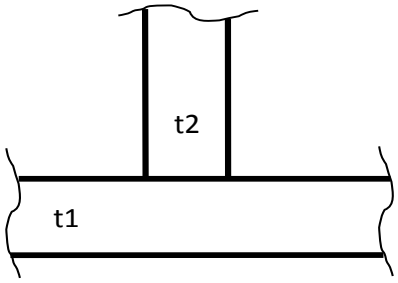
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

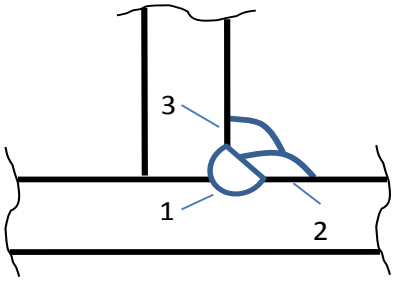
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PD
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	160-190	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IFW-007	date	24-10-2011
		rev.	2

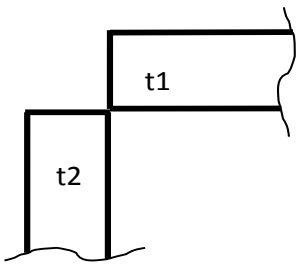
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

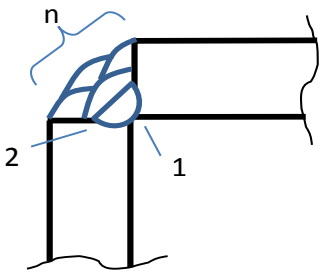
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PB
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



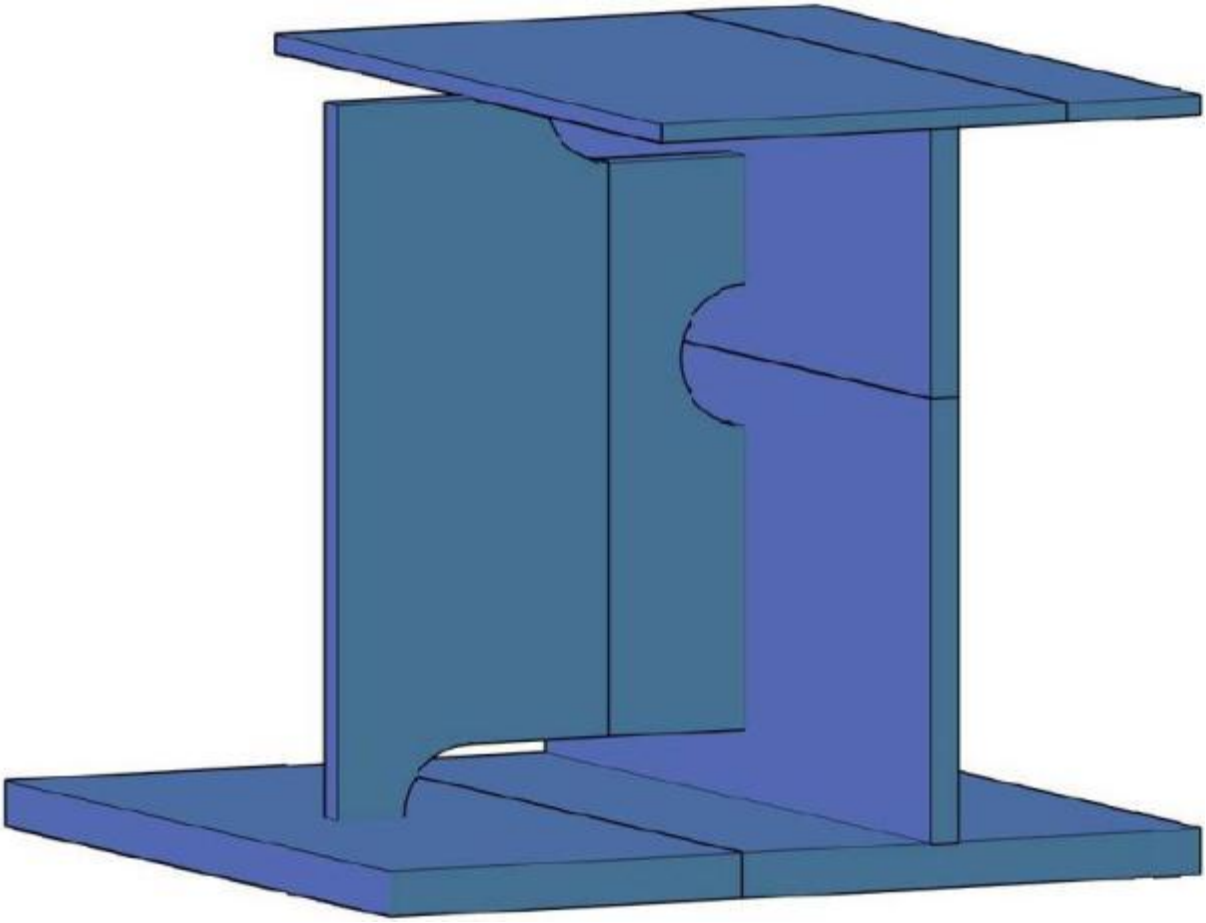
Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	105-135	125-155	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

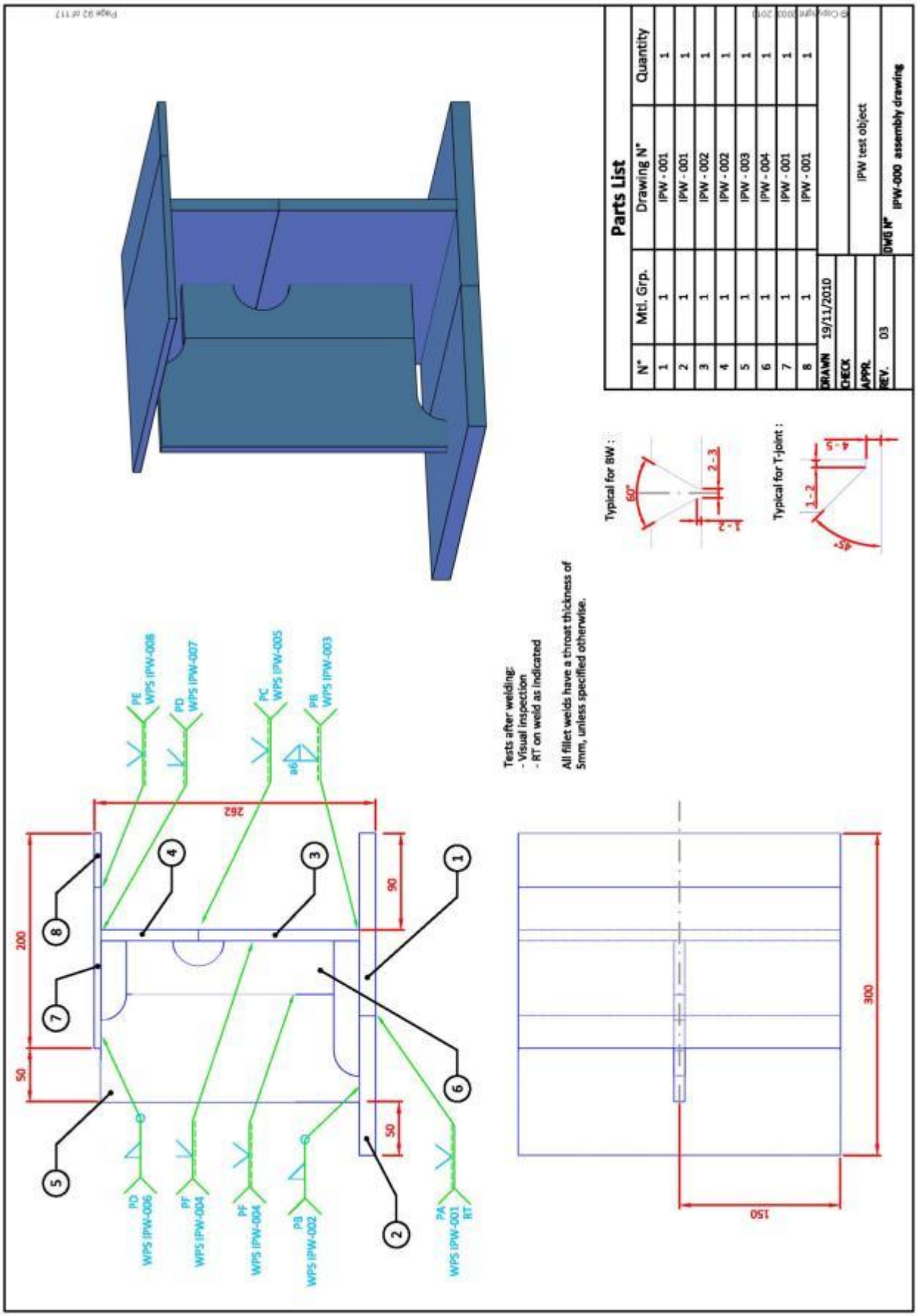
Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

17.3.2 IPW Test Object – 141

Material groups 1, 2 and 3



Important note: The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.


Parts List
N° | Mtl. Grp. | Drawing N° | Quantity
1 | 1 | IPW - 001 | 1
2 | 1 | IPW - 001 | 1
3 | 1 | IPW - 002 | 1
4 | 1 | IPW - 002 | 1
5 | 1 | IPW - 003 | 1
6 | 1 | IPW - 004 | 1
7 | 1 | IPW - 001 | 1
8 | 1 | IPW - 001 | 1
DRAWN 19/11/2010
CHECK
APPR.
REV. 03
IPW test object
DWG N° IPW-000 assembly drawing
Typical for BW :
60°
2 - 3
Typical for T-joint :
1 - 2
45°
Tests after welding:
- Visual inspection
- RT on weld as indicated
All fillet welds have a throat thickness of 5mm, unless specified otherwise.
PE WPS IPW-006
PD WPS IPW-007
PC WPS IPW-005
PB WPS IPW-003
PA WPS IPW-001 RT
PG WPS IPW-006
PF WPS IPW-004
PE WPS IPW-004
PB WPS IPW-002
262
200
50
90
50
300
150

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Joint type A
Length
Width
Joint type A
30°
1 - 2
The root gap hasn't been taken into account in the indicated widths of the plates
The suggested root gap is to be found on the WPS of the corresponding joint.
Item N° acc. drawing IPW-000
Length
Width
Plate thickness
1 300 170 15
2 300 130 15
7 300 150 6
8 300 50 6
Drawn 19/11/2010
Check
Appr.
Rev. 01
ipw test object-001 details
Drawing N°
IPW - 001

Joint type A
Joint type B
Length
Width
Page 94 of 117
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Drawn 19/11/2010
Check
Appr.
Rev. 01
ipw test object-002 details
Drawing N°
IPW - 002
Item N° acc. drawing IPW-000
Length
Width
Plate thickness
3 300 150 10
4 300 91 10
The root gap hasn't been taken into account in the indicated widths of the plates
The suggested root gap is to be found on the WPS of the corresponding joint.
Joint type B
45°
1 - 2
Joint type A
30°
1 - 2

Page 95 of 117
Joint type A
30°
1 - 2
Th root gap hasn't been taken into account in the indicated plate dimentions.
The suggested root gap is to be found on the WPS of the corresponding joint.
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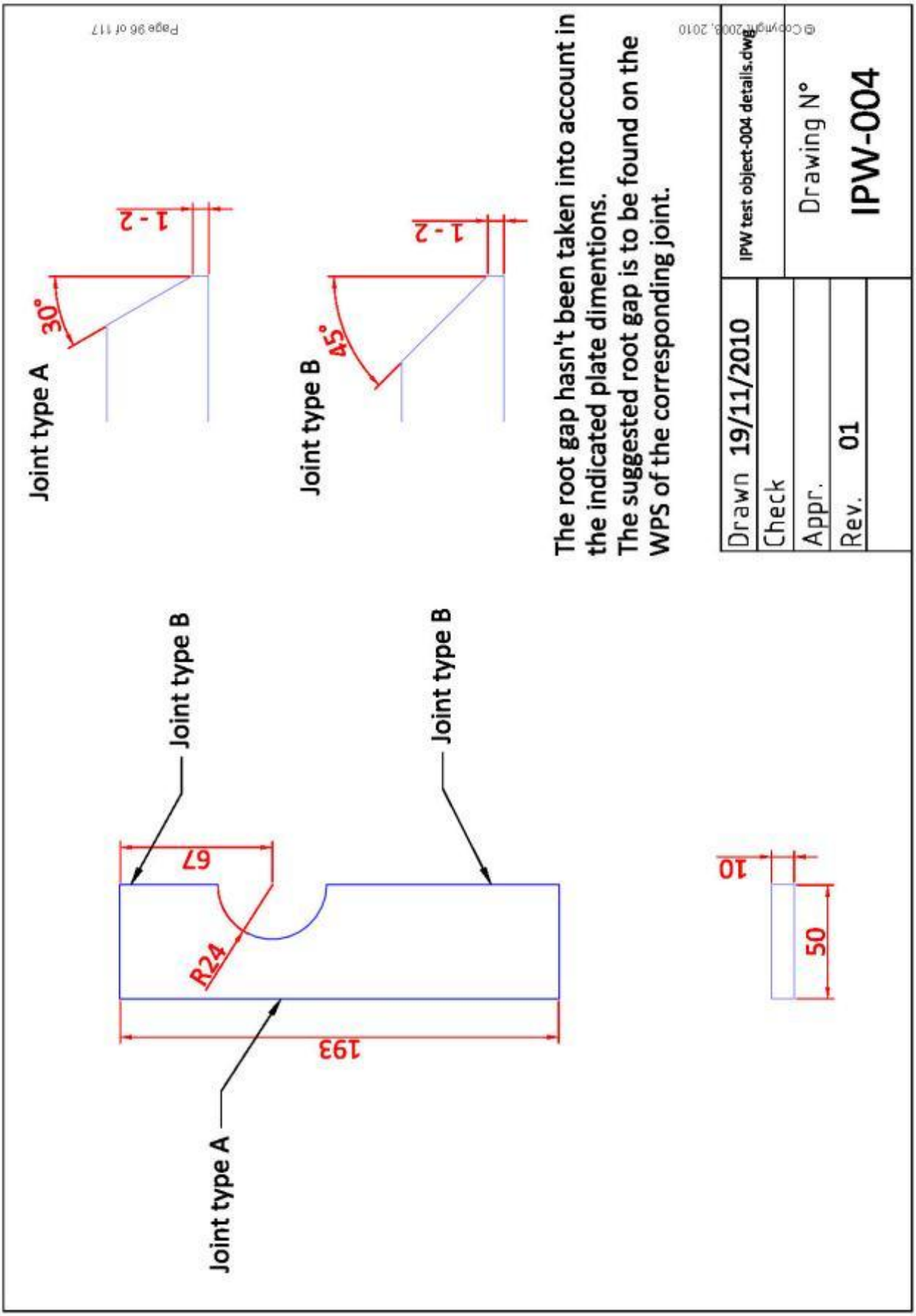
IPW test object-003 details.dwg
Drawing N°
IPW-003
Drawn 19/11/2010
Check
Appr.
Rev. 01
Joint type A
24
24
R24
76
50
R24
26
241
100
10


Page 96 of 117
Joint type A
30°
1 - 2
Joint type B
45°
1 - 2
The root gap hasn't been taken into account in the indicated plate dimentions.
The suggested root gap is to be found on the WPS of the corresponding joint.
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IPW test object-004 details.dwg
Drawing N°
IPW-004
Drawn 19/11/2010
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Rev. 01
Joint type B
Joint type B
67
R24
193
Joint type A
10
50

ATB

WPS-Nr.	IPW-001	date	28-10-2011
		rev.	2

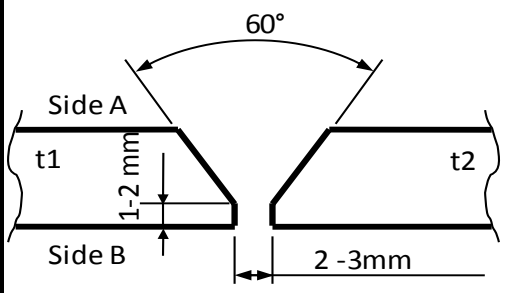
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

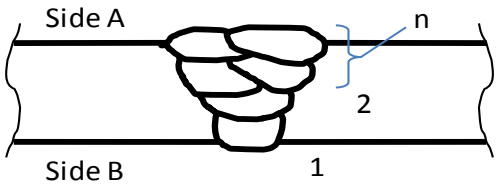
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PA
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	15
t2	15
Outside pipe diameter (mm):	N/A
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	105-135	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-002	date	28-10-2011
		rev.	2

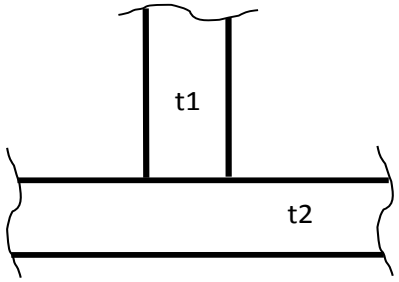
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

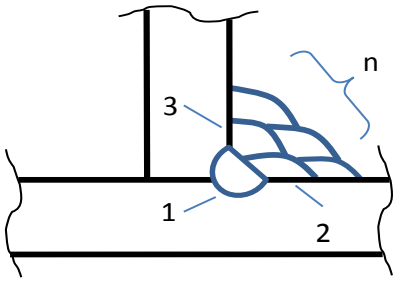
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PB
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	15
Outside pipe diameter (mm):	-
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	145-175	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-003	date	28-10-2011
		rev.	2

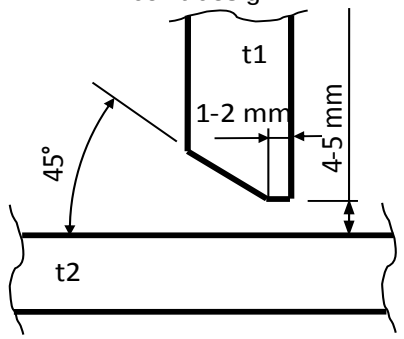
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

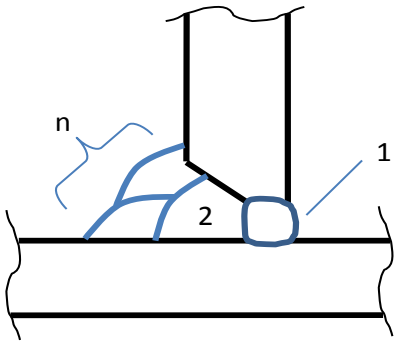
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PB
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	15
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	135-165	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-004	date	28-10-2011
		rev.	2

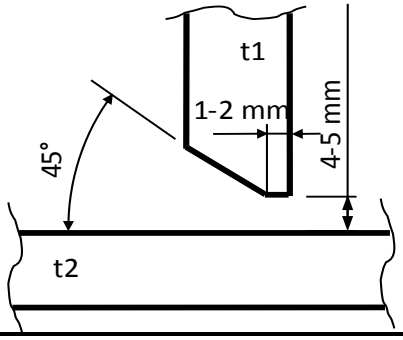
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

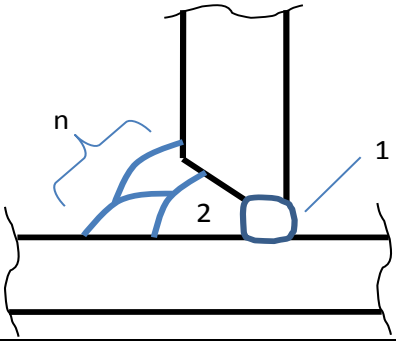
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	135-165	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-005	date	28-10-2011
		rev.	2

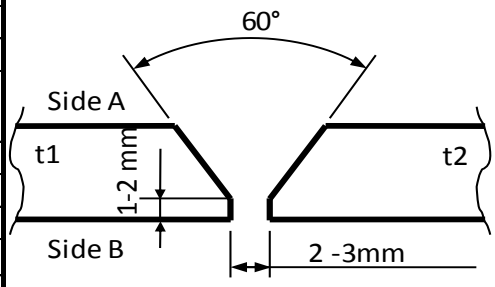
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

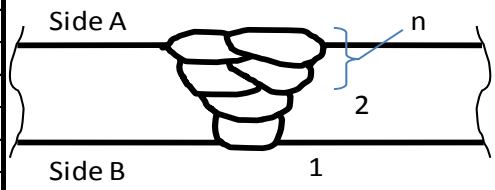
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PC
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10
t2	10
Outside pipe diameter (mm):	-
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	105-135	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-006	date	28-10-2011
		rev.	2

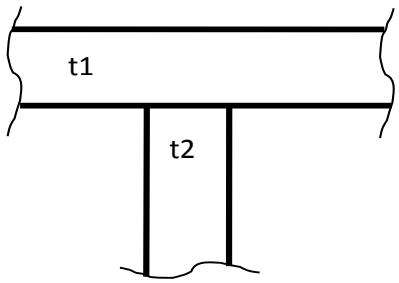
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

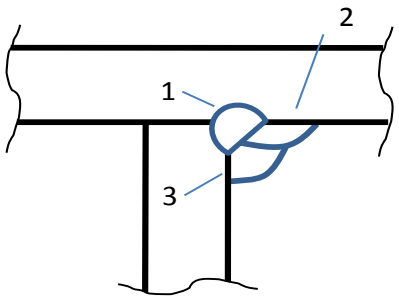
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PD
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - 3	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	145-175	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-007	date	28-10-2011
		rev.	2

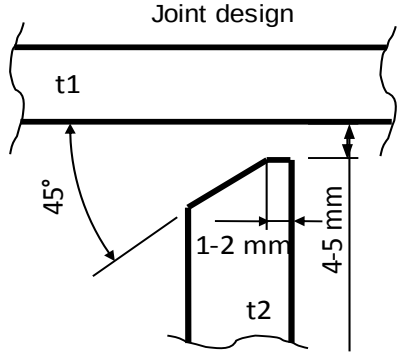
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

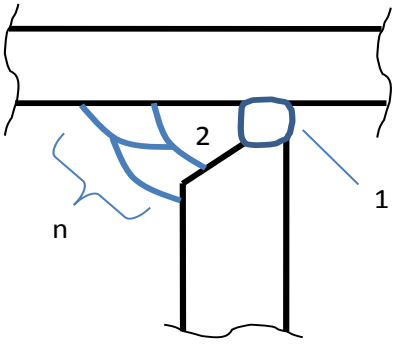
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PD
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	10
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	135-165	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	IPW-008	date	28-10-2011
		rev.	2

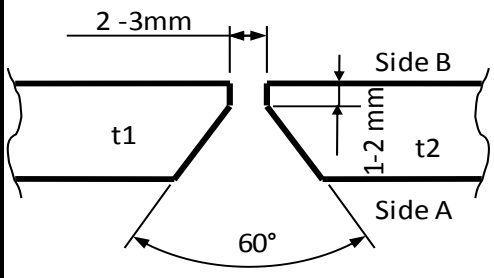
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

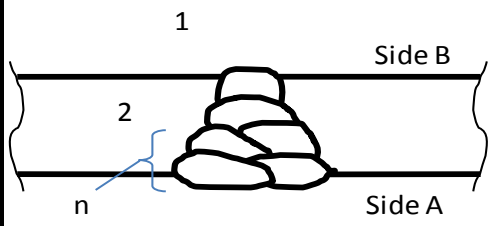
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PE
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	6
Outside pipe diameter (mm):	N/A
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



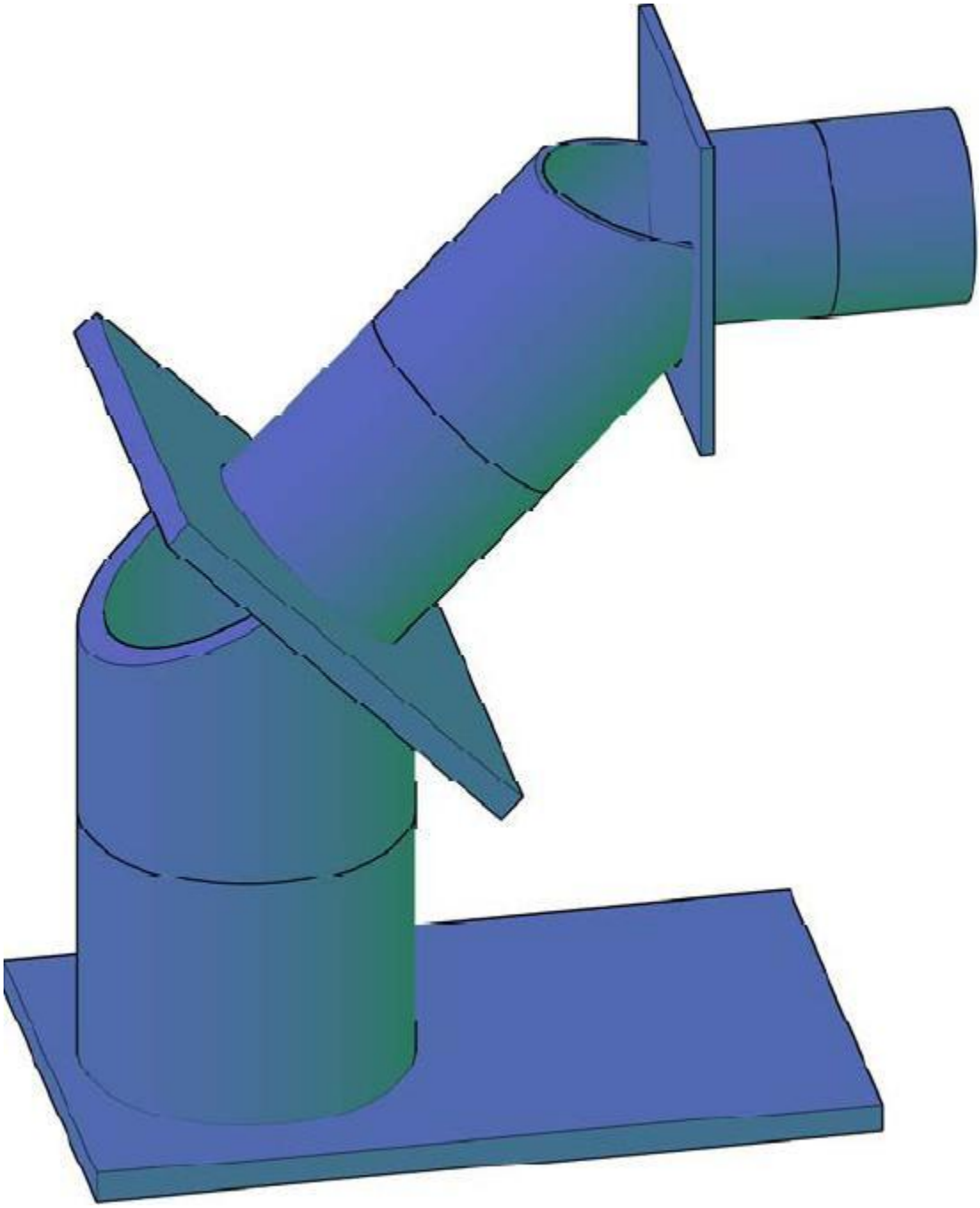
Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	95-125	115-145	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 -12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A: W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

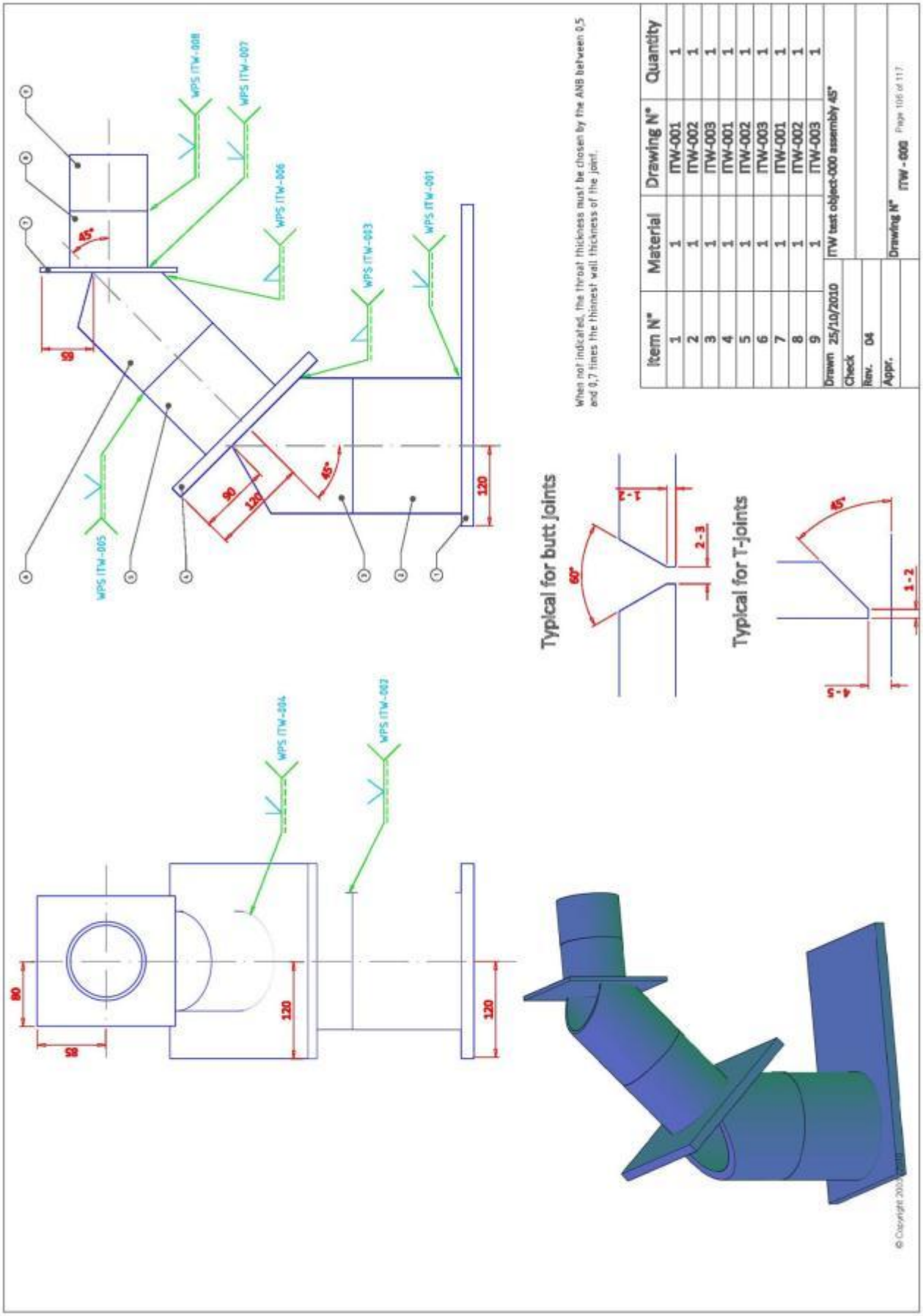
Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

17.3.3 ITW Test Object – 141

Material groups 1, 2 and 3



Important note: The assembly drawing was originally created in the DIN A3 format. By printing on A4 or downscaling to A4 format, it is possible that some details are badly or not visible.



Item N°	Material	Drawing N°	Quantity
1	1	ITW-001	1
2	1	ITW-002	1
3	1	ITW-003	1
4	1	ITW-001	1
5	1	ITW-002	1
6	1	ITW-003	1
7	1	ITW-001	1
8	1	ITW-002	1
9	1	ITW-003	1

Drawn 25/10/2010 — ITW test object-000 assembly 45°
Check
Rev. 04
Appr.
Drawing N° ITW - 000 Page 106 of 117

Item N° acc. drawing ITW-000 and drawing ITW 135-000	Plate / Tube	Length	Width	Plate thickness
1	Plate	400	240	15
4	Plate	240	240	15
7	Plate	170	160	6

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 22/09/2011	ITW test object-001 details.dwg
Check	
Appr.	Drawing N°
Rev. 02	ITW-001

Item N° acc. drawing ITW-000	Plate / Tube	Length	Diameter	Wall thickness
2	T	135	168.3	10.97
5	T	110	114.3	6.02
8	T	70	60.3	5.50
9	T	70	60.3	5.50

Item N° acc. drawing ITW 135-000	Plate / Tube	Length	Diameter	Wall thickness
2	T	135	168.3	10.97
5	T	110	114.3	6.02
8	T	70	88.9	5.50
9	T	70	88.9	5.50

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn	22/09/2011	ITW test object-002 details	
Check			
Appr.		Drawing N°	ITW-002
Rev.	02		

Item N° acc. drawing ITW-000 and drawing ITW 135-000	Plate / Tube	Length	Diameter	Wall thickness
3	T	150	168.3	10,97
6	T	150	114.3	6.02

The exact material thicknesses are not mandatory and can be slightly changed according to local needs.

Drawn 22/09/2011	ITW test object-003 details	
Check		
Appr.	Drawing N°	
Rev. 02	ITW-003	

ATB

WPS-Nr.	ITW-001	date	28-10-2011
		rev.	2

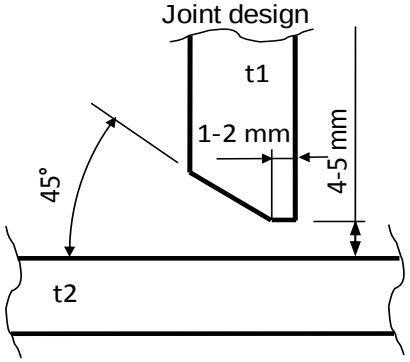
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

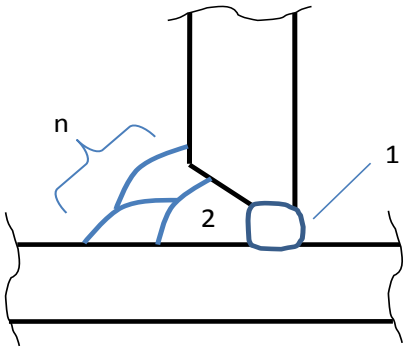
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PB
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10,97
t2	15
Outside pipe diameter (mm):	168,3
Backing :	none
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	125-155	155-185	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-002	date	28-10-2011
		rev.	2

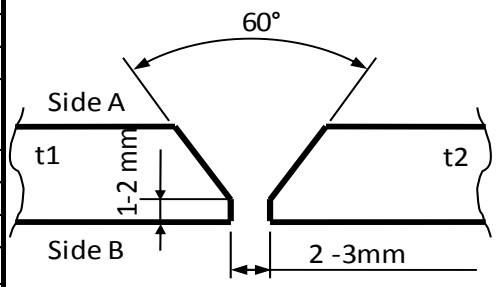
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

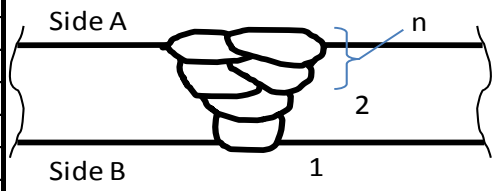
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PC
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	10,97
t2	10,97
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	100-130	125-155	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-003	date	28-10-2011
		rev.	2

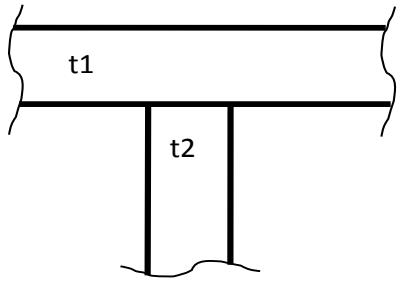
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

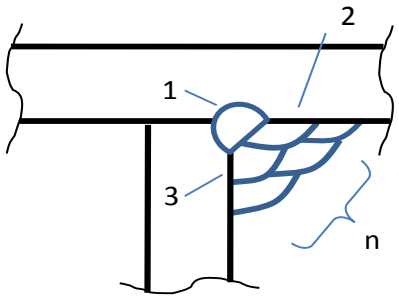
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PD 045
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	15
t2	10,97
Outside pipe diameter (mm):	168,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	155-185	155-185	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-004	date	28-10-2011
		rev.	2

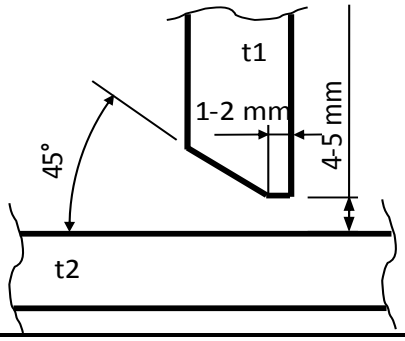
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

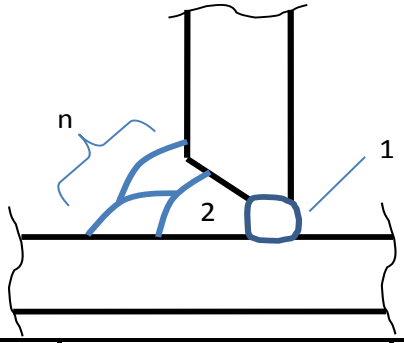
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PB 045
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6,02
t2	15
Outside pipe diameter (mm):	114,9
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	125-155	155-185	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :
Not qualified	

ATB

WPS-Nr.	ITW-005	date	28-10-2011
		rev.	2

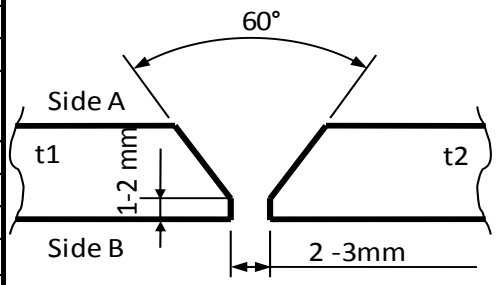
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

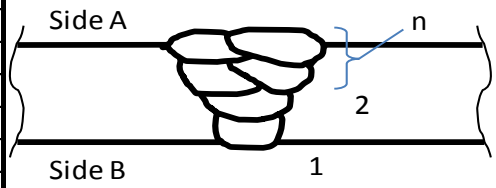
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	H-L045
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6,02
t2	6,02
Outside pipe diameter (mm):	114,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	100-130	125-155	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-006	date	28-10-2011
		rev.	2

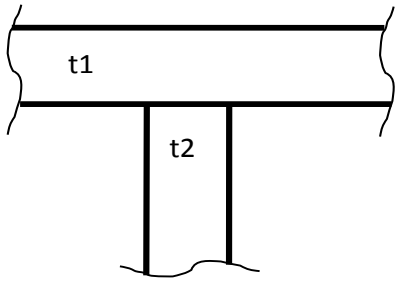
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

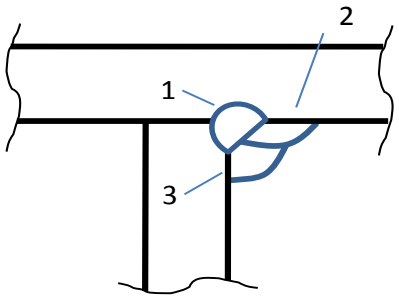
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	6,02
Outside pipe diameter (mm):	114,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - 3	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	155-185	155-185	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-007	date	28-10-2011
		rev.	2

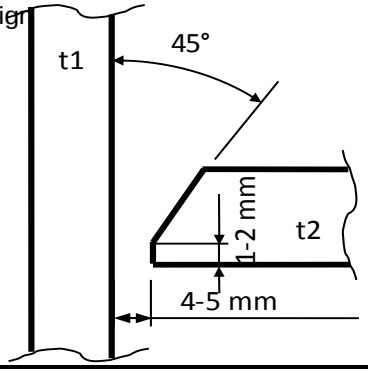
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

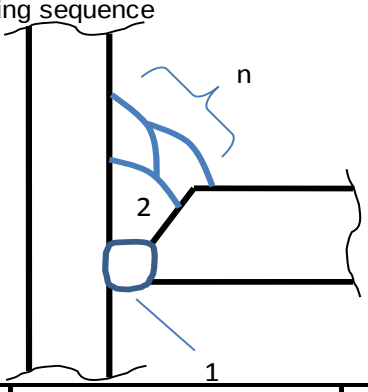
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF tube (PH)
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	6
t2	5,5
Outside pipe diameter (mm):	60,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	125-155	145-175	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

ATB

WPS-Nr.	ITW-008	date	28-10-2011
		rev.	2

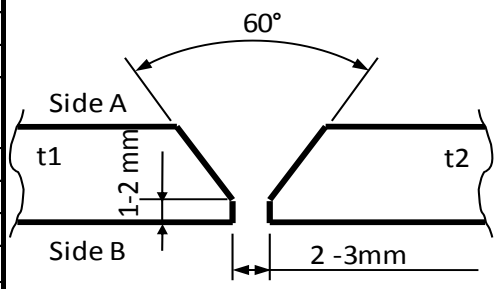
WELDING PROCEDURE SPECIFICATION

EN ISO 15609-1

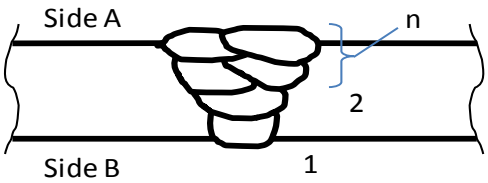
Parent material :	S235JR
to parent material :	S235JR
Parent material standard :	EN 10025
ISO/TR 15608 Group nr. :	1.1
Welding Process :	141
Filler material :	
Welding position :	PF (PH)
Shielding gas :	ISO 14175 : I1
Type of flux :	N/A
Preheat :	none
Material thickness (mm): t1	5,5
t2	5,5
Outside pipe diameter (mm):	60,3
Backing :	N/A
Gouging / grinding :	N/A
Single or multi layer	multi layer
max. interpass temp. (°C):	250
PWHT :	none

Supplementary requirement :
Clean the welding joint of all oxides, dirt, oil, paint,...

Joint design



Welding sequence



Welding parameters

Run number :	1	2 - n	
Welding process :	141	141	
Type of current (AC/DC) :	DC	DC	
Polarity (+/-)	-	-	
Diameter of filler material (mm) :	2,40	2,40	
Welding current (A) :	100-130	125-155	
Voltage range (V) :	-	-	
Welding speed (cm/min) :	-	-	
Distance contact-tube/workpiece (mm) :	N/A	N/A	
Overlap (mm) :	N/A	N/A	
max. weaving (mm) :	3D	3D	
Oscillation (cycles/min) :	N/A	N/A	
Schielding gas flow rate (l/min) :	8 - 12	8 - 12	
Backing gas flow rate (l/min) :	none	none	
Filler material designation :	ISO 636-A - W42 5 W3Si1		
Heat Input (kJ/cm) :	N/A	N/A	
Tungsten electrode diameter (mm):	1,6	1,6	
Type of tungsten electrode (ISO 6848) :	Wth 20 or Wla 15	Wth 20 or Wla 15	

Welding Procedure Qualification Record Nr. :	written by :	
Not qualified		

17.3.4 Ordlista för svetstermer i IW kursplaner del II	
arc voltage	bågspänning
assembly drawing	sammanställningsritning
backing	rotstöd
backing gas protection	rotgasskydd
clean	rengör
designation (filler material)	beteckning (tillsatsmaterial)
detail drawing	detaljritning
diameter	diameter
dirt	smuts
distance contact tube/work piece	avstånd kontaktrör/arbetsstycke
drawing	ritning
drill	borra
filler material	tillsatsmaterial
fillet	käl
flow rate	flödeshastighet
gouging	mejsling
grinding	slipning
heat input	sträckenergi
hole	hål
interpass temperature	mellansträngstemperatur
item	detalj
joint	fog
joint design	fogutformning
length	längd
material group	materialgrupp
multi layer	flera lager
N/A (Not applicable)	inte tillämplig
oil	olja
oscillation	pendlingsfrekvens
outside pipe diameter	rörytterdiameter
overlap	överlappning
oxides	oxider
paint	färg
parent material	grundmaterial
plate	plåt
polarity	polaritet
preheat	förhöjd arbetstemperatur
PWHT, post weld heat treatment	värmebehandling efter svetsning
qualified	kvalificerad
root gap	rotspalt
RT (Radiographic test)	radiografering
run number	svetssträng nummer
shielding gas	skyddsgas
single layer	ett lager
stainless steel	rostfritt stål
supplementary requirement	tilläggskrav
test object	provobjekt
thickness	tjocklek

throat thickness	a-mått
transfer mode	bågtyp
travel speed	svetshastighet
tube	rör
tungsten electrode diameter	volframelektrodens diameter
type of current	typ av ström
type of flux	typ av pulver
wall thickness	godstjocklek
weaving	pendling
weld	svets
welding current	svetsström
welding joint	svetsfog
welding position	svetsläge
Welding Procedure Qualification Record (WPQR)	protokoll för att kvalificera en svetsprocedur (WPQR)
Welding Procedure Specification (WPS)	svetsdatablad (WPS)
welding process	svetsmetod
welding sequence	svetsföljd
width	bredd
visual inspection	syning