HYUNDAI ALUMINIUM PRODUCT GUIDE

Taking Your Welding Experience to a Higher Level

HYUNDAI WELDING

Aluminium Armed with HYUNDAI Advantage

WHY HYUNDAI WELDING

HYUNDAI WELDING, as a 'Total Welding Solutions' company, provide a complete solution for our customers' welding applications. Our structure and people are fully committed to offer the global market the highest level of service and satisfaction without losing sight of each customer's specific requirements. We work to ensure our product best fits the needs of our clients.

WHY HYUNDAI ALUMINIUM

As the usage of aluminium wire in welding field is increasing; **HYUNDAI WELDING** is geared to offer a rapid response to clients' specific requirements. With constant research and development, our range of aluminium wire will continue to evolve to offer the global market new grades and products that covers a multitude of applications.

We strive to be the **No.1 Global Welding** consumable and equipment manufacturer. **HYUNDAI WELDING** will work endlessly to ensure that our **aluminium line**, remains at the forefront of today's technology.

Index by Products

Aluminium Alloy Filler Metal

Product	AWS	EN	JIS	Mechanical Properties	Approval
SMT-1070	AWS A 5.10 : ~ ER 1070	EN ISO 18273 ~ Al 1070 (Al99.7)	JIS Z3232 : A 1070	Tensile Strength (Rm) : ≥ 65 N/mm^2 Elongation : ≥ 35%	
SMT-1080	AWS A 5.10 : ER 1080A	EN ISO 18273 : S Al 1080A (Al99.8(A))	JIS Z3232 : A 1080	Yield Strength ($Rp_{1.0}$) : ≥ 22 N/mm^2 Tensile Strength (Rm) : ≥ 60 N/mm^2 Elongation : ≥ 40%	
SMT-4043	AWS A 5.10 : ER 4043	EN ISO 18273 : S Al 4043 ($AlSi_5$)	JIS Z3232 : A 4043	Yield Strength ($Rp_{0.2}$) : ≥ 40N/mm^2 Tensile Strength (Rm) : ≥ 120 N/mm^2 Elongation : ≥ 8%	CE, DB
SMT-4047	AWS A 5.10 : ER 4047	EN ISO 18273 : S Al 4047 ($AlSi_{12}$)	JIS Z3232 : A 4047	Yield Strength (Rp0.2) : ≥ 60 N/mm^2 Tensile (Rm) : ≥ 130 N/mm^2 Elongation : ≥ 5%	
SMT-5087	AWS A 5.10 : ER 5087	EN ISO 18273: S Al 5087 ($AlMg_{4.5}MnZr$(A))		Yield Strength (Rp0.2) : ≥ 140 N/mm^2 Tensile (Rm) : ≥ 285 N/mm^2 Elongation : ≥ 18%	CE, DB
SMT-5183	AWS A 5.10 : ER 5183	EN ISO 18273: S Al 5183 ($AlMg_{4.5}Mn_{0.7}$(A))	JIS Z3232 : A5183	Yield Strength (Rp0.2) : ≥ 130 N/mm^2 Tensile (Rm) : ≥ 275 N/mm^2 Elongation : ≥ 18% Charpy-V Impact (R.T.) : ≥ 16J	CE, DB
SMT-5356	AWS A 5.10 : ER 5356	EN ISO 18273: S Al 5356 ($AlMg_5Cr$(A))	JIS Z3232 : A5356	Yield Strength (Rp0.2) : ≥ 126 N/mm^2 Tensile (Rm) : ≥ 275 N/mm^2 Elongation : ≥ 18% Charpy-V Impact (R.T.) : ≥ 16J	CE, DB
SMT-5554	AWS A 5.10 : ER 5554	EN ISO 18273: S Al 5554 ($AlMg_{2.7}Mn$)	JIS Z3232 : A5554	Yield Strength (Rp0.2) : ≥ 100 N/mm^2 Tensile (Rm) : ≥ 215 N/mm^2 Elongation : ≥ 18%	
SMT-5556	AWS A 5.10 : ER 5556	EN ISO 18273: S Al 5556 ($AlMg_5Mn_1Ti$) / S Al 5556A ($AlMg_5Mn$)	JIS Z3232 : A5556	Yield Strength (Rp0.2) : ≥ 145 N/mm^2 Tensile (Rm) : ≥ 290 N/mm^2 Elongation : ≥ 17% Charpy-V Impact (R.T.) : ≥ 16J	
SMT-5754	AWS A 5.10 : ER 5754	EN ISO 18273: S Al 5754 ($AlMg_3$)	JIS Z3232 : A5754	Yield Strength (Rp0.2) : ≥ 80 N/mm^2 Tensile (Rm) : ≥ 190 N/mm^2 Elongation : ≥ 20%	

SMT-1070

Conformances

AWS A5.10 ~ **ER 1070**
EN ISO 18273 ~ **Al 1070 (Al99.7)**
JIS Z3232 **A 1070**

Weldable Base Materials

Pure aluminium: Al99.5 (3.0255), Al99 (3.0205)
(illustrative, not-exhaustive list)

Key Features

- High purity aluminium alloy
- Highly resistant to weathering and chemical attack
- Good resistance to a wide range of corrosive media (Particularly in alkaline environment)
- High ductility and highly reflective finish

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

Typical Application

- Low strength corrosion resistant vessels and tanks
- Metalizing and thermal spray application
- Food industry
- Electrical, chemical, construction

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Be	Al
Max	Max	Max	Max	Max	Max	Max	Max	99.50
0.25	0.40	0.05	0.05	0.05	0.07	0.05	0.0003	min

Mechanical Properties

Tensile Strength (Rm)	Elongation
≥ 65 N/mm²	≥ 35%

SMT-1080

Conformances

AWS A5.10 **ER 1080A**
EN ISO 18273 **S Al 1080A (Al99.8(A))**
JIS Z3232 **A 1080**

Weldable Base Materials

Al99.8, Al99.7, Al99.5
(illustrative, not-exhaustive list)

Key Features

- High purity aluminium wires and rods
- Highly resistant to weathering and chemical attack
- Good resistance to atmosphere and a wide range of corrosive media – particularly alkaline environment

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

Typical Application

- Metalizing
- Chemical processing plant
- Thermal spray
- Food industry
- Panelling application

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ga	Ti	Be
Max	Max	Max	Max	Max	Max	Max	Max	Max
0.15	0.15	0.03	0.02	0.02	0.06	0.03	0.02	0.0003

Mechanical Properties

Yield Strength ($Rp_{1.0}$)	Tensile Strength (Rm)	Elongation
≥ 22 N/mm²	≥ 60 N/mm²	≥ 40%

SMT-4043

Conformances

AWS A5.10 **ER 4043**
EN ISO 18273 **S Al 4043 ($AlSi_5$)**
JIS Z3232 **A 4043**

Weldable Base Materials

Heat-treatable base alloys, 6XXX series aluminium types: 6052, 6053 *(illustrative, not-exhaustive list)*

Key Features

- Silicon-aluminium filler
- General purpose type filler alloy
- Improved wetting action
- Less crack sensitive bright weld bead
- Excellent when aesthetical outcome is of importance
- Not recommended for the material to be anodized

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

CE, DB

Typical Application

- All industrial manufacturing sectors
- Automotive industry
- Production of mobile equipment
- Shipbuilding sector

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Be
4.50	Max	Max	Max	Max	Max	Max	Max
6.00	0.60	0.30	0.05	0.05	0.10	0.15	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation
≥ 40 N/mm²	≥ 120 N/mm²	≥ 8%

SMT-4047

Conformances

AWS A5.10 **ER 4047**
EN ISO 18273 **S Al 4047 ($AlSi_{12}$)**
JIS Z3232 **A 4047**

Weldable Base Materials

Base 6XXX alloys; aluminium alloys 1060, 1350, 3003, 3004, 3005, 5005, 5053, 6053, 6061, 6951, 7005; cast alloys 710.0, 711.0 *(illustrative, not-exhaustive list)*

Key Features

- Silicon-aluminium alloy for welding and brazing
- Low melting point and narrow freezing range
- Increased fluidity and reduced shrinkage & hot cracking
- Substitute for 4043 (increased silicon for higher fillet weld shear strength)
- Excellent wetting action & corrosion resistance
- Produces bright and almost smut-free welds
- Non-heat treatable

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

Typical Application

- Application with elevated temperatures
- Thin sections where its higher fluidity and lower shrinkage rate are important for distortion control
- Joint sealing of pressurized fluids and gases
- Radiators and air conditioning components
- General repair and maintenance

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Be
11.00	Max	Max	Max	Max	Max	Max	Max
13.00	0.60	0.30	0.15	0.10	0.20	0.15	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation
≥ 60 N/mm²	≥ 130 N/mm²	≥ 5%

SMT-5087

Conformances

AWS A5.10 **ER 5087**
EN ISO 18273 **S Al 5087 (AlMg4.5MnZr(A))**

Weldable Base Materials

$AlMg_{4.5}Mn$, $AlMg_5Mn$, $AlMg_3$, $AlMg_5$, AlMgMn, $AlMgSi_{0.5}$, $AlMgSi_{0.7}$, $AlMgSi_1$, $AlMg_1SiCu$, $AlZnMg_1$, etc.
(illustrative, not-exhaustive list)

Key Features

- For welding aluminium alloys with up to 5% Mg
- For alloys which requires a higher tensile strength
- Zr produces improved resistance to hot cracking and produces a fine-grained weld-metal microstructure
- Improved bending and corrosion resistance
- For complicated welding constructions with critical tensions
- Superior wire surface finish improves wire feedability and arc performances

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

CE, DB

Typical Application

- Marine fabrication and repair
- Cryogenic tanks
- Shipbuilding and other high strength structural applications
- Railway industry
- Automotive industry
- Offshore industry

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Zr	Be
Max	Max	Max	0.70	4.50	0.05	Max	Max	0.10	Max
0.25	0.40	0.05	1.10	5.20	0.25	0.25	0.15	0.20	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation
≥ 140 N/mm²	≥ 285 N/mm²	≥ 18%

SMT-5183

Conformances

AWS A5.10 **ER 5183**
EN ISO 18273 **S Al 5183 (AlMg4.5Mn0.7(A))**
JIS Z3232 **A 5183**

Weldable Base Materials

5083, 5086, 5654 and other similar high magnesium alloys
(illustrative, not-exhaustive list)

Key Features

- Meets the tensile strength of high magnesium alloys
- High strengths and fracture toughness to impact as well as exposure to corrosive elements
- Non-heat treatable
- Not recommended for elevated temperature service application

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

CE, DB

Typical Application

- Railroad cars & transportation
- Unfired pressure vessels
- Marine components
- Drilling rigs
- Cryogenics storage tanks

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
Max	Max	Max	0.50	4.30	0.05	Max	Max	Max
0.40	0.40	0.10	1.00	5.20	0.25	0.25	0.15	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation	Charpy V Impact (R.T.)
≥ 130 N/mm²	≥ 275 N/mm²	≥ 18%	≥ 16J

SMT-5356

Conformances

AWS A5.10 **ER 5356**
EN ISO 18273 **S Al 5356 ($AlMg_5Cr(A)$)**
JIS Z3232 **A 5356**

Weldable Base Materials

Series 5xxx aluminium alloys, Al-Mg and Al-Mg-Zn alloys such as Peraluman 3, 5 and 5 type or Anticorodal 11
(illustrative, not-exhaustive list)

Key Features

- For Al-Mg or Al-Mg-Zn aluminium alloy
- For dissimilar aluminium alloys with maximum 5% of magnesium
- Non-heat treatable
- Excellent corrosion resistance and mechanical properties

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

CE, DB

Typical Application

- Ship-making
- Bicycle
- Truck
- Pressure vessels
- Storage tank
- Railways
- Automotive industry

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
Max	Max	Max	0.05	4.50	0.05	Max	0.06	Max
0.25	0.40	0.10	0.20	5.50	0.20	0.10	0.20	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation	Charpy V Impact (R.T.)
≥ 126 N/mm²	≥ 275 N/mm²	≥ 18%	≥ 16J

SMT-5554

Conformances

AWS A5.10 **ER 5554**
EN ISO 18273 **S Al 5554 ($AlMg_{2.7}Mn$)**
JIS Z3232 **A 5554**

Weldable Base Materials

Aluminium 5454 ($AlMg_{2.7}Mn$), AlMgMn, $AlMg_1$, $AlMg_3$, $AlMgSi_{0.8}$ *(illustrative, not-exhaustive list)*

Key Features

- For high temperature applications
- Able to provide high resistance to stress corrosion
- Low magnesium content
- Suitable for welding of 5454 or base alloys
- Suitable for welding 5454 with the 6000 series

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Approvals

Typical Application

- Automotive wheels
- Transportation applications
- Over-the-road trailers and rail tank cars
- Chemical storage tanks

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
Max	Max	Max	0.50	2.40	0.05	Max	0.05	Max
0.25	0.40	0.10	1.00	3.00	0.20	0.25	0.20	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation
≥ 100 N/mm²	≥ 215 N/mm²	≥ 18%

SMT-5556

Conformances

AWS A5.10 **ER 5556**
EN ISO 18273 **S Al 5556 ($AlMg_5Mn_1Ti$) / Al 5556A ($AlMg_5Mn$)**
JIS Z3232 **A 5556**

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Weldable Base Materials

5XXX Alloys; $AlMg_{4.5}Mn$, $AlMg_5$, $AlMg_5Mn$, $AlMg_{2.7}Mn$, $AlMgSi_1$ *(illustrative, not-exhaustive list)*

Approvals

Key Features

- To weld aluminium magnesium base metal alloys (Mg < 5.3%)
- Highest as-welded strengths in fillet welds
- High corrosion resistance & toughness
- Good workability and weldability
- Non-heat treatable

Typical Application

- Military industry
- Structural industry
- Pressure vessels
- Construction
- Storage tanks

Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
Max	Max	Max	0.60	5.00	0.05	Max	0.05	Max
0.25	0.40	0.10	1.00	5.50	0.25	0.25	0.20	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation	Charpy V Impact (R.T.)
≥ 145 N/mm²	≥ 290 N/mm²	≥ 17%	≥ 16J

SMT-5754

Conformances

AWS A5.10 **ER 5754**
EN ISO 18273 **S Al 5754 ($AlMg_3$)**
JIS Z3232 **A 5754**

Shielding Gas

Argon 100%
Mixed (Argon + Helium)

Weldable Base Materials

$AlMg_1$, $AlMg_2$, $AlMg_3$, $AlMg_{3.5}$, AlMgMn, $AlMg_2Mn_{0.3}$, $AlMgSi_{0.5}$, $AlMgSi_{0.8}$, $AlMg_{2.7}Mn$, etc.
(illustrative, not-exhaustive list)

Approvals

Key Features

- To weld aluminium magnesium base metal alloys (Mg < 3.0%)
- High corrosion resistance & Seawater-resistant
- Outstanding color-uniformity after anodizing
- Resistant to intergranular corrosion and stress corrosion cracking after exposure to elevated temperatures (over 65°C)

Typical Application

- General construction sector
- Structural industry
- Ship building
- Automotive components
- Storage tanks

Chemical Composition (%)

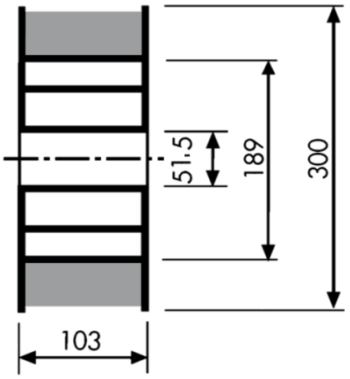
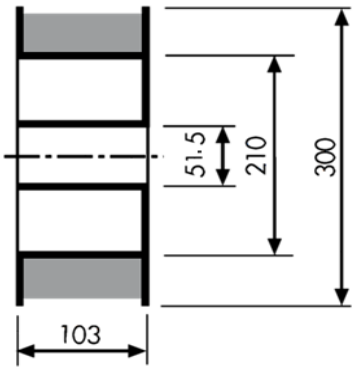
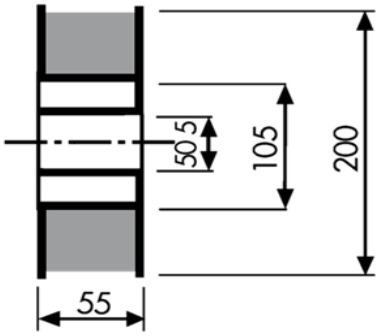
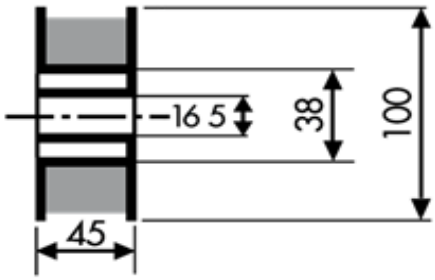
Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
Max	Max	Max	Max	2.60	Max	Max	Max	Max
0.40	0.40	0.10	0.50	3.60	0.30	0.20	0.15	0.0003

Mechanical Properties

Yield Strength ($Rp_{0.2}$)	Tensile Strength (Rm)	Elongation
≥ 80 N/mm²	≥ 190 N/mm²	≥ 20%

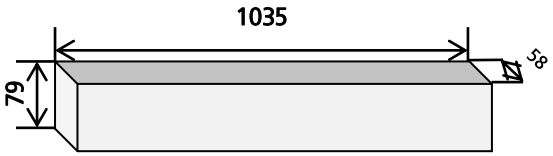
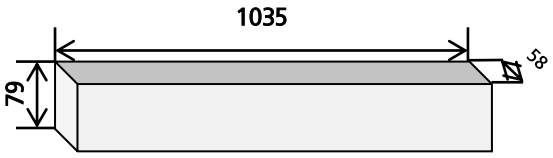
Standard Packaging Data – MIG / Spool

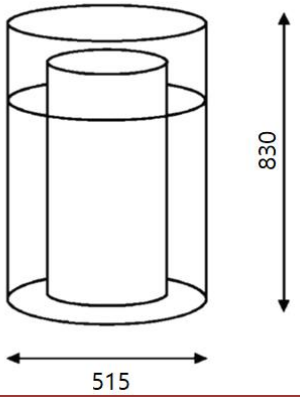
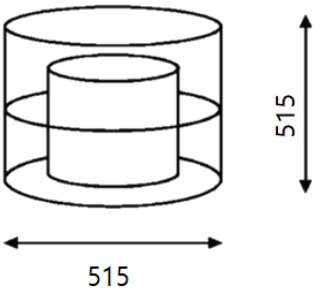
MIG Welding Wire Packaging

Spool Type	Dimension (mm)	Net Weight (kg)
Basket Spool BS 300 (acc. to EN ISO 544) 		7
Spool S 300 (acc. to EN ISO 544) 		6~7
Spool S 200 (acc. to EN ISO 544) 		2
Spool S 100 (acc. to EN ISO 544) 		1

Standard Packaging Data – TIG / DRUM

TIG / DRUM Welding Wire Packaging

Package Type	Dimension (mm)	Net Weight (kg)
Cardboard box A(1) 		5
PVC box A(2) 		5

Drum type	Size (mm)	Net weight (kg)
Drum 		80
Mini drum 		40

Guide to the Choice of Filler Metal for General Purpose Welding

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Guide to the Choice of Filler Metal for General Purpose Welding

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5005 5050								
3004								
3003 Alc.3003								
2219 2519								
2014 2036								
1100								
1060 1070 1080 1350								

Typical Aluminium Welding Parameters

Square - Groove Weld

Nominal Plate Thickness		Gap		Filler Wire Diameter		Amps	Volts	Wire Speed		Travel Speed		Wire Consumption	
in.	mm	in.	mm	in.	mm			ipm	m/min	ipm	cm/min	lbs/100ft	kg/m
5/64 (.078)	2	0	0	.030	0.8	85	18-22	460	11.7	40	102	0.67	.01
1/8 (.125)	3	0-1/32	0-0.5	.035	0.9	135	19-21	480	12.2	40	102	0.75	.01
5/32 (.156)	4	0-3/64	0-1	.040	1.0	155	20-24	450	11.4	40	102	1.25	.02

Single V-Groove Weld

(Groove Angle= 60°)

Nominal Plate Thickness		Gap		Filler Wire Diameter		Amps	Volts	Wire Speed		Travel Speed		Wire Consumption	
in.	mm	in.	mm	in.	mm			ipm	m/min	ipm	cm/min	lbs/100ft	kg/m
3/16 (.187)	5	0	0	.035	0.9	180	20-23	750	19.1	40	102	2.6	.04
1/4 (.250)	6	0	0	.047	1.2	200	21-24	430	10.9	40	102	4.6	.07
5/16 (.313)	8	0	0	.047	1.2	225	22-26	465	11.8	35	89	7.2	.11
3/8 (.375)	10	0-1/16	0-1	.062	1.6	240	23-27	320	8.1	35	89	10.3	.15
1/2 (.500)	12	0-1/16	0-1	.062	1.6	280	24-28	380	9.7	30	76	18.3	.27
3/4 (.750)	19	0-3/32	0-2	.071	1.8	295	25-29	335	8.5	24	61	41.3	.61

Horizontal Fillet Weld

Nominal Plate Thickness		Gap		Filler Wire Diameter		Amps	Volts	Wire Speed		Travel Speed		Wire Consumption	
in.	mm	in.	mm	in.	mm			ipm	m/min	ipm	cm/min	lbs/100ft	kg/m
5/64 (.078)	2	N/A		.030	0.8	105	17-20	500	12.7	41	104	0.4	.01
1/8 (.125)	3	N/A		.035	0.9	145	19-21	580	14.7	31	78 0	0.6	.01
5/32 (.156)	4	N/A		.040	1.0	155	20-22	425	10.8	20	51	1.6	.02
5/32 (.156)	4	N/A		.047	1.2	175	20-22	410	10.4	25	64	1.6	.02
3/16 (.187)	5	N/A		.047	1.2	190	21-23	425	10.8	22	56	2.2	.03
3/16 (.187)	5	N/A		.062	1.6	225	21-23	285	7.2	26	66	2.2	.03
1/4 (.250)	6	N/A		.047	1.2	215	22-24	480	12.2	20	51	4.0	.06
1/4 (.250)	6	N/A		.062	1.6	235	22-25	300	7.6	25	64	4.0	.06
5/16 (.313)	8	N/A		.062	1.6	235	23-26	300	7.6	20	51	6.2	.09
3/8 (.375)	10	N/A		.062	1.6	240	23-26	325	8.3	18	46	8.9	.13

Typical Aluminium Welding Parameters

Outside Corner Joint

Nominal Plate Thickness		Gap		Filler Wire Diameter		Amps	Volts	Wire Speed		Travel Speed		Wire Consumption	
in.	mm	in.	mm	in.	mm			ipm	m/min	ipm	cm/min	lbs/100ft	kg/m
5/64 (.078)	2	N/A		0.03	0.8	85	17-20	460	11.7	40	101.6	0.4	.01
1/8 (.125)	3	N/A		0.035	0.9	115	18-21	480	12.2	30	76.2	0.6	.01
5/32 (.156)	4	N/A		0.04	1	125	19-22	433	11.0	26	66.4	1.6	.02
3/16 (.187)	5	N/A		0.047	1.2	160	20-23	365	9.3	22	55.9	2.2	.03
1/4 (.250)	6	N/A		0.047	1.2	185	21-24	420	10.7	20	50.8	4.0	.06
5/16 (.313)	8	N/A		0.062	1.6	200	23-27	260	6.6	12	30.5	6.2	.09
3/8 (.375)	10	N/A		0.062	1.6	230	23-27	300	7.6	8	20.3	8.9	.13
1/2 (.500)	12	N/A		0.071	1.8	260	25-28	315	8.0	8	20.3	15.9	.24

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