böhler welding
by voestalpine

Lasting Connections

DRY SYSTEM – PREMIUM PACKAGING SOLUTION FOR STICK ELECTRODES

voestalpine Böhler Welding
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ONE STEP AHEAD.

Böhler Welding
Lasting Connections

As a pioneer in innovative welding consumables, Böhler Welding offers a unique product portfolio for joint welding worldwide. More than 2000 products are adapted continuously to the current industry specifications and customer requirements, certified by well-respected institutes and thus approved for the most demanding welding applications. As a reliable partner for customers, "lasting connections" are the brand's philosophy in terms of both welding and people.

BÖHLER WELDING DRY SYSTEM VACUUM PACKAGING DESIGN FOR EFFICIENT HIGH QUALITY WELDING

Böhler Welding DRY SYSTEM is the efficient alternative for costly climate controlled storage and handling procedure, providing "oven dry" stick electrodes straight from the vacuum packaging.

Böhler Welding DRY SYSTEM avoids the necessity of re-drying, and use of holding ovens and quivers in welding applications with a potential risk of hydrogen induced or hydrogen assisted cracking. Safe welding with low-hydrogen weld metal is assured up to nine hours after opening the vacuum pack.*

Böhler Welding DRY SYSTEM Features	User benefits
Oven dry electrodes upon opening the vacuum pack and up to nine hours thereafter	» Guarantee of low-hydrogen weld metal – an important prerequisite in the prevention of hydrogen cracks
Strong vacuum packs that fully resist moisture reabsorption	» Avoidance of costly climate controlled storage and handling and re-drying. Simple distribution to welders
Label for documenting date and time of opening	» Possibility to check whether electrodes are within 9 hours of safe exposure
Several filling contents available	» Optimal packaging content can be chosen in order to match the consumption for numerous applications in several industries at its best.
Fully recyclable materials	» Can be disposed with normal paper and metal waste

* valid for our stick electrodes with moisture resistant coating

The Böhler Welding DRY SYSTEM ensures for the relevant basic covered non-alloy and low-alloy electrodes a diffusible hydrogen content of < 5 ml / 100 g weld metal according to EN ISO 3690 or < 4 ml / 100 g according to AWS A4.3-93 within a processing time of 9 hours after opening of the pack. This condition is preserved until nine hours after opening the pack, provided the foil remains in place.*

Using a stronger foil made of multi-layered aluminium, the Böhler Welding DRY SYSTEM offers maximum safety against loss of vacuum due to the undesired penetration of sharp objects during storage and use. Also welders will see immediately if the electrodes are still oven dry.

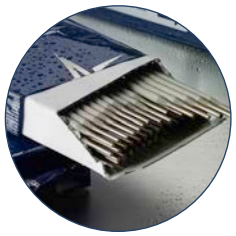
With the vacuum in place, electrodes are ready to use. The packs can be stored in any dry place where the packaging cannot get damaged. Packs must be allowed to warm-up to ambient temperature before opening, to avoid condensation of atmospheric moisture on the electrodes.

Böhler Welding DRY SYSTEM is absolutely user-friendly. The inner carton has a tear flap for easy opening and the vacuum packs themselves carry a special label for writing the welder's name, date and time of opening. With a choice of filling content – ca. 1.3 or 2.1 kg – it is easy to match electrode consumption to specific needs of individual customers and industries.

Böhler Welding DRY SYSTEM is also environmentally-friendly. No plastic in the form of PE or PP boxes is used at all – all components can be scrapped with normal metal and paper waste.

ALWAYS READY TO USE

The vacuum-sealed packages in Böhler Welding design provide you with absolutely dry electrodes, ready to start high quality welding.



» Easy opening tear flap, ready to use, even 9 hours after opening (no re-drying!)

» Area for documenting date/time of opening. 3 years guaranteed storage, no costly climate control necessary

» Strong, multi-layered aluminium foil preserving the vacuum and providing absolutely dry electrodes

MAXIMIZE EFFICIENCY BY REDUCING THE NUMBER OF HANDLING STEPS

Conventional packaging (no vacuum)

1. Climate controlled storage in central stock
2. Re-drying as safety procedure
3. Climate controlled intermediate storage on site
4. Climate controlled storage in quivers before use
5. Welding
6. Re-drying or scrapping of remaining electrodes

Böhler Welding DRY SYSTEM

1. Storage in any dry place where packaging cannot get damaged
2. Welding
3. Re-drying or scrapping of remaining electrodes

"We appreciate the new Böhler Welding DRY SYSTEM packaging that contains no plastic anymore.

We also like the use of a softer cardboard, which greatly reduces shock sensitivity.

The selection of different sizes of packaging is also very helpful in everyday life."

Peter Dommes,
Pedo Schweiß, Löt & Verschleißschutztechnik e.K

OPTIMAL QUANTITY FOR HIGH DEMANDING INDUSTRIES

Stick electrodes ensure easy and flexible handling without gases and simple power sources. Böhler Welding DRY SYSTEM vacuum packages together with smaller packaging sizes offer new possibilities in industries where stick electrodes are of high priority.

Take a short look inside the offshore industry. Under adverse, moist working conditions on stormy seas and dizzy heights, small vacuum packages of stick electrodes offer you the best welding solutions.

As stick electrodes are also used in industries such as steel constructions, steel production, and chemical industry, as well as for thermal power plants the Böhler Welding DRY SYSTEM vacuum packaging offers optimal quantity for each application.

BÖHLER WELDING DRY SYSTEM PORTFOLIO

Un-alloyed				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
BÖHLER FOX EV 50	E7018-1 H4 R	E 42 5 B 4 2 H5	Steel constructions with high requirements for toughness and low hydrogen content	TÜV (00426), DB (10.014.02), ABS, BV, DNV GL, LR, RMR, RINA, CWB (Ø3,2-6,0 mm)
BÖHLER FOX EV 50-W	E7016-1 H4 R	E 42 5 B 1 2 H5	Steel constructions, especially for root pass welding. Also sutiable for AC	TÜV (04180), DNV GL
Phoenix 120 K	E7018-1	E 42 5 B 3 2 H5	Steel construction especially if welding on AC is required.	TÜV (00348), DB (10.014.83), ABS, BV, DNV GL, LR
Phoenix Spezial D	E7016	E 42 3 B 1 2 H10	Steel construction with special requirements on root pass welding. Very good gap-bridging properties.	TÜV (10572), DB (10.138.12)

High strength				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
BÖHLER FOX EV 60	E8018-C3 H4 R	E 46 6 1Ni B 4 2 H5	Welding of high strength steels up to 460 MPa	TÜV (01524), DNV GL, RMR, CRS, VG 95132, ABS
Phoenix SH V1	E8018-G	E 50 6 Mn1Ni B 4 2 H5	Welding of high strength steels up to 500 MPa, armoured plates.	TÜV (00531), DB (10.014.58) ABS, BV, DNV GL, LR, VG 95132-1
BÖHLER FOX EV 63	E8018-G H4 R	E 50 4 B 4 2 H5	Welding of high strength steels up to 500 MPa	TÜV (00730), DB (10.014.07 / 81.014.01), RMR
BÖHLER FOX EV 65	E8018-G H4 R E8018-D1 H4 R (mod.)	E 55 6 1NiMo B 4 2 H5	Welding of high strength steels up to 550 MPa	TÜV (01802),NAKS, VG 95132, BV, RMR, ABS
BÖHLER FOX EV 70	E9018-G H4 R	E 55 6 1NiMo B 4 2 H5	Welding of high strength steels up to 550 MPa	TÜV (00112)
BÖHLER FOX EV 75	E10018-G H4 R	E 62 6 Mn2NiCrMo B 4 2 H5	Welding of high strength steels up to 620 MPa	CE
BÖHLER FOX EV 85	E11018-G H4 R	E 69 6 Mn2NiCrMo B 4 2 H5	Welding of high strength steels up to 690 MPa	TÜV (04313), DB (10.014.22), BV
Phoenix SH Ni 2 K 130	E12018-G	E 89 4 Mn2Ni1CrMo B 4 2 H5	Welding of high strength steels up to 890 MPa	CE
BÖHLER FOX 2,5 Ni	E8018-C1 H4 R	E 46 8 2Ni B 4 2 H5	Welding of cryogenic steels for temperatures down to -80°C	TÜV (00147), DB (10.014.16),ABS, WIWEB, DNV GL, LR, RINA

Pipeline				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
BÖHLER FOX EV Pipe	E7016-1	E 42 4 B 1 2	Vertical up welding of pipelines up to X60	TÜV (07620.), DB (10.014.77), CE, NAKS, GAZPROM
BÖHLER FOX EV 60 Pipe	E8016-G H4 R	E 50 4 1Ni B 1 2 H5	Vertical up welding of pipelines up to X65	CE
BÖHLER FOX EV 70 Pipe	E9016-G H4 R	E 55 4 ZMn2NiMo B 1 2 H5	Vertical up welding of pipelines up to X80	TÜV (12809)
BÖHLER FOX BVD 90	E9018-G H4 R	E 55 5 Z2Ni B 4 5 H5	Vertical down welding of pipelines up to X80	TÜV (03402.), GAZPROM

Creep resistant				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
BÖHLER FOX DMO Kb	E7018-A1 H4	E 46 5 Mo B 4 2 H5 E Mo B 4 2 H5	Welding of creep resistant steels with 0,5 % Mo like 16Mo3	TÜV (00019), KTA 1408.1 (8053), DB (10.014.82), ABS, DNV GL
BÖHLER FOX DCMS Kb	E8018-B2 H4	E CrMo1 B 4 2 H5	Welding of creep resistant steels with 1,25 % Cr / 0,5 % Mo like 13CrMo4-5	TÜV (0728), DB (10.014.42), ABS, DNV GL, NAKS (ø 3.2 mm; ø 4.0 mm)
BÖHLER FOX P 22	E9018-B3	E CrMo2 B 4 2 H5	Welding of creep resistant steels with 2,25 % Cr / 0,5 % Mo	-
BÖHLER FOX P 22 (LC)	E9018-B3L	E CrMo2L B 4 2 H5	Same steels as for FOX P 22 but the lower carbon content makes it better for repair welding.	-
Phoenix SH Chromo 2 KS	E9015-B3 H4	E CrMo2 B 4 2 H5	Welding of creep resistant CrMo and CrMoV alloyed steels.	TÜV (01823)
BÖHLER FOX C 9 MV	E9015-B91 H4	E CrMo91 B 4 2 H5	Welding of creep resistant 9 % Cr steel like P 91 or T 91	TÜV (06762)
Thermanit Chromo 9V	E9015-B91 H4 R	E CrMo91 B 4 2 H5	Welding of creep resistant 9 % Cr steel like P 91 or T 91	TÜV (06173), IBR
Thermanit Chromo 9V Mod	E9015-B91 H4 R	E Z CrMo91 B 4 2 H	Welding of creep resistant 9 % Cr steel like P 91 or T 91. Half-synthetical coating.	CE

High alloyed				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
BÖHLER FOX A 7-A	E307-16 (mod.)	E Z 18 9 MnMo R 3 2	Various applications, for dissimilar joints as well as for buffer layers and difficult to weld steels	TÜV (09101)
BÖHLER FOX EAS 2-A	E308L-17	E 19 9 L R 3 2	Joining of austenitic and ferritic 13 % Cr steels like AISI 304L or 1.4301 / X5CrNi18-10	TÜV (01095), DB (30.014.15), ABS, DNV GL, CWB
BÖHLER FOX CN 23/12-A	E309L-17	E 23 12 L R 3 2	Various applications, for dissimilar joints as well as for cladding.	TÜV (01771), DB (30.014.08), ABS, BV, LR, DNV GL, CWB, NAKS (Ø 3.2 mm, Ø 4.0 mm)
BÖHLER FOX EAS 4 M-A	E 316L-17	E 19 12 3 L R 3 2	Joining of austenitic Cr steels like AISI 316L or 1.4401 / X5CrNiMo17-12-2	TÜV (00773), DB (30.014.14), ABS, DNV GL, LR, Equinor, CWB, NAKS (Ø 3.2 mm, 4.0 mm)
BÖHLER FOX FFB-A	E310-16	E 25 20 R 3 2	Welding of heat resistant steels like AISI 305 or 1.4586 X5NiCrMoCuNb22-18	Equinor
BÖHLER FOX SAS 2-A	E347-17	E 19 9 Nb R 3 2	Welding of austenitic Ti and Nb stabalized CrNi steels like AISI 347, 321 or 1.4541, 1.4541	TÜV (01105), DB (30.014.06), ABS, DNV GL, NAKS (Ø 2,5 mm, 3,2 mm, 4,0 mm)
BÖHLER FOX SAS 4-A	E318-17	E 19 12 3 Nb R 3 2	Welding of austenitic Ti and Nb stabalized CrNi steels like AISI 316Ti 316Cb or 1.4571, 1.4580	TÜV (00777), DB (30.014.07), NAKS (Ø 2,5 mm, 3,2 mm, 4,0 mm)

STAINLESS STEEL DRY SYSTEM PORTFOLIO

Standard austenitics				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
Avesta 308L/MVR	E308L-17	E 19 9 L R 3 2	Joining of austenitic and ferritic 13 % Cr steels like AISI 304L or 1.4301 / X5CrNi18-10	TÜV (01064), DB (30.014.17), DNV GL
Avesta 308L/MVR-4D	E308L-17	E 19 9 L R	Joining of austenitic and ferritic 13 % Cr steels like AISI 304L or 1.4301 / X5CrNi18-10	TÜV (10728)
Avesta 316L/SKR	E316L-17	E 19 12 3 L R 3 2	Joining of austenitic Cr steels like AISI 316L or 1.4401 / X5CrNiMo17-12-2	TÜV (01073), DB (30.014.18), DNV GL
Avesta 309L	E309L-17	E 23 12 L R 3 2	Various applications, for dissimilar joints as well as for cladding.	–
Avesta 316L/SKR-PW AC/DC	E316L-17	E 19 12 3 L R 3 2	Joining of austenitic Cr steels like AISI 316L or 1.4401 / X5CrNiMo17-12-2. Increased welding out of position and on AC	TÜV (1070), DB(30.014.36), DNV GL
Avesta 316L/SKR-4D	E316L-17	E 19 12 3 L R 3 2	Joining of austenitic Cr steels like AISI 316L or 1.4401 / X5CrNiMo17-12-2	TÜV (10710)
Avesta P7 AC/DC	E312-17	E 29 9 R	Welding dissimilar joints between stainless steels and tool steels, spring steels and other difficult to weld alloys.	CE

High temperature				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
Avesta 253 MA	–	E 21 10 N R	Welding of heat resistant stainless steels like 253 MA® (1.4835 / UNS S30815) and 153 MATM (1.4818 / UNS S30415	CE
Avesta 253 MA-NF AC/DC	–	E 21 10 N R	Welding of heat resistant stainless steels like 253 MA® (1.4835 / UNS S30815) and 153 MATM (1.4818 / UNS S30415	CE
Avesta 308/308H AC/DC	E308H-17	E 19 9 R	Welding of heat resistant stainless steels like AISI 304H / 1.4948	TÜV (12841)
Avesta 309 AC/DC	E309-17	E 22 12 R	Welding of creep resistant steels like AISI 309S / 1.4833 and for dissimilar joints	CWB
Avesta 310	E310-17	E 25 20 R 3 2	Welding of heat resistant steels like AISI 310S / 1.4845	CE

Other austenitics				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
Avesta 347/MVNb	E347-17	E 19 9 Nb R	Welding of stabalized steels like AISI 347 / 321 for service temperatures above 400°C	TÜV (01062.), DB(30.014.22), DNV GL, CWB
Avesta 317L/SNR	E317L-17	E Z 19 13 4 N L	Electrodes with higher Mo content for welding of corrosion resistant, stainless CrNiMo(N) steels like AISI 317L / 1.4438	DNV GL
Avesta 904L	E385-17	E 20 25 5 Cu N L R	Fully austenitic CrNiMoCu alloyed stick electrode for welding of AISI 904L / 1.4539 and similar stainless steels	TÜV (03496), DB (30.014.23)
Avesta 904L-PW AC/DC	E385-17	E 20 25 5 Cu N L R	Fully austenitic CrNiMoCu alloyed stick electrode for welding of AISI 904L / 1.4539 and similar stainless steels. Increased welding out of position and on AC	–

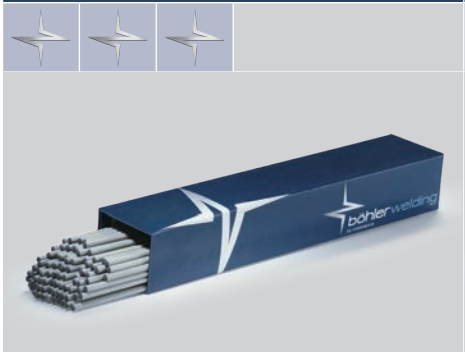
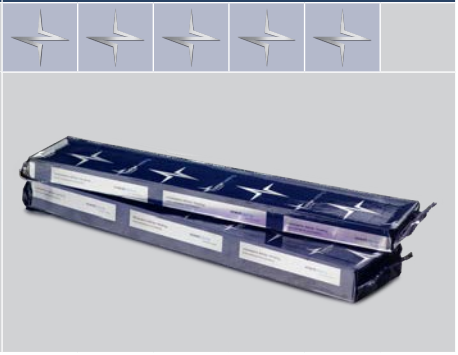
Duplex				
Product name	**AWS**	**EN ISO**	**Application**	**Approval**
Avesta LDX 2101	E2307-17 (mod.)	E Z 23 7 N L R 3 2	Welding of lean duplex steel LDX 2101® (1.4162 / UNS S23101)	TÜV (11410)
Avesta 2205	E2209-17	E 22 9 3 N L R	Welding of duplex steel with 22 % Cr like 1.4462 / UNS S31803 und S32205	TÜV (07139), DB (10.014.20), CWB
Avesta 2205 Basic	E2209-15	E 22 9 3 N L B	Welding of duplex steel with 22 % Cr like 1.4462 / UNS S31803 und S32205	CE
Avesta 2205-2D	E2209-17	E 22 9 3 N L R	Welding of duplex steel with 22 % Cr like 1.4462 / UNS S31803 und S32205	CE
Avesta 2205-4D	E2209-17	E 22 9 3 N L R	Welding of duplex steel with 22 % Cr like 1.4462 / UNS S31803 und S32205. Especially for root pass welding of thin-walled pipes	CE
Avesta 2205-PW AC/DC	E2209-17	E 22 9 3 N L R	Welding of duplex steel with 22 % Cr like 1.4462 / UNS S31803 und S32205.Increased welding out of position and on AC	TÜV (04486), DNV GL, CWB
Avesta 2205-HF	E2209-17	E 22 9 3 N L	Especially for repair welding of 22 % Cr duplex cast steels	CE
Avesta 2507/P100	E2594-17	E 25 9 4 N L R 3 2	Welding of super-duplex steels like 1.4410 / UNS S32570 und 1.4501 / UNS S32760	CE
Avesta 2507/P100 Rutile	E2594-16	E 25 9 4 N L R 4 2	Welding of super-duplex steels like 1.4410 / UNS S32570 und 1.4501 / UNS S32760	CE
Avesta 2507/P100-HF	E2594-15	E 25 9 4 N L B 4 3	Welding of super-duplex steels and cast steels like UNS J93404	CE
Avesta 3RE60 AC/DC	–	~E Z 20 6 3 L N	Welding of duplex steels like 1.4424 UNS S31500 or 3RE60	CE

You can also visit our website to get more information about stick electrodes “The Best For The Best”:

www.voestalpine.com/welding

BÖHLER WELDING PACKAGING SOLUTIONS

Böhler Welding offers stick electrodes in the following packaging types

Standard – Cardboard Box	Advanced – Metal Tin	Premium – DRY SYSTEM Vacuum Pack
		

Overview of available packaging for Böhler Welding stick electrodes

		Cardboard Box	Tin	DRY SYSTEM
Un-alloyed	rutile coated (~6013)	●	—	—
	basic coated (~7018)	●	—	o
Low alloyed	high strength	●	—	●
	creep resistant	—	●	o
Pipeline	FOX CEL	—	●	—
	FOX BVD and FOX EV Pipe	—	●	o
High alloyed	Avesta	—	—	●
	BÖHLER FOX	—	●	o
Nickel base		—	●	o

● = Standard / Serial o = on request — = not available

JOIN! voestalpine Böhler Welding

With over 100 years of experience, voestalpine Böhler Welding is the global top address for the daily challenges in the areas of joint welding, repair, hardfacing and cladding as well as brazing. Customer proximity is guaranteed by more than 43 subsidiaries in 25 countries, with the support of 2,300 employees, and through more than 2,000 distribution partners worldwide. 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.

böhler welding by voestalpine

Lasting Connections – As a pioneer in innovative welding consumables, Böhler Welding offers a unique product portfolio for joint welding worldwide. More than 2000 products are adapted continuously to the current industry specifications and customer requirements, certified by well-respected institutes and thus approved for the most demanding welding applications. As a reliable partner for customers, "lasting connections" are the brand's philosophy in terms of both welding and people.

utp maintenance by voestalpine

Tailor-Made Protectivity™ – UTP Maintenance ensures an optimum combination of protection and productivity with innovative and tailor-made solutions. Everything revolves around the customer and their individual requirements. That is expressed in the central performance promise: Tailor-Made Protectivity™.

fontargen brazing by voestalpine

In-Depth Know-How – As a leading brand of soldering and brazing consumables, Fontargen Brazing offers proven solutions based on 50 years of industrial experience, tried and tested processes and methods. This In-Depth Know-How has made Fontargen Brazing an internationally preferred partner for every soldering and brazing task.

The Management System of voestalpine Böhler Welding Group GmbH, Peter-Mueller-Strasse 14-14a, 40469 Duesseldorf, Germany has been approved by Lloyd's Register Quality Assurance to: ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007, applicable to: Development, Manufacturing and Supply of Welding and Brazing Consumables.
More information: www.voestalpine.com/welding

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