

Welding Consumables

Selection Chart

Carbon and Low Alloy Steel Castings

Material Specification			Welding Process			
AS2074	ASTM	BS	MMAW	GMAW	FCAW	TIG
C1		BS3100 AW1	BOC Smootharc 16 BOC Smootharc 18	BOC Mild Steel	BOC Smooth-Cor 711 BOC Smooth-Cor 70C6 BOC Smooth-Cor 715	BOC Mild Steel TIG Wire
C2	–	BS3100 AM1,AM2	BOC Smootharc 13 BOC Smootharc 16			
C3	A27 N-1	BS3100 A1	BOC Smootharc 18			
C4-1	A27 65-35	–	BOC Smootharc 16			
C4-2	A27 70-36	BS3100 A2	BOC Smootharc 18			
C5	–	BS3100 A3				
C6	–	BS3100 AW2				
C7A-1	A214 WCA	BS1504 430				
C7A-2	A214 WCB	BS1504 480				
C7A-3	A214 WCB	BS1504 540				
L1A	–	BS3100 A4	BOC Smootharc 16			
L1B		BS3100 A5,A6	BOC Smootharc 18			
L2A	–	BS3100 BW2, BW3 BS3100 BW4	Alloycraft 80-B2 Lincoln SL19G	Autocraft CrMo1	W55X.B2H (NA)	Comweld CrMo 1
L3A	A352 LC2	BS3100 BL2	[Alloycraft 80-C1] [Jet-LH 8018-C1 MR]	[Autocraft Mn-Mo]	[BOC Smooth-Cor 811K2]	
L4A	–	–	Alloycraft 80-C1 Jet-LH 8018-C1 MR	Autocraft Mn-Mo	BOC Smooth-Cor 811K2	Comweld CrMo 1
L5A-1	A217 WC1	BS3100 B1	[BOC Smootharc 16]	W501AH-A1	W501.A1H	Comweld CrMo 1
L5A-2	A356 - 2		[BOC Smootharc 18]	[Autocraft Mn-Mo]		
L5B	A217 WC6, W11	BS3100 B2	Alloycraft 80-B2 Lincoln SL19G	Autocraft CrMo1	W551.B2H (NA)	Comweld CrMo 1
L5C	A217 WC9 A356 - 10	BS3100 B3	Alloycraft 90-B3 Lincoln SL20G			Comweld CrMo 2
L5D		BS3100 B4				
L5F	–	BS3100 B6	Alloycraft 90-B3 Lincoln SL20G			Comweld CrMo 2
L5G	–	–	Alloycraft 80-B2	Autocraft CrMo1		Comweld CrMo 1
L5H	–	BS3100 B7	Lincoln SL19G			
L6	A148 90-60	–	Alloycraft 90 Lincoln 9018G	Autocraft NiCrMo	BOC Smooth-Cor 115	Comweld CrMo 2
L6A-1	A148 105-85	BS3100 BT1	Alloycraft 110	Autocraft NiCrMo	BOC Smooth-Cor 115	
L6A-2			Jetweld LH-110M MR			
L6B-2	A148 150-135	BS3100 BT3	{Alloycraft 110}	{Autocraft NiCrMo}	{BOC Smooth-Cor 115}	
L6C			{Jetweld LH-110M MR}			

NOTES (1) Products in [] brackets have similar specified minimum tensile strength., (2) Products in { } brackets have under matching specified minimum tensile strength., (3) Products in [] and { } brackets are not pre-qualified to AS 1988 – 1989., (4) Welding procedure qualification should be carried out prior to welding for structural and matching strength applications., (5) Consult you BOC welding process specialist or visit BOCs Inform website (subscription required) for more detailed information.

Ferritic Steels

Steel Type	Grade		Welding Process				
	AS, AISI or SAE	ASTM or BS970	MMAW Electrode	GMAW Wire	FCAW Gas Shielded	FCAW Gasless	TIG
Carbon Steels							
Mild Steel	200 250 300 1006 1010 1015 1016 1020 1022 7-430 7-460	A36 A106 EN3A EN201	BOC Smootharc 13	BOC Mild Steel	BOC Smooth-Cor 711 BOC Smooth-Cor 70C6	Innershield NR-211-MP NS-3M NR-311	BOC Mild Steel TIG Wire
350 to 500 Mpa Yield Strength Steels	350 400 450 XF500 7-490 1030 X1033 1035 1040 1045 X1320 8620	A105 A106 EN5 EN5B EN8A EN8 EN14A	BOC Smootharc 16 BOC Smootharc 18	BOC Mild Steel	BOC Smooth-Cor 711 BOC Smooth-Cor 70C6 BOC Smooth-Cor 715	Innershield NR-211-MP NR-232 NS-3M NR-311	BOC Mild Steel TIG Wire
Medium Tensile Steels	1050 1055 X1340	EN43A EN33 EN9 EN15A	Alloycraft 80-C1 Jet-LH 8018-C1 MR	Autocraft Mn-Mo	BOC Smooth-Cor 811K2	Innershield NR-208-H	Comweld CrMo 1
High Tensile Steels	U1058 1070 4140 4340 K5140 P20 6F7	EN42 EN19 EN24 EN18D EN25 EN30B	Alloycraft 90 Lincoln 9018G	Autocraft NiCrMo	BOC Smooth-Cor 115	Innershield NR-208-H	Comweld CrMo 2
High Tensile Steels	U1058 1070 4140 4340 K5140 P20 6F7	EN42 EN19 EN24 EN18D EN25 EN30B	Alloycraft 110 Jetweld LH-110M MR	Autocraft NiCrMo	BOC Smooth-Cor 115	NA	
Spring Steels	XK5155S XK5160S XK9258S 9255 XK9261S	EN48 EN45A	Alloycraft 110 Jetweld LH-110M MR	Autocraft NiCrMo	BOC Smooth-Cor 115	NR	
Free Cutting Steels	1137 X1112 1141 1144 1146 X1147 1214	EN1A	BOC Smootharc 18	NR	NR	NR	
Galvanised Steels	–	–	BOC Smootharc 13	BOC Mild Steel	NR	NR-211-MP	

NOTES

(1) Steels listed on one line are not necessarily equivalent.

(2) Consumables listed against a steel may not achieve matching mechanical properties depending on the condition (heat treatment history) of the steel.

(3) Welding procedure qualification should be carried out prior to welding for structural and matching strength applications.

(4) Consult you BOC welding process specialist or visit BOCs Inform website (subscription required) for more detailed information.

NR = Not Recommended, NA = Not Available

Cast Irons

Type	MMAW	FCAW	Gas Welding	Gas Brazing
Grey Cast Iron	BOC Smootharc C Cast NiFe BOC Smootharc C Cast Ni	Nicor 55	Super Silicon	Profill Mang Bronze Profill Nickel Bronze Profill Nickel Coat
SG & Nodular Cast Iron	BOC Smootharc C Cast NiFe BOC Smootharc C Cast Ni	Nicor 55	Super Silicon	Profill Mang Bronze Profill Nickel Bronze Profill Nickel Coat
White Cast Iron (Chilled Iron)	NR	NR	NR	NR
Malleable Cast Iron	BOC Smootharc C Cast NiFe BOC Smootharc C Cast Ni	Nicor 55	Super Silicon	Profill Mang Bronze Profill Nickel Bronze Profill Nickel Coat

NOTES (1) Use BOC Smootharc C Cast NiFe for joining, build up and crack repairs., (2) Use BOC Smootharc C Cast Ni for cosmetic repairs., NR = Not Recommended

Stainless Steels (BOC Smootharc S)

Base Metal ASTM,AISI, UNS	201, 202	304, 304L	309, 309S	310, 310S	317, 316	317L, 316L, 316Ti	321, 347	S30815, (253MA), 904L, (N08904)	409, 430, 446, 5CR12	410, 420	Duplex S31500, S31803, S32304	Carbon and Low Alloy Steels
201, 202	347 308L	347 308L	347 309MoL	347 310 309MoL	318 347	308L 316L 347	347	347 309MoL	309MoL 309L	309MoL 309L	Duplex 309MoL	309MoL
304, 304L		347 308L	347 309MoL 308L 309L	347 310 308L	347 318 308L	347 318 308L	347 308L	347 308L	309MoL 309L	309MoL	Duplex 309MoL 309L	309MoL 309L
309, 309S			309MoL 309L	309MoL 309L 310	309MoL 318 316 309L	309L 316L 318	347 309MoL	Match above 309MoL 347	309MoL 309L	309MoL 309L	Duplex 309MoL 309L	309MoL 309L
310, 310S				310	316L 318 310	316L 318 310	347 310	Match above 309L 310	309MoL 309L 316L	309MoL 309L 310	Duplex 309MoL 309L	309L 309MoL 310
317, 316					318 316L	316L 318	347 316L	Match above 309MoL 316L	309MoL 309L	309MoL 309L	Duplex 309MoL 309L	309MoL 309L
317L, 316L, 316Ti						316L	347 316L	Match above 309MoL 309L	309MoL 309L	309MoL 309L	Duplex 309MoL 309L	309MoL 309L
321, 347							347	Match above 309MoL 347	309MoL 309L	309MoL 309L	Duplex 309MoL 347	309MoL 309L
S30815, (253MA), 904L, (N08904)								Matching	309MoL 309L	309MoL 309L	Duplex 309MoL 309L	309MoL 309L
409, 430, 446, 5CR12									309L 309MoL	309MoL 309L	Duplex 309MoL 309L	309MoL 309L
410, 420										Matching or 309MoL 309L	Duplex 309MoL 309L	309MoL 309L
Duplex, S31500, S31803, S32304											Matching	Duplex 309MoL 309L
Carbon and Low Alloy Steels												Matching

NOTES (1) Consumables listed against a steel may not achieve matching corrosion resistance or mechanical properties., (2) Welding procedure qualification should be carried out prior to welding in critical applications., (3) Consult you BOC welding process specialist or visit BOC's Inform website (subscription required) for more detailed information.

Aluminium and Aluminium Alloys

Base Metal	1060, 1100, (1050), 3003	3004	5005, 5050	5052	5083	5086	5154, 5354	5454	5456	6005, 6061	7005	356,0 443,0
1060, 1100, (1050), 3003	1100 (1050) (b)(e)	4043 (d)(e)	4043 (d)(e)	4043 (d)(e)	5356 (b)(d)	5356 (b)(d)	4043 (d)(e)	4043 (d)(e)	5356 (b)(d)	4043 (e)	5356 (b)(d)	4043 (e)
3004		4043 (d)(e)	4043 (d)(e)	4043 (d)(e)	5356 (d)	5356 (d)	5356 (a)	5356 (a)	5356 (d)	4043 (d)(e)	5356 (b)(e)	4043 (e)
5005, 5050			4043 (d)(e)	4043 (d)(e)	5356 (d)	5356 (d)	5356 (a)	5356 (a)	5356 (d)	4043 (d)(e)	5356 (b)(d)	4043 (e)
5052				5356 (a)(b)	5356 (d)	5356 (d)	5356 (a)	5356 (a)	5356 (d)	5356 (a)(b)	5356 (a)	4043 (a)(e)
5083					5183 (d)	5356 (d)	5356 (d)	5356 (d)	5183 (d)	5356 (d)	5183 (d)	5356 (b)(d)
5086						5356 (d)	5356 (d)	5356 (d)	5356 (d)	5356 (d)	5356 (d)	5356 (b)(d)
5154, 5254							5356 (a)	5356 (a)	5356 (a)	5356 (a)	5356 (d)	4043 (a)
5454								5554 (b)(d)	5356 (d)	5356 (a)(b)	5356 (a)	4043 (a)(e)
5456									5556 (d)	5356 (d)	5556 (d)	5356 (b)(d)
6005, 6061, 6063, 6351										4043 (a)(e)	5356 (a)(b)	4043 (a)(e)
7005											5356 (d)	4043 (a)(e)
356,0 443,0												4043 (c)(e)

NOTES (1) The filler metal that is shown for each combination of base metals is that most commonly used. However, the specific filler metal depends upon usage and type of joint and, in a number of cases, acceptable alternates is recommended (footnotes a to c). (2) Filler metals conform to requirements of AWS specification A5.10-80. (3) Exposure to specific chemicals or a sustained high temperature (over 150°F) may limit the choice of the metals. Filler alloys 5183, 5356, 5556 and 5654 should not be used in sustained elevated-temperature service.

a) 5813, 5356, 5554, 5556 and 5654 may be used. In some cases they provide: improved colour match after anodising treatment, higher weld ductility, higher weld strength. 5554 is suitable for elevated-temperature service. Castings welded with these filler metals should not be subjected to post-weld artificial aging. b) 4043 may be used for some applications. c) filler metal with the same analysis as the base metal is sometimes used. d) 5183, 5356 or 5556 may be used. e) 4047 may be used for some applications.

Quenched and Tempered High Strength Steels and Wear Plate

Material Specification	MMAW		GMAW (Solid)		FCAW		TIG	
	MS	LS	MS	LS	MS	LS	MS	LS
AS/NZS 3597 Grade 500 (E.g. Bisplate60, Welten60, Weldox 420)	Alloycraft 90 Lincoln 9018G	Alloycraft 80-C1 Jet-LH 8018-C1 MR BOC Smootharc 16 BOC Smootharc 18	Autocraft Mn-Mo	BOC Mild Steel	BOC Smooth-Cor 115	BOC Smooth-Cor 711 BOC Smooth-Cor 715 BOC Smooth-Cor 70C6	Comweld CrMo 2	BOC Mild Steel TIG Wire
AS/NZS 3597 Grade 600 (E.g. Bisplate 70, Welten 70, Weldox 500)	Alloycraft 110 Jetweld LH-110M MR	Alloycraft 90 Lincoln 9018G BOC Smootharc 16 BOC Smootharc 18	Autocraft NiCrMo	Autocraft Mn-Mo BOC Mild Steel	BOC Smooth-Cor 115	BOC Smooth-Cor 811K2 BOC Smooth-Cor 711 BOC Smooth-Cor 715 BOC Smooth-Cor 70C6		Comweld CrMo 2
AS/NZS 3597 Grade 700 (E.g. Bisplate 80, 80PV, Welten 80, Weldox 700)	Alloycraft 110 Jetweld LH-110M MR	Alloycraft 90 Lincoln 9018G BOC Smootharc 16 BOC Smootharc 18	Autocraft NiCrMo	Autocraft Mn-Mo BOC Mild Steel	BOC Smooth-Cor 115	BOC Smooth-Cor 811K2 BOC Smooth-Cor 711 BOC Smooth-Cor 715 BOC Smooth-Cor 70C6		Comweld CrMo 2
Wear Plates (E.g. Bisplate320, 360, 400, 500, Welten RE, Hardox 400, 500)	NA	Alloycraft 110 Jetweld LH-110M MR Alloycraft 90 Lincoln 9018G BOC Smootharc 16 BOC Smootharc 18	NA	Autocraft NiCrMo Autocraft Mn-Mo BOC Mild Steel	BOC Smooth-Cor 115	BOC Smooth-Cor 811K2 BOC Smooth-Cor 711 BOC Smooth-Cor 715 BOC Smooth-Cor 70C6		Comweld CrMo 2

NOTES MS = Matching Strength, LS = Lower Strength, NR = Not Recommended, NA = Not Available,

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