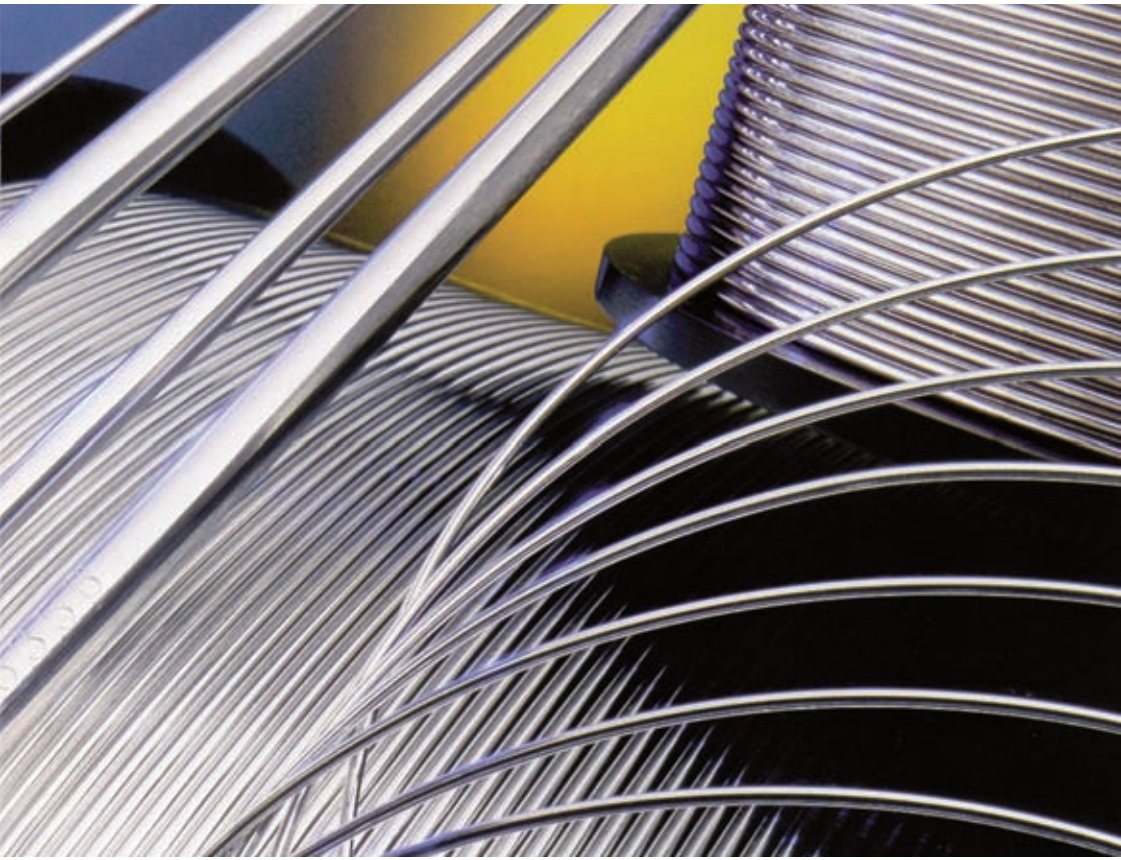
Solid Wires

MIG, TIG, SUBMERGED ARC WELDING



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Guide to using your ESAB Consumables Catalogue

All Weld Mechanical Properties
The mechanical properties of the deposited weld metal shown in this catalogue refer to all weld metal properties when deposited in the flat position. These may have little relevance to the properties of a real joint achieved in practice, since this will depend on the dilution from the base material, welding position, bead sequence and heat input. Apart from their use for quality control purposes, the mechanical properties of the all weld metal test provide the designer with an initial guide to the selection of welding consumables.

This is particularly important with regard to Charpy impact grading. Thus, consumables which have the highest grade are more likely to offer better Charpy properties when used in practice. They will not necessarily give the same level of Charpy results in a welded joint as they do in an all weld metal test piece.

Shielding Gases
For optimum performance of gas shielded wires, careful control of electrode extension (stickout) and of shielding gas flow rate are recommended in order to avoid nitrogen entrainment from the air. The use of low nitrogen shielding gas is also recommended. Consult your gas supplier for information on the nitrogen levels of shielding gases.

Storage and Handling of Welding Consumables

MIG/MAG and TIG Wires
Although welding wires do not have a flux coating, poor storage conditions can be detrimental to their performance and shelf life. Inadequate storage conditions can lead to surface rusting or contamination of the wire to the extent that feedability and diffusible hydrogen levels are adversely affected.

Wires should not be left on welding machines or out of the store for prolonged periods, especially overnight, since condensation of moisture from the air may lead to rapid surface deterioration. Always replace wires in their original packaging and return them to controlled storage areas.

It is recommended that the relative humidity of storage areas for welding consumables should not exceed 60%. Where the ambient temperature falls below 15ºC, storage temperatures should be maintained at 2ºC above ambient. The reason for this recommendation is to avoid condensation of moisture onto consumables. It is more important for storage areas to be dry than to be warm.

Welding Fume
Welding fume consists of various airborne substances (fine particles and gases) which may increase hazards to health when they are inhaled or swallowed. The degree of hazard to the welder depends upon the composition of the fume, the concentration in the air that he is breathing and the time for which he is exposed to it.

No fumes or gases are evolved by MMA, MIG or TIG, SAW or gas welding consumables at normal ambient temperatures, but in use (welding), fumes can be evolved. The tables in this section give the chemical composition of the particulate fume evolved during the use of the range of welding consumables, analysis being of fume generated in an enclosed Swedish box type apparatus and using a compatible base plate.

The chemical composition of the fume is expressed as weight percent of elements, as is conventional, rather than as oxides and silicates and the other complex forms they actually exist in, in the fume. The analysis is not a complete analysis, the balance of the fume from the MMA process, for example, consisting of complex oxides and silicates of some or all the slag-forming constituents of the electrode coating such as sodium, potassium, calcium, magnesium, aluminium, titanium, which are usually treated together as a residual fraction of inert inorganic fume.

The gases nitric oxide, nitrogen dioxide and ozone may sometimes be produced by the action of the electric arc or the radiation from it on the surrounding air. These gases do not arise from the welding consumable and are not usually a problem in MMA welding under conditions of normal ventilation. MIG welding is more likely to give rise to these gases, particularly at high current levels, and ozone generation may be increased by the presence of argon in the atmosphere around the arc. Carbon monoxide may be produced by the decomposition of carbon dioxide in the shielding gas or of carbonates in flux cored wires.

Occupational Exposure Limits
The recommended limit on the concentration of welding fume (or any other atmospheric contaminant) in the air breathed by any person is defined by the Health & Safety Executive in a list of Occupational Exposure Limits (guidance note EH40). This guidance note is revised annually and reference should always be the most recent edition. A long term exposure limit (8 hr T WA value) of 5mg/m^3 for particulate welding fume is included in the current list.

It is the responsibility of the user/employer under the Health & Safety at Work Act and the Control of Substances Hazardous to Health (COSHH) regulations that limits are not exceeded. The fume analysis cannot be used to assess the concentration of total welding fume to which a welder is exposed. Assessment of the possible exposure of the welder must be carried out by a competent person.

The analysis of fume from electrodes and wires for welding mild and some low alloy steels and aluminium alloys indicates that at a total particulate fume concentration of 5mg/m^3 no individual constituent of the fume will exceed its own recommended limit.

These consumables can be found in table 1. There are, however, consumables which give fume containing elements such as chromium, nickel, manganese and copper in sufficient quantities that even at 5mg/m^3 their own limits would be exceeded. In these cases a greater degree of fume control or protection is required to ensure that welders and others are not exposed to excessive amounts of these elements. Consumables giving fume of this nature are listed in table 2, which also include guidance on the maximum concentration of total particulate fume allowable in order to protect workers from the main constituent (e.g. chromium) present in the fume.

The figures quoted in these tables are theoretical maximum concentrations, but at very low values, for accuracy with gravimetric determinations, sampling would have to be carried out for long periods, perhaps even over a complete working day. In these instances it is suggested that chemical analysis for the main constituent elements of concern might be a more practical approach.

Hazards of Excessive Exposure
Effects from excessive exposure to fume arising from inadequate ventilation may become apparent at the time of welding or shortly afterwards or at some later date. Some of the effects are summarised below, and here it is important to note that workers other than welders may also come into contact with the products of welding fume:-

(a) Irritation of the Respiratory Tract
This is the effect of dust or fume on the lining of the respiratory tract and can cause dryness of the throat, tickling, coughing, chest tightness, wheezing and difficulty in breathing. In its most acute form it can cause the lungs to become full of fluid. The effects will vary with exposure, concentration and type of irritant.

(b) Metal Fume Fever
The inhalation of freshly formed metallic oxides such as those of zinc, chromium, nickel, copper, manganese may lead to an acute influenza like illness termed metal fume fever.

(c) Systemic Poisoning
This can result from the inhalation or swallowing of substances such as fluorides, hexavalent chromium, lead and barium.

(d) Long Term Effects
It is possible that certain constituents of welding fume such as hexavalent chromium and nickel may be carcinogenic and until there is definite information about this it is wise to treat them as such.

(e) Fibrosis
This is the formation of fibrous or scar tissue in the lungs. It is the result of a reaction between dust or fume with the lung tissue. There are various types depending on the nature of the substance involved and duration of exposure.

In all cases of doubt concerning physiological response to welding pollutants, medical advice should be sought promptly.

Composition

Metal Inert Gas Consumables
Semi-automatic MIG welding consumables are bare wires deposited with an inert gas shield. Variations of the process include the use of cored tubular wires with a metal powder or flux infill, use of gas mixtures in which all or part of the gas is active rather than inert and the use of self-shielded flux-cored wires. Tubular wires generally consist of a mild steel tube containing powder filling, the main constituents of which are some or all of the following: iron, manganese, nickel, copper, silicon, chromium, molybdenum as alloy and deoxidising elements. In addition the powder may include titanium dioxide, calcium carbonate or calcium fluoride.

Solid wire MIG consumables for the welding of mild and low alloy steels either have a protective copper coating or are bare wires with no copper coating. They conform to various grades contained in EN 440 or equivalent specifications.

Consumables wires for the welding of stainless steels, copper and aluminium alloys are not copper coated and conform to BS2901 Parts 2, 3 & 4 respectively, which are in the process of being replaced by EN standards.

Handling and Storage
With regard to storage and handling we do not consider that any special safety precautions are required, although obviously electrode coatings should not be ingested or allowed to come into contact with food. Hands should be washed thoroughly before all meal breaks.

Skin contact does not normally present a hazard, though it is always possible that occasional individuals may be found who are allergic to substances normally regarded as inert (e.g. cases of allergy to nickel have been reported arising from the wearing of nickel bracelets). However we do not know of any such cases in which welding consumables have been identified as the cause of an allergic response.

Consumables are dense materials and even small packets are relatively heavy. They should not be left in positions where physical injury or accidents could result.

Fire/Explosion Hazard
Welding consumables are non inflammable under ordinary conditions and do not present a fire or explosion risk. Welding consumables should not be allowed to come into contact with acids or other corrosive substances or with oxidising agents, nor with any other chemical substance with which a reaction may occur.

Health and Safety Information

Personal Protection/Ventilation
Welders should wear the normal protective clothing and eye protection appropriate to electric arc welding. Under certain circumstances particularly with some high alloyed electrodes, the slag formed on the weld bead can detach and fly off in pieces, presenting a burn hazard to eyes and skin. Those in close proximity to welds should protect themselves from the danger of flying slag.

Ventilation and/or fume extraction must be adequate to keep fume concentration within safe limits.

Note on Other Atmospheric Pollutants
In any welding operation other possible sources of atmospheric contamination may be present, for example, coatings, paint or traces of oil or of degreasing agents on work being welded, or substances arising from other operations in the vicinity, in addition to any fume arising from the welding consumables. Advice regarding the nature and extent of any possible hazard which might arise directly or indirectly from such substances or sources should always be obtained from the manufacturer of each product. Occupational exposure limits for a large number of substances are listed in Guidance Note EH40.

Further Information
Additional information and technical advice on products included in this book may be obtained from:
Esab Ltd,
Tel: 01992 760698.

Welding Manufacturers Association leaflet 236 Hazards from Welding Fume, which gives some more general information about welding fume, is also available on request.

Guidance Note EH40 (Occupational Exposure Limits), EH54 (Assessment of exposure to fume from welding and allied processes) and EH55 (Control of exposure to fume from welding, brazing and similar processes) are available from HMSO bookshops.

OK AristoRod™ 12.50

GMAW
ER70S-6

Description

OK AristoRod™ 12.50 is a bare Mn-Si-alloyed G3Si1/ER70S-6 solid wire for the GMAW of non-alloyed steels, as used in general construction, automotive components, pressure vessel fabrication and shipbuilding. OK AristoRod 12.50 is treated with ESAB's unique Advanced Surface Characteristics (ASC) technology, taking MAG welding operations to new levels of performance and all-round efficiency, especially in robotic and mechanised welding. Characteristic features include excellent start properties; trouble-free feeding at high wire speeds and lengthy feed distances; a very stable arc at high welding currents; extremely low levels of spatter; low fume emission; reduced contact tip wear and improved protection against corrosion of the wire.

Welding current
DC+

Classifications

SFA/AWS A5.18	ER70S-6
EN 440	G3Si1
CSA W48	ER49S-6

Wire composition

C	Si	Mn
0.1	0.9	1.5

Typical mech. properties all weld metal

Yield stress, MPa	470
Tensile strength, MPa	560
Elongation, %	26

Charpy V

Test temps, °C	Impact values, J
+20	130
-20	90
-30	70

Approvals

ABS	3SA, 3YSA
BV	SA3YM
CWB	CSA W48
DB	42.039.29
DNV	III YMS
GL	3YS
LR	3S, 3YS
VdTÜV	10052
CE	EN13479

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	3.2-10	60-200	18-24	0.8-2.5
0.9	3.0-12	70-250	18-26	0.8-3.3
1.0	2.7-15	80-300	18-32	1.0-5.5
1.4	2.3-12	150-420	22-36	1.6-8.7
1.6	2.3-15	225-550	28-38	2.1-11.4

OK AristoRod™ 12.63

GMAW
ER70S-6

Description

OK AristoRod™ 12.63 is a bare Mn-Si-alloyed G4Si1/ER70S-6 solid wire for the GMAW of non-alloyed steels, as used in general construction, automotive components, pressure vessel fabrication and shipbuilding. It has a slightly higher manganese and silicon content than OK AristoRod 12.50 to increase the weld metal strength. This also promotes a low sensitivity to surface impurities and contributes to smooth, sound welds.

OK AristoRod 12.63 is treated with ESAB's unique Advanced Surface Characteristics (ASC) technology, taking MAG welding operations to new levels of performance and all-round efficiency, especially in robotic and mechanised welding. Characteristic features include excellent start properties; trouble-free feeding at high wire speeds and lengthy feed distances; a very stable arc at high welding currents; extremely low levels of spatter; low fume emission; reduced contact tip wear and improved protection against corrosion of the wire.

Welding current
DC+

Classifications

SFA/AWS A5.18	ER70S-6
EN 440	G4Si1
CSA W48	ER49S-6

Wire composition

C	Si	Mn
0.1	1.0	1.7

Typical mech. properties all weld metal

Yield stress, MPa	525
Tensile strength, MPa	595
Elongation, %	26

Charpy V

Test temps, °C	Impact values, J
+20	130
-20	90
-30	70

Approvals

ABS	3SA, 3YSA
BV	SA3YM
DB	42.039.30
DNV	III YMS
GL	3YS
LR	3S, 3YS
VdTÜV	10051
CE	EN13479
CWB	CSA W48

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	3.2-10	60-185	18-24	0.8-2.5
0.9	3.0-12	70-250	18-26	0.8-3.3
1.0	2.7-15	80-300	18-32	1.0-5.5
1.2	2.3-15	120-380	18-35	1.2-8.0
1.6	2.3-15	120-380	18-35	1.2-8.0

OK Autrod 12.51

GMAW
ER70S-6

Description

OK Autrod 12.51 is a copper-coated, Mn-Si-alloyed G3Si1/ER70S-6 solid wire for the GMAW of non-alloyed steels, as used in general construction, pressure vessel fabrication and shipbuilding. The wire has a carefully controlled wire chemistry and a unique surface technology providing superior weld-metal quality at high wire feed speeds and at high welding currents. The wire can be used with both Ar/CO_2 mixed gas and pure CO_2 shielding gas.

Welding current
DC(+)

Classifications

SFA/AWS A5.18	ER70S-6
EN 440	G3Si1

Wire composition

C	Si	Mn
0.1	0.9	1.5

Typical mech. properties all weld metal

Yield stress, MPa	470
Tensile strength, MPa	560
Elongation, %	26

Charpy V

Test temps, °C	Impact values, J
+20	130
-20	90
-30	70

Approvals

ABS	3SA, 3YSA
BV	SA3YM
DB	42.039.06
DNV	III YMS
GL	3YS
LR	3 3YS
PRS	3YS
RS	3YMS
Sepros	UNA 485178
VdTÜV	00899
CE	EN13479

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.6	5.5-13	30-100	15-20	0.7-1.7
0.8	3.2-13	60-200	18-24	0.8-3.0
0.9	3.0-12	70-250	18-26	0.9-3.6
1.0	2.7-15	80-300	18-32	1.0-5.6
1.2	2.5-15	120-380	18-34	1.3-8.0
1.4	2.3-12	150-420	22-36	1.6-8.7
1.6	2.3-12	225-550	28-38	2.1-11.4

OK Autrod 12.64

GMAW
ER70S-6

Description

OK Autrod 12.64 is a copper-coated, Mn-Si-alloyed G4Si1/ER70S-6 solid wire for the GMAW of non-alloyed steels, as used in general construction, automotive components, pressure vessel fabrication and shipbuilding. It has a slightly higher manganese and silicon content than OK Autrod 12.50 to increase the weld-metal strength. This also promotes low sensitivity to surface impurities and contributes to smooth, sound welds.

The wire can be used with both Ar/CO_2 mixed gas and pure CO_2 shielding gas

Welding current
DC+

Classifications

SFA/AWS A5.18	ER70S-6
EN 440	G4Si1

Wire composition

C	Si	Mn
0.1	1.0	1.7

Typical mech. properties all weld metal

Yield stress, MPa	525
Tensile strength, MPa	595
Elongation, %	26

Charpy V

Test temps, °C	Impact values, J
+20	130
-30	70

Approvals

ABS	3SA, 3YSA
BV	SA3YM
DB	42.039.11
DNV	III YMS
GL	3YS
LR	3 3YS
RS	3YMS
Sepros	UNA 485178
VdTÜV	04294
CE	EN13479

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.6	5.0-13	50-100	16-20	0.7-1.7
0.8	3.2-10	60-185	18-24	0.8-2.5
0.9	3.0-12	70-250	18-26	0.8-3.3
1.0	2.7-15	80-300	18-32	1.0-5.5
1.2	2.3-15	120-380	18-35	1.2-8.0
1.4	2.5-12	150-420	22-36	1.7-8.5
1.6	2.3-15	120-380	18-35	1.2-8.0

OK Tigrod 12.62

E

Description

A triple desoxidized copper cated rod designed for GTAW of mild and fine grained structural and pressure vessel steels as well as ship building steels. The rod is capable of producing high quality welds in semi-killed and rimmed steel as well as steel of various carbon levels. Because of added desoxidants, Al-Ti-Zr, the rod can also be used for welding steels with a rusty or dirty surface, without any sacrifice of weld quality.

Welding current
DC+

Classifications

SFA/AWS A5.18	ER70S-2
EN 1668	W2Ti

Wire composition

C	Si	Mn
0.06	0.60	1.10

Typical mech. properties all weld metal

Yield stress, MPa
Tensile strength, MPa
Elongation, %

Charpy V

Test temps, °C	Impact values, J
-40	180

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Autrod 12.10

SAW
EL12

Description

OK Autrod 12.10 is a copper-coated, mild steel wire for submerged arc welding. It can be combined with the following fluxes:
OK Flux 10.40, OK Flux 10.45,
OK Flux 10.61, OK Flux 10.70,
OK Flux 10.71, OK Flux 10.76,
OK Flux 10.80, OK Flux 10.81,
OK Flux 10.83 and OK Flux 10.96.

Classifications

SFA/AWS A5.17	EL12
EN 756	S1

Wire composition

C	Si	Mn
0.09	<0.1	0.5

Approvals

CE	EN13479
DB	52.039.01
Sepros	UNA 347719

Comments: See also Flux Wire combinations

OK Autrod 12.22

SAW
EM12K

Description

OK Autrod 12.22 is a killed, medium manganese alloyed, copper-coated steel wire for submerged arc welding in medium and high strength structural steels. It can be combined with the following fluxes:
OK Flux 10.45, OK Flux 10.61,
OK Flux 10.62, OK Flux 10.71,
OK Flux 10.81 and OK Flux 10.83.

Classifications

SFA/AWS A5.17	EM12K
EN 756	S2Si

Wire composition

C	Si	Mn
0.1	0.2	1.0

Approvals

CE	EN13479
DB	52.039.05
NAKS/HAKL	2,5-3.2mm: CZ
Sepros	UNA 347719

Comments: See also Flux Wire combinations

OK Autrod 12.32

SAW
EH12K

Description

OK Autrod 12.32 is a manganese-alloyed, copper-coated wire for the submerged arc welding of medium and high strength structural steels. OK Autrod 12.32 should preferably be used together with non-alloying or slightly alloying fluxes, such as OK Flux 10.62, when high weld metal quality requirements must be met.

It can also be combined with OK Flux 10.40, OK Flux 10.61.

Classifications

SFA/AWS A5.17	EH12K
EN 756	S3Si

Wire composition

C	Si	Mn
0.12	0.3	1.7

Approvals

CE	EN13479
DB	52.039.12
Sepros	UNA 347719

Comments: See also Flux Wire combinations

OK Flux 10.45
Type Acid

SAW
EN 760: SF MS 1 57 AC

Description

OK Flux 10.45 is a fused, acid, slightly Mn-alloying flux for submerged arc welding. It has a well balanced silicate slag system. In combination with a specially-developed grain size, this slag system makes OK Flux 10.45 ideal for applications in which welding at high speed is of primary importance. Welding speeds of up to 5 m/minute can easily be achieved in thin sheet materials.

Density
≈1.75 kg/dm^3

Basicity index
0.85

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	1.4	1.6
30	1.8	1.9
34	2.4	2.4
38	3.1	3.1

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.10	0.07	0.2	1.1	-	-	-
OK Autrod 12.22	0.06	0.25	1.3	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.10	375	480	+20	110
			-20	70
			-29	35
OK Autrod 12.22	420	510	+20	110
			-20	70
			-29	60

Approvals

CE	EN13479

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.10							x		x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.10	S 35 2 MS S1	F6A2-EL12/F6P2-EL12
OK Autrod 12.22	S 38 2 MS S2Si	F7A2-EM12K/F6P2-EM12K

OK Flux 10.47
Type Basic

SAW
EN 760: SF AB 1 65 AC

Description

OK Flux 10.47 is a non-alloying, fused flux, specially designed for the single and multi-pass butt welding of mild and medium tensile strength steels. It is not sensitive to moisture absorption and can be used without re-baking, while yielding low-hydrogen weld metal.

Typical applications are found in shipbuilding and pressure vessel manufacture with impact strength requirements down to -40°C. OK Flux 10.47 has a high current-carrying capacity on both AC and DC.

Density
approx. 1.1 kg/dm^3

Basicity index
1.3

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.7	0.7
30	1.0	1.0
34	1.3	1.3
38	1.8	1.8

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.20	0.04	0.3	0.9	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.20	365	455	-20	110
			-30	90
			-40	70

Approvals

CE	EN13479
DB	51.039.09

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.20							x	x	

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.20	S 35 3 AB S2	F6A4-EM12

OK Flux 10.61
Type High-basic

SAW
EN 760: SF AB 1 65 AC

Description

OK Flux 10.61 is designed for the single-wire, multi-run butt welding of mild, medium and high tensile steels with impact strength requirements down to -40°C/-60°C.

Due to the non-alloying effect, OK Flux 10.61 is designed for use with a suitable alloying wire. OK Flux 10.61 can be used on DC±.

Density
1.1 kg/dm^3

Basicity index
2.8

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.6	
30	0.9	
34	1.2	
8	1.4	

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.10	0.07	0.15	0.5	-	-	-
OK Autrod 12.22	0.08	0.35	1.0	-	-	-
OK Autrod 12.32	0.09	0.3	1.4	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.10	355	445	+20	180
			-10	130
			-20	100
OK Autrod 12.22	440	520	-20	130
			-30	80
			-40	70
			-62	35
OK Autrod 12.32	440	550	-20	110
			-40	90
			-50	55
			-51	55
			-62	40

Approvals

CE	EN13479
DB	51.039.03
Sepros	UNA 40982

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.10							x		x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.22	S 38 4 FB S2Si	F7A8-EM12K/F6P8-EM12K
OK Autrod 12.32	S 42 5 FB S3Si	F7A6-EH12K/F7P8-EH12K

OK Flux 10.62
Type High-basic

SAW
EN 760: SA FB 1 55 AC H5

Description

OK Flux 10.62 is an all-mineral, non-alloying, high-basic flux. The weld metal can be fully controlled through the suitable choice of wires, independently of the welding parameters. It is therefore very suitable for the multi-run welding of thick materials using the single-wire and multiple-wire technique. OK Flux 10.62 is designed for the multi-pass butt welding of mild, medium and high tensile steels, as well as low-alloyed steels, with an impact strength down to -40°/-60°C. As it is a flux of the high-basic type, OK Flux 10.62 has a high current-carrying capacity on both AC and DC. To increase productivity with no loss of mechanical properties, OK Flux 10.62 is best used together with iron powder addition. OK Flux 10.62 is especially suitable for narrow gap welding, due to the good slag detachability and smooth side-wall blending. Pressure vessels for nuclear applications and offshore constructions in which good CTOD values are required are two areas in which OK Flux 10.62 can be successfully used. It operates optimally at the lower end of the voltage range.

OK Flux 10.62 yields low-oxygen weld metal (approx. 300 ppm) and produces low-hydrogen weld metal (lower than 5 ml/100g).

Density
approx. 1.1 kg/dm^3

Basicity index
3.4

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.7	0.6
30	0.9	0.75
34	1.2	1.0
38	1.5	1.25

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.22	0.07	0.30	1.0	-	-	-
OK Autrod 12.32	0.10	0.35	1.6	-	-	-
OK Autrod 12.40	0.08	0.12	1.9	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.22	410	500	-40	90
			-50	70
			-62	35
OK Autrod 12.32	475	570	-30	130
			-40	110
			-62	70
OK Autrod 12.40	530	620	-20	80
			-40	50
			-51	40

Approvals

CE	EN13479
DB	51.039.07
NAKS/HAKC	RD 03-613-03 SE
Sepros	UNA 409821

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.22	3M, 3YM	3M, 3YM	IIIYM	A3, 3YM	3YM		x	x	x
OK Autrod 12.32	4Y42M	4Y40M	IVY42M	A4Y42M	4Y42M	3YM	x	x	x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.22	S 38 5 FB S2Si	F7A8-EM12K/F6P8-EM12K
OK Autrod 12.32	S 46 6 FB S3Si	F7A8-EH12K/F7P8-EH12K
OK Autrod 12.40	S 50 4 FB S4	F7A6-EH14/F7P6-EH14

OK Flux 10.71
Type Basic

SAW
EN 760: SA AB 1 67 AC H5

Description

OK Flux 10.71 is a basic agglomerated, slightly Si- and Mn-alloying flux for submerged arc welding, specially designed for fillet welding and for the single- and multi-pass butt welding of mild, medium and high tensile steels. OK Flux 10.71 is of the aluminate basic type and, for this slag system, it has a very high current-carrying capacity on both AC and DC and very good operating characteristics. OK Flux 10.71 is ideally suited to narrow gap welding due to the excellent slag detachability and smooth side-wall blending.

Density
approx. 1.2 kg/dm^3

Basicity index
1.6

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.6	0.5
30	0.85	0.7
34	1.15	0.95
38	1.35	1.15

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.10	0.04	0.3	1.0	-	-	-
OK Autrod 12.20	0.05	0.3	1.35	-	-	-
OK Autrod 12.22	0.08	0.5	1.4	-	-	-
OK Autrod 12.30	0.09	0.4	1.65	-	-	-
OK Autrod 12.32	0.09	0.5	2.0	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.10	360	465	-20	95
			-30	75
OK Autrod 12.20	410	510	-20	80
			-40	55
OK Autrod 12.22	425	520	-20	100
			-40	60
			-46	40
OK Autrod 12.30	480	580	-20	90
			-30	60
OK Autrod 12.32	480	580	-20	95
			-40	65
			-46	40

Approvals

CE	EN13479
DB	51.039.05
NAKS/HAKC	RD 03-613-03 PL
Sepros	UNA 409821

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.10	3M	3M	IIIM	A3M	3M		x	x	x
OK Autrod 12.20	3M, 3YM	3M, 3YM	IIIYM	3YM	3YM		x	x	x
OK Autrod 12.22	4Y400M	4Y40M	IVY40M	A 4Y40M	4Y40M		x	x	x
OK Autrod 12.30							x	x	x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.10	S 35 4 AB S1	F6A4-EL12/F6P5-EL12
OK Autrod 12.20	S 38 4 AB S2	F7A4-EM12/F6P4-EM12
OK Autrod 12.22	S 38 4 AB S2Si	F7A5-EM12K/F6P5-EM12K
OK Autrod 12.30	S 46 3 AB S3	
OK Autrod 12.32	S 46 4 AB S3Si	F7A5-EH12K//F7P5-EH12K

OK Flux 10.81
Type Acid

SAW
EN 760: SA AR 1 97 AC

Description

OK Flux 10.81 is an acid agglomerated Si- and Mn-alloying flux for submerged arc welding, most suitable for applications where the dilution of base metal is high, e.g. in fillet welding and butt welding of thin and medium thick plates with a small number of passes. The excellent welding properties associated with the acid slag system of OK Flux 10.81 permit high travel speeds in butt welding, i.e. the spiral welding of thin-walled pipes and fillet welding, where good bead shape, excellent slag removal and top-class surface finish are essential.

Density
approx. 1.25 kg/dm^3

Basicity index
0.6

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.10	0.06	0.8	1.2	-	-	-
OK Autrod 12.20	0.07	0.8	1.45	-	-	-
OK Autrod 12.22	0.07	0.9	1.5	-	-	-
OK Autrod 12.30	0.08	0.8	1.75	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.10	450	540	+20	50
			0	30
OK Autrod 12.20	510	610	+20	80
			0	60
			-18	40
OK Autrod 12.22	530	610	+20	60
OK Autrod 12.30	540	640	+20	75
			0	60

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.6	0.5
30	0.8	0.65
34	1.05	0.9
38	1.35	1.25

Approvals

CE	EN13479
DB	51.039.04
Sepros	UNA 409821

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.10							x	x	x
OK Autrod 12.20	2TM 2YTM	2TM 2YTM	IIYTM	A2	2YTM		x	x	x
OK Autrod 12.30							x	x	x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.10	S 42 A AR S1	F7AZ-EL12/F7PZ-EL12
OK Autrod 12.20	S 46 0 AR S2	F7A0-EM12/F7PZ-EM12
OK Autrod 12.22	S 50 A AR S2Si	F7AZ-EM12K/F7PZ-EM12K
OK Autrod 12.30	S 50 0 AR S3	

OK Flux 10.83
Type Acid

SAW
EN 760: SA AR 1 85 AC

Description

An acid, agglomerated flux for the high-speed, single-pass welding of butt, lap and fillets which are well washed and free from undercut, even at speeds in excess of 3 metres per minute. It is primarily used with DC single- and twin-arc wire systems at currents of up to 1300 A. It is recommended for the high-speed welding of heat exchanger tubes, storage tanks, building beams and rail car panels.

Density
≈1.4 kg/dm^3

Basicity index
0.3

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.8	0.5
30	1.1	0.8
34	1.4	1.0
38	1.8	1.4

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.22	0.05	0.8	0.9	-	-	-
OK Autrod 12.51	0.04	1.3	1.3	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.22	470	560	+20	50
			0	30
OK Autrod 12.51	530	610	+20	25

Approvals

CE	EN13479

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.22							x		x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.22	S42 Z AR S2Si	F7AZ-EM12K/F7PZ-EM12K
OK Autrod 12.51	S46 Z AR SO	F7AZ-EH11K/F7PZ-EH11K

OK AristoRod™ 13.08

GMAW
ER80S-D2

Description

OK AristoRod™ 13.08 is a 0.4Mo-alloyed (ER80S-D2), bare, solid wire for the GMAW of creep-resistant steels of the same composition, like those used with a service temperature of up to 500°C. OK AristoRod 13.08 is treated with ESAB's unique Advanced Surface Characteristics (ASC) technology, taking MAG welding operations to new levels of performance and allround efficiency, especially in robotic and mechanised welding. Characteristic features include excellent start properties; trouble-free feeding at high wire speeds and lengthy feed distances; a very stable arc at high welding currents; extremely low levels of spatter; low fume emission; reduced contact tip wear and improved protection against corrosion of the wire.

Welding current
DC+

Classifications

SFA/AWS A5.28	ER80S-D2
EN 440	G4Mo
CSA W48	ER805-D2

Wire composition

C	Si	Mn	Mo
0.09	0.7	1.9	0.5

Typical mech. properties all weld metal

Yield stress, MPa	590
Tensile strength, MPa	685
Elongation, %	24

Charpy V

Test temps, °C	Impact values, J
+20	140
-29	80

Approvals

CWB	CSA W48
	Valid for items ending with A

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	2.0-10.8	40-170	16-22	0.4-2.6
0.9	2.7-14.7	70-280	18-28	1.0-5.4
1.0	2.7-14.7	90-300	18-28	1.0-5.4
1.2	2.7-12.4	120-350	20-33	1.5-6.6
1.6	3.1-12.0	225-480	26-38	3.3-11.6

OK AristoRod™ 13.12

GMAW
ER80S-G

Description

OK AristoRod™ 13.12 is a 1.1Cr-0.5Mo-alloyed, bare, solid wire for the GMAW of creep-resistant steels of the same composition, like those used for pipes in pressure vessels and boilers with a service temperature of up to 450°C. OK AristoRod 13.12 is treated with ESAB's unique Advanced Surface Characteristics (ASC) technology, taking MAG welding operations to new levels of performance and all-round efficiency, especially in robotic and mechanised welding. Characteristic features include excellent start properties; trouble-free feeding at high wire speeds and lengthy feed distances; a very stable arc at high welding currents; extremely low levels of spatter; low fume emission; reduced contact tip wear and improved protection against corrosion of the wire.

Welding current
DC+

Classifications

SFA/AWS A5.28	ER80S-G
EN 12070	G CrMo1Si
GOST 2246	08X CM A

Wire composition

C	Si	Mn	Cr	Mo
0.1	0.7	1.0	1.2	0.5

Typical mech. properties all weld metal

Yield stress, MPa	450
Tensile strength, MPa	580
Elongation, %	24

Charpy V

Test temps, °C	Impact values, J
+20	80
0	40
-20	30

Approvals

VdTÜV	10089

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	2.0-10.8	40-170	16-22	0.4 -2.6
1.0	2.7-14.7	80-280	18-28	1.0-5.4
1.2	2.7-12.4	120-350	20-33	1.5-6.6
1.6	3.1-12.0	225-480	26-38	3.3-11.6

OK AristoRod™ 13.26

GMAW
ER80S-G

Description

OK AristoRod TM 13.26 is a 0.8Ni-0.3Cu-alloyed, bare, solid wire for the GMAW of weathering steels such as COR-TEN, Patinax, Dillicor and so on. It is also suitable for high strength steels with a yield strength of up to 470MPa.

OK AristoRod 13.26 is treated with ESAB's unique Advanced Surface Characteristics (ASC) technology, taking MAG welding operations to new levels of performance and all-round efficiency, especially in robotic and mechanised welding. Characteristic features include excellent start properties; trouble-free feeding at high wire speeds and lengthy feed distances; a very stable arc at high welding currents; extremely low levels of spatter; low fume emission; reduced contact tip wear and improved protection against corrosion of the wire.

Welding current
DC+

Classifications

SFA/AWS A5.28	ER80S-G

Wire composition

C	Si	Mn	Ni	Cu
0.1	0.8	1.4	0.8	0.4

Typical mech. properties all weld metal

Yield stress, MPa	540
Tensile strength, MPa	625
Elongation, %	26

Charpy V

Test temps, °C	Impact values, J
+20	140
0	142
-20	110
-40	83
-60	50

Approvals

DB	42.039.32
DNV	III YMS (M21)
DNV	II YMS (C1)
DS	EN 440
Ü	42.039/1

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	2.7-14.7	80-280	18-28	0.4-2.6
1.0	2.7-14.7	80-280	18-28	1.0-5.4
1.2	2.7-12.4	120-350	20-33	1.5-6.6

OK Autrod 13.28

GMAW
ER80S-Ni2

Description

OK Autrod 13.28 is a 2.4Ni-alloyed (ER80S-Ni2), copper-coated, solid wire for the GMAW of low alloyed and low-temperature steels in applications such as vessels, pipes and the offshore industry, with a minimum yield strength of up to 470 MPa. The wire provides good impact toughness down to -60°C.

Welding current
DC(+)

Classifications

SFA/AWS A5.28	ER80S-Ni2
EN 440	G2Ni2

Wire composition

C	Si	Mn	Ni
0.1	0.6	1.1	2.4

Typical mech. properties all weld metal

Yield stress, MPa	540
Tensile strength, MPa	630
Elongation, %	28

Charpy V

Test temps, °C	Impact values, J
0	130
-40	100
-60	60

Approvals

DNV	V YMS (M21)
UDT	EN 440
VdTÜV	01450 (LC)
VdTÜV	06852 (RG)

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	2.0-10.8	40-170	16-22	0.4-2.6
1.0	2.7-14.7	80-280	18-28	1.0-5.4
1.2	2.7-12.4	120-350	20-33	1.5-6.6
1.6	3.1-8.1	225-480	26-38	3.3-11.6

OK AristoRod 13.29

GMAW
ER100S-G

Description

OK AristoRod™13.29 is a 0.3Cr-1.4Ni-0.25Mo-alloyed, bare, solid wire for the GMAW of high strength steels with low-temperature impact toughness requirements. OK AristoRod 13.29 is treated with ESAB's unique Advanced Surface Characteristics (ASC) technology, taking MAG welding operations to new levels of performance and all-round efficiency, especially in robotic and mechanised welding. Characteristic features include excellent start properties; trouble-free feeding at high wire speeds and lengthy feed distances; a very stable arc at high welding currents; extremely low levels of spatter; low fume emission; reduced contact tip wear and improved protection against corrosion of the wire.

Classifications

SFA/AWS A5.28	ER100S-G
EN 12534	G Mn3Ni1CrMo

Wire composition

C	Si	Mn	Cr	Ni	Mo
<0.1	0.5	1.6	0.3	1.4	0.2

Typical mech. properties all weld metal

Yield stress, MPa	700
Tensile strength, MPa	800
Elongation, %	19

Charpy V

Test temps, °C	Impact values, J
+20	100
-20	70
-30	60

Approvals

DB	42.039.33
VdTÜV	10090
CE	EN 13479

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
1.0	2.7-14.7	80-280	18-28	1.0-5.4
1.2	2.7-12.4	120-350	20-33	1.5-6.6
1.6	3.1-8.1	225-480	26-38	3.3-11.6

OK Tigrod 13.08

GTAW
ER80S-D2

Description

OK Tigrod 13.08 is a 1.5Mn-0.4Mo-alloyed (ER80S-D2), copper-coated rod for the GTAW of creep-resistant steels of the same type, such as pipes in pressure vessels and boilers with a working temperature of up to about 500°C. The rod can also be used for welding low-alloyed, high tensile strength steels.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER80S-D2
BS 2901 part 1	A31
EN 1668	W 46 2 W4Mo

Wire composition

C	Si	Mn	Mo
0.9	0.6	1.9	0.5

Typical mech. properties all weld metal

Yield stress, MPa	520
Tensile strength, MPa	615
Elongation, %	28

Charpy V

Test temps, °C	Impact values, J
-29	200

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.12

GTAW
ER80S-G

Description

OK Tigrod 13.12 is a 1.0Cr-0.5Mo-alloyed, copper-coated rod for the GTAW of creep-resistant steels of the same type, such as pipes in pressure vessels and boilers. The rod can also be used for welding low-alloyed, high strength steels with a minimum tensile strength of 550 MPa.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER80S-G
DIN 8575	W.nr. 1.7339
EN 12070	W CrMo1Si

Wire composition

C	Si	Mn	Cr	Mo
0.1	0.6	1.0	1.2	0.5

Typical mech. properties all weld metal

Yield stress, MPa	560
Tensile strength, MPa	720
Elongation, %	24

Charpy V

Test temps, °C	Impact values, J
+20	120
-20	50
-30	40
-40	20
-60	20

Approvals

UDT	DIN 8575
VdTÜV	04952

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.16

GTAW
ER80S-B2

Description

OK Tigrod 13.16 is a 1.3Cr-0.5Mo-alloyed (ER80S-B2), copper-coated rod for the GTAW of creep-resistant steels like SA-387 Grade 11, A 335 Grade P11 or similar materials. The rod has a high purity chemistry with a guaranteed Bruscato factor X <15.

Welding current
DC-

Classifications

SFA/AWS A5.28 ER80S-B2

Wire composition

C	Si	Mn	Cr	Mo
0.09	0.6	0.6	1.4	0.5

Typical mech. properties all weld metal

Yield stress, MPa	640
Tensile strength, MPa	730
Elongation, %	24

Charpy V

Test temps, °C	Impact values, J
-40	>47

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.17

GTAW
ER90S-B3

Description

OK Tigrod 13.17 is a 2.5Cr-1.1Mo-alloyed (ER90S-B3), copper-coated rod for the GMAW of creep-resistant steels like SA-387 Grade 22, A335 Grade P22 or similar materials. The rod has a high purity chemistry with a guaranteed Bruscato factor X <15.

Welding current
DC-

Classifications

SFA/AWS A5.28	ER90S-B3

Wire composition

C	Si	Mn	Cr	Mo
0.09	0.6	0.6	2.5	1.0

Typical mech. properties all weld metal

Yield stress, MPa	620
Tensile strength, MPa	730
Elongation, %	22

Charpy V

Test temps, °C	Impact values, J
-40	>47

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.22

GTAW
ER90S-G

Description

OK Tigrod 13.22 is a 2.5Cr-1.0Mo-alloyed, copper-coated rod for the GTAW of creep-resistant steels such as pipes in pressure vessels and boilers of similar composition, with service temperatures of up to 600°C, but it is also suitable for welding high strength steels.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER90S-G
DIN 8575	W.nr 1.7384
EN 12070	W CrMo2Si

Wire composition

C	Si	Mn	Cr	Mo
0.08	0.7	1.0	2.6	1.0

Typical mech. properties all weld metal

	SR 750°C/0.5h
Yield stress, MPa	>400
Tensile strength, MPa	>500
Elongation, %	>18

Charpy V

Test temps, °C	Impact values, J
+20	200

Approvals

Sepros	UNA 046731
UDT	EN 12070
VdTÜV	

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.26

GTAW
ER80S-G

Description

OK Tigrod 13.26 is a 0.8Ni-0.3Cu-alloyed, copper-coated solid rod for the GTAW of weathering steels such as COR-TEN, Patinax, Dillicor and so on. It is also suitable for high strength steels with a yield strength of up to 470 MPa.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER80S-G

Wire composition

C	Si	Mn	Ni	Cu
0.1	0.8	1.4	0.8	0.4

Typical mech. properties all weld metal

Yield stress, MPa	480
Tensile strength, MPa	580
Elongation, %	30

Charpy V

Test temps, °C	Impact values, J
+20	110
-20	70
-40	60

Approvals

DNV	IV YM

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.28

GTAW
ER80S-Ni2

Description

OK Tigrod 13.28 is 2.4Ni-alloyed (ER80S-Ni2), copper-coated rod for the GTAW of low-temperature, fine-grained steels in applications such as pressure vessels, pipes and the offshore industry, with a minimum yield strength of up to 470 MPa. The wire provides good impact toughness down to -60°C.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER80S-Ni2
EN 1668	W2Ni2

Wire composition

C	Si	Mn	Ni
0.1	0.6	1.1	2.4

Typical mech. properties all weld metal

Yield stress, MPa	540
Tensile strength, MPa	630
Elongation, %	30

Charpy V

Test temps, °C	Impact values, J
-20	200
-40	180
-60	150

Approvals

UDT	EN 440
VdTÜV	06243 (RG)
VdTÜV	03956 (LC)

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 13.32

GTAW
ER80S-B6

Description

OK Tigrod 13.32 is a 5Cr-0.5Mo-alloyed (ER80SB6), copper-coated rod for the GTAW of creep resistant steels of similar composition. The rod is also suitable for welding high strength steels with a minimum yield strength of up to 730 MPa.

AWS has changed the classification for this product. The previous classification was A5.9 ER502.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER80S-B6
DIN 8575	W.nr. 1.7373
EN 12070	WCrMo5

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
0.07	0.4	0.6	5.8	<0.3	0.6	<0.4

Typical mech. properties all weld metal

Yield stress, MPa	730
Tensile strength, MPa	900
Elongation, %	22

Charpy V

Test temps, °C	Impact values, J
+20	100
-20	80
-29	50

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0

OK Tigrod 13.38

GTAW
ER90S-B9

Description

OK Tigrod 13.38 is a 9CrMoVN-alloyed rod for the GTAW of high-temperature steels and steels for hot hydrogen service, especially in oil refineries. It should preferably be used for 9% Cr steels, such as P 91/T 91 steels.

The alloy is modified in terms of the limits for impurity elements and is extremely “clean”. This produces improved strength levels both at room temperature and at higher temperatures. AWS has changed the classification for this product. The previous classification was A5.9 ER505.

Welding current
DC(-)

Classifications

SFA/AWS A5.28	ER90S-B9
EN 12070	W CrMo91

Wire composition

C	Si	Mn	Cr	Ni	Mo
0.1	0.2	0.5	8.9	0.7	1.0

Typical mech. properties all weld metal

Yield stress, MPa	690
Tensile strength, MPa	785
Elongation, %	20

Charpy V

Test temps, °C	Impact values, J
+20	200
0	180
-20	150
-40	90
-60	70

Approvals

UDT	DIN 8575
VdTÜV	07686

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Autrod 12.44

SAW
EA3

Description

OK Autrod 12.44 is a Mn-Mo-alloyed, coppercoated wire for the submerged arc welding of high tensile steel and steel for low temperature work. It can be combined with OK Flux 10.62.

Classifications

SFA/AWS A5.23	EA3
EN 756	S4Mo

Wire composition

C	Si	Mn	Mo
0.11	0.15	2.0	0.5

OK Autrod 13.24

SAW
EG

Description

OK Autrod 13.24 is a low-alloyed, coppercoated wire for submerged arc welding, to be used when the requirements imposed on the weld metal are rigorous – in the in offshore industry, for example. It can be used in combination with OK Flux 10.62 and OK Flux 10.71.

Classifications

SFA/AWS	A5.23 EG
EN 756	S0

Wire composition

C	Si	Mn	Ni	Mo
0.11	0.2	1.4	1.0	0.2

Approvals

NAKS/HAKC	3.2mm: GZ

OK Autrod 13.27

SAW
ENi2

Description

OK Autrod 13.27 is a copper-coated, low-alloyed, 2%Ni electrode for the submerged arc welding of low-alloyed and low-temperature steels for applications in the offshore industry, for example. It can be combined with OK Flux 10.62 and OK Flux 10.71.

Classifications

SFA/AWS A5.23	ENi2
EN 756	S2Ni2

Wire composition

C	Si	Mn	Ni
0.08	0.2	1.0	2.3

Approvals

CE	EN 13479
DB	52.039.08

OK Flux 10.61
Type High-basic

SAW
EN 760: SF AB 1 65 AC

Description

OK Flux 10.61 is designed for the single-wire, multi-run butt welding of mild, medium and high tensile steels with impact strength requirements down to -40°C/-60°C.

Due to the non-alloying effect, OK Flux 10.61 is designed for use with a suitable alloying wire. OK Flux 10.61 can be used on DC±.

Density
1.1 kg/dm^3

Basicity index
2.8

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.6	
30	0.9	
34	1.2	
8	1.4	

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.10	0.07	0.15	0.5	-	-	-
OK Autrod 12.22	0.08	0.35	1.0	-	-	-
OK Autrod 12.32	0.09	0.3	1.4	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.10	355	445	+20	180
			-10	130
			-20	100
OK Autrod 12.22	440	520	-20	130
			-30	80
			-40	70
			-62	35
OK Autrod 12.32	440	550	-20	110
			-40	90
			-50	55
			-51	55
			-62	40

Approvals

CE	EN13479
DB	51.039.03
Sepros	UNA 40982

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.10							x		x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.22	S 38 4 FB S2Si	F7A8-EM12K/F6P8-EM12K
OK Autrod 12.32	S 42 5 FB S3Si	F7A6-EH12K/F7P8-EH12K

OK Flux 10.62
Type High-basic

SAW
EN 760: SA FB 1 55 AC H5

Description

OK Flux 10.62 is an all-mineral, non-alloying, high-basic flux. The weld metal can be fully controlled through the suitable choice of wires, independently of the welding parameters. It is therefore very suitable for the multi-run welding of thick materials using the single-wire and multiple-wire technique. OK Flux 10.62 is designed for the multi-pass butt welding of mild, medium and high tensile steels, as well as low-alloyed steels, with an impact strength down to -40°/-60°C. As it is a flux of the high-basic type, OK Flux 10.62 has a high current-carrying capacity on both AC and DC. To increase productivity with no loss of mechanical properties, OK Flux 10.62 is best used together with iron powder addition. OK Flux 10.62 is especially suitable for narrow gap welding, due to the good slag detachability and smooth side-wall blending. Pressure vessels for nuclear applications and offshore constructions in which good CTOD values are required are two areas in which OK Flux 10.62 can be successfully used. It operates optimally at the lower end of the voltage range.

OK Flux 10.62 yields low-oxygen weld metal (approx. 300 ppm) and produces low-hydrogen weld metal (lower than 5 ml/100g).

Density
approx. 1.1 kg/dm^3

Basicity index
3.4

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.7	0.6
30	0.9	0.75
34	1.2	1.0
38	1.5	1.25

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.22	0.07	0.30	1.0	-	-	-
OK Autrod 12.32	0.10	0.35	1.6	-	-	-
OK Autrod 12.40	0.08	0.12	1.9	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.22	410	500	-40	90
			-50	70
			-62	35
OK Autrod 12.32	475	570	-30	130
			-40	110
			-62	70
OK Autrod 12.40	530	620	-20	80
			-40	50
			-51	40

Approvals

CE	EN13479
DB	51.039.07
NAKS/HAKC	RD 03-613-03 SE
Sepros	UNA 409821

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.22	3M, 3YM	3M, 3YM	IIIYM	A3, 3YM	3YM		x	x	x
OK Autrod 12.32	4Y42M	4Y40M	IVY42M	A4Y42M	4Y42M	3YM	x	x	x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.22	S 38 5 FB S2Si	F7A8-EM12K/F6P8-EM12K
OK Autrod 12.32	S 46 6 FB S3Si	F7A8-EH12K/F7P8-EH12K
OK Autrod 12.40	S 50 4 FB S4	F7A6-EH14/F7P6-EH14

OK Flux 10.71
Type Basic

SAW
EN 760: SA AB 1 67 AC H5

Description

OK Flux 10.71 is a basic agglomerated, slightly Si- and Mn-alloying flux for submerged arc welding, specially designed for fillet welding and for the single- and multi-pass butt welding of mild, medium and high tensile steels. OK Flux 10.71 is of the aluminate basic type and, for this slag system, it has a very high current-carrying capacity on both AC and DC and very good operating characteristics. OK Flux 10.71 is ideally suited to narrow gap welding due to the excellent slag detachability and smooth side-wall blending.

Density
approx. 1.2 kg/dm^3

Basicity index
1.6

Flux consumption, kg flux/kg wire

Voltage	DC+	AC
26	0.6	0.5
30	0.85	0.7
34	1.15	0.95
38	1.35	1.15

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 12.10	0.04	0.3	1.0	-	-	-
OK Autrod 12.20	0.05	0.3	1.35	-	-	-
OK Autrod 12.22	0.08	0.5	1.4	-	-	-
OK Autrod 12.30	0.09	0.4	1.65	-	-	-
OK Autrod 12.32	0.09	0.5	2.0	-	-	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 12.10	360	465	-20	95
			-30	75
OK Autrod 12.20	410	510	-20	80
			-40	55
OK Autrod 12.22	425	520	-20	100
			-40	60
			-46	40
OK Autrod 12.30	480	580	-20	90
			-30	60
OK Autrod 12.32	480	580	-20	95
			-40	65
			-46	40

Approvals

CE	EN13479
DB	51.039.05
NAKS/HAKC	RD 03-613-03 PL
Sepros	UNA 409821

Comments: See also Flux Wire combinations

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CE	DB	VdTÜV
OK Autrod 12.10	3M	3M	IIIM	A3M	3M		x	x	x
OK Autrod 12.20	3M, 3YM	3M, 3YM	IIIYM	3YM	3YM		x	x	x
OK Autrod 12.22	4Y400M	4Y40M	IVY40M	A 4Y40M	4Y40M		x	x	x
OK Autrod 12.30							x	x	x

Other approvals may be applicable. Please contact ESAB.

Classifications

Wire	EN 756	SFA/AWS A5.17
OK Autrod 12.10	S 35 4 AB S1	F6A4-EL12/F6P5-EL12
OK Autrod 12.20	S 38 4 AB S2	F7A4-EM12/F6P4-EM12
OK Autrod 12.22	S 38 4 AB S2Si	F7A5-EM12K/F6P5-EM12K
OK Autrod 12.30	S 46 3 AB S3	
OK Autrod 12.32	S 46 4 AB S3Si	F7A5-EH12K//F7P5-EH12K

OK Autrod 308LSi

GMAW
ER308LSi

Description

A continuous, solid, corrosion-resistant, chromium-nickel wire for welding austenitic chromium-nickel alloys of the 18 Cr-8% Ni type. OK Autrod 308LSi has good general corrosion resistance. The alloy has a low carbon content, making it particularly recommended where there is a risk of intergranular corrosion. The higher silicon content improves the welding properties such as wetting. The alloy is widely used in the chemical and food processing industries, as well as for pipes, tubes and boilers.

Welding current
DC(+)

Classifications

SFA/AWS A5.9	ER308LSi
EN 12072	G 19 9 LSi
Werkstoffnummer	~1.4316

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.8	1.8	20.3	10.0	<0.3	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	370
Tensile strength, MPa	620
Elongation, %	36

Charpy V

Test temps, °C	Impact values, J
+20	110
-60	90
-196	60

Approvals

DB	43.039.01
DNV	308L MS (-196ºC)
VdTÜV	04267
CE	EN 13479
CWB	AWS A5.9

Valid for items ending with A

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	4.0-17.0	55-160	15-24	1.0-4.2
0.9	3.5-18.0	65-220	15-28	1.1-5.4
1.0	4.0-16.0	80-240	15-28	1.5-6.0
1.2	3.0-14.0	100-300	15-29	1.6-7.5
1.6	5.5-9.0	230-375	23-29	5.2-8.6

OK Autrod 309LSi

GMAW
ER309LSi

Description

A continuous, solid ,corrosion-resistant, chromium-nickel wire for welding steels with a similar composition, wrought and cast steels of the 23% Cr -12% Ni types. The alloy is also used for welding buffer layers on CMn steels and welding dissimilar joints. When using the wire for buffer layers and dissimilar joints, it is necessary to control the dilution of the weld.

OK Autrod 309LSi has good general corrosion resistance. The higher silicon content improves the welding properties such as wetting.

Welding current
DC(+)

Classifications

SFA/AWS A5.9	ER309LSi
EN 12072	G 23 12 LSi
Werkstoffnummer	~1.4332

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.8	1.8	24.0	13.0	<0.3	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	440
Tensile strength, MPa	600
Elongation, %	41

Charpy V

Test temps, °C	Impact values, J
+20	160
-60	130
-110	90

Approvals

DB	43.039.16
UDT	DIN 8556
VdTÜV	10020
Ü	43.039/1

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	4.0-17.0	55-160	15-24	1.0-4.0
0.9	3.5-18.0	65-220	15-28	1.1-5.4
1.0	4.0-16.0	80-240	15-28	1.5-6.0
1.2	3.0-14.0	100-300	15-29	1.6-7.5
1.6	5.5-9.0	230-375	23-31	5.2-8.6

OK Autrod 316LSi

GMAW
G 19 12 3 LSi

Description

A continuous, solid, corrosion-resistant, chromium-nickel-molybdenum wire for welding austenitic stainless alloys of the 18% Cr -8% Ni and 18% Cr -10% Ni -3% Mo types.

OK Autrod 316LSi has good general corrosion resistance; in particular, the alloy has very good resistance to corrosion in acid and chlorinated environments. The alloy has a low carbon content which makes it particularly recommended when there is a risk of intergranular corrosion. The higher silicon content improves the welding properties such as wetting. The alloy is widely used in the chemical and food processing industries, as well as in shipbuilding and various types of architectural structure.

Welding current
DC(+)

Classifications

EN 12072	G 19 12 3 LSi
SFA/AWS A5.9	ER316LSi
Werkstoffnummer	~1.4430

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.8	1.8	19.0	12.5	2.8	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	440
Tensile strength, MPa	620
Elongation, %	37

Charpy V

Test temps, °C	Impact values, J
+20	120
-60	95
-196	55

Approvals

DB	43.039.05
DNV	316L MS (-120ºC)
UDT	DIN 8556
VdTÜV	04268
Ü	43.039/1
CWB	AWS A5.9

Valid for items ending with A

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	4.0-17.0	55-160	12-24	1.0-4.2
0.9	3.5-18.0	65-220	15-28	1.1-5.4
1.0	4.0-16.0	80-240	15-28	1.5-6.0
1.2	3.0-14.0	100-300	15-29	1.6-7.5
1.6	5.5-9.0	230-375	23-31	5.2-8.6

OK Autrod 347Si

GMAW
ER347Si

Description

A continuous, solid, corrosion-resistant, chromium-nickel wire for welding austenitic chromium-nickel alloys of the 18% Cr-8% Ni type. OK Autrod 347Si has good general corrosion resistance. The alloy is stabilised with niobium to improve resistance to the intergranular corrosion of the weld metal. The higher silicon content improves the welding properties such as wetting. Due to the niobium content, this alloy is recommended for use at higher temperatures.

Welding current
DC(+)

Classifications

SFA/AWS A5.9	ER347Si
EN 12072	G 19 9 NbSi
Werkstoffnummer	~1.4551

Wire composition

C	Si	Mn	Cr	Ni	Mo	Nb	Cu
<0.08	0.8	1.8	20.0	10.0	<0.3	<1.0	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	440
Tensile strength, MPa	640
Elongation, %	37

Charpy V

Test temps, °C	Impact values, J
+20	110
-60	80

Approvals

DB	43.039.13
VdTÜV	09734
Ü	43.039/1

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	4.0-17.0	55-160	15-24	1.0-4.0
1.0	3.5-18.0	80-240	15-28	1.3-6.7
1.2	3.0-14.0	100-300	15-29	1.6-7.5
1.6	5.5-9.0	230-375	23-31	5.2-8.6

OK Autrod 16.95

GMAW
G 18 8 Mn

Description

A continuous, solid, corrosion-resistant, chromium-nickel-manganese wire for welding austenitic stainless alloys of the 18% Cr, 8% Ni, 7% Mn types. OK Autrod 16.95 has general corrosion resistance similar to that of the corresponding parent metal. The higher silicon content improves the welding properties such as wetting. When used for joining dissimilar materials, the corrosion resistance is of secondary importance. The alloy is used in a wide range of applications across the industry, such as the joining of austenitic, manganese, work-hardenable steels, as well as armour plate and heat-resistant steels.

Welding current
DC(+)

Classifications

EN 12072	G 18 8 Mn
Werkstoffnummer	~1.4370

Wire composition

C	Si	Mn	Cr	Ni
<0.2	<1.2	6.5	18.5	8.5

Typical mech. properties all weld metal

Yield stress, MPa	450
Tensile strength, MPa	640
Elongation, %	41

Charpy V

Test temps, °C	Impact values, J
+20	130

Approvals

DB	43.039.10
UDT	DIN 8556
Ü	43.039/1
VdTÜV	05420

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	4.0-17	55-160	15-24	1.0-4.1
0.9	3.5-18	65-220	15-28	1.1-5.4
1.0	4.0-16	80-240	15-28	1.5-6.0
1.2	3.0-14	100-300	15-29	1.6-7.5
1.6	5.5-9	230-375	23-31	5.2-8.6

OK Autrod 2209

GMAW
ER2209

Description

A continuous, solid, corrosion-resistant, duplex wire for welding austenitic-ferritic stainless alloys of the 22% Cr, 5% Ni, 3% Mo types.

OK Autrod 2209 has high general corrosion resistance. In media containing chloride and hydrogen sulphide, the alloy has a high resistance to intergranular corrosion, pitting and especially to stress corrosion. The alloy is used in a variety of applications across all industrial segments.

Welding current
DC(+)

Classifications

SFA/AWS A5.9	ER2209
EN 12072	G 22 9 3 NL

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.7	22.5	8.5	3.3	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	600
Tensile strength, MPa	765
Elongation, %	28

Charpy V

Test temps, °C	Impact values, J
+20	100
-20	85
-60	60

Approvals

DNV	For duplex stainless steels
VdTÜV	05387 (IT)

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	3.4-11.0	50-140	16-22	0.8-2.6
1.0	2.9-8.4	80-190	16-24	1.0-3.2
1.2	4.9-8.5	180-280	20-28	2.6-4.6
1.6	3.2-5.5	230-350	24-28	3.0-5.2

OK Tigrod 308L

GTAW
ER308L

Description

Bare, corrosion-resistant, chromium-nickel TIG rod. OK Tigrod 308L has good general corrosion resistance. The alloy has a low carbon content which makes it particularly recommended when there is a risk of intergranular corrosion. The alloy is widely used in the chemical and food-processing industries, as well as for pipes, tubes and boilers. Suitable for the joining of stainless steels of the18% Cr-8% Ni type with a low carbon content and Nb-stabilised steels of the same type if the service temperature does not exceed 350ºC. It can also be used for welding Cr steels, except in sulphur-rich environments.

Welding current
DC(-)

Classifications

SFA/AWS A5.9	ER308L
EN 12072	W 19 9 L
Werkstoffnummer	~1.4316

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.8	20.3	10.0	<0.3	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	450
Tensile strength, MPa	645
Elongation, %	36

Charpy V

Test temps, °C	Impact values, J
+20	170
-80	135
-196	90

Approvals

DNV	308L (-60ºC)
VdTÜV	04269
CWB	AWS A5.9
	Valid for items ending with A

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.2	1000	5
1.6	1000	5
2.0	1000	5
2.4	1000	5
3.2	1000	5

OK Tigrod 309L

GTAW
ER309L

Description

Bare, corrosion-resistant, chromium-nickel welding rod for welding the 24%Cr, 13%Ni alloyed types of steel. The alloy is also used for welding buffer layers on CMn steels and for welding dissimilar joints. When using the wire for buffer layers and dissimilar joints, it is necessary to control the dilution of the weld.

OK Tigrod 309L has good general corrosion resistance. When used for joining dissimilar materials, the corrosion resistance is of secondary importance.

Welding current
DC(-)

Classifications

SFA/AWS A5.9	ER309L
EN 12072	W 23 12 L
Werkstoffnummer	~1.4332

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.8	24.0	13.0	<0.3	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	430
Tensile strength, MPa	590
Elongation, %	40

Charpy V

Test temps, °C	Impact values, J
+20	160
-60	130
-110	90

Approvals

VdTÜV	10021
CWB	AWS A5.9
	Valid for items ending with A

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.2	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 316L

GTAW
ER316L

Description

Bare, corrosion-resistant, chromium-nickelmolybdenum rods for welding austenitic stainless alloys of the 18% Cr-8% Ni and 18% Cr-10% Ni-3% Mo types.

OK Tigrod 316L has good general corrosion resistance, particularly to corrosion in acid and chlorinated environments. The alloy has a low carbon content which makes it particularly recommended when there is a risk of intergranular corrosion. The alloy is widely used in the chemical and food-processing industries, as well as in shipbuilding and various types of architectural structure.

Welding current
DC(-)

Classifications

SFA/AWS A5.9	ER316L
EN 12072	W 19 12 3 L
Werkstoffnummer	~1.4430

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.8	19.0	12.5	2.8	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	470
Tensile strength, MPa	650
Elongation, %	32

Charpy V

Test temps, °C	Impact values, J
+20	140
-60	110
-196	70

Approvals

DNV	316L (-60ºC)
VdTÜV	04270
CWB	AWS A5.9

Valid for items ending with A

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.0	1000	5.0
1.2	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0
4.0	1000	5.0

OK Tigrod 347

GTAW
W 19 9 Nb

Description

Bare, corrosion-resistant, chromium-nickel rods for welding stabilised austenitic chromium-nickel alloys of the 18% Cr-8% Ni type. The rods are stabilised with niobium, which provides good resistance to the intergranular corrosion of the weld metal. Due to the niobium content, this alloy is recommended for use at higher temperatures.

Welding current
DC(-)

Classifications

EN 12072	W 19 9 Nb
SFA/AWS A5.9	ER347
Werkstoffnummer	~1.4551

Wire composition

C	Si	Mn	Cr	Ni	Mo	Nb	Cu
<0.08	0.5	1.4	20.0	10.0	<0.3	<1.0	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	>350
Tensile strength, MPa	>550
Elongation, %	>25

Charpy V

Test temps, °C	Impact values, J
-20	90

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0

OK Tigrod 2209

GTAW
ER2209

Description

Bare, corrosion-resistant, duplex welding rods for welding austenitic-ferritic stainless alloys of the 22% Cr, 5% Ni, 3% Mo types.

OK Tigrod 2209 has high general corrosion resistance. In media containing chloride and hydrogen sulphide, the alloy has high resistance to intergranular corrosion, pitting and especially to stress corrosion. The alloy is used in a variety of applications across all industrial segments.

Welding current
DC(-)

Classifications

SFA/AWS A5.9	ER2209
EN 12072	W 22 9 3 NL

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.7	22.5	8.5	3.3	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	600
Tensile strength, MPa	765
Elongation, %	28

Charpy V

Test temps, °C	Impact values, J
+20	100
-20	85
-60	60

Approvals

VdTÜV	05519 (IT)

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.2	1000	5.0
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0

OK Tigrod 2509

GTAW
W 25 9 4 NL

Description

Bare, corrosion-resistant, “Super Duplex” rods for welding austenitic-ferritic stainless alloys of the 25% Cr, 7% Ni, 4% Mo, low C types. OK Autrod 2509 has high intergranular-corrosion, pitting and stress-corrosion resistance. The alloy is widely used in applications where corrosion resistance is of the utmost importance. The pulp & paper industry, offshore and gas industry are areas of interest.

Welding current
DC(-)

Classifications

EN 12072	W 25 9 4 NL

Wire composition

C	Si	Mn	Cr	Ni	Mo	W	Cu
<0.02	0.4	0.4	25.0	9.8	4.0	<1.0	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	670
Tensile strength, MPa	850
Elongation, %	30

Charpy V

Test temps, °C	Impact values, J
+20	150
-40	115

Approvals

VdTÜV	06593 (IT)

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	5.0
2.0	1000	5.0
2.4	1000	5.0
3.2	1000	5.0

OK Autrod 308L

SAW
ER308L

Description

A continuous, solid, corrosion-resistant, chromium-nickel wire. OK Autrod 308L has good general corrosion resistance. The alloy has a low carbon content which makes it particularly recommended where there is a risk of intergranular corrosion. The alloy is widely used in the chemical and food-processing industries, as well as for pipes, tubes and boilers. OK Autrod 308L can be used in combination with OK Flux 10.93 or OK Flux 10.92.

Classifications

SFA/AWS A5.9	ER308L
EN 12072	S 19 9 L
Werkstoffnummer	~1.4316

Wire composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.8	20.3	10.0	<0.3	<0.3

OK Autrod 309L

SAW

Description

A continuous, solid , corrosion-resistant, chromium-nickel wire for joining stainless steels to non-alloy or low-alloy steels and for welding austenitic stainless alloys of the 24% Cr, 13% Ni types.

OK Autrod 309L has good general corrosion resistance. When used for joining dissimilar materials, the corrosion resistance is of secondary importance. OK Autrod 309L can be used in combination with OK Flux 10.93 or OK Flux 10.92.

Welding current
DC+

Classifications

SFA/AWS A5.9	ER309L
EN 12072	S 23 12 L
Werkstoffnummer	~1.4332

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.8	24.0	13.0	<0.3	<0.3

OK Autrod 316L

SAW
ER316L

Description

A continuous, solid , corrosion-resistant, chromium-nickel-molybdenum wire for welding austenitic stainless alloys of the 18% Cr-8% Ni and 18% Cr-8% Ni-3% Mo types. OK Autrod 316L has good general corrosion resistance. In particular, the alloy has very good resistance to corrosion in acid and chlorinated environments. The alloy has a low carbon content which makes it particularly recommended where there is a risk of intergranular corrosion. The alloy is widely used in the chemical and food-processing industries, as well as in shipbuilding and various types of architectural structure. OK Autrod 316L can be used in combination with OK Flux 10.93 or OK Flux 10.92.

Classifications

SFA/AWS A5.9	ER316L
EN 12072	S 19 12 3 L
Werkstoffnummer	~1.4430

Wire composition

C	Si	Mn	Cr	Ni	Mo	Cu
<0.03	0.5	1.8	19.0	12.5	2.8	<0.3

OK Flux 10.92

Type Calcium silicate

SAW
SA CS 2 Cr DC

Description

OK Flux 10.92 is an agglomerated, Cr-alloying flux which is designed for the butt welding of stainless steels. The chromium alloying effect of OK Flux 10.92 compensates for Cr losses in the arc during welding.

Density
approx. 1.0 kg/dm^3

Basicity index
1.0

Flux consumption, kg flux/kg wire

Voltage	DC+
26	0.4
30	0.55
34	0.7
38	0.9

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 16.97	0.04	0.9	5.0	19.0	8.5	-
OK Autrod 308H	0.03	0.9	1.0	20.0	10.0	0.75
OK Autrod 308L	0.02	0.9	1.0	20.0	10.0	-
OK Autrod 309L	0.02	0.8	1.1	24.0	13.0	-
OK Autrod 316L	0.02	0.8	1.0	19.0	12.0	2.7
OK Autrod 347	0.04	0.8	0.9	20.0	10.0	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 16.97	450	630	+20	60
			-20	55
			-60	45
OK Autrod 308H	365	580	-60	60
OK Autrod 308L	365	580	-60	60
OK Autrod 309L	410	575	-20	50
OK Autrod 316L	385	590	-70	55
OK Autrod 347	470	640	-60	55

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CL	DB	VdTÜV
OK Autrod 308L							x		x
OK Autrod 347									x
OK Autrod 316L			316 L (tm)				x		x
OK Autrod 317L			316L (tm), NV 25		UP (KV -60°C)				
OK Autrod 318									x
OK Autrod 309L		SS/CMn	x						
OK Band 308L			x						x
OK Band 347									x
OK Band 316L			x		4462M				x

Classifications

Wire	EN 12072	SFA/AWS A5.9
OK Autrod 308L	ER308L	S 19 9 L
OK Autrod 308H	ER308H	S 19 9 H
OK Autrod 347	ER347	S 19 9 Nb
OK Autrod 316L	ER316L	S 19 12 3 L
OK Autrod 318	ER318	S 19 12 3 Nb
OK Autrod 309L	ER309L	S 23 12 L
OK Autrod 309MoL	(309MoL)	S 23 12
OK Autrod 310	ER310	S 25 20
OK Autrod 312	ER312	S 29 9
OK Autrod 16.97	(ER307)	S 18 8 Mn
OK Band 308L	EQ308L	S 19 9 L
OK Band 347	EQ347	S 19 9 Nb
OK Band 316L	EQ316L	S 19 12 3 L
OK Band 309L	EQ309L	S 23 12 L

OK Flux 10.93
Type Fluoride basic

SAW
SA AF 2 DC

Description

OK Flux 10.93 is a basic non-alloying agglomerated flux for the submerged arc welding of stainless steels and high-alloyed CrNiMo steels such as duplex stainless steels.

Density
~1.0 kg/dm³

Basicity index
1.7

Flux consumption, kg flux/kg wire

Voltage	DC+
26	0.5
30	0.6
34	0.8
38	1.0

Typical all weld metal composition, %

Wire	C	Si	Mn	Cr	Ni	Mo
OK Autrod 308L	0.03	0.6	1.4	20.0	10.0	-
OK Autrod 309L	0.03	0.6	1.5	24.0	12.5	-
OK Autrod 316L	0.03	0.6	1.4	18.5	11.5	2.7
OK Autrod 347	0.03	0.5	1.1	19.2	9.6	-
OK Autrod 2209	0.02	0.8	1.3	22.0	9.0	-

Typical mech. properties all weld metal

Wire	Yield stress MPa	Tensile strength MPa	Charpy V °C	J
OK Autrod 308L	400	560	-40	75
			-60	65
			-110	55
			-196	40
OK Autrod 309L	430	570	-60	70
			-110	60
			-196	35
OK Autrod 316L	390	565	-40	95
			-60	90
			-110	75
			-196	40
OK Autrod 318	440	600	-60	90
			-110	40
OK Autrod 347	455	635	-60	85
			-110	60
			-196	30
OK Autrod 385	310	530	+20	80
OK Autrod 2209	630	780	-20	125
			-40	110
			-60	80

Approvals

Wire	ABS	LR	DNV	BV	GL	RS	CL	DB	VdTÜV	CE
OK Autrod 308L	Stainless		308L					x	x	EN 13479
OK Autrod 347									x	
OK Autrod 316L								x	x	EN 13479
OK Autrod 318									x	
OK Autrod 309L		x	309L						x	EN 13479
OK Autrod 16.97			x						x	
OK Autrod 385									x	
OK Autrod 2209	x		x		4462M		x		x	

OK Flux 10.93 continued on page 60.

OK Flux 10.93 *(continued)* SAW
Type Fluoride basic SA AF 2 DC

Classifications

Wire	SFA/AWS A5.9	EN 12072
OK Autrod 308L	S 19 9 L	ER308L
OK Autrod 347	S 19 9 Nb	ER347
OK Autrod 316L	S 19 12 3 L	ER316L
OK Autrod 318	S 19 12 3 Nb	ER318
OK Autrod 309L	S 23 12 L	ER309L
OK Autrod 16.97	S 18 8 Mn	(ER307)
OK Autrod 2209	S 22 9 3 N L	ER2209
OK Autrod 312	S 29 9	ER312
OK Autrod 385	S 20 25 5 Cu L	ER385

OK Autrod 4043

GMAW
ER4043

Description

OK Autrod 4043 is one of the most widely used welding and brazing alloys and can be classified as a general-purpose filler alloy. The silicon addition results in improved fluidity (wetting action), making the alloy the preferred choice of welders. The alloy is not sensitive to weld cracking and produces bright, almost smut-free welds. Not recommended for anodising. Non-heat treatable.

Welding current
DC(+)

Classifications

SFA/AWS A5.10	ER4043
EN ISO 18273	S Al 4043 (AlSi5)
EN ISO 18273	S Al 4043A (AlSi5(A))

Wire composition

Si	Mn	Cr	Cu	Ti	Zn	Fe
5.0	<0.05	<0.05	<0.05	<0.15	0.10	<0.6

Typical mech. properties all weld metal

Yield stress, MPa	55
Tensile strength, MPa	165
Elongation, %	18

Approvals

CWB	AWS A5.10 *(Item number ending with A)*
DB	61.039.05
CE	EN 13479

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	5-13	60-170	13-24	0.4-1.1
0.9	5-13	60-170	13-24	0.5-1.3
1.0	7-14	90-210	15-26	0.9-1.8
1.2	6-13	140-260	20-29	1.1-2.4
1.6	4.5-7.5	190-350	25-30	1.5-2.5
2.4	3.5-5	280-400	26-31	2.5-3.7

OK Autrod 5183

GMAW
ER5183

Description

OK Autrod 5183 is designed to provide the highest possible strength in the as-welded condition of alloy AA 5083 and similar high-magnesium alloys. The more common OK Autrod 5356 typically fails to meet the as-welded tensile requirements of AA 5083. The alloy is typically used in marine and structural applications where high strength, high fracture toughness for impact resistance and exposure to corrosive elements are important. The alloy is not recommended for elevated temperature applications due to its susceptibility to stress corrosion cracking. The alloy is non-heat treatable.

Welding current
DC(+)

Classifications

SFA/AWS A5.10	ER5183
EN ISO 18273	S Al 5183 (AlMg4.5Mn0.7(A)

Wire composition

Si	Mn	Cr	Cu	Ti	Zn	Fe	Mg
<0.25	0.8	0.15	<0.10	<0.15	<0.25	<0.40	4.8

Typical mech. properties all weld metal

Yield stress, MPa	140
Tensile strength, MPa	290
Elongation, %	25

Charpy V

Test temps, °C	Impact values, J
+20	30

Approvals

ABS	ER5183 for dim 1.2 and 1.6 mm
CWB	AWS A5.10 *(Item number ending with A)*
DB	61.039.03
DNV	5183 (WC)
GL	RAlMg4.5
LR	WC/I-1, RC/I-1
VdTÜV	
CE	EN 13479
DV	WC

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
1.0	7-14	90-210	15-26	0.9-1.8
1.2	6-13	140-260	20-29	1.1-2.4
1.6	4.5-7.5	190-350	25-30	1.5-2.5
2.4	3.5-5	280-400	26-31	2.5-3.7

OK Autrod 5356

GMAW
ER5356

Description

OK Autrod 5356 is the most widely used welding alloy and can be classified as a general-purpose type filler alloy. OK Autrod 5356 is typically chosen because of its relatively high shear strength.

The 5XXX alloy base material, welded with OK Autrod 5356, with a weld pool chemistry greater than 3% Mg and service temperatures in excess of 65°C, is susceptible to stress corrosion cracking. The alloy is non-heat treatable.

Welding current
DC(+)

Classifications

SFA/AWS A5.10	ER5356
EN ISO 18273	S Al 5356 (AlMg5Cr(A))

Wire composition

Si	Mn	Cr	Cu	Ti	Zn	Fe	Mg
<0.25	0.15	0.13	<0.05	0.11	<0.10	<0.40	5.0

Typical mech. properties all weld metal

Yield stress, MPa	120
Tensile strength, MPa	265
Elongation, %	26

Approvals

ABS	ER 5356 for dim. 1.2 mm
CWB	AWS A5.10 *(Item number ending with A)*
DB	61.039.01
DNV	5356 (WB)
GL	S-AlMg 5
LR	WB/I-1
VdTÜV	
BV	WB
CE	EN 13479

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
0.8	5-13	60-170	13-24	0.4-1.1
0.9	5-13	60-170	13-24	0.5-1.3
1.0	7-14	90-210	15-26	0.9-1.8
1.2	6-13	140-260	20-29	1.1-2.4
1.6	4.5-7.5	190-350	25-30	1.5-2.5
2.4	3.5-5	280-400	26-31	2.5-3.7

OK Autrod 5556

GMAW
ER5556

Description

Continuous solid wire suitable for welding aluminium alloys with up to approx. 5% Mg that are not age hardenable and alloys where a higher tensile strength is required. The corrosion resistance in a marine atmosphere is high.

Welding current
DC(+)

Classifications

SFA/AWS A5.10	ER5556
EN ISO 18273 S	Al 5556A (AlMg5Mn)

Wire composition

Si	Mn	Cr	Cu	Ti	Zn	Fe	Mg
<0.25	0.8	0.13	<0.10	0.13	<0.20	<0.40	5.3

Typical mech. properties all weld metal

Yield stress, MPa	145
Tensile strength, MPa	295
Elongation, %	25

Charpy V

Test temps, °C	Impact values, J
+20	25

Approvals

CWB	AWS A5.10 *(Item number ending with A)*
VdTÜV	

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
1.0	7-14	90-210	15-26	0.9-1.8
1.2	6-13	140-260	20-29	1.1-2.4
1.6	4.5-7.5	190-350	25-30	1.5-2.5

OK Autrod 1070

GMAW
S Al 1070 (Al99.7)

Description

OK Autrod 1070 is highly resistant to chemical attack and weathering. It is a relatively soft alloy that is very formable and it is used extensively in thin-gauge and foil products. It has good welding characteristics. One characteristic feature of the alloy is the bright finish obtained by anodising. Non-heat treatable.

Welding current
DC(+)

Classifications

EN ISO 18273	S Al 1070 (Al99.7)

Wire composition

Si	Mn	V	Cu	Al	Fe
<0.20	<0.03	<0.05	<0.04	>99.7	<0.25

Typical mech. properties all weld metal

Yield stress, MPa	35
Tensile strength, MPa	75
Elongation, %	45

Welding parameters

Diameter, mm	Wire feed, m/min	Welding current, A	Arc voltage, V	Deposition rate kg weld metal/hour
1.0	7-14	90-210	15-26	0.9-1.8
1.2	6-13	140-260	20-29	1.1-2.4
1.6	4.5-7.5	190-350	25-30	1.5-2.5
2.0		190-350	25-30	

OK Tigrod 4043

GTAW
R4043

Description

OK Tigrod 4043 is one of the most widely used welding alloys. It is used for welding AlMgSi types and AlSi alloys with up to 7% silicon. Not recommended for anodising. Non-heat treatable.

Welding current
AC

Classifications

SFA/AWS A5.10	R4043
EN ISO 18273	S Al 4043 (AlSi5)
EN ISO 18273	S Al 4043A (AlSi5(A))

Wire composition

Si	Mn	Cu	Ti	Zn	Fe
5.0	<0.05	<0.05	<0.15	<0.10	<0.6

Typical mech. properties all weld metal

Yield stress, MPa	55
Tensile strength, MPa	165
Elongation, %	18

Approvals

CWB	AWS A5.10 *(Item number ending with A)*
DB	61.039.06
CE	EN 13479

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	2.5/5
2.0	1000	2.5
2.4	1000	2.5/5
3.2	1000	2.5/5
4.0	1000	2.5/5

OK Tigrod 4047

GTAW
R4047

Description

OK Tigrod 4047 was originally developed as a brazing alloy to take advantage of its low melting point and narrow freezing range. In addition, it has a higher silicon content than OK Tigrod 4043, which provides increased fluidity and reduced shrinkage. Hot cracking is significantly reduced when using OK Autrod 4047 as a filler alloy. The alloy may be used in applications at sustained elevated temperatures. Non-heat treatable.

Welding current
AC

Classifications

SFA/AWS A5.10	R4047
EN ISO 18273	S Al 4047 (AlSi12(A))
EN ISO 18273	S Al 4047 (AlSi12)

Wire composition

Si	Mn	Cu	Ti	Zn	Fe
12.0	<0.15	<0.05	<0.15	<0.20	<0.6

Typical mech. properties all weld metal

Yield stress, MPa	80
Tensile strength, MPa	170
Elongation, %	12

Approvals

CWB	AWS A5.10 *(Item number ending with A)*

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	2.5/5
2.0	1000	2.5
2.4	1000	2.5/5
3.2	1000	2.5/5

OK Tigrod 5356

GTAW
R5356

Description

OK Tigrod 5356 is the most widely used welding alloy and can be classified as a general-purpose type filler alloy. OK Tigrod 5356 is typically chosen because of its relatively high shear strength.

The 5XXX alloy base material, welded with OK Tigrod 5356, with a weld pool chemistry greater than 3% Mg and service temperatures in excess of 65°C, is susceptible to stress corrosion cracking. The alloy is non-heat treatable.

Welding current
AC

Classifications

SFA/AWS A5.10	R5356
EN ISO 18273	S Al 5356 (AlMg5Cr(A))

Wire composition

Si	Mn	Cr	Cu	Ti	Zn	Fe	Mg
<0.25	0.15	0.13	<0.05	0.11	<0.10	<0.40	5.0

Typical mech. properties all weld metal

Yield stress, MPa	120
Tensile strength, MPa	265
Elongation, %	26

Approvals

CWB	AWS A5.10 *(Item number ending with A)*
DB	61.039.02
CE	EN 13479

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	2.5/5
2.0	1000	2.5/5
2.4	1000	2.5/5
3.2	1000	2.5/5
4.0	1000	2.5/5
5.0	1000	2.5/5

OK Tigrod 5556

GTAW
R5556

Description

Bare welding rod suitable for welding aluminium alloys with up to approx. 5% Mg that are not age hardenable and alloys where a higher tensile strength is required. The corrosion resistance in a marine atmosphere is very good.

Welding current
AC

Classifications

SFA/AWS A5.10	R5556
EN ISO 18273	S Al 5556A (AlMg5Mn)

Wire composition

Si	Mn	Cr	Cu	Ti	Zn	Fe	Mg
<0.25	0.8	0.13	<0.10	0.13	<0.20	<0.40	5.3

Typical mech. properties all weld metal

Yield stress, MPa	145
Tensile strength, MPa	295
Elongation, %	25

Charpy V

Test temps, °C	Impact values, J
+20	25

Approvals

CWB	AWS A5.10 *(item number ending with A)*
VdTÜV	

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	2.5
2.4	1000	2.5
3.2	1000	2.5
4.0	1000	2.5

OK Tigrod 1070

GTAW
S Al 1070 (Al99,7)

Description

OK Tigrod 1070 is highly resistant to chemical attack and weathering. It is a relatively soft alloy that is very formable and it is used extensively in thin-gauge and foil products. It has good welding characteristics. One characteristic feature of the alloy is the bright finish obtained by anodising. Non-heat treatable.

Welding current
AC

Classifications

EN ISO 18273	S Al 1070 (Al99,7)

Typical mech. properties all weld metal

Yield stress, MPa	35
Tensile strength, MPa	75
Elongation, %	33

Wire composition

Si	Mn	V	Cu	Al	Ti	Zn	Fe
<0.20	<0.03	<0.05	<0.04	>99.7	<0.03	<0.04	<0.25

Packing data

Diameter, mm	Length, mm	Weight of rods/box, kg
1.6	1000	2.5
2.0	1000	2.5
2.4	1000	2.5
3.2	1000	2.5
4.0	1000	2.5

OK Autrod 19.30

GMAW
ERCuSi-A

Description

A continuous, solid, copper wire for the GMA joining of copper-zinc alloys and low-alloyed copper and for the GMA brazing of zinc-coated steel sheets.

OK Autrod 19.30 is alloyed with silicon and manganese and has good flow properties and wear resistance. The alloy is widely used in the joining of zinc-coated steel sheets in car body production, as well as for overlay welding on low- and non-alloyed steels and cast iron. Pulsed GMA is recommended. OK Autrod 19.30 is normally welded with pure Ar as the shielding gas; however, for GMA brazing, the addition of 1% O_2 improves the brazing properties.

Welding current
DC(+)

Classifications

SFA/AWS A5.7	ERCuSi-A
EN 14640	S Cu 6560 (CuSi3Mn1)

Wire composition

Si	Mn	Cu	Sn	Zn	Fe
3.4	1.1	>94.0	<0.2	<0.2	<0.3

Typical mech. properties all weld metal

Yield stress, MPa	130
Tensile strength, MPa	350
Elongation, %	40

Charpy V

Test temps, °C	Impact values, J
+20	25

Approvals

VdTÜV	09147

MARATHON PAC™ – endless feedability

For many customers, Marathon Pac bulk drums for MIG/MAG and FCAW are key in maximising production efficiency and quality; in manual welding and especially in mechanised and robotic welding. Marathon Pac can cut the time taken by spool changes and maintenance by almost 95%. Marathon Pac comes in three sizes – the standard version, the jumbo version and the mini version – and is available for non and low-alloyed MAG wires, stainless MIG wires, aluminium MIG wires, MAG-brazing wires and cored wires. In addition, there is an "endless version" for C,mn Wires, which makes it possible to combine the content of a series of Marathon Pacs to form a continuous in-line supply source, thereby necessitating no stops whatsoever for wire exchange. This is ideal for multi-robot stations. A special wire resistance welder is available from ESAB for this purpose. Availability and content weight are given in the table below.

Marathon Pac versions	Wire Types	Filling content
Standard version (w x h: 513 x 830mm)	Non-/low-alloyed Stainless MAG-brazing Cored wires	250kg (ø 0.8 mm: 200kg) 250kg (ø 0.8 mm: 200kg) 200kg depending on wire type
Jumbo version (w x h: 595 x 935mm)	Non-/low-alloyed Stainless 475kg Aluminium Cored wires	475kg (min. ø 1.0mm) (min. ø 1.0mm) 141kg depending on wire type
Mini version (w x h: 513 x 500mm)	Stainless	100kg
Endless version (2 x standard or jumbo version)	Non-/low-alloyed wires Stainless	2 x 250kg 2 x 475kg 2 x 250kg 2 x 475kg

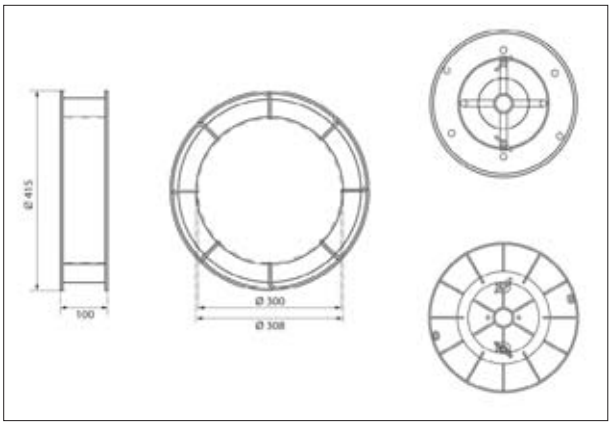
Packaging

Perfect delivery to the welding head
The special coiling technique that is used when packing the drum ensures that the wire is never twisted or warped, which would otherwise cause arc wander. Welds are well positioned and perfectly straight. The unwinding process from the drum is automatic, so no separate de-coiling equipment is needed and no additional forces are required, like those that are needed when pulling a traditional revolving spool. This translates into a lower wear rate for the wire feeder.

Easy recycling
Marathon Pac comes in octagonal cardboard drums that are fully recyclable. They can be folded flat after use to save on storage space.

From left to right: Endless Marathon Pac, Mini Marathon Pac, Standard Marathon Pac, Jumbo Marathon Pac.

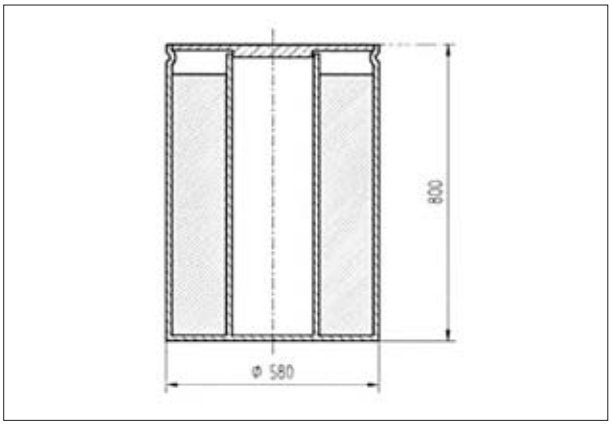
Spool types



Spool 03

03-0	25kg
03-2	30kg
03-3	15kg

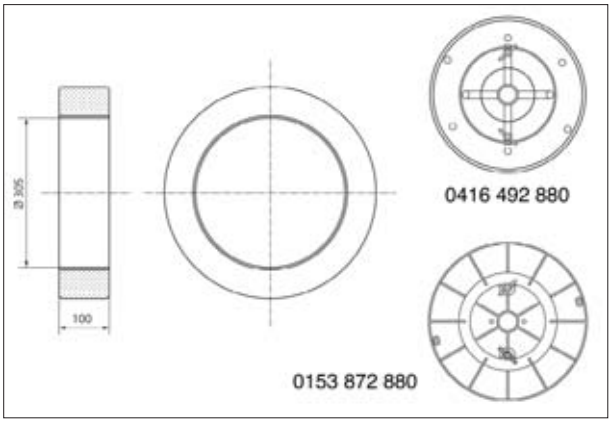
Random-wound wire basket. Can be fitted to ESAB's 0416 492 880 or 0153 872 880 coil holder. This spool is also suitable for coil holders with crossed arms. The empty basket is nonreturnable.



Spool 04

04-0	280kg

Random-wound pay-off drum. The empty spool is non-returnable.

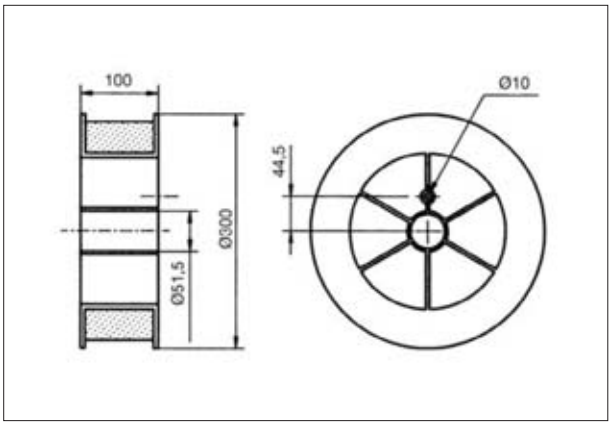


Spool 08

08-0	30kg

Random-wound spool without cardboard former. Can be fitted to ESAB's 0416 492 880 or 0153 872 880 coil holders. This spool is not suitable for coil holders with crossed arms.

Spool types



Spool 24

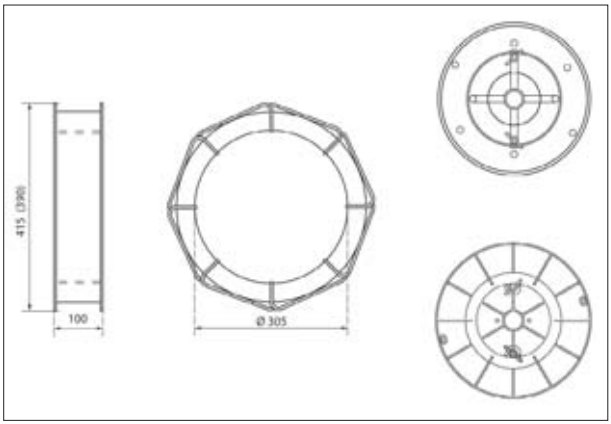
Plastic spool. Layer wound. EN 759: S 300.

24-7	15kg

Spool 25

Plastic spool. Random wound. EN 759: S 300.

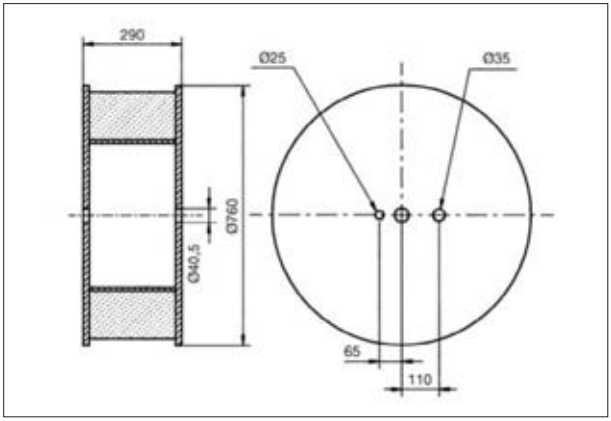
25-0	15kg
25-2	10kg



Spool 28/31 Eurospool

28-0	30kg
28-1	25kg
28-2	15kg

Precision-wound octagonal wire basket. Can be fitted to ESAB's 0416 492 880 or 0153 872 880 coil holder. This spool is also suitable for coil holders with crossed arms. The empty basket is non-returnable.

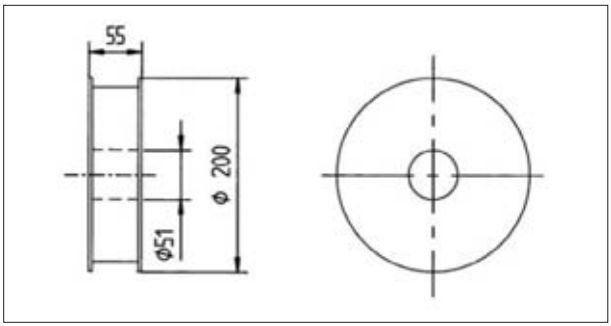


Spool 34

34-0	300kg

Random-wound wooden bobbin. Decoiling stand required. The empty bobbin is non-returnable.

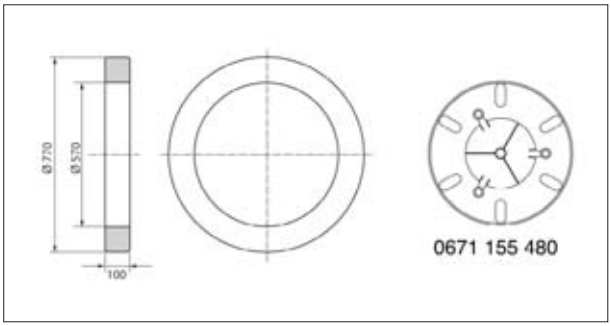
Spool types



Spool 46

Plastic spool. Random wound. EN 759: S 200.

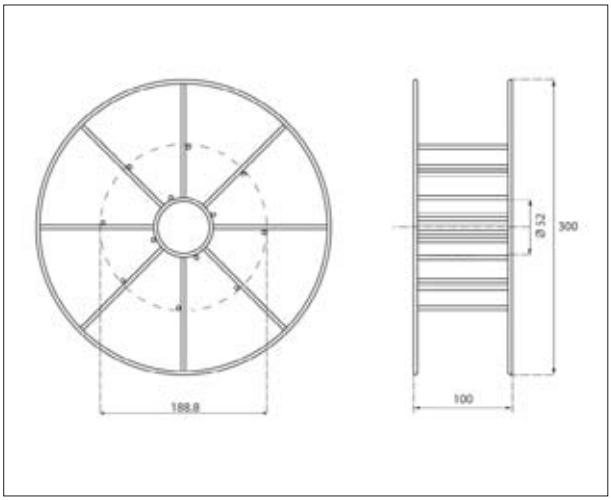
46-0	5kg
46-2	2kg



Spool 48

48-0	100kg
48-1	75kg

Random-wound coil sheet metal former. Can be fitted to ESAB's 0671 155 480 coil holder. Decoiling stand required.



Spool 66/68

Wire basket. Random wound. EN 759: BS 300. 66-copper-coated, 68-bare

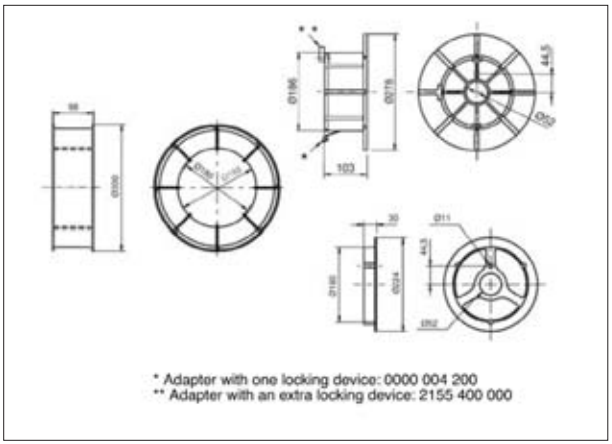
66-0	15kg
66-1	18kg
66-2	10kg
66-3	16kg

Spool 67/69

Wire basket. Layer wound. EN 759: BS 300. 67-copper-coated, 69-bare

67-0	15kg
67-1	18kg
67-3	16kg

Spool types



Spool 76

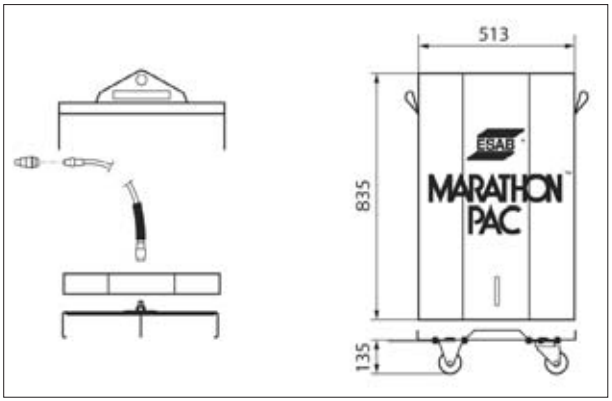
Wire basket. Random wound. EN 759: B 300.

76-0	15kg
76-1	18kg
76-3	16kg

Spool 77

Wire basket. Layer wound. EN 759: B 300.

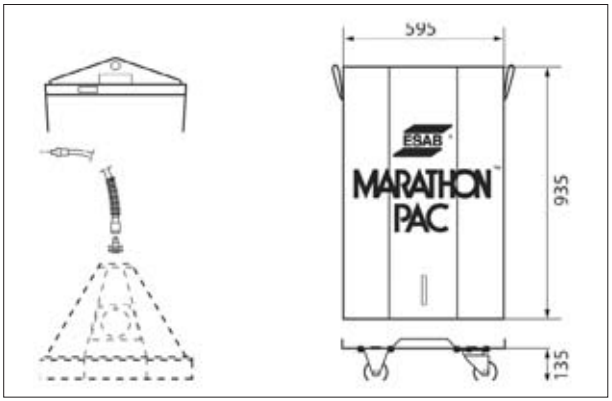
77-0	15kg
77-1	18kg
77-3	16kg



Spool 93
MARATHON PAC™

93-0-200kg, 93-2-250kg
93-X-catch weight

Accessories:
1. Wire conduit attachment
2. Wire conduits
3. Connector wire feed unit
4. Lifting yoke
5. Trolley

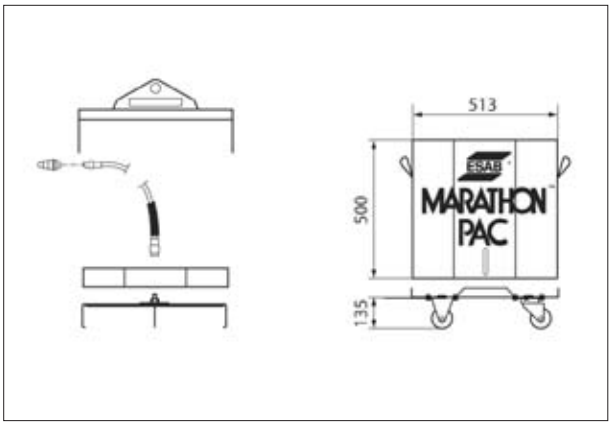


Spool 94
MARATHON PAC™

94-0	475kg

Accessories:
1. Plastic hood
2. Quick connector
3. Wire conduits
4. Connector wire feed unit
5. Lifting yoke
6. Trolley

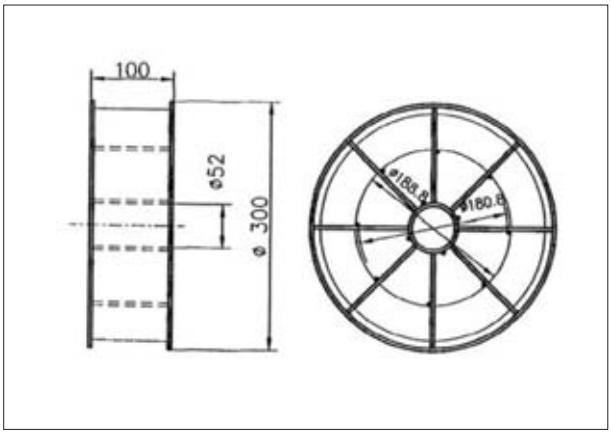
Spool types



Spool 95
MARATHON PAC™

95-0 100kg

Accessories:
1. Quick connector
2. Wire conduits
3. Connector wire feed unit
4. Lifting yoke
5. Trolley



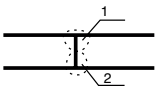
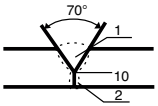
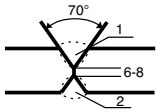
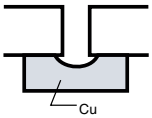
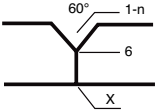
Spool 98

EN 759: BS 300
Layer-wound wire basket, plastic coated, which is used without adapter. Fitting to hub with diam.
= 51mm. Empty spool is recyclable.

98-2	15kg
98-3	18kg
98-4	16kg
98-6	6kg
98-7	7kg

Welding data and joint preparation

Typical welding data and recommended joint preparation for submerged arc welding mild steel and carbon-manganese structural steels with OK Flux 10.40, OK Flux 10.47, OK Flux 10.70, OK Flux 10.71, OK Flux 10.72, OK Flux 10.76 and OK Flux 10.81.

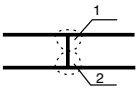
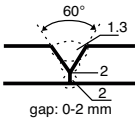
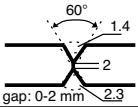
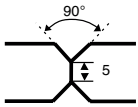
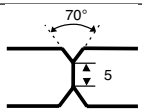
Type of joint	Plate thickness mm	Wire diameter mm	Run No	Arc voltage V	Welding current A	Welding speed cm/min.
	6	3	1	33	400	80
			2	33	430	
	8	4	1	34	480	60
			2	34	550	
	10	4	1	34	550	55
			2	35	650	
	12	4	1	35	650	50
			2	35	700	
	14	4	1	35	700	40
			2	35	750	
	16	4	1	32	600	50
			2	35	650	
	18	4	1	34	700	50
			2	35	650	
	20	4	1	36	750	40
			2	35	650	
	18	6	1	36	700	30
			2	36	850	
	20	6	1	36	800	25
			2	36	850	
	25	6	1	36	850	20
			2	36	950	
	30	6	1	36	900	15
			2	36	1000	
	2	2	1	28	325	125
	4	2.5	1	30	450	70
	6	3	1	31	510	50
	8	3	1	32	525	45
	10	3	1	33	600	35
	20	4	1	29	650	50
			2	32	750	50
			3	34	750	40
			X	30	550	50
	25	4	1	29	650	50
			2	30	700	50
			3, 4	32	750	40
			5	36	750	40
			X	30	550	50
	30	4	1	29	650	50
			2	30	700	50
			3-5	32	750	50
			6	34	750	40
			7-8	36	750	40
			X	30		

Typical welding data for submerged arc fillet welding mild steel and carbon-manganese structural steels with OK Flux 10.47, OK Flux 10.71 and OK Flux 10.81.

Type of joint	Plate thickness mm	Wire diameter mm	Throat thickness mm	Arc voltage V	Welding current A	Welding speed cm/min.
	Single welding head					
	≥ 6 ≥ 8 ≥10	3 4 4	3 4 5	30–32 30–32 30–32	500 450 650	100 60 50
	≥ 8 ≥12 ≥15	4 4 4	4 4 7	32–34 32–34 36	700 800 800	115 140 45
	≥15 ≥20	4 4	– –	36 36	750 750	45 40
	Twin wire					
	– –	2x1.6 2x2.0	4 5	32 34	800 300	120 110
	Two welding heads + ~					
	– –	4 4	4 4	+32 ~38 +32 ~38	800 700 800 700	140 140
	– –	4 4	4 5	+32 ~38 +32 ~35	800 700 800 700	140 90

General information

Typical welding data for submerged arc fillet welding mild steel and carbon-manganese structural steels with OK Flux 10.47, OK Flux 10.71 and OK Flux 10.81.

Type of joint	Plate thickness mm	Wire diameter mm	Run No	Arc voltage V	Welding current A	Welding speed m/h
	6	3	1 2	34	400 500	80 60
	8	4	1 2	34	500 600	80 60
	Manual welded root bead					
 gap: 0-2 mm	10	4	1 2	34	600 600	40 60
	12	4	1 2	34	600 600	35 50
	20	4	1 2 3	34	600 600 600	35 30 40
 gap: 0-2 mm	25	4	1 2 3 4	34 34	600 600 600 600	40 35 35 40
	8	4	1 2	34 34	450 550	55 50
	10	4	1 2	34 34	500 600	40 50
	12	4	1 2	34 34	500 600	35 40
	14	4	1 2	34 34	550 600	35 35

Notes

World leader in welding and cutting technology and systems.

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 and the environment are two key areas of focus. ESAB is one of few international companies to have achieved the new ISO 14001 standard in Environmental 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 unrivalled expertise in materials and processes within reach of all our customers, wherever they are located.

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