WELDING PROCEDURE SPECIFICATION (WPS)

in accordance with EN ISO 15609-1

WPQR: EN ISO 15610

Others: N/A

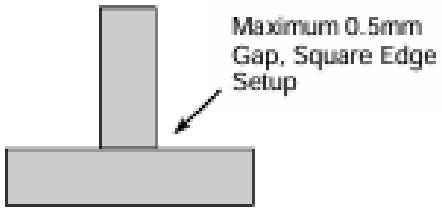
WPS No: ESC-WPS-TIG-ALUFW

Revision No: 1 **Date:** 26-02-2026

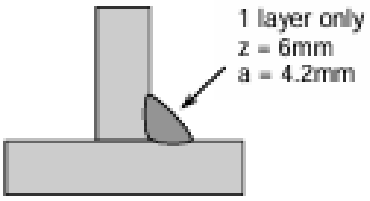
Manufacturer: EngEPA / Rambaldini Welding Services	**WPQR No:** None	
Welding process(es): TIG, Solid Filler Wire - 141	**Parent material:** 1XXX/4XXX/5XXX/6XXX	**Group No:** 21/22/23
Welding technique: Manual	**Material thickness, t (mm):** 6mm	
Joint type and weld: Fillet Weld (FW),	**Outside diameter, D (mm):** N/A - Plate	
Single Layer (sl)	**Welding position:** PB - Horizontal Vertical	

Joint preparation method		Inter-pass cleaning method		Second side back gouging method	
Thermal cut and grind &/or Machine	✓	Grinding, chipping & wire brushing	✓	None	✓
Wire brush and degrease	✓	Other:		If necessary, grind back to sound metal	
Other:				DPI / MPI check	

Joint design



Welding sequences



Welding details

Welding process:	TIG, Solid Filler Wire - 141
Weld metal deposited thickness, s (mm):	z6 (leg length), a4.2 (throat thickness)
Filler material designation:	1050 / 1070 / 4043 / 4047 / 5356 / 5556
Filler material group(s):	AlSi or AlMg
Filler material make & trade name:	Any compliant with the above
Filler material size (mm):	1.6, 2.4 or 3.2
Filler material, any special baking or drying:	As per manufacturers recommendations
Shielding gas/flux:	Pure Argon – I1
Shielding gas flow rate (ltrs/min):	12 – 16 at torch end
Backing gas/flux:	-
Backing gas flow rate (ltrs/min):	-
Tungsten electrode type/size(mm):	Any suitable for AC current (Lanthanted / Zirconiated / E3 / Ceriated), 2.4 or 3.2mm
Minimum preheat temperature (°C):	5°C
Heating method/control:	-
Maximum inter-pass temperature (°C):	-
Post heating (hydrogen release)	-
Post weld heat treatment (PWHT):	Without PWHT
Weaving (maximum width of run):	Stringer technique only
Oscillation:	-
Pulse welding details:	-
Gas cup size:	No. 5, 6, 7 or 8 ceramic
Balance / Frequency (suggested):	20-30% positive electrode balance, 120-250hz frequency

Run No.	Welding process	Filler material size (mm)	Current (Amps)	Voltage (Volts)	Type of current/ Polarity	Wire feed speed (m/min)	Run out length/ Travel speed (mm/min)	Heat input (kJ/mm)*	Metal transfer mode
1	141	2.4 / 3.2	160 - 250	12 - 17	AC	N/A	N/A	N/A	N/A

Method & additional information	**Approvals (stamp/signature)**
No grinding or metal removal from the weld surface or surrounding areas	
No wire brushing after welding	

WELDING PROCEDURE SPECIFICATION (WPS)

in accordance with EN ISO 15609-1

WPQR: EN ISO 15610

Others: N/A

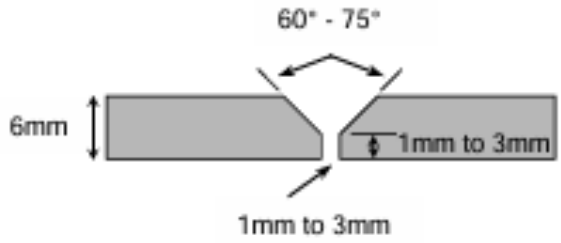
WPS No: ESC-WPS-MMA-CSBW

Revision No: 1 / **Date:** 26/02/2026

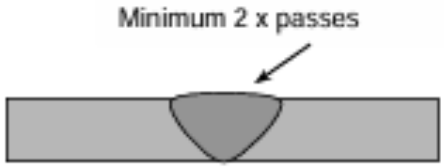
Manufacturer: EngEPA / Rambaldini Welding Services	**WPQR No:** None	
Welding process(es): Manual Metal Arc - 111	**Parent material:** S235/275/355 or similar	**Group No:** 1.1/1.2
Welding technique: Manual	**Material thickness, t (mm):** 6mm	
Joint type and weld: Single V, Butt Weld (BW), Single Side Welded Only	**Outside diameter, D (mm):** N/A	
	Welding position: PF - Vertical Up	

Joint preparation method		Inter-pass cleaning method		Second side back gouging method	
Thermal cut and grind &/or Machine	✓	Grinding, chipping & wire brushing	✓	None	✓
Wire brush and degrease	✓	Other:		grind back to sound metal	
Other:				DPI / MPI check	

Joint design



Welding sequences



Welding details

Welding process:	MMA - 111
Weld metal deposited thickness (mm):	6mm
Filler material designation:	E7016, E7018 or E6013 (combination of electrodes can be used)
Filler material group(s):	FM1
Filler material make & trade name:	Any compliant with the above
Filler material size (mm):	2.5mm / 3.2mm
Filler material, any special baking or drying:	As per manufacturers recommendations
Shielding gas/flux:	Basic or Rutile Coated Electrodes
Shielding gas flow rate (ltrs/min):	-
Backing gas/flux:	-
Backing gas flow rate (ltrs/min):	-
Tungsten electrode type/size(mm):	-
Minimum preheat temperature (°C):	5°C
Heating method/control:	-
Maximum inter-pass temperature (°C):	-
Post heating (hydrogen release)	-
Post weld heat treatment (PWHT):	Without PWHT
Weaving (maximum width of run):	Stringer or Weave Technique
Oscillation:	-
Pulse welding details:	-
Gas cup size:	-

Run No.	Welding process	Filler material size (mm)	Current (Amps)	Voltage (Volts)	Type of current/ Polarity	Wire feed speed (m/min)	Run out length/ Travel speed (mm/min)	Heat input (kJ/mm)	Metal transfer mode
Root	111	2.5mm	75 - 95	22 - 25	DC-VE	N/A	N/A	N/A	N/A
Fill/Cap	111	2.5mm	75 - 95	21 - 26	Basic DC+VE	N/A	N/A	N/A	N/A
	111	3.2mm	105 - 115	21 - 26	Rutile DC-VE	N/A	N/A	N/A	N/A

Method & additional information	Approvals (stamp/signature)
No grinding or metal removal from the weld surface or surrounding areas, wire brush only	
All welding to be done vertically up, no stoving/vertical down welding	
A combination of different electrodes type can be used. e.g rutile root pass, basic fill/cap	

WELDING PROCEDURE SPECIFICATION (WPS)

in accordance with EN ISO 15609-1

WPQR: EN ISO 15610

Others: N/A

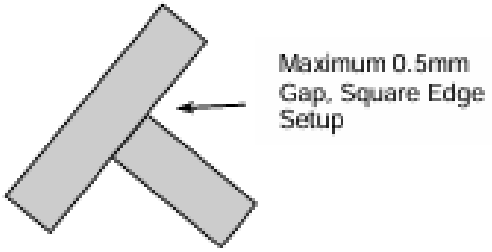
WPS No: ESC-WPS-TIG-SSFW

Revision No: 1 **Date:** 26-02-2026

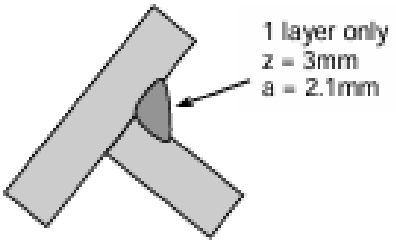
Manufacturer: EngEPA / Rambaldini Welding Services		**WPQR No:** None	
Welding process(es): TIG, Solid Filler Wire - 141		**Parent material:** 304 / 308 / 316	**Group No:** 8
Welding technique: Manual		**Material thickness, t (mm):** 3mm	
Joint type and weld: Fillet Weld (FW)		**Outside diameter, D (mm):** N/A - Plate	
Single Layer (sl)		**Welding position:** PC – Horizontal	

Joint preparation method		**Inter-pass cleaning method**		**Second side back gouging method**	
Thermal cut and grind &/or Machine	✓	Grinding, chipping & wire brushing	✓	None	✓
Wire brush and degrease	✓	Other:		If necessary, grind back to sound metal	
Other:				DPI / MPI check	

Joint design



Welding sequences



Welding details

Welding process:	TIG, Solid Filler Wire - 141
Weld metal deposited thickness, s (mm):	z3 (leg length), a2.1 (throat thickness)
Filler material designation:	308 / 309 / 316
Filler material group(s):	FM5
Filler material make & trade name:	Any compliant with the above
Filler material size (mm):	1.6 or 2.4
Filler material, any special baking or drying:	As per manufacturers recommendations
Shielding gas/flux:	Pure Argon – I1
Shielding gas flow rate (ltrs/min):	12 – 16 at torch end (may be increased if a large gas lens is used)
Backing gas/flux:	-
Backing gas flow rate (ltrs/min):	-
Tungsten electrode type/size(mm):	Any suitable for DC current (Lanthanted / Thoriated / E3 / Ceriated), 1.6 or 2.4mm
Minimum preheat temperature (°C):	5°C
Heating method/control:	-
Maximum inter-pass temperature (°C):	-
Post heating (hydrogen release)	-
Post weld heat treatment (PWHT):	Without PWHT
Weaving (maximum width of run):	Stringer or weave technique
Oscillation:	-
Pulse welding details:	-
Gas cup size:	No. 6, 7 or 8 ceramic, gas lens and larger ceramic cup size permissible

Run No.	Welding process	Filler material size (mm)	Current (Amps)	Voltage (Volts)	Type of current/ Polarity	Wire feed speed (m/min)	Run out length/ Travel speed (mm/min)	Heat input (kJ/mm)*	Metal transfer mode
1	141	1.6 / 2.4	60 - 95	9 - 12	DC-VE	N/A	N/A	N/A	N/A

Method & additional information	**Approvals (stamp/signature)**
No grinding or metal removal from the weld surface or surrounding areas	
No wire brushing after welding	

WELDING PROCEDURE SPECIFICATION (WPS)

in accordance with EN ISO 15609-1

WPQR: EN ISO 15614-1

Others: N/A

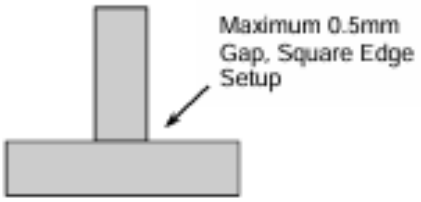
WPS No: ESC-WPS-MAG-CSFW

Revision No: 1 **Date:** 26-02-2026

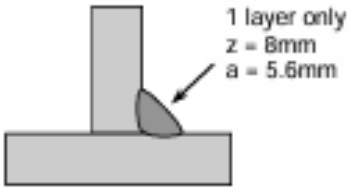
Manufacturer: EngEPA / Rambaldini Welding Services		**WPQR No:** None	
Welding process(es): MAG, Solid Wire Electrode - 135		**Parent material:** S235/275/355 or similar	**Group No:** 1.1/1.2
Welding technique: Partly Mechanised		**Material thickness, t (mm):** 6mm	
Joint type and weld: Fillet Weld (FW),		**Outside diameter, D (mm):** N/A - Plate	
Single Layer (sl)		**Welding position:** PB - Horizontal Vertical	

Joint preparation method		Inter-pass cleaning method		Second side back gouging method	
Thermal cut and grind &/or Machine	✓	Grinding, chipping & wire brushing	✓	None	✓
Wire brush and degrease	✓	Other:		If necessary, grind back to sound metal	
Other:				DPI / MPI check	

Joint design



Welding sequences



Welding details

Welding process:	MAG, Solid Wire Electrode - 135
Weld metal deposited thickness (mm):	z8 (leg length), a5.6 (throat thickness)
Filler material designation:	G4Si1 / G3Si1 / SG2 / SG3 or similar
Filler material group(s):	FM1
Filler material make & trade name:	Any compliant to the above
Filler material size (mm):	1.0mm
Filler material, any special baking or drying:	As per manufacturers recommendations
Shielding gas/flux:	Any Active Gas suitable for the welding of steel (ArC, ArCO, M12/M14/M20/M21/M24)
Shielding gas flow rate (ltrs/min):	18 – 22 at torch end
Backing gas/flux:	N/A
Backing gas flow rate (ltrs/min):	N/A
Tungsten electrode type/size(mm):	N/A
Minimum preheat temperature (°C):	5°C
Heating method/control:	N/A
Maximum inter-pass temperature (°C):	N/A
Post heating (hydrogen release)	N/A
Post weld heat treatment (PWHT):	Without PWHT
Weaving (maximum width of run):	Stringer technique only
Oscillation:	N/A
Pulse welding details:	N/A
Nozzle size:	12mm - 20mm ID
Number of electrodes:	Single Wire System
Others:	Push technique, Contact Tip to Workpiece Distance (CTWD): 15 - 20mm.

Run No.	Welding process	Filler material size (mm)	Current (Amps)	Voltage (Volts)	Type of current/ Polarity	Wire feed speed (m/min)	Run out length/ Travel speed (mm/min)	Heat input (kJ/mm)*	Metal transfer mode*
1	135	1.0	150 – 200	23 – 27	DC+VE	6 – 10	N/A	N/A	Any Transfer Mode Permissible*

Method & additional information

No grinding or metal removal from the weld surface or surrounding areas, wire brush only

Synergic, Pulse Current / Pulsed Spray may all be used and are allowed

*Transfer mode to be set by the operator to provide the best weld quality and depends on welding parameters / equipment capability

Approvals (stamp/signature)