

# Babcock Welding Products



## Welding Consumables Catalogue

# Babcock Welding Products



## Manual Metal Arc Welding Electrodes

## Babcock Welding Products

### Introduction

Babcock Welding Products is part of Doosan Babcock and is based at the Company's Fabrication, Technology and Engineering Site at Renfrew, Scotland. For over 70 years the company has manufactured a wide range of high quality Manual Metal Arc Welding Electrodes, which have been used in many applications throughout the world, from structural steelwork to high integrity pressure parts. Our electrodes are designed to deposit weld metal of optimum metallurgical and radiographic quality under conditions of high restraint and in all welding positions.

Because of our involvement in the Energy and Process market it is likely that more Babcock electrodes have been used on power station plant in the UK than from any other manufacturer. This gives Babcock electrodes a track record second to none and clearly demonstrates the quality and reliability of our products. Continual assessment by our own organisation ensures that our products remain at the leading edge of technology.

As part of Doosan Babcock, Babcock Welding Products are able to draw on the services and knowledge from within the company when developing new products requiring specialist engineering and metallurgical properties. The company also has close links with major utilities owners and engineering support functions and this corporate knowledge assists in electrode development.

Additional support is available from Doosan Babcock's Technology facility, which provides a NAMAS Chemical Laboratory, a NAMAS Test House and a Materials Development Group.

Our current accreditations included BS EN ISO 9001, BS EN ISO 14001 and OHSAS 18001.



## Product Information

**Range:** The data sheets on the following pages give general information on the range of electrodes which are normally ex stock. Where electrodes are not available from stock these would normally be supplied within two to three weeks. Special or other electrodes not shown can be manufactured on request by contacting us.

**Electrode Sizes:** Our capability allows us to manufacture most electrodes in 1.6 and 2.0mm diameter in addition to the sizes shown on the data sheets.

**Batch Sizes:** Electrodes can be manufactured in batch sizes down to 20kgs for specific applications and in single batches up to 3,000kgs.

**Packaging:** The majority of low hydrogen electrodes are supplied in vacuum packs, allowing the electrodes to be used straight from the packet without the need for further baking treatments. Acid rutile stainless steel electrodes are also supplied in vacuum packs to prevent moisture pick up.

**Re-Branding:** Electrodes can be manufactured to suit individual customer requirements and supplied either unbranded or private branded with the customer's own name, packaging and labelling.

**Specific Chemistry Requirements:** Electrodes can be manufactured to meet specific chemistry requirements to suit the customer's needs or particular operational environment.

## Technical Information

**Mechanical Properties:** Mechanical properties are based on results from tests carried out on all weld metal specimens welded in the flat position and may vary from that obtained from actual welded joints, where dilution from base metal and other variables may be a factor.

**Moisture Re-absorption:** The moisture resistance of hydrogen controlled electrodes is critically important when considering the procedures to avoid hydrogen induced cracking. Babcock electrodes have low moisture re-absorption coatings and are designed to remain moisture resistant even after exposure to high levels of relative humidity and temperature. Under normal conditions electrodes can be used up to eight hours after exposure to the atmosphere without re-baking.

**Storage:** Electrodes should be kept in a dry store at a temperature of 15° C minimum and a relative humidity of 60% maximum. If it is suspected that electrodes have picked up moisture they should be re-dried as shown on the packaging label.

**Material Safety Data Sheets:** Available on request by contacting us.

## Contact Us

Further information and enquiries should be addressed to:

Babcock Welding Products  
Block C, Westway Site  
Porterfield Road  
Renfrew  
PA4 8DJ

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Email	<a href="mailto:enquiry@doosanbabcock.com">enquiry@doosanbabcock.com</a>

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## Product Range Summary

Electrode	Application	Classification
<b>Electrodes for Carbon Manganese Steels</b>		
R4	Rutile coated electrode for high quality welding of structural applications where sub-zero toughness properties are required.	EN ISO 2560-A – E 38 2 R 1 2 AWS A5.1 E6013
R6	Rutile coated iron powder electrode with over 150% efficiency suitable for both downhand and horizontal-vertical fillet welding.	AWS A5.1 E7024-1
A2	Basic coated low hydrogen electrode with excellent low temperature properties for use in Power Generation Equipment, Pressure Vessels, Piping and Offshore applications.	EN ISO 2560-A – E 42 5 B 3 2 H5 AWS A5.1 E7018-1
A6	Basic coated low hydrogen electrode suitable for root runs and areas of restricted access. The thin coating allows easily manipulation where access to joint preparation is restricted.	EN ISO 2560-A – E 42 5 B 1 2 H5 AWS A5.1 E7016-1
V	Cellulose coated electrode for high quality welding of pipeline and structural fabrications. It has been developed for fully positional welding, including vertical down.	EN ISO 2560-A – E 38 0 C 1 1
<b>Electrodes for Low Alloy Ferritic Steels</b>		
H2	Basic coated low hydrogen electrode for welding carbon manganese and low alloy steels. The addition of up to 1% nickel provides excellent low temperature toughness properties.	EN ISO 2560-A – E 42 5 Mn1Ni B 3 2 H5 AWS A5.5 E7018-G
H3	Basic coated low hydrogen electrode for the welding of medium/high tensile steels. Developed for pressure vessels it combines good sub-zero toughness with high strength at elevated temperatures.	EN 757 – E 55 4 Mn2NiMo B 3 2 H5 (Nearest)
H5	Basic coated low hydrogen electrode for welding of medium and high tensile steels with excellent sub-zero temperature properties plus high strength after post weld heat treatment.	EN ISO 2560-A – E 50 5 1NiMo B 3 2 H5 (Nearest) AWS A5.5 E8018-G
H6	Basic coated low hydrogen electrode for welding very high strength, high toughness low alloy steels. It was developed to comply with MOD NES 769 for use on submarine hull Q1N steels.	EN 757 – E 55 5 Z B 3 2 H5 (Nearest) AWS A5.5 E9018-G MOD NES 769 Issue 4
H7	Basic coated low hydrogen electrode for welding high strength, low alloy steels combining high strength and excellent weld metal toughness after post weld heat treatment.	AWS A5.5 E10018-D2
H8	Basic coated low hydrogen electrode for welding very high strength, high toughness, low alloy steels.	EN 757 – E 69 2 Z B 3 2 H5 (Nearest) AWS A5.5 E11018-G MOD NES 769 Issue 4

## Product Range Summary

Electrode	Application	Classification
<b>Electrodes for Creep Resisting Steels</b>		
BR	Rutile coated electrode for the structural welding of 1.0% chromium, 0.5% molybdenum (ASTM P12) material.	EN ISO 3580-A – E CrMo1 R 1 1
KR	Rutile coated electrode for the structural welding of 2.0% chromium, 1.0% molybdenum (ASTM P22) material.	EN ISO 3580-A – E CrMo2 R 1 1
A5MO	Basic coated low hydrogen electrode for welding carbon, 0.5% molybdenum (ASTM P1) material in the creep range up to 460° C	EN ISO 3580-A – E Mo B 3 2 H5 AWS A5.5 E7018-A1
B	Basic coated low hydrogen electrode for welding 1.0% chromium, 0.5% molybdenum (ASTM P12) material in the creep range up to 550° C	EN ISO 3580-A – E CrMo1 B 3 2 H5 AWS A5.5 E8016-B2
J	Basic coated low hydrogen electrode for welding 2.0% chromium, 1.5% tungsten (ASTM P23) material in the creep range up to 550° C.	Under development
K	Basic coated low hydrogen electrode for welding 2.0% chromium, 1.0% molybdenum (ASTM P22) material in the creep range up to 575° C	EN ISO 3580-A – E CrMo2 B 3 2 H5 AWS A5.5 E9016-B3
L5	Basic coated low hydrogen electrode for welding 5.0% chromium, 0.5% molybdenum (ASTM P5) material.	EN ISO 3580-A – E CrMo5 B 3 2 H5 AWS A5.5 E8016-B6
L9	Basic coated low hydrogen electrode for welding standard 9.0% chromium, 1.0% molybdenum (ASTM P9) material	EN ISO 3580-A – E CrMo9 B 3 2 H5 AWS A5.5 E8018-B8
M	Basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum (ASTM P91) material in the creep range up to 600° C.	EN ISO 3580-A – E CrMo91 B 3 2 H5 (Nearest) AWS A5.5 E9016-B9 (Nearest)
M8	Basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum (ASTM P91) material in the creep range up to 600° C.	AWS A5.5 E9015-B9
M9	Basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum (ASTM P91) material in the creep range up to 600° C.	AWS A5.5 E9016-B9
M2W	Basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum, 1.5% tungsten (ASTM P92) material in the creep range up to 625° C.	Under development
<b>Electrodes for Austenitic Steels</b>		
S	Basic coated low carbon electrode for welding 19.0% chromium, 12.0% nickel, 3.0% molybdenum, type 316, austenitic stainless steels.	EN 1600 – E 19 12 3 L B 4 2 AWS A5.4 E316L-15
S1	Basic coated low carbon electrode for welding 19.0% chromium, 8.0% nickel, type 308, austenitic stainless steels.	EN 1600 – E 19 9 L B 4 2 AWS A5.4 E308L-15

## Product Range Summary

Electrode	Application	Classification
<b>Electrodes for Austenitic Steels</b>		
S2	Basic coated low carbon electrode for welding 23% chromium, 12.0% nickel, type 309, austenitic stainless steels.	EN 1600 – E 23 12 L B 4 2 AWS A5.4 E309L-15
S3	Basic coated electrode for welding type 321 or 347 austenitic stainless steels. The lean 316 chemistry provides increased resistance to thermal embrittlement.	BS 2926 17 8 2 BR EN 1600 – E 16 8 2 B 4 2 (Nearest)
S4	Basic coated electrode for welding 19.0% chromium, 9.0% molybdenum, 1.0% niobium, type 347 austenitic stainless steels.	EN 1600 – E 19 9 Nb B 4 2 AWS A5.4 E347-15
S10	Rutile coated low carbon electrode for welding 19.0% chromium, 12.0% nickel, 3.0% molybdenum, type 316, austenitic stainless steels.	EN 1600 – E 19 12 3 L R 3 2 AWS A5.4 E316L-16
S11	Rutile coated low carbon electrode for welding 19.0% chromium, 8.0% nickel, type 308, austenitic stainless steels.	EN 1600 – E 19 9 L R 3 2 AWS A5.4 E308L-16
S12	Rutile coated low carbon electrode for welding 23% chromium, 12.0% nickel, type 309, austenitic stainless steels.	EN 1600 – E 23 12 L R 3 2 AWS A5.4 E309L-16
S17	Rutile coated high carbon electrode for welding 19.0% chromium, 8.0% nickel, type 308H, austenitic stainless steels.	EN 1600 – E 19 9 H R 3 2 AWS A5.4 E308H-16
S29	Rutile coated electrode for welding dissimilar materials, nickel steels and difficult to weld steels.	EN 1600 – E 29 9 R 3 2 AWS A5.4 E312-16 (Nearest)
<b>Electrodes for Die Repairs</b>		
4NI2CRMO	Basic coated low hydrogen electrode for the repair of hot working dies where a final hardness of 35-40Rc is required.	Not Applicable
<b>Electrodes for Hard Surfacing</b>		
SH350R	Rutile coated electrode for hard surfacing where a final hardness of approximately 350 Hv is required. It provides increased resistance abrasive wear and can be machined.	Not Applicable
SH650R	Rutile coated electrode for hard surfacing where a final hardness of approximately 650 Hv is required. It provides good resistance to abrasive wear and high impact. It is not readily machined.	Not Applicable
<b>Electrodes for Cutting and Gouging</b>		
G	Cutting and gouging electrode for use with manual metal arc equipment. It can be used for mild steels, stainless steels cast iron and nickel alloys and on most non ferrous materials.	Not Applicable

# **Babcock Welding Products**

## **Data Sheets**

## Babcock R4

EN ISO 2560-A – E 38 2 R 1 2  
AWS A5.1 E6013

The Babcock R4 is a rutile coated electrode for high quality welding of structural applications where sub-zero toughness properties are required.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V	Nb
0.058	0.27	0.46	0.013	0.007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
360	443	26	50	>47 at (-) 20 <sup>o</sup> C

### Welding and packing data

Current conditions: DC± or AC (Min OCV 70).

Stock Code	4101010	4101011	4101013
Size (mm)	2.5x350	3.2x350	4.0x350
Min. Amps.	75	100	115
Max. Amps	100	150	200
Approx. No. of Electrodes	740	540	316
Approx. Wt. per ctn. (kg)	13.4	15.0	14.0

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock R6

AWS A5.1 E7024-1

The Babcock R6 is a rutile coated iron powder electrode with over 150% efficiency suitable for both downhand and horizontal-vertical HV fillet welding.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V	Nb
0.08	0.35	0.50	0.010	0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
454	551	26	48	>30 at (-) 18 <sup>o</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4101061	4101062	4101063
Size (mm)	3.2x450	4.0x450	5.0x450
Min. Amps.	130	170	235
Max. Amps	170	210	300
Approx. No. of Electrodes	222	160	108
Approx. Wt. per ctn. (kg)	14.2	16.0	15.6

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock A2

EN ISO 2560-A – E 42 5 B 3 2 H5  
AWS A5.1 E7018-1

The Babcock A2 is a basic coated low hydrogen electrode with excellent low temperature properties for use in Power Generation Equipment, Pressure Vessels, Piping and Offshore applications.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.050	0.35	1.40	0.014	0.007	<0.05	0.15	<0.05	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
474	568	30	73	>80 at (-) 50 <sup>U</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103085	4103083	4103084	4103082	4103081	4103080
Size (mm)	2.5x350	3.2x350	3.2x450	4.0x450	5.0x450	6.0x450
Min. Amps.	80	110	110	140	200	250
Max. Amps	110	150	150	200	280	370
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(6x27) 162	(4x30) 120	(4x18) 72	(4x14) 56
Approx. Wt. per ctn. (kg)	5.3	5.7	7.5	8.0	7.5	8.0

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock A6

EN ISO 2560-A – E 42 5 B 1 2 H5  
AWS A5.1 E7016-1

The Babcock A6 is a basic coated low hydrogen electrode suitable for root runs and areas of restricted access. The thin coating allows easily manipulation where access to joint preparation is restricted.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.07	0.35	1.20	0.014	0.007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
424	524	32	77	>47 at (-) 50 <sup>U</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103370	4103372	4103373	4103374
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x36) 252	(6x30) 180	(4x32) 128	(4x20) 80
Approx. Wt. per ctn. (kg)	4.9	7.2	7.8	7.4

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock V

EN ISO 2560-A – E 38 0 C 1 1  
 AWS A5.1 E6011 (Nearest)

The Babcock V is a cellulose coated electrode for high quality welding of pipeline and structural fabrications. It has been developed for fully positional welding, including vertical down.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V	Nb
0.08	0.34	0.50	0.013	0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
447	489	24	67	>47 at (-) 0 <sup>o</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 50).

Stock Code	4101134	4101135	4101133
Size (mm)	2.5x350	3.2x350	4.0x350
Min. Amps.	85	110	150
Max. Amps	110	150	210
Approx. No. of Electrodes	660	440	290
Approx. Wt. per ctn. (kg)	12.6	13.2	13.2

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

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## Babcock H2

EN ISO 2560-A – E 42 5 Mn1Ni B 3 2 H5  
AWS A5.5 E7018-G

The Babcock H2 is a basic coated low hydrogen electrode for welding carbon manganese and low alloy steels. The addition of up to 1% nickel provides excellent low temperature toughness properties.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.050	0.35	1.33	0.013	0.008	<0.05	<0.05	0.90	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
469	559	29	76	>100 at (-) 50 <sup>o</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103126	4103125	4103123	4103122
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock H3

EN 757 – E 55 4 Mn2NiMo B 3 2 H5 (Nearest)

The Babcock H3 is a basic coated low hydrogen electrode for the welding of medium/high tensile steels. Developed for pressure vessels it combines good sub-zero toughness with high strength at elevated temperatures.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.06	0.38	1.49	0.013	0.006	<0.05	0.38	1.86	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
664	772	21	62	>40 at (-) 50 <sup>o</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103039	4103038	4103037	4103036
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard Cartons.

## Babcock H5

EN ISO 2560-A – E 50 5 1NiMo B 3 2 H5 (Nearest)  
AWS A5.5 E8018-G

The Babcock H5 is a basic coated low hydrogen electrode for welding of medium and high tensile steels with excellent sub-zero temperature properties plus high strength after post weld heat treatment.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V
0.046	0.34	1.44	0.016	0.006	<0.05	0.21	0.94	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
606	684	29	69	>50 at (-) 50 <sup>o</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103127	4103129	4103130	4103131
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock H6

EN 757 – E 55 5 Z B 3 2 H5 (Nearest)  
AWS A5.5 E9018-G MOD NES 769 Issue 4

The Babcock H6 is a basic coated low hydrogen electrode for welding very high strength, high toughness low alloy steels. It was developed to comply with MOD NES 769 for use on submarine hull Q1N steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.06	0.37	1.30	0.016	0.010	<0.05	0.21	1.50	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
559	644	23	68	>70 at (-) 50 <sup>o</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103282	4103281	4103280
Size (mm)	3.2x450	4.0x450	5.0x450
Min. Amps.	110	140	200
Max. Amps	150	200	280
Approx. No. of Electrodes	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock H7

AWS A5.5 E10018-D2

The Babcock H7 is a basic coated low hydrogen electrode for welding high strength, low alloy steels combining high strength and excellent weld metal toughness after post weld heat treatment.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.052	0.43	1.83	0.014	0.014	<0.05	0.47	0.86	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (post weld heat treated at 620° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
703	779	17	66	50 @ (-)51° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103377	4103378	4103379	4103380
Size (mm)	3.2x450	4.0x450	5.0x450	6.0x450
Min. Amps.	110	140	200	250
Max. Amps	150	200	280	370
Approx. No. of Electrodes	(6x27) 162	(4x30) 120	(4x18) 72	(4x14) 56
Approx. Wt. per ctn. (kg)	7.5	8.0	7.5	8.0

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock H8

EN 757 – E 69 2 Z B 3 2 H5 (Nearest)  
AWS A5.5 E11018-G MOD 769 Issue 4

The Babcock H8 is a basic coated low hydrogen electrode for welding very high strength, high toughness, low alloy steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.06	0.35	1.50	0.015	0.011	<0.05	0.31	1.90	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
688	783	20	63	>50 at (-) 50° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103214	4103213	4103212
Size (mm)	3.2x450	4.0x450	5.0x450
Min. Amps.	110	140	200
Max. Amps	150	200	280
Approx. No. of Electrodes	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock BR

EN ISO 3580-A – E CrMo1 R 1 1

The Babcock BR is a rutile coated electrode for the structural welding of 1.0% chromium, 0.5% molybdenum (ASTM P1) material.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb
0.06	0.30	0.80	0.015	0.010	1.10	0.55	<0.05	<0.05	<0.05

### Typical all weld metal mechanical properties (post weld heat treated @ 695°C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
517	612	21	63	60 @ 20 <sup>0</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70).

Stock Code	4101098	4101099	4101100
Size (mm)	2.5x350	3.2x350	4.0x350
Min. Amps.	75	100	115
Max. Amps	100	150	200
Approx. No. of Electrodes	740	540	316
Approx. Wt. per ctn. (kg)	13.4	15.0	14.0

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock KR

EN ISO 3580-A – E CrMo2 R 1 1

The Babcock KR is a rutile coated electrode for the structural welding of 2.0% chromium, 1.0% molybdenum (ASTM P22) material.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni
0.046	0.33	0.38	0.013	0.007	1.98	1.01	<0.05

### Typical all weld metal mechanical properties (post weld heat treated @ 695°C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
568	668	19	64	76 @ 20 <sup>0</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70).

Stock Code	4101095	4101096	4101097
Size (mm)	2.5x350	3.2x350	4.0x350
Min. Amps.	75	80	100
Max. Amps	100	120	150
Approx. No. of Electrodes	740	540	316
Approx. Wt. per ctn. (kg)	13.4	15.0	14.0

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock A5MO

EN ISO 3580-A – E Mo B 3 2 H5  
AWS A5.5 E7018-A1

The Babcock A5MO is a basic coated low hydrogen electrode for welding carbon, 0.5% molybdenum (ASTM P1) material in the creep range up to 460° C

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.06	0.29	0.81	0.010	0.007	<0.05	0.52	<0.05	<0.05	<0.01	<0.03

### Typical all weld metal mechanical properties (post weld heat treated @ 600° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
427	571	31	75	152 @ 20° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103023	4103025	4103026	4103027
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock B

EN ISO 3580-A – E CrMo1 B 3 2 H5  
AWS A5.5 E8016-B2

The Babcock B is a basic coated low hydrogen electrode for welding 1.0% chromium, 0.5% molybdenum (ASTM P12) material in the creep range up to 550° C

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.05	0.27	0.80	0.014	0.008	1.19	0.52	<0.05	<0.05	<0.01	<0.03

### Typical all weld metal mechanical properties (post weld heat treated @ 680° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
579	671	25	75	>100 at 20° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103020	4103019	4103021	4103018	4103017
Size (mm)	2.5x350	3.2x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	110	140	200
Max. Amps	110	150	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	5.4	7.0	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock J

Under development

The Babcock J is a basic coated low hydrogen electrode for welding 2.0% chromium, 1.5% tungsten (ASTM P23) material in the creep range up to 550° C

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code				
Size (mm)				
Min. Amps.				
Max. Amps				
Approx. No. of Electrodes				
Approx. Wt. per ctn. (kg)				

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock K

EN ISO 3580-A – E CrMo2 B 3 2 H5  
AWS A5.5 E9016-B3

The Babcock K is a basic coated low hydrogen electrode for welding 2.0% chromium, 1.0% molybdenum (ASTM P22) material in the creep range up to 575° C

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Al	As	Cu	Nb	Sn	V	Sb
0.05	0.25	0.80	0.011	0.008	2.25	1.05	<0.05	<0.02	<0.02	<0.05	<0.01	<0.02	<0.03	<0.002

### Typical all weld metal mechanical properties (post weld heat treated @ 680° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
593	701	20	70	>100 at 20° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103073	4103071	4103072	4103070	4103069
Size (mm)	2.5x350	3.2x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	110	140	200
Max. Amps	110	150	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	5.4	7.1	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock L5

EN ISO 3580-A – E CrMo5 B 3 2 H5  
AWS A5.5 E8016-B6

The Babcock L5 is a basic coated low hydrogen electrode for welding 5.0% chromium, 0.5% molybdenum (ASTM P5) material.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni
0.084	0.40	0.89	0.012	0.009	5.46	0.60	0.04

### Typical all weld metal mechanical properties (post weld heat treated @ 740° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
595	696	20	66	>100 @ 20° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103285	4103286	4103287	4103288	4103289
Size (mm)	2.5x350	3.2x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	110	140	200
Max. Amps	110	150	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	5.4	7.2	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock L9

EN ISO 3580-A – E CrMo9 B 3 2 H5  
AWS A5.5 E8016-B8

The Babcock L9 is a basic coated low hydrogen electrode for welding standard 9.0% chromium, 1.0% molybdenum (ASTM P9) material

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V
0.06	0.30	0.75	0.010	0.007	8.3	1.1	<0.05	<0.05	<0.01	<0.05

### Typical all weld metal mechanical properties (post weld heat treated @ 740° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
562	742	19	64	50 @ 20° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103090	4103091	4103092	4103093	4103094
Size (mm)	2.5x350	3.2x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	110	140	200
Max. Amps	110	150	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	5.7	7.5	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock M

EN ISO 3580-A – E CrMo91 B 3 2 H5 (Nearest)  
AWS A5.5 E9016-B9 (Nearest)

The Babcock M is a basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum (ASTM P91) material in the creep range up to 600° C.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V	N
0.10	0.37	1.06	0.013	0.007	9.12	1.04	0.25	<0.05	0.10	0.23	0.047

### Typical all weld metal mechanical properties (post weld heat treated @ 760° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
606	765	20	58	>40 at 12 <sup>0</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	4103275	4103276	4103277	4103278
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	7.2	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock M8

AWS A5.5 E9015-B9

The Babcock M8 is a basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum (ASTM P91) material in the creep range up to 600° C.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V	N
0.10	0.20	0.62	0.010	0.009	8.46	0.99	0.22	0.02	0.04	0.19	0.052

### Typical all weld metal mechanical properties (post weld heat treated at 760° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
608	763	21	58	64 at 22 <sup>0</sup> C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code			
Size (mm)	2.5x350	3.2x350	4.0x350
Min. Amps.	80	110	140
Max. Amps	110	150	200
Approx. No. of Electrodes	(7x36) 252	(7x27) 189	(7x16) 112
Approx. Wt. per ctn. (kg)	5.3	6.3	6.0

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock M9

AWS A5.5 E9016-B9

The Babcock M9 is a basic coated low hydrogen electrode for welding modified 9.0% chromium, 1.0% molybdenum (ASTM P91) material in the creep range up to 600° C.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V	N
0.096	0.30	0.78	0.006	0.009	8.80	0.95	0.64	0.04	0.06	0.19	0.040

### Typical all weld metal mechanical properties (post weld heat treated at 740° C)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)
660	792	20	55	29 at 20° C

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code	3146	3147	3148	3149
Size (mm)	2.5x350	3.2x450	4.0x450	5.0x450
Min. Amps.	80	110	140	200
Max. Amps	110	150	200	280
Approx. No. of Electrodes	(7x34) 238	(6x27) 162	(4x30) 120	(4x18) 72
Approx. Wt. per ctn. (kg)	5.3	7.2	8.0	7.5

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock M2W

Under development

The Babcock M2W is a basic coated low hydrogen electrode for welding 9.0% chromium, 1.5% tungsten, 0.5% molybdenum (ASTM P92) material in the creep range up to 625° C.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb	V	N

### Typical all weld metal mechanical properties

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Charpy V Notch (Joules)

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70). DC preferred.

Stock Code				
Size (mm)				
Min. Amps.				
Max. Amps				
Approx. No. of Electrodes				
Approx. Wt. per ctn. (kg)				

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock S

EN 1600 – E 19 12 3 L B 4 2  
AWS A5.4 E316L-15

The Babcock S is a basic coated low carbon electrode for welding 19.0% chromium, 12.0% nickel, 3.0% molybdenum type 316, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.03	0.28	1.16	0.010	0.012	18.40	2.60	12.00	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
449	590	39	62	2-8

### Welding and packing data

Current conditions: DC+

Stock Code	4101115	4101114	4101113	4101112
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	65	80	110	140
Max. Amps	90	110	150	180
Approx. No. of Electrodes	528	336	240	168
Approx. Wt. per ctn. (kg)	12.0	12.0	13.0	13.4

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock S1

EN 1600 – E 19 9 L B 4 2  
AWS A5.4 E308L-15

The Babcock S1 is a basic coated low carbon electrode for welding 19.0% chromium, 8.0% nickel, type 308, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.03	0.31	1.20	0.011	0.009	19.40	<0.05	10.10	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
397	545	41	65	2-8

### Welding and packing data

Current conditions: DC+

Stock Code	4101178	4101177	4101176	4101175
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	65	80	110	140
Max. Amps	90	110	150	180
Approx. No. of Electrodes	528	336	240	168
Approx. Wt. per ctn. (kg)	12.0	12.0	13.0	13.4

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock S2

EN 1600 – E 23 12 L B 4 2  
AWS A5.4 E309L-15

The Babcock S2 is a basic coated low carbon electrode for welding 23% chromium, 12.0% nickel, type 309, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.03	0.48	1.27	0.008	0.009	23.20	<0.05	12.50	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
451	564	35	62	9-15

### Welding and packing data

Current conditions: DC+

Stock Code	4101203	4101202	4101201	4101200
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	65	80	110	140
Max. Amps	90	110	150	180
Approx. No. of Electrodes	528	336	240	168
Approx. Wt. per ctn. (kg)	12.0	12.0	13.0	13.4

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock S3

BS 2926 17 8 2 BR  
EN 1600 – E 16 8 2 B 4 2 (Nearest)

The Babcock S3 is a basic coated electrode for welding type 321 or 347 austenitic stainless steels. The lean 316 chemistry provides increased resistance to thermal embrittlement.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.07	0.54	1.86	0.018	0.008	16.10	8.90	2.0	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
452	625	43	60	2-8

### Welding and packing data

Current conditions: DC+

Stock Code	4101330	4101331	4101332	4101333
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	65	80	110	140
Max. Amps	90	110	150	180
Approx. No. of Electrodes	540	336	240	168
Approx. Wt. per ctn. (kg)	12.0	12.0	13.0	13.4

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock S4

EN 1600 – E 19 9 Nb B 4 2  
AWS A5.4 E347-15

The Babcock S4 is a basic coated electrode for welding 19.0% chromium, 9.0% molybdenum, 1.0% niobium, type 347 austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N	Nb
0.05	0.45	1.30	0.012	0.010	19.80	<0.05	9.80	<0.10	<0.10	0.72

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
462	627	40	55	5-15

### Welding and packing data

Current conditions: DC+

Stock Code	4101193	4101192	4101191	4101190
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	65	80	110	140
Max. Amps	90	110	150	180
Approx. No. of Electrodes	528	336	240	168
Approx. Wt. per ctn. (kg)	12.0	12.0	13.0	13.4

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock S10

EN 1600 – E 19 12 3 L R 3 2  
AWS A5.4 E316L-16

The Babcock S10 is a rutile coated low carbon electrode for welding 19.0% chromium, 12.0% nickel, 3.0% molybdenum, type 316, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.023	0.69	0.99	0.020	0.004	18.11	2.53	11.42	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
415	572	47	58	2-8

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4103150	4103151	4103152	4103153
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	50	70	110	150
Max. Amps	80	115	155	190
Approx. No. of Electrodes	(7x35) 245	(7x27) 189	(7x16) 112	(7x12) 84
Approx. Wt. per ctn. (kg)	5.3	6.3	5.6	6.3

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock S11

EN 1600 – E 19 9 L R 3 2  
AWS A5.4 E308L-16

The Babcock S11 is a rutile coated low carbon electrode for welding 19.0% chromium, 8.0% nickel, type 308, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.03	0.35	1.30	0.010	0.005	19.30	<0.05	10.20	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
390	540	40	60	2-8

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4103155	4103156	4103157	4103158
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	50	70	110	150
Max. Amps	80	115	155	190
Approx. No. of Electrodes	(7x35) 245	(7x27) 189	(7x16) 112	(7x12) 84
Approx. Wt. per ctn. (kg)	5.3	6.3	5.6	6.3

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock S12

EN 1600 – E 23 12 L R 3 2  
AWS A5.4 E309L-16

The Babcock S12 is a rutile coated low carbon electrode for welding 23% chromium, 12.0% nickel, type 309, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.03	0.45	1.30	0.010	0.005	23.10	<0.05	12.40	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
450	560	38	60	5-15

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4103160	4103161	4103162	4103163
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	50	70	110	150
Max. Amps	80	115	155	190
Approx. No. of Electrodes	(7x35) 245	(7x27) 189	(7x16) 112	(7x12) 84
Approx. Wt. per ctn. (kg)	5.3	6.3	5.6	6.3

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock S17

EN 1600 – E 19 9 H R 3 2  
AWS A5.4 E308H-16

The Babcock S17 is a rutile coated high carbon electrode for welding 19.0% chromium, 8.0% nickel, type 308H, austenitic stainless steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.059	0.47	1.04	0.024	0.004	19.31	0.09	9.90	0.06	0.095

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
450	651	42	52	2-8

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4103189	4103190	4103191	4103192
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	50	70	110	150
Max. Amps	80	115	155	190
Approx. No. of Electrodes	(7x35) 245	(7x27) 189	(7x16) 112	(7x12) 84
Approx. Wt. per ctn. (kg)	5.3	6.3	5.6	6.3

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock S29

EN 1600 – E 29 9 R 3 2  
AWS A5.4 E312-16 (Nearest)

The Babcock S29 is rutile coated electrode for welding dissimilar materials, nickel steels and difficult to weld steels.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N
0.10	0.75	1.80	0.020	0.015	29.80	<0.10	9.50	<0.10	<0.10

### Typical all weld metal mechanical properties (as welded)

Yield Strength (N/mm <sup>2</sup> )	Ultimate Tensile Strength (N/mm <sup>2</sup> )	Elongation (%)	Reduction of Area (%)	Ferrite Number (WRC)
666	779	22	30	NA

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4103207	4103206	4103205	4103204
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	50	70	110	150
Max. Amps	80	115	155	190
Approx. No. of Electrodes	(7x34) 238	(7x27) 189	(7x15) 105	(7x11) 77
Approx. Wt. per ctn. (kg)	4.5	6.3	5.6	6.3

The electrodes are vacuum packed in foil sleeves and packed in strongly constructed cardboard cartons.

## Babcock 4Ni2CRMO

Not classified

The Babcock 4Ni2CRMO is a basic coated low hydrogen electrode for the repair of hot working dies where a final hardness of 35-40Rc is required.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni
0.10	0.45	1.85	0.013	0.008	2.04	1.62	4.40

### Typical all weld metal mechanical properties

As welded	~40Rc
PWHT	~35Rc

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4101266	4101267	4101268
Size (mm)	4.0x450	5.0x450	6.0x450
Min. Amps.	140	200	250
Max. Amps	200	280	370
Approx. No. of Electrodes	220	144	104
Approx. Wt. per ctn. (kg)	14.6	15.2	15.0

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

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## Babcock SH350R

Not classified

The Babcock SH350R is a rutile coated electrode for hard surfacing where a final hardness of approximately 350 Hv is required. It provides increased resistance abrasive wear and can be machined.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	Ni
0.25	0.35	0.35	0.010	0.015	3.10	<0.10	<0.10

### Typical all weld metal mechanical properties

As Welded	350-400Hv
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### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4101334	4101335	4101336	4101355
Size (mm)	3.2x450	4.0x450	5.0x450	6.0x450
Min. Amps.	110	140	200	250
Max. Amps	150	200	280	370
Approx. No. of Electrodes	292	200	128	104
Approx. Wt. per ctn. (kg)	15.6	16.0	15.6	16.2

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock SH650R

Not classified

The Babcock SH650R is a rutile coated electrode for hard surfacing where a final hardness of approximately 650 Hv is required. It provides good resistance to abrasive wear and high impact. It is not readily machined.

### Typical all weld metal chemical composition

C	Si	Mn	P	S	Cr	Mo	V
0.50	0.80	0.35	0.015	0.010	8.50	0.50	0.60

### Typical all weld metal mechanical properties

As welded	650-700Hv
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### Welding and packing data

Current conditions: DC+ or AC (Min OCV 70)

Stock Code	4101337	4101338	4101339	4101356
Size (mm)	3.2x450	4.0x450	5.0x450	6.0x450
Min. Amps.	110	140	200	250
Max. Amps	150	200	280	370
Approx. No. of Electrodes	324	220	144	104
Approx. Wt. per ctn. (kg)	16.0	16.8	16.8	16.0

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

## Babcock G

Not classified

The Babcock G is a cutting and gouging electrode for use with manual metal arc equipment. It can be used for mild steels, stainless steels cast iron and nickel alloys and on most-non ferrous materials.

### Welding and packing data

Current conditions: DC+ or AC (Min OCV 50)

Stock Code	4101043	4101042	4101041	4101040
Size (mm)	2.5x350	3.2x350	4.0x350	5.0x350
Min. Amps.	80	110	180	280
Max. Amps	120	190	280	350
Approx. No. of Electrodes	464	320	200	144
Approx. Wt. per ctn. (kg)	10.2	10.6	10.4	12.0

The electrodes are packed in strongly constructed cardboard cartons, two packets to a carton.

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# Babcock Welding Products



## Tungsten Inert Gas Welding Wires

## Product Range Summary

Wire	Application	Classification
<b>Wires for Carbon Manganese Steels</b>		
Babcock 14B	Double de-oxidised wire for mild and low alloy steels	EN ISO 636-A – W 42 5 W3Si1 AWS A5.18 ER70S-6
<b>Wires for Creep Resisting Steels</b>		
Babcock 15B	1% Chromium, ½% Molybdenum steels	EN ISO 21952-A – W CrMo1Si AWS A5.28 ER80S-B2 (Nearest)
Babcock 16B	2% Chromium 1% Molybdenum steels	EN ISO 21952-A – W CrMo2Si AWS A5.28 ER90S-B3 (Nearest)
Babcock 18B	9% Chromium 1% Molybdenum steels	EN ISO 21952-A – W CrMo9Si AWS A5.28 ER90S-B8 (Nearest)
Babcock 41B	Modified 9% Chromium 1% Molybdenum steels with Vanadium, Niobium and Nitrogen additions	EN ISO 21952-A – W CrMo91 AWS A5.28 ER90S-B9 (Nearest)
<b>Wires for Stainless Steels</b>		
Babcock 11B	Low carbon austenitic for 308L steels	EN ISO 14343-A – W 19 9 L AWS A5.9 ER308L
Babcock 12B	Low carbon austenitic for 309 steels	EN ISO 14343-A – W 23 12 L AWS A5.9 ER309L
Babcock 13B	Low carbon austenitic for 347 steels	EN ISO 14343-A – W 19 9 Nb AWS A5.9 ER347
Babcock 17B	Low carbon austenitic for 316 steels	EN ISO 14343-A – W 19 12 3 L AWS A5.9 ER316L
Babcock 25B	Austenitic for 310 steels	EN ISO 14343-A – W 25 20 AWS A5.9 ER310