



# ***ESAB arc welding consumables for creep resisting steels.***

HIGH QUALITY CONSUMABLES  
FOR MMA, MAG, TIG, FCAW AND SAW.



# A wide range of consumables for creep resisting steels -

All ESAB customers enjoy the support of the world's only welding equipment and supplies company to have over a century of manufacturing and applications experience. For the petrochemical and power generation industries, ESAB combines a specialist range of high quality welding and cutting products with world-wide presence and dependable, one-stop service capability.



**ESAB develops and produces most consumables in-house, channeling production and application experience into innovative products.**



The ESAB range of welding consumables for creep resisting steels is just a small part of the extensive catalogue of welding and cutting products delivered to every sector of industry. ESAB process solutions range from consumables and power sources for manual welding, to operator-friendly installations for mechanised welding and cutting.

The range of consumables highlighted here deliver repeatable, value-added performance for MMA, MAG, TIG, FCAW and SAW and covers all commonly used grades of creep resisting steels. A separate programme is also available for strip cladding, as well as filler metals

**Productive, high quality consumables for all arc welding processes from one dependable source.**

for low hydrogen applications, stainless steel and nickel alloys. All these products have been developed to achieve optimal productivity for welders and operators with a strong focus on weldability. ESAB develops and produces most of its products from in house resources and driven by a thorough understanding of industry needs.

Consistent quality standards are guaranteed through uniform QC and QA systems across all ESAB plants. All products are manufactured according to ISO 9002 and are subject to both internal and external (ASME, TÜV) quality audits.

As a global company with representation through local sales organisations and distributors in over eighty countries, ESAB offers world-class solutions and dedicated support to all users wherever they are located. In addition, a network of Welding Application Centres are strategically located across the world to ensure maximum support whenever assistance is required with the implementation of new methods, the development of new welding procedures or when welder training is needed.

**- comes with a century of application experience.**

# All the consumables needed for a perfect weld and optimal productivity.

Consumables selection table

Steel type		CMnMo	1.25Cr 0.5Mo	2.25Cr 1Mo	5Cr 0.5Mo
EN/ASME grade		16Mo3	13CrMo4-5	10CrMo9-10	X12CrMo5
		18MnMoNi4-5	13CrMoSi5-5	12CrMo9-10	X11CrMo5
		SA-204	SA-182 F11	SA-182 F22	SA-213 T5
		SA-209 T1	SA-213 T11	SA-213 T22	SA-234 WP5
		SA-250 T1	SA-387 12,Cl1	SA-387 22,Cl1	
<b>MMA</b>	<b>EN 1599</b>	<b>AWS A 5.5</b>			
OK 74.46	E Mo B 42 H5	E7018-A1	X		
OK 76.16*	E CrMo1 B 42 H5	E8018-B2-H4R		X	
OK 76.18	E CrMo1 B 42 H5	E8018-B2		X	
OK 76.26*	E CrMo2 B 42 H5	E9018-B3			X
OK 76.28	E CrMo2 B 42 H5	E9018-B3		X	
OK 76.35	E CrMo5 B 42 H5	E8015-B6			X
OK 76.96	E CrMo9 B42 H5	E8015-B8			
OK 76.98	E CrMo91 B 42 H5	E9015-B9			
<b>MAG</b>	<b>EN 12070</b>	<b>AWS A 5.28</b>			
OK AristoRod 13.09	G MoSi	ER 80S-G	X		
OK AristoRod 13.12	G CrMo1Si	ER 80S-G		X	
OK Autrod 13.16*		ER 80S-B2		X	
OK Autrod 13.17*		ER 90S-B3			X
OK AristoRod 13.22	G CrMo2Si	ER 90S-G			X
OK Autrod 13.37	G CrMo9	ER 80S-B8			
<b>TIG</b>	<b>EN 12070</b>	<b>AWS A 5.28</b>			
OK Tigrod 13.09	W MoSi	ER 80S-G	X		
OK Tigrod 13.12	W CrMo1Si	ER 80S-G		X	
OK Tigrod 13.16*		ER 80S-B2		X	
OK Tigrod 13.17*		ER 90S-B3			X
OK Tigrod 13.22	W CrMo2Si	ER 90S-G			X
OK Tigrod 13.32	W CrMo5	ER 80S-B6			X
OK Tigrod 13.37	W CrMo9	ER 80S-B8			
OK Tigrod 13.38	W CrMo91	ER 90S-B9			
<b>FCAW</b>		<b>AWS A 5.29</b>			
Dual Shield 7000-A1		E 81T1-A1	X		
Dual Shield 8000-B2		E 81T1-B2		X	
Dual Shield 9000-B3		E 91T1-B3			X
Dual Shield B9		E 101T1-GM-H8			
<b>SAW</b>	<b>EN 12070</b>	<b>AWS A 5.23</b>			
OK Flux 10.62/OK Autrod 12.24	S Mo	F8A6-EA2-A2	X		
OK Flux 10.62/OK Autrod 13.10 SC	S CrMo1	F8P2-EB2R-B2		X	
OK Flux 10.62/OK Autrod 13.20 SC	S CrMo2	F8P2-EB3R-B3			X
OK Flux 10.62/OK Autrod 13.33	S CrMo5	EB6			X
OK Flux 10.63/OK Autrod 13.10 SC*	S CrMo1	F8P4-EB2R-B2R		X	
OK Flux 10.63/OK Autrod 13.20 SC*	S CrMo2	F8P8-EB3R-B3R			X
OK Flux 10.63/OK Autrod 13.35	S CrMo91	EB9			

\* Creep resistant consumables with an extra low level of the impurity elements P, As, Sb and Sn, to avoid temper embrittlement. Weld metal fulfills the X-factor < 15 ppm requirement.

9Cr 1Mo	9Cr 1MoVNb
X11CrMo9-1	X10CrMoVNb9-1
X11CrMo9-1 + NT	SA-182 F91
SA-234 WP9	SA-213 T91
SA-335 P9	SA-335 P91
SA-336 F9	

## Officine Luigi Resta relies on ESAB.



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Officine Luigi Resta of Scanzorosciate, Italy, manufactures components, such as heat exchangers, distillation columns and reactors, for the petrochemical and power generation industries. They have vast experience in the fabrication of heavy components in mild steel, creep resisting steel, stainless steel, aluminium alloys, nickel alloys and titanium.

A recent project, for China, called for the fabrication of dissolver reactors in 1.25Cr/0.5Mo creep resisting steel according to SA 387 Gr. 11 Cl.2. The reactors weigh 195t, are 18m high, 3.5m in diameter with a wall thickness of 134mm.

Longitudinal and circumferential welds were all deposited with highly productive ESAB tandem narrow gap SAW equipment mounted on an ESAB Column & Boom.

The wire/flux combination OK Autrod 13.10 SC/OK Flux 10.62. consistently met the required Charpy-V toughness at -18°C after a stress relieve treatment at 660°C for 5h.

Officine Luigi Resta and ESAB Italy look back on a long history of co-operation, the combination of welding productivity and consistent quality being the key to continued success.

# ESAB VacPac™ - convenience and security.

The ESAB VacPac™ vacuum packaging for MMA electrodes is ideal where control of weld metal hydrogen is essential, such as in the welding of creep resisting steels.

VacPac™ eliminates the costly storage and handling routines normally associated with the dry storage of electrodes by preventing air borne moisture absorption.

**No re-baking**  
**No holding ovens**  
**No quivers**

VacPac™ is simple and convenient to use ensuring that the electrodes keep their 'factory fresh' low moisture condition until the sealed vacuum packaging is opened. Even when the vacuum is released, the unused electrodes can remain in the opened VacPac™ for at least 10 hours at

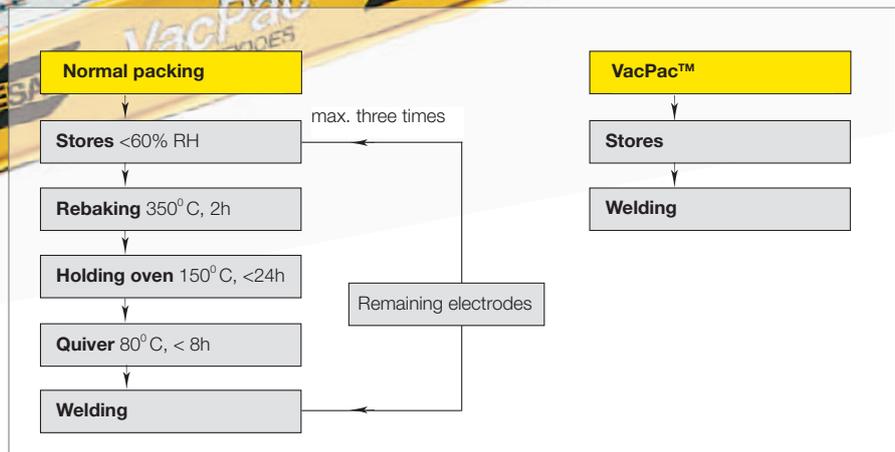
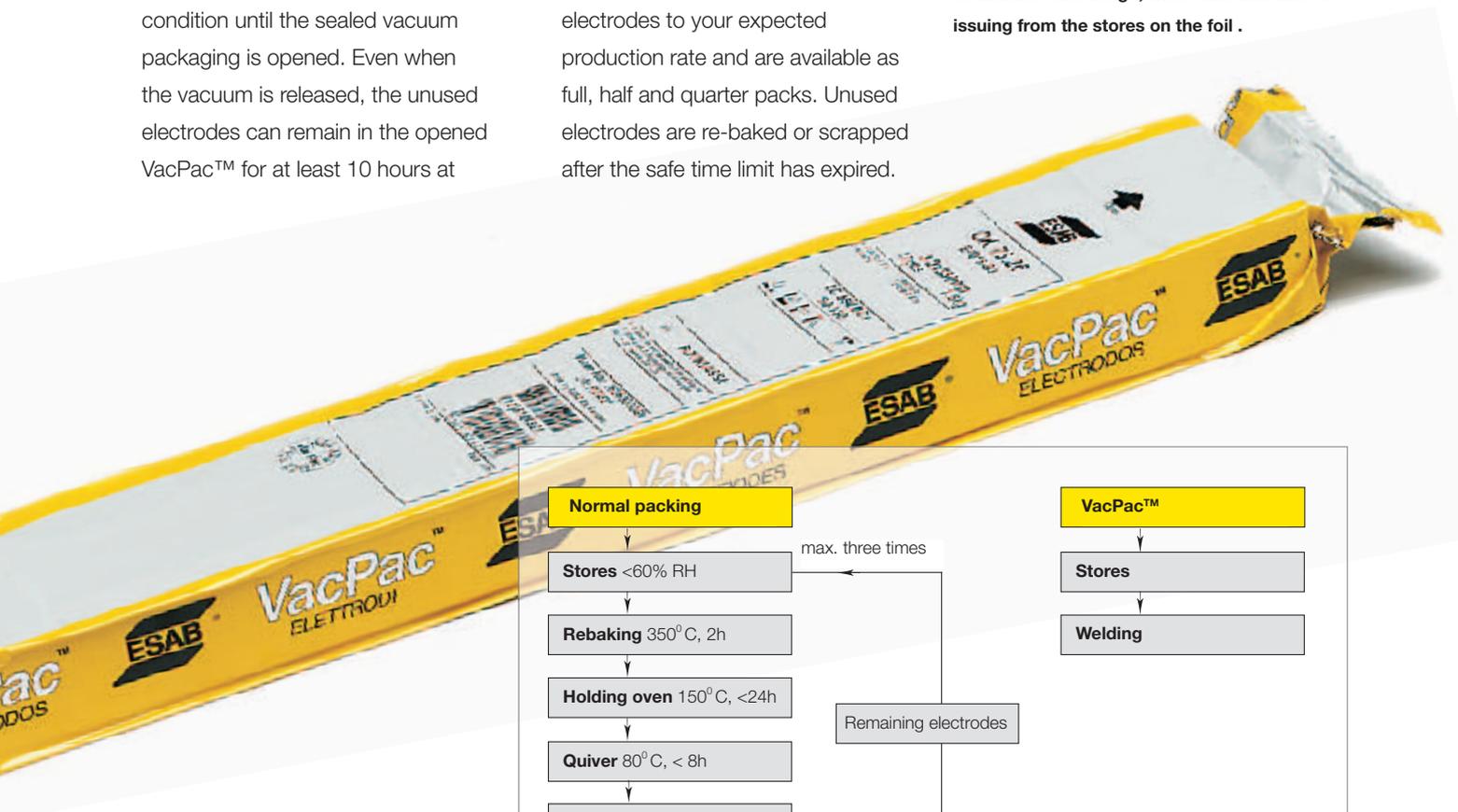
28°C/80% RH, and still ensure a weld metal hydrogen content that's within the lowest EN hydrogen class H5. This is because the special LMA (Low Moisture Absorption) coating on the electrodes effectively slows down the absorption of moisture from the air.

When properly stored under conditions where the sealed VacPac™ electrodes are not damaged, their shelf life is virtually unlimited.

The VacPac™ pack sizing options allow you to match the quantity of electrodes to your expected production rate and are available as full, half and quarter packs. Unused electrodes are re-baked or scrapped after the safe time limit has expired.



ESAB creep resisting electrodes are available in VacPac™, consisting of a recyclable plastic inner box and a strong moisture proof aluminium foil. The foil shows all necessary product information and is left in place after opening. To monitor safe usage, write date and time of issuing from the stores on the foil .



# World leader in welding and cutting technology and systems.



Officine Luigi Resta, Italy.

Since 1904, ESAB has been a pioneer in welding and cutting. By improving and developing our products and methods continuously, we meet the challenges of technological advance in any sector in which we operate.

Our focus on quality has always been strong. Quality is an ongoing process that is at the heart of all our production processes and facilities worldwide. With world leadership come worldwide applications, experience and expertise.

Multinational manufacturing of welding consumables and equipment brings ESAB quality and innovation within reach of all our customers.

ESAB customers enjoy full access to an unrivaled resource of technical and applications knowledge, service and support. With local representation all over the world, and a network of independent distributors, ESAB brings practical expertise and solutions to challenges involving materials, welding, cutting and overall productivity at local level.



Wherever in the world quality and productivity in welding and cutting counts, ESAB is there to set the standard.



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**ESAB 1904**  
A CENTURY OF INNOVATION IN  
WELDING & CUTTING