



STRONG RELIABLE EXCEPTIONAL



CrMo FILLER METALS

High Purity Solutions for Creep Resistant Steels - B2 SC and B3 SC Alloys



UNCOMPROMISED QUALITY

UNPARALLELED PRODUCTIVITY

The petrochemical industry is continuously evolving with higher-efficiency pressure vessels, decreased wall thicknesses, and advanced base materials – all making high-quality welding more critical than ever. As the global leader in welding, ESAB understands the stringent technical specifications for building and maintaining petrochemical and refinery applications. That's why we support our customers with new technologies - from reliable filler metals for standard welding applications to narrow-gap preparations and innovative processes that improve productivity.

ESAB offers a complete product solution of B2 SC and B3 SC alloys for all welding processes to meet industry standards, classifications, stringent chemical and mechanical property requirements in the refinery, petrochemical, power generation, and pressure vessel applications. The B2 SC and B3 SC filler metal range are for use with SA-387 Grade 11, 22, A355 Grade P11, P22, and similar materials.

<i>Filler Metal Range</i>	<i>Chemical Composition</i>	<i>Base Material Grade</i>
B2 SC	1.25% Cr 0.5% Mo	SA-387 Grade P11, A335 Grade P11
B3 SC	2.25% Cr 1% Mo	SA-387 Grade P22, A335 Grade P22

You can't compromise quality – and neither does ESAB.

We look forward to putting our innovation and expertise to work on your next project.

YOUR CHOICE FOR

CREEP RESISTANT STEELS

ESAB CrMo FILLER METALS

The CrMo filler metal range features modernised formulations designed for applications that require high toughness after prolonged heat treatment as well as after step cooling treatment. The weld metal is also designed for increased rupture resistance at high service temperatures. Filler metal chemistry is carefully controlled so that weldments have a maximum X-bar (Bruscatto Factor) of 10, resulting from a very low level of impurity elements to reduce susceptibility to temper embrittlement.

SA-387. Grade P11

SMAW	OK B2 SC	SFA/AWS A5.5: E8018-B2-H4R EN ISO 3580-A: E CrMo1B 42 H5
	OK Autrod B2 SC	SFA/AWS A5.23: EB2R EN ISO 24598-A: S S CrMo1
SAW	OK Flux 10.66	EN ISO 14174: S A FB 1 55 AC H5
	OK Flux 10.66/ OK Autrod B2 SC	SFA/AWS A5.23: F8P4-EB2R-B2R EN ISO 24598-A: S S CrMo1 FB
GTAW	OK Tigrod B2 SC	SFA/AWS A5.28: ER80S-B2 EN ISO 21952-A: W Z CrMo1Si, EN ISO 21952-B: W 55 11 1CM

SA-387. Grade P22

SMAW	OK B3 SC	SFA/AWS A5.5 E9018-B3 H4 R EN ISO 3580-A: E CrMo2 B 32 H5
	OK Autrod B3 SC	SFA/AWS A5.23: EB3R EN ISO 24598-A: S S CrMo2
SAW	OK Flux 10.65	EN ISO 14174: S A FB 1 65 AC H4
	OK Flux 10.65/ OK Autrod B3 SC	SFA/AWS A5.23 F9P2-EB3R-B3R EN ISO 24598-A: S S CrMo2 FB
GTAW	OK Tigrod B2 SC	SFA/AWS A5.28 ER90S-B3 EN ISO 21952-B W 62 2C1M

FEATURED FILLER METALS FOR CREEP RESISTANT STEELS.



Electrodes

Basic AC/DC electrodes designed for highest toughness value requirements even after step cooling treatment. Very low level of impurity elements ensures a X-bar max.10 for temper embrittlement resistant applications.

SAW Wires & Fluxes

Agglomerated fluoride basic fluxes with high purity wires ensure very low levels of impurities providing X-bar lower than 10 in the weld metal. The versatility of the combination ensures consistently superior properties across all process variants like single-wire, multi-wire, AC, DC or narrow groove preparations for multi layer welding of unlimited plate thicknesses.



TIG Rods

Copper-coated, low-alloyed, chromium-molybdenum solid wire designed for GTAW of creep resistant steels when highest toughness values are required even after step cooling treatment. Very low level of impurity elements providing a X-bar max. 10 for temper embrittlement resistant applications.

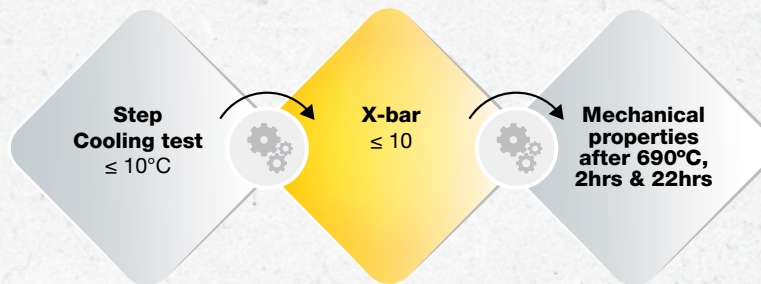


ROBUST MECHANICAL PROPERTIES

- ALL WELD METAL - B2 SC

Brand Name	C	Si	Mn	Cr	Mo	Ni	V	Nb	Cu	Al	Ti	B	Mn+Si
OK B2 SC	0.07-0.1	0.15-0.30	0.65-0.90	1.10-1.40	0.45-0.60	≤ 0.15	≤ 0.010	≤ 0.006	≤ 0.05	≤ 0.005	≤ 0.010	≤ 0.001	≤ 1.1
OK Flux 10.66/ OK Autrod B2 SC	0.05-0.08	0.17-0.25	0.80-1.00	1.10-1.40	0.40-0.65	≤ 0.20	≤ 0.010	≤ 0.006	≤ 0.15	≤ 0.010	≤ 0.010	≤ 0.001	≤ 1.2
OK Tigrod B2 SC	0.07-0.11	0.50-0.60	0.50-0.60	1.10-1.50	0.40-0.60	≤ 0.20	≤ 0.010	≤ 0.006	≤ 0.20	≤ 0.010	≤ 0.010	≤ 0.001	≤ 1.1

Brand Name	P	S	As	Sb	Sn	X-bar (Typical)
OK B2 SC	≤ 0.007	≤ 0.006	≤ 0.004	≤ 0.003	≤ 0.004	8
OK Flux 10.66/ OK Autrod B2 SC	≤ 0.007	≤ 0.007	≤ 0.004	≤ 0.003	≤ 0.004	7
OK Tigrod B2 SC	≤ 0.006	≤ 0.009	≤ 0.005	≤ 0.005	≤ 0.005	6



Brand Name	PWHT	YS (MPa)	UTS (MPa)	Elongation (%)	CVN Impact @ -30°C (J)	Hardness (HV10)	YS @ +450°C (MPa)	TS @ +450°C (MPa)
Guaranteed (SMAW, SAW GTAW)	690°C, 1 hr	≥ 470	≥ 550	≥ 19	≥ 47			
	690°C, 2 hrs	≥ 310	≥ 485	≥ 22	≥ 55	≤ 235		
	690°C, 22 hrs	≥ 310	≥ 485	≥ 22	≥ 55	-	-	-
OK B2 SC (Typical)	690°C, 1hr	510	605	25	150	-	-	-
	690°C, 2 hrs	490	590	27	155	200	-	-
	690°C, 22 hrs	460	555	30	160	-	370	470
OK Flux 10.66/ OK Autrod B2 SC (Typical)	690°C, 1 hr - DC+	470	560	30	-	-	-	-
	690°C, 2 hrs - DC+	310	530	32	170	175	-	-
	690°C, 22 hrs - DC+	400	515	32	220	-	310	370
	690°C, 2 hrs - AC	460	560	29	200	190	-	-
	690°C, 22 hrs - AC	430	530	31	250	-	-	-
OK Tigrod B2SC (Typical)	690°C, 1 hr	650	740	25	200*	-	-	-
	690°C, 2 hrs	500	610	30	70*	220	-	-
	690°C, 22 hrs	420	540	32	50*	-	370	450

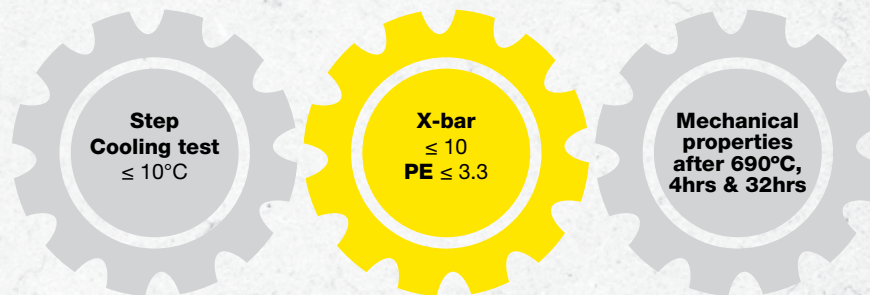
For 2h and 22h PWHT: No single value ≤ 48 J

ROBUST MECHANICAL PROPERTIES

- ALL WELD METAL - B3 SC

Brand Name	C	Si	Mn	Cr	Mo	Ni	V	Nb	Cu	Al	Ti	B	Mn+Si
OK B3 SC	0.05-0.12	0.20-0.30	0.60-0.80	2.10-2.50	0.90-1.10	≤ 0.10	≤ 0.015	≤ 0.006	≤ 0.10	≤ 0.010	≤ 0.010	≤ 0.001	≤ 1.1
OK Flux 10.65/ OK Autrod B3 SC	0.08-0.12	0.17-0.30	0.75-1.00	2.00-2.50	0.90-1.10	≤ 0.20	≤ 0.010	≤ 0.006	≤ 0.15	≤ 0.010	≤ 0.009	≤ 0.001	≤ 1.2
OK Tigrod B3 SC	0.07-0.11	0.50-0.60	0.50-0.60	2.30-2.50	0.95-1.10	≤ 0.20	≤ 0.010	≤ 0.005	≤ 0.20	≤ 0.010	≤ 0.007	≤ 0.001	≤ 1.1

Brand Name	P	S	As	Sb	Sn	X-bar (Typical)
OK B3 SC	≤ 0.007	≤ 0.007	≤ 0.004	≤ 0.003	≤ 0.005	8
OK Flux 10.65/ OK Autrod B3 SC	≤ 0.007	≤ 0.007	≤ 0.004	≤ 0.003	≤ 0.004	7
OK Tigrod B3 SC	≤ 0.006	≤ 0.009	≤ 0.005	≤ 0.005	≤ 0.005	6



Brand Name	PWHT	YS (MPa)	UTS (MPa)	Elongation (%)	CVN Impact @ -30°C (J)	Hardness (HV10)	YS @ +450°C (MPa)	TS @ +450°C (MPa)
Guaranteed (SMAW, SAW GTAW)	690°C, 1 hr	≥ 540	≥ 620	≥ 17	≥ 47			
	690°C, 4 hrs	≥ 415	≥ 520	≥ 20	≥ 55	≤ 235		
	690°C, 32 hrs	≥ 320	≥ 520	≥ 20	≥ 55	-	≥ 232	≥ 415
OK B3 SC (Typical)	690°C, 1 hr	550	650	23	120	-	-	-
	690°C, 4 hrs	540	650	25	150	210	-	-
	690°C, 32 hrs	460	580	27	140	-	370	455
OK Flux 10.65/ OK Autrod B3 SC (Typical)	690°C, 1 hr - DC+	580	690	25	100	-	-	-
	690°C, 4 hrs - DC+	520	640	26	130	205	-	-
	690°C, 32 hrs - DC+	440	570	28	100	-	400	490
	690°C, 4 hrs - AC	540	650	25	170	215	-	-
	690°C, 32 hrs - AC	460	590	29	170	-	450	490
OK Tigrod B3 SC (Typical)	690°C, 1 hr	560	680	27	155	-	-	-
	690°C, 4 hrs	540	660	28	170	225	-	-
	690°C, 32 hrs	500	620	29	190	-	410	460

For 4h and 32h PWHT: No single value ≤ 48 J

PACKAGING

ESAB's SMAW electrodes come in VacPac vacuum-sealed packages, which feature a laminated, multi-layer aluminium foil that is hermetically-sealed around a strong plastic inner box. Upon opening, fresh and dry electrodes are guaranteed when the vacuum is confirmed. VacPac reduces or eliminates the need to scrap unused electrodes at the end of the day or re-bake them in a rod oven, and the packages are also much easier for operators to carry.

To ensure moisture protection for SAW fluxes (such as OK Flux 10.65 and OK Flux 10.66), ESAB recommends its 25 kg BlockPac packaging so that flux can be used directly from the package without re-drying. Like VacPac, BlockPac features a laminated, multi-layer aluminium foil with a welded seal to protect the flux against moisture re-absorption from the atmosphere, provide unlimited shelf life and guarantee fresh and dry flux when the bag is still in the block shape.



VacPac™

Hermetically-sealed vacuum packed welding electrodes for cost savings on storage and handling.

BlockPac™

With BlockPac, ESAB's SAW flux is packed in a solid block, instead of a traditional bag. The multi-layer moisture-protection packaging keeps the flux dry during transportation and storage.



TIG Rods

Premium quality copper-coated, low-alloyed, chromium-molybdenum TIG rods are carefully packed in ergonomically designed tubes and pallets for easy handling.

At ESAB, We connect fabricators with the widest range of products under our industry-leading brand portfolio with the latest technologies to solve virtually any industry challenge - then we back it up with our knowledge, experience and passion to help them be more productive than ever before. To learn more, visit esab.com.

WORLD LEADER IN WELDING AND CUTTING TECHNOLOGY AND SYSTEMS

ESAB operates at the forefront of welding and cutting technology. Over one hundred years of continuous improvement in products and processes enables us to meet the challenges of technological advance in every sector in which ESAB operates.

Quality and environment standards

Quality, the environment and safety are three key areas of focus. ESAB is one of few international companies to have achieved the ISO 14001 and OHSAS 18001 standards in Environmental, Health & Safety Management Systems across all our global manufacturing facilities. At ESAB, quality is an ongoing process that is at the heart of all our production processes and facilities worldwide.

Multinational manufacturing, local representation and an international network of independent distributors brings the benefits of ESAB quality and unrivaled expertise in materials and processes within reach of all our customers, wherever they are located.



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