

# Böhler 1% Nickel-alloyed Arc Welding Consumables

A full range for demanding fabrication



# Lasting Connections



Creating lasting connections is the most important part of the welding process. Böhler Welding offers a globally unique product portfolio for all conventional arc welding processes and our best-in-class welding consumables ensure these lasting connections – even in the most challenging applications and industries. These merits are equally valid for our complete range of 1% Ni-alloyed welding consumables for demanding applications, covering all commonly applied arc welding processes. The all-weld metal Ni-content is kept below 1% to ensure conformance with the NACE MR0175 requirement for SSC safe service in sour environments in oil and gas exploration and processing. Packed with decades of application experience, these welding consumables are designed to bring you productivity, weld quality and – above all – security.

# Designed for Demanding Industries

Böhler 1% Ni consumables are designed to meet welding challenges in oil and gas exploration and other demanding industries – often coming with combined requirements for increased strength, low-temperature toughness and sulphide stress corrosion (SSC) resistance.

All products feature an all-weld metal Ni-content with less than 1% Ni to ensure conformance with the NACE MR0175 requirement for SSC safe service in sour environments in oil and gas exploration.

Steels with elevated yield strength levels up to 550 MPa can be welded, meeting Charpy V-Notch demands down to -60 °C, both in the as welded and stress relieved condition.

Our range of products is CTOD tested and/or approved in HIC and SSC tests according to NACE standards.

The product range covers the commonly applied arc welding processes MMA, MAG, TIG, FCAW and SAW.

## Appreciated by fabricators

Böhler 1% Ni consumables have a proven track record in the oil and gas exploration industry where they are widely applied in the welding of jackets and topsides of offshore platforms, piping and flow lines between rigs and to onshore terminals.

Another area are jackets for offshore wind turbines. Outside the offshore industry, products are used in demanding shipbuilding and civil constructions such as bridges where better than normal low-temperature impact toughness is required.

Users appreciate the excellent weldability of the products making their welding – as a necessary step in production – productive and efficient, while bringing sound welds with required mechanical properties.

## For hydrogen critical applications

All Böhler 1% Ni welding consumables are very low-hydrogen types falling in the EN H5 and AWS H4 hydrogen classes.

They offer the best protection against hydrogen induced cracking you can possibly get from filler metals for the various welding processes.

Stick electrode coatings and fluxes are low moisture absorbing types with delayed pick-up during exposure to the atmosphere outside their protective packaging.

State-of-the-art in FCAW are seamless cored wires with a closed wire design, blocking any moisture reabsorption – even during unprotected exposure, out of the packaging at the work station.

Packaging systems for the various low-hydrogen consumables are designed to provide easy and cost-efficient storage and handling, and superb protection against moisture reabsorption until the moment of welding.



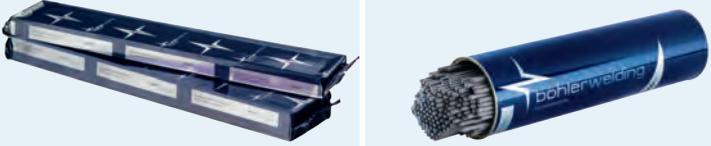
# Complete Table of 1% Nickel Portfolio

	Product name	Typical chemical position, all weld metal (Wt-%)					Shielding gas	Min. mechanical properties, all weld metal				
		C (%)	Si (%)	Mn (%)	Ni (%)	Mo (%)		R <sub>e</sub> /R <sub>p0.2</sub> (MPa)	R <sub>m</sub> (MPa)	A <sub>5</sub> (%)	ISO-V (J)	Weld metal condition
MMA / stick electrodes	<b>Phoenix SH V 1</b> EN ISO 2560-A: E 50 6 Mn 1 Ni B 42 H5 AWS A5.5: E8018-G (E8018-C3 mod.)	0.07	0.25	1.50	0.95			500 470	580 560	23 25	+20°C: 140 -60°C: 50 +20°C: 140 -60°C: 50	AW SR: 610°C/1h
	<b>BÖHLER FOX 1 Ni</b> EN ISO 2560-A: E 46 6 1 Ni B 4 2 H5 AWS A5.5: E7018-G H4R	0.06	0.3	1.2	0.9			470 420	550 510	25 26	+20°C: 160 -60°C: 50 +20°C: 160 -60°C: 50	AW SR: 610°C/1h
	<b>BÖHLER FOX EV 60</b> EN ISO 2560-A: E 46 6 1Ni B 4 2 H5 AWS A5.5: E8018-C3H4R	0.07	0.4	1.15	0.9			510 480	610 580	27 27	+20°C: 180 -60°C: 110 +20°C: 160	AW SR: 580°C/2h
	<b>BÖHLER FOX EV 65</b> EN ISO 18275-A: E 55 6 1NiMo B 4 2 H5 AWS A5.5: E8018-GH4R/ E8018-D1H4R(mod)	0.06	0.3	1.2	0.8	0.35		600 580	650 630	25 25	+20°C: 180 -60°C: 80 +20°C: 160	AW
MIG / solid wires	<b>BÖHLER SG 8-P</b> EN ISO 14341-A: G 42 5 M21 3Ni1 AWS A5.28: ER80S-G	0.06	0.7	1.5	0.9		M21 C1	500 470	590 560	24 25	+20°C: 150 -50°C: 80 +20°C: 110 -50°C: 45	AW AW
	<b>Union K Nova Ni</b> EN ISO 14341-A: G 50 6 M21 Z 3Ni/ G 46 4 C1 Z 3Ni AWS A5.18: ER80S-G/ER80SNi1 (mod.)	0.06	0.7	1.5	0.9		M21 C1	500 485	600 570	24 25	+20°C: 150 -50°C: 80 +20°C: 110 -50°C: 45	AW AW
	<b>Union K 52 Ni</b> EN ISO 14341-A: G 50 6 M21 Z3Ni1/ G 46 4 C1 Z3Ni1 AWS A5.28: ER80S-G/ER80S-Ni1 (mod.)	0.06	0.7	1.5	0.9	0.08	M21 C1	500 460	590 560	24 24	+20°C: 150 -60°C: 47 +20°C: 140 -40°C: 47	AW AW
TIG / rods	<b>BÖHLER ER 80 S Ni 1-IG</b> EN ISO 636-A: W 46 5 W0 AWS A5.28: ER80S-Ni1	0.09	0.6	1.1	0.95	0.25	I1	500	600	25	+20°C: 180 -30°C: 150 -50°C: >47	AW
	<b>BÖHLER Ni 1-IG</b> EN ISO 636-A: W 46 5 W3Ni1 AWS A5.28: ER80S-Ni1 (mod.)	0.07	0.7	1.4	0.9		I1	500	600	25	-20°C: 150 -50°C: ≥47	AW
	<b>Union I NiMo1</b> EN ISO 636-A: W 55 6 W0 AWS A5.28: ER90S-Ni1	0.09	0.20	1.7	0.95	0.60		560	680	24	+20°C: 140 -40°C: 70 -60°C: >47	



# Moisture proof packaging system

Moisture proof packaging systems are available for absolute protection against moisture reabsorption, during storage and handling of Böhler 1% Ni low-hydrogen welding consumables. They guarantee the availability of “factory dry” products until the moment of welding when the packaging is opened.

Description	Picture	
<p><b>MMA   Stick electrodes</b></p> <p>Standard packaging</p> <p>Moisture protective packaging</p> <ul style="list-style-type: none"> <li>■ Vacuum packed in various quantities</li> <li>■ Air tight tins</li> </ul>		
<p><b>MAG   Solid wires</b></p> <p>Standard packaging</p> <p>Moisture protective packaging</p>		
<p><b>TIG   TIG rods</b></p> <p>Standard packaging</p> <p>Moisture protective packaging</p>		
<p><b>FCAW   Cored wires</b></p> <p>Standard packaging</p> <p>Moisture protective packaging</p> <p>Vacuum sealed aluminium foil for folded cored wires</p>		
<p><b>SAW   Fluxes</b></p> <p>Standard packaging</p> <p>Moisture protective packaging</p> <p>Sealed drums</p>		
<p><b>SAW   Wires</b></p> <p>Standard packaging</p> <p>Moisture protective packaging</p> <p>Sealed drums</p>		



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WELDING

# voestalpine Böhler Welding

## Welding know-how joins steel

With over 100 years of experience, voestalpine Böhler Welding is the global top address for the daily challenges in the areas of joint welding, wear and corrosion protection as well as brazing. Customer proximity is guaranteed by more than 40 subsidiaries in 25 countries, with the support of 2,200 employees, and through more than 1,000 distribution partners worldwide. And with individual consultation by our application technicians and welding engineers, we make sure that our customers master the most demanding welding challenges. voestalpine Böhler Welding offers three specialized and dedicated brands to cater our customers' and partners' requirements.



**Lasting connections** – More than 2,000 products for joint welding in all conventional arc welding processes are united in a product portfolio that is unique throughout the world. Creating lasting connections is the brand's philosophy in welding and between people.



**Tailor-made Protectivity™** – Decades of industry experience and application know-how in the areas of repair of cracked material, anti-wear and cladding, combined with innovative and custom-tailored products, guarantee customers an increase in the productivity and protection of their components.



**In-depth know-how** – Through deep insight into processing methods and ways of application, Fontargen Brazing provides the best brazing and soldering solutions based on proven products with German technology. The expertise of this brand's application engineers has been formulated over many years of experience from countless application cases.

