QUALITY
SINCE 1948

ELEKTRODA ZAGREB d.d.

MANUFACTURER OF FILLER
MATERIALS FOR WELDING

2022

ELEKTRODA ZAGREB d.d.

Manufacturer of Filler Materials for Welding

Adress: Rusevje 7
10290 ZAPRESIC, Republic of Croatia
Identification number: 03218066
VAT / EORI: HR99516156261

Bank: ZAGREBACKA BANKA d.d., Ulica bana Josipa Jelacica 1, Zapresic
Bank account:
IBAN: HR1323600001101228817
SWIFT Code: ZABAHR2X

NOVA HRVATSKA BANKA d.d., Varsavska 9, Zagreb
Bank account:
IBAN: HR4225030071100083729
SWIFT Code: VBCRHR22

Tel.: +385 1 3477 444 (operator)
+385 1 3477 410 (sales & purchasing)
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+385 1 3477 430 (sales & purchasing)
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Fax.: +385 1 3477 492 (sales & purchasing)

E-mail: elektroda@ezg.hr

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Bureau Veritas Certification

ELEKTRODA ZAGREB d.d.

Ruševje 7, 10290 Zaprešić, Croatia

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2015

Scope of certification

MANUFACTURE AND SALE OF WELDING CONSUMABLES.

Original cycle start date:	25-05-2012
Expiry Date of Previous Cycle:	24-05-2021
Certification / Recertification Audit Date:	07-05-2021
Certification / Recertification cycle start date:	13-05-2021
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	24-05-2024

Certificate No.: HR008331 Version: 1 Issue Date: 13-05-2021

UKAS MANAGEMENT SYSTEMS

0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Local Office: Ciottina 17a, 51000 Rijeka, Croatia

Further clarifications regarding the scope and validity of this certificate, and the applicability of the management system requirements, please call: 00 385 51 213 672

Bureau Veritas Certification

ELEKTRODA ZAGREB d.d.

Ruševje 7, 10290 Zaprešić, Croatia

Bureau Veritas Certification certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 14001:2015

Scope of certification

MANUFACTURE AND SALE OF WELDING CONSUMABLES.

Original Cycle Start Date:	08-06-2022
Expiry Date of Previous Cycle:	NA
Certification / Recertification Audit Date:	17-05-2022
Certification / Recertification Cycle Start Date:	08-06-2022
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	07-06-2025

Certificate No.: HR008960 Version: 1 Issue Date: 08-06-2022

17021 HAA 4184 EMS

Local Office: Ciottina 17a, 51000 Rijeka, Croatia

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation. To check this certificate validity please call: 00 385 51 213 672.

Bureau Veritas Certification

ELEKTRODA ZAGREB d.d.

Ruševje 7, 10290 Zaprešić, Croatia

Bureau Veritas Certification certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 45001:2018

Scope of certification

MANUFACTURE AND SALE OF WELDING CONSUMABLES.

Original Cycle Start Date:	08-06-2022
Expiry Date of Previous Cycle:	NA
Certification / Recertification Audit Date:	17-05-2022
Certification / Recertification Cycle Start Date:	08-06-2022
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	07-06-2025

Certificate No.: HR008961 Version: 1 Issue Date: 08-06-2022

17021 HAA 4184 OH&SMS

Local Office: Ciottina 17a, 51000 Rijeka, Croatia

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation. To check this certificate validity please call: 00 385 51 213 672.

CERTIFICATE

VdTÜV – S 039.2018.002

The company

ELEKTRODA ZAGREB d.d.
Ruševje 7
HR-10290 Zaprešić – Zagreb, Kroatien

has been audited and approved as manufacturer of filler metals according to

VdTÜV-Merkblatt 1153
in connection with AD 2000-Merkblatt W 0

The scope of the audit and other relevant data are detailed in our report no.:
R-TSS-IS-21_22/21.

The company

- has facilities permitting manufacturing and inspection in compliance with the current technical standards,
- operates a quality system which guarantees that manufacturing and inspection of the filler metals stated in our report are in conformity with the technical rules and standards,
- employs qualified supervisory and inspection personnel.

The certificate expires in February 2024.

Munich, April 14, 2021

Certification Body
Material and Welding Technology

(Daniel Zellmer)
(Leader of the Certification Body)

EQ3106658

TÜV SÜD Industrie Service GmbH, Westendstr. 199, 80686 Munich, Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ CERTIFICADO ◆ CERTIFICAT

Certificate of conformity of the factory production control

0036 - CPR - S 039.2018.002

In compliance with Regulation 305/2011/EU of the European Parliament and of the Council of March 09th, 2011 (Construction Products Regulation - CPR), this certificate applies to the construction product

filler metals acc. to EN ISO 14341, EN ISO 2560, EN ISO 3580, EN ISO 16834 und EN ISO 3581

produced by or for

ELEKTRODA ZAGREB d.d.
Ruševje 7
HR-10290 Zaprešić – Zagreb, Kroatien

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in annex ZA of the harmonised standard

EN 13479:2017

under system 2+ are applied and

the factory production control fulfils all the prescribed requirements set out above.

This certificate was first issued on 24.02.2009 and recurring on 14.04.2021 and will remain valid as long as the test methods and/or factory production control requirements included in the harmonised standard, used to assess the performance of the declared characteristics, do not change, and the product, and the manufacturing conditions in the plant are not modified significantly and latest on 18.02.2024.

Further information about the product parameters and description of the products are included in the annex 1 to this certificate.

Munich, April 14, 2021

Notified Body, No. 0036

(Daniel Zellmer)
(Leader of the Certification Body)

EQ3106657

TÜV SÜD Industrie Service GmbH, Westendstr. 199, 80686 Munich, Germany

Dear Sir or Madam,

Welding has for many years been irreplaceable as a technique of joining materials together in almost any process of production. Technological advancement and the need for improving product quality demand the development not only of new materials, but also of additional materials necessary for their welding. Since its foundation in 1948, and thanks to its long tradition, Elektroda Zagreb d.d. has been able to provide its customers with quality products that meet their needs. Complete business of the company is based on ISO: 9001, ISO: 14001 and ISO: 45001 procedures, which continuosly monitor and enriches all company processes. This catalogue is designed to introduce you with our latest programme of coated electrodes, wires, powders and rods used in welding.

Besides the standard assortment that we offer both in the domestic and foreign markets, there is also a novelty: a wide assortment of solid wires for welding low-alloyed steels, flux cored welding wires for non alloy, low alloy and high alloy steels, wires and rods for the welding of high alloy steels, aluminium and aluminium-based alloys, and wires and powders for SAW welding of non alloy and low alloy steels.

Taking into account the needs of the market as well as our clients' suggestions and opinions, both positive and negative, the development team within Elektroda Zagreb d.d. is constantly trying to improve the existing materials used in welding, as well as to develop new ones, for example thin-coated rutile and rutile-celullose electrode and the group of wires for welding of low-alloyed steels. All our products undergo strict controls during the production process, from the stage of raw materials all the way to the finished products. This is best proved by the fact that our products have been certified by all major certificate authorities. Each produced batch comes with the factory certificate, including the "3.1 certificate", at the client's request.

Today, Elektroda Zagreb d.d. is a very significant name in the domestic, european and world market. Currently we provide about 90 different filler materials for welding which are available in over 40 different countries around the world.
Our products can be found in almost any industrial branch, such as: shipbuilding industry, energy plants, automobile industry, chemical industry, civil engineering, bridge construction, etc.

In order to achieve the best possible quality of our products, and expand of our assortment we constantly invest in the modernisation of production equipment, quality control testing, education of personnel, and scientific research work.

The basic postulates of our business can be described by three features:

- quality,
- flexibility,
- speed.

We are grateful for your trust.

ELEKTRODA ZAGREB d.d.
ZAPRESIC
REPUBLIC OF CROATIA

CONTENT

CONTENT

CONTENT

CONTENT

ELEKTRODA ZAGREB d.d.

STICK ELECTRODES

ELEKTRODA ZAGREB d.d.

ELECTRODES FOR WELDING UNALLOYED STEELS

EZ - 7 C
EZ - 7 C Mo
EZ - 8 RC
EZ - 10 RC
EZ - 11 F
EZ - 10 R
ADRIA R
EZ - 130
EZ - 180 R

EZ - 7 C

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 3 C 25	E6010

DESCRIPTION AND APPLICATION

High cellulose electrode for all position welding, espacially for vertical-down. Recommended for root passes, hot passes, filler layers, and especialy recommended for welding pipelines. Besides strong penetration and concetrated electric arc, it offers good weld metal toughness and a good X-ray quality.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

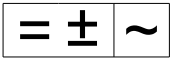
R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-30°C) J
> 420	500 - 640	> 22	≥ 50

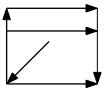
APPROXIMATE CHEMICAL COMPOSITION

	C	Mn	Si
%	< 0,12	0,7	0,3

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	94 600	4,0	5 x 4,0 = 20,0
Ø 3,2 x 350	62 200	4,5	5 x 4,5 = 22,5
Ø 4,0 x 350	31 900	4,5	5 x 4,5 = 22,5
Ø 5,0 x 350	10 500	6,2	5 x 6,2 = 31,0





Marking: **EZ - 7 C**

EZ - 7 C Mo

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 3 Mo C 25	E7010-A1

DESCRIPTION AND APPLICATION

High cellulose electrode alloyed with molybdenum for all positional welding, especially vertical-down. Recommended for hot passes, filler and cover layers, and especially recommended for welding of pipelines. Besides strong penetration and concentrated electrical arc, it offers good weld metal toughness and good X-ray quality.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

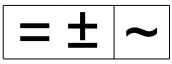
R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-30°C) J
> 420	500 - 640	> 22	≥ 50

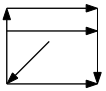
APPROXIMATE CHEMICAL COMPOSITION

	C	Mn	Si	Mo
%	< 0,12	0,6	0,3	0,5

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	32 000	4,8	5 x 4,8 = 24,0
Ø 4,0 x 350	22 400	4,8	5 x 4,8 = 24,0
Ø 5,0 x 350	10 600	6,5	5 x 6,5 = 32,5





Marking: **EZ - 7 C Mo**

EZ - 8 RC

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 0 RC 11	E6013

DESCRIPTION AND APPLICATION

A medium coated electrode of rutile-cellulose type for welding of mild and low-alloy steels with tensile strength up to 510 N/mm². Suitable for welding in all positions, including vertical down. Distinguished by stable electric arc and easy slag detachment.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0483	St 33 (1.0035) to St 44-3N (1.0144)	S 185 to S 275J2G3 Fe 310-0 to Fe 430 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 do L360NB
Shipbuilding steels	A, B, D	A, B, D	
Cold-reduced steel sheet	Č 0146 to Č 0148	St 12 (1.0330) to St 14 (1.0338)	Fe P01 to Fe P04

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 420	500 - 640	> 20	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,08	0,5	0,3

RECOMMENDED WELDING CURRENT

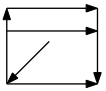
Ø mm	2,0	2,5	3,2	4,0	5,0
A	40 - 60	60 - 90	100 - 130	140 - 170	180 - 210

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	94 600	0,8; 3,5	20 x 0,8 = 16; 5 x 3,5 = 17,5
Ø 2,5 x 300	62 200	0,8; 3,5	20 x 0,8 = 16; 5 x 3,5 = 17,5
Ø 3,2 x 350	31 900	0,8; 4,5	25 x 0,8 = 20; 5 x 4,5 = 22,5
Ø 4,0 x 350	22 300	4,5	5 x 4,5 = 22,5
Ø 5,0 x 450	10 500	6,2	5 x 6,2 = 31,0

APPROVALS

DB; TÜV



Marking: **EZ - 8 RC**

EZ - 10 RC

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 0 RC 11	E6013

DESCRIPTION AND APPLICATION

Thin-coated rutile-cellulose electrode for welding mild and low-alloy steels with tensile strength up to 510 N/mm². Suitable for welding in all positions, including vertical down. It is characterised by stabile welding arc and easy slag detachment.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0483	St 33 (1.0035) to St 44-3N (1.0144)	S 185 to S 275J2G3 Fe 310-0 to Fe 430 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D	A, B, D	
Cold-reduced steel sheet	Č 0146 to Č 0148	St 12 (1.0330) to St 14 (1.0338)	Fe P01 to Fe P04

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 420	500 - 640	> 20	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

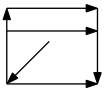
	C	Mn	Si
%	0,08	0,5	0,3

RECOMMENDED WELDING CURRENT

Ø mm	2,0	2,5	3,2	4,0
A	40 - 60	60 - 90	100 - 130	140 - 170

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	104 000	0,8; 4,0	20 x 0,8 = 16; 5 x 4,0 = 20,0
Ø 2,5 x 300	67 895	0,8; 3,8	20 x 0,8 = 16; 5 x 3,8 = 19,0
Ø 3,2 x 350	34 888	0,8; 4,5	25 x 0,8 = 20; 5 x 4,5 = 22,5
Ø 4,0 x 450	23 405	4,7	5 x 4,7 = 23,5



Marking: **EZ - 10 RC**

EZ - 11 F

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 0 RR 12	E6013

DESCRIPTION AND APPLICATION

A heavily coated rutile electrode for welding of steels with tensile strength up to 510 N/mm². Distinguished by consistent welding arc, excellent slag detachment and fine smooth welds.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570)	S 185 to S 355J2G3 Fe 310-0 to Fe 510 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D	A, B, D	
Cold-reduced steel sheet	Č 0146 to Č 0148	St 12 (1.0330) to St 14 (1.0338)	Fe P01 to Fe P04

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 420	500 - 640	> 20	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,08	0,6	0,35

RECOMMENDED WELDING CURRENT

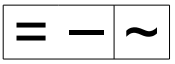
Ø mm	2,0	2,5	3,2	4,0	5,0	6,0
A	50 - 70	60 - 95	110 - 150	140 - 200	200 - 270	230 - 300

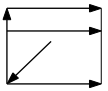
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	89 200	0,8; 3,7	20 x 0,8 = 16; 5 x 3,7 = 18,5
Ø 2,5 x 300	54 300	0,8; 3,5	20 x 0,8 = 16; 5 x 3,5 = 17,5
Ø 3,2 x 350	27 900	0,8; 4,3	25 x 0,8 = 20; 5 x 4,3 = 21,5
Ø 4,0 x 450	14 700	5,3	5 x 5,3 = 26,5
Ø 5,0 x 450	10 000	5,4	5 x 5,4 = 27,0
Ø 6,0 x 450	6 700	5,2	5 x 5,2 = 26,0

APPROVALS

DB; TÜV





Marking: **EZ - 11 F**

EZ - 10 R

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 0 R 12	E6013

DESCRIPTION AND APPLICATION

Thin-coated rutile electrode for welding of steels with tensile strength up to 510 N/mm². It is characterized by stabile welding arc, excellent slag detachment and fine smooth weld. It is suitable for welding in forced position, eg. overhead position.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Construction steel	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570)	S 185 to S 355J2G3 Fe 310-0 to Fe 510 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D	A, B, D	
Cold-reduced steel sheet	Č 0146 to Č 0148	St 12 (1.0330) to St 14 (1.0338)	Fe P01 to Fe P04

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 420	500 - 640	> 20	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,08	0,5	0,3

RECOMMENDED WELDING CURRENT

Ø mm	2,0	2,5	3,2	4,0
A	50 - 70	60 - 95	110 - 150	140 - 200

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	100 000	0,8; 4,0	20 x 0,8 = 16; 5 x 4,0 = 20,0
Ø 2,5 x 300	65 238	0,8; 4,2	20 x 0,8 = 16; 5 x 4,2 = 21,0
Ø 3,2 x 350	33 777	0,8; 4,5	25 x 0,8 = 20; 5 x 4,5 = 22,5
Ø 4,0 x 450	16 500	5,3	5 x 5,3 = 26,5

Marking: **EZ - 10 R**

ADRIA R

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 35 0 RR 12	E6013

DESCRIPTION AND APPLICATION

Rutile electrode designed for welding of steels with tensile strength up to 470 N/mm². The electrode is characterized by very good operating welding characteristics and is therefore suitable for use with welders who do not have a lot of experience in welding.
Seam surface is smooth and slag detachment is easy.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0045)	S 185 to S 355JR Fe 310-0 to Fe 510 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D	A, B, D	
Cold-reduced steel sheet	Č 0146 to Č 0148	St 12 (1.0330) to St 14 (1.0338)	Fe P01 to Fe P04

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 355	440 - 570	> 22	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,08	0,37	0,35

RECOMMENDED WELDING CURRENT

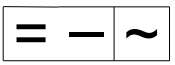
Ø mm	2,0	2,5	3,2	4,0	5,0	6,0
A	50 - 70	60 - 95	110 - 150	140 - 200	200 - 270	230 - 300

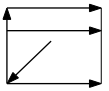
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	89 200	0,8; 3,7	20 x 0,8 = 16; 5 x 3,7 = 18,5
Ø 2,5 x 300	54 300	0,8; 3,5	20 x 0,8 = 16; 5 x 3,5 = 17,5
Ø 3,2 x 350	27 900	0,8; 4,3	25 x 0,8 = 20; 5 x 4,3 = 21,5
Ø 4,0 x 450	14 700	5,3	5 x 5,3 = 26,5
Ø 5,0 x 450	10 000	5,4	5 x 5,4 = 27
Ø 6,0 x 450	6 700	5,2	5 x 5,2 = 26

APPROVALS

CE





Marking: **ADRIA R**

EZ - 130

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 0 RR 53	E7024

DESCRIPTION AND APPLICATION

A heavily coated rutile electrode, with effective efficiency approx. 130%. Particulary suitable for horizontal and fillet welding of steels with tensile strength up to 510 N/mm². Distinguished by excellent weldability, easy slag detachment and good mechanical properties.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570)	S 185 to S 355J2G3 Fe 310-0 to Fe 510 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Shipbuilding steels	A, B, D AH 32 to DH 36	A, B, D AH 32 to DH 36	

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 420	500 - 640	> 22	≥ 55

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,1	0,5	0,25

RECOMMENDED WELDING CURRENT

Ø mm	4,0	5,0	6,0
A	160 - 210	210 - 270	250 - 310

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	19 700	3,8	5 x 3,8 = 19,0
Ø 4,0 x 450	10 800	4,8	5 x 4,8 = 24,0
Ø 5,0 x 450	7 100	4,9	5 x 4,9 = 24,5
Ø 6,0 x 450	5 200	4,8	5 x 4,8 = 24,0

APPROVALS

CE

Marking: **E 7024**

EZ - 180 R

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 0 RR 73	E7024

DESCRIPTION AND APPLICATION

A heavily coated rutile electrode with effective efficiency approximate 180%.
Suitable for welding of mild and low-alloy steels in flat and horizontal-vertical position.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570)	S 185 to S 355J2G3 Fe 310-0 to Fe 510 D1
Boiler steels	Č 1202 Č 1204 Č 3133	HI (1.0345) HII (1.0425) 17Mn4 (1.0481)	P235GH P265GH P295GH
Shipbuilding steels	A, B, D AH 32 to DH 36	A, B, D AH 32 to DH 36	

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (0°C) J
> 420	500 - 640	> 22	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,08	0,95	0,35

RECOMMENDED WELDING CURRENT

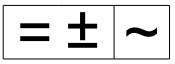
Ø mm	4,0	5,0
A	160 - 240	240 - 300

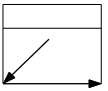
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 4,0 x 450	9 600	5,3	5 x 5,3 = 26,5
Ø 5,0 x 450	6 200	5,3	5 x 5,3 = 26,5

APPROVALS

CE; CRS (2Y); BV (2Y)





Marking: **E 7024**

ELEKTRODA ZAGREB d.d.

ELECTRODES FOR WELDING
UNALLOYED AND LOW-ALLOYED STEELS

EZ - 50 B
EZ - 500 B
EZ - 60 B
EZ - 65 B

EZ - 50 B

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 42 4 B 42 H5	E7018-1

DESCRIPTION AND APPLICATION

A heavily coated basic electrode for welding of mild and low alloy steels with tensile strength up to 640 N/mm². Also, it is suitable for welding of fine grained steels with yield strength up to 440 N/mm². Hydrogen content of all-weld metal < 5 ml/100 g. Effective efficiency approx. 120%.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570) StE 420 S (1.0428)	S 185 to S 355 J2G3 Fe 310-0 to Fe 510 D1
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581)	DX55D to P355T2
Shipbuilding steels	A, B, D, E AH 32 to EH 36	StE 210.7 (1.0307) to StE 360.7 (1.0582) A, B, D, E AH 32 to EH 36	L210 to L360NB
Fine grained steels	ČRO 250 to ČRO 350 ČPRV 250 to ČPRV 350	StE 285 (1.0486) StE (1.0562) WStE 285 (1.0487) WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J	KV (-40°C) J
> 420	500 - 640	> 26	≥ 120	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si
%	0,08	1,0	0,5

RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0	6,0
A	60 - 90	110 - 140	140 - 190	170 - 250	240 - 330

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	57 000	0,8; 3,2	20 x 0,8 = 16; 5 x 3,2 = 16,0
Ø 2,5 x 300	53 100	0,8; 3,2	20 x 0,8 = 16; 5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	0,8; 3,9	25 x 0,8 = 20; 5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0
Ø 6,0 x 450	6 900	5,5	5 x 5,5 = 27,5

APPROVALS

BV (3,3YHH); CRS (3YHH); DB; LR (3,3YH15); TÜV

= + (~) (OCV > 70V)

Marking: **EZ - 50 B**
Dry before use 2h/300°C

EZ - 500 B

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.1
E 46 4 B 42 H5	E7018-1

DESCRIPTION AND APPLICATION

A heavily coated basic type electrode for welding mild and low-alloy steels, fine-grained steels with tensile strength up to 460 N/mm². Easier to weld in forced positions with good restrikting properties, better penetration and crack resistant coating.
Hydrogen content of all-weld metal < 5 ml/100 g.
Effective efficiency approx. 120%.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570) StE 460 (1.8918)	S 185 to S 355 J2G3 P460NL2
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581)	DX55D to P355T2
Shipbuilding steels	A, B, D, E AH 32 to EH 36	StE 210.7 (1.0307) to StE 360.7 (1.0582) A, B, D, E AH 32 to EH 36	L210 to L360NB
Fine grained steels	ČRO 250 to ČRO 350 ČPRV 250 to ČPRV 350	StE 285 (1.0486) StE (1.0562) WStE 285 (1.0487) WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J	KV (-40°C) J
> 460	530 - 680	> 26	≥ 160	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

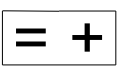
	C	Mn	Si
%	0,08	1,3	0,3

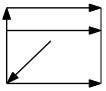
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0	6,0
A	60 - 90	110 - 140	140 - 190	170 - 250	240 - 330

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	57 000	3,2	5 x 3,2 = 16,0
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0
Ø 6,0 x 450	6 900	5,5	5 x 5,5 = 27,5





Marking: **EZ - 500 B**
Dry before use 2h/300°C

EZ - 60 B

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.5
E 50 6 1Ni B 42 H5	E8018-G

DESCRIPTION AND APPLICATION

A basic coated, alloyed with nickel (Ni), electrode for welding low-alloyed steels with tensile strength from 510 to 670 N/mm². Also suitable for welding fine-grained steels with yield strength up to 460 N/mm², where is required very good impact properties at low temperatures. Hydrogen content of all-weld metal < 5 ml/100 g.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0561 to Č 0745	St 52-3N (1.0570) to St 70-2 (1.0070)	S 355J2G3 to E 360 Fe 510 D1 to Fe 690-2
Boiler steels	Č 3133 Č 3105	17 Mn4 (1.0481) 19Mn6 (1.0473)	P295GH P355GH
Fine-grained steels	ČRO 350 to ČRO 460	StE 355 (1.0562) to StE 460 (1.8905)	P355N P460N
	ČRV 350 to ČRV 460	WStE 355 (1.0565) WStE 460 (1.8935)	P355NH P460NH
	ČRM 350 to ČRN 460	TStE 355 (1.0566) TStE 460 (1.8915)	P355NL1 P460NL1
Nickel steels		11Mnni53 (1.6212) 13MnNi63 (1.6217)	11MnNi5-3 13MnNi6-3
Cast steels	ČL 0500 ČL 0600	GS-52 (1.0551) GS-60 (1.0553)	S355JRC S355JO

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J	KV (-60°C) J
> 500	560 - 720	> 22	≥ 80	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

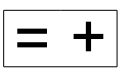
	C	Mn	Si	Ni
%	0,08	1,0	0,5	1,1

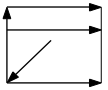
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0	6,0
A	65 - 80	120 - 140	140 - 180	220 - 250	260 - 300

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0
Ø 6,0 x 450	6 900	5,5	5 x 5,5 = 27,5





Marking: **E 8018-G**
Dry before use 2h/300°C

EZ - 65 B

CLASSIFICATION

HRN EN ISO 2560-A	AWS / ASME SFA-5.5
E 50 4 B 42 H5	E8018-G

DESCRIPTION AND APPLICATION

A heavily coated basic electrode for welding of mild and low-alloy constructional steels with tensile strength from 510 to 670 N/mm². Also, it is suitable for welding of fine-grained steels with yield strength up to 460 N/mm².

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0561 to Č 0745	St 52-3N (1.0570) to St 70-2 (1.0070)	S 355J2G3 to E 360 Fe 510 D1 to Fe 690-2
Boiler steels	Č 3133 Č 3105	17 Mn4 (1.0481) 19Mn6 (1.0473)	P295GH P355GH
Tube and pipe steels	Č 3100 to Č 1402	St 52.4 (1.0581) to StE 55.4 (1.0509)	P355T2 to S355K2G3Cu
		StE 360.7 (1.0582) to StE 415.7 (1.8972)	L210 to L415NB
Shipbuilding steels	A, B, D, E	A, B, D, E	
	AH 32 to EH 36	AH 32 to EH 36	
Fine grained steels	ČRO 350 to ČRO 460	StE 355 (1.0562) to StE 460 (1.8905)	P355N P460N
	ČRV 350 to ČRV 460	WStE 355 (1.0565) WStE 460 (1.8935)	P355NH P460NH
Cast steels	ČL 0300 to ČL 0600	GS-38 (1.0416) to GS-60 (1.0553)	C18D to S355JO

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J	KV (-40°C) J
> 500	560 - 720	> 22	≥ 100	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

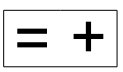
	C	Mn	Si
%	0,08	1,7	0,7

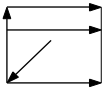
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0	6,0
A	70 - 80	110 - 130	140 - 170	220 - 250	260 - 300

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0
Ø 6,0 x 450	6 900	5,5	5 x 5,5 = 27,5





Marking: **E 8018-G**
Dry before use 2h/300°C

ELEKTRODA ZAGREB d.d.

ELECTRODES FOR WELDING CREEP RESISTING STEELS

EZ - 55 B Mo
EZ - 70 B
EZ - 80 B

EZ - 55 B Mo

CLASSIFICATION

HRN EN ISO 3580-A	AWS / ASME SFA-5.5
E Mo B 42	E7018-A1

DESCRIPTION AND APPLICATION

An Mo-alloyed basic coated electrode for welding of creep resisting steels, persistent on working temperatures up to 550°C.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0361 to Č 0545	St 37-2 (1.0037) to St 50-2 (1.0050)	S 235JR to E 295 Fe 360B to Fe 490-2
Fine-grained steels	ČRV 350 to ČRV 420	WStE 355 (1.0565) to WStE 420 (1.8932)	P355NH to P420NH
Boiler steels	Č 1202 Č 1204	HI (1.0481) HII (1.0473)	P235GH P265GH
	Č 3133 Č 3105	17Mn4 (1.0481) 19Mn6 (1.0473)	P295GH P355GH
	Č 7100	15Mo3 (1.5415)	16M03
Tube and pipe steels	Č 1214 Č 1215	St 35.8 (1.0305) St 45.8 (1.0405)	P235G1TH P255G1TH
Cast steels	ČL 7130	G-22 Mo4 (1.5419)	G20Mo5

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Stress relieved at 620°C.

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 420	500 - 640	> 23	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	Mo
%	0,08	0,9	0,5	0,5

RECOMMENDED WELDING CURRENT

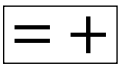
Ø mm	2,5	3,2	4,0	5,0
A	60 - 90	85 - 140	140 - 190	170 - 250

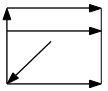
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0

APPROVALS

TÜV





Marking: **EZ - 55 B Mo**
Dry before use 2h/300°C

EZ - 70 B

CLASSIFICATION

HRN EN ISO 3580-A	AWS / ASME SFA-5.5
E Cr Mo1 B 42	E8018-B2

DESCRIPTION AND APPLICATION

Basic coated electrode allyed with Cr and Mo. Suitable for welding of creep resisting steels with working temperatures up to 550°C. Also, it is suitable for welding of heat treatable steels of similar chemical composition.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Creep resisting and heat-treatable steels steels and casts	Č 7400	13CrMo44 (1.7335)	13CrMo4-5
	Č 4732	42CrMo4 (1.7225)	42CrMo4
	Č 4730	25CrMo4 (1.7218)	25CrMo4
	Č 4720	15CrMo5 (1.7262)	18CrMo4
	ČL 4730	20CrMo4 (1.7321)	20MoCr5
	ČL 7431	16MnCr5 (1.7131)	16MnCr5
		GS-25 CrMo4 (1.7218)	G25CrMo4
		GS-24 CrMo 54 (1.7354)	G22CrMo5-4
		GS-17 CrMo 55 (1.7357)	G17CrMo5-5

MECHANICAL COMPOSITION OF THE ALL-WELD METAL

Stress relieved at 720°C.

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 470	570 - 700	> 22	≥ 110

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

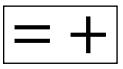
	C	Mn	Si	Cr	Mo
%	0,08	0,8	0,5	1,2	0,5

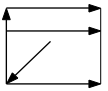
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0
A	65 - 80	120 - 140	140 - 180	220 - 250

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0





Marking: **E 8018-B2**
Dry before use 2h/300°C

EZ - 80 B

CLASSIFICATION

HRN EN ISO 3580-A	AWS / ASME SFA-5.5
E Cr Mo2 B 42	E9018-B3

DESCRIPTION AND APPLICATION

Basic coated electrode aloyed with Cr and Mo. Suitable for welding creep resisting steels whose operating temperature is up to 600°C. It is also suitable for welding of heat treatable steels of similar chemical composition.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Creep resisting and heat treatable steels and cast	Č 7401	10CrMo 9 10 (1.7380)	10 CrMo 9-10
		10CrSiMoV (1.8075)	11CrMo 9-10
	Č 4734	30CrMoV 9 (1.7707)	30CrMoV9
		GS-12 CrMo 9 10 (1.7380)	G12CrMo9-10

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Stress relieved at 760°C.

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 520	620 - 720	> 20	≥ 80

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

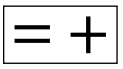
	C	Mn	Si	Cr	Mo
%	0,08	0,8	0,5	2,4	1,0

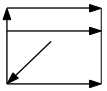
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0
A	65 - 80	120 - 140	140 - 180	220 - 250

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	26 900	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	14 400	5,2	5 x 5,2 = 26,0
Ø 5,0 x 450	9 600	5,4	5 x 5,4 = 27,0





Marking: **E 9018-B3**
Dry before use 2h/300°C

ELEKTRODA ZAGREB d.d.

ELECTRODES FOR WELDING HIGH-ALLOY STEELS

EZ - KROM 8
EZ - KROM 10 R
EZ - KROM 10 Nb
EZ - KROM 20
EZ - KROM 30 R
EZ - KROM 30 Nb
EZ - KROM 40 R
EZ - KROM 70

EZ - KROM 8

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 29 9 R 12	E312-16	1.4337

DESCRIPTION AND APPLICATION

A rutile coated electrode for welding of austenitic-ferritic steels, similar corrosion resisting steels and steel cast. Electrode is also suitable for joining dissimilar steels (alloyed and unalloyed), hard manganese steels, steels with poor weldability and high strength steels. Suitable for wear resistant surfacing and for buffer layers at hardfacing. Weld metal has an austenitic-ferritic structure.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	Tvrdoća HB
> 450	700 - 830	> 20	235 - 270

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	Cr	Ni
%	0,15	1,0	1,2	29,0	9,0

RECOMMENDED WELDING CURRENT

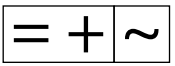
Ø mm	2,5	3,2	4,0	5,0
A	60 - 80	80 - 100	110 - 130	140 - 170

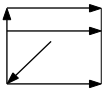
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	52 800	1,1	15 x 1,1 = 16,5
Ø 3,2 x 350	26 300	1,1	17 x 1,1 = 18,7
Ø 4,0 x 350	18 200	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	9 100	5,0	5 x 5,0 = 25,0

APPROVALS

CE





Marking: **EZ - KROM 8**
Dry before use 2h/300°C

EZ - KROM 10 R

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 19 9 LR 12	E308L-16	1.4316

DESCRIPTION AND APPLICATION

A low-carbon rutile electrode for welding of identical or similar (stabilized and unstabilized) stainless steels. Weld metal is of austenitic Cr-Ni type with delta-ferrite. Weld is resistant to intergranular corrosion on working temperatures up to 350°C.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
Stainless high-alloy austenite steels	Č 4580	X5 CrNi 18 11 (1.4301)	304	X5CrNi18-10
	ČL 4571	G-X 10 CrNi 18 8 (1.4312)	-	GX10CrNi18-8
	Č 45701	X2 CrNi 19 11 (1.4306)	304 L	X2CrNi19-11
	ČL 45701	G-X6 CrNi 18 9 (1.4308)	-	GX5CrNi19-10
	Č 4582	X6 CrNiNb 18 10 (1.4550)	347	X6CrNiNb18-10
	ČL 4572	G-X5 CrNiNb 18 9 (1.4552)	-	GX5CrNiNb19-11
	Č 4572	X6 CrNiTi 18 10 (1.4541)	321	X6CrNiTi18-10

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 320	> 510	> 30	> 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	Cr	Ni
%	≤ 0,03	0,9	0,9	19	10

RECOMMENDED WELDING CURRENT

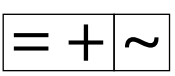
Ø mm	2,0	2,5	3,2	4,0	5,0
A	20 - 60	50 - 85	70 - 125	110 - 165	160 - 230

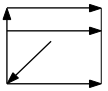
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	82 700	1,1	15 x 1,1 = 16,5
Ø 2,5 x 300	52 800	1,1	15 x 1,1 = 16,5
Ø 3,2 x 350	26 300	1,1	17 x 1,1 = 18,7
Ø 4,0 x 350	18 200	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	9 100	6,0	5 x 6,0 = 30,0

APPROVALS

DB; TÜV





Marking: **EZ - KROM 10 R**
Dry before use 2h/300°C

EZ - KROM 10 Nb

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 19 9 Nb R 12	E347-16	1.4551

DESCRIPTION AND APPLICATION

A rutile type coated electrode for welding of identical (stabilized) and similar stainless steels. The weld metal is of austenitic Cr-ni type with low carbon, stabilized with niobium, resistant to intergranular corrosion up to 400°C and oxidation up to 800°C. Weld metal structure is austenite with delta ferrite.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High alloyed austenitic stainless steels and casts	Č 4582	X6 CrNiNb 18 10 (1.4550)	347	X6CrNiNb18-10
	ČL 4572	G-X5 CrNiNb 18 9 (1.4552)	-	GX5CrNiNb19-11
	Č 4572	X6 CrNiTi 18 10 (1.4541)	321	X6CrNiTi18-10
	Č 4580	X5 CrNi 18 11 (1.4301)	304	X5CrNi18-10
	Č 4571	G-X10 CrNi 18 8 (1.4312)	-	GX10CrNi18-8
	Č 45701	X2 CrNi 19 11 (1.4306)	304 L	X2CrNi19-11
	ČL 45701	G-X6 CrNi 18 9 (1.4308)	-	GX5CrNi19-10

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 400	600 - 700	> 30	> 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

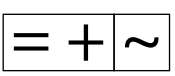
	C	Mn	Si	Cr	Ni	Nb
%	≤ 0,03	0,9	0,9	19	10	> 10x%C

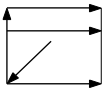
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0
A	60 - 90	80 - 130	110 - 160

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	52 800	1,1	15 x 1,1 = 16,5
Ø 3,2 x 300	26 300	1,1	17 x 1,1 = 18,7
Ø 4,0 x 350	18 200	1,2	16 x 1,2 = 19,2





Marking: **E 347-16**
Dry before use 2h/300°C

EZ - KROM 20

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 18 8 Mn B 22	~ E307-15	1.4370

DESCRIPTION AND APPLICATION

A basic coated electrode for welding Cr-Ni stainless steels, steels with poor weldability, and steels with dissimilar structural phases (unalloyed and low-alloy steels as well as manganese steel). Electrode is also suitable for obtaining elastic buffer layer in hardfacing. Weld metal is austenitic Cr-Ni-Mn type, nonmagnetic, wear resistant, and corrosion resistant up to 800°C.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 350	590 - 690	> 35	> 80

APPROXIMATE CHEMICAL PROPERTIES OF THE ALL-WELD METAL

	C	Mn	Si	Cr	Ni
%	0,12	6,0	1,0	18,5	8,0

RECOMMENDED WELDING CURRENT

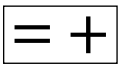
Ø mm	2,5	3,2	4,0	5,0
A	65 - 85	90 - 110	125 - 145	150 - 170

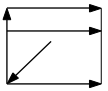
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	65 000	1,3	15 x 1,3 = 19,5
Ø 3,2 x 350	33 000	1,2	17 x 1,2 = 20,4
Ø 4,0 x 350	22 000	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	11 300	5,2	5 x 5,2 = 26,0

APPROVALS

CE





Marking: **EZ - KROM 20**
Dry before use 2h/300°C

EZ - KROM 30 R

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 19 12 3 LR 12	E316L-16	1.4430

DESCRIPTION AND APPLICATION

A low-carbon rutile electrode for welding of identical and similar (stabilized and unstabilized) stainless steels. Weld metal is of austenitic Cr-Ni-Mo type with delta-ferrite. Weld metal is resistant to intergranular corrosion on working temperatures up to 350°C.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
Stainless high-alloy austenite steels	Č 4573	X5 CrNiMo 17 12 2 (1.4401)	316	X5CrNiMo17-12-2
	Č 45703	X2 CrNiMo 17 13 2 (1.4404)	316 L	X2CrNiMo17-12-2
	Č 4574	X6 CrNiMoTi 17 12 2 (1.4571)	316 Ti	X6CrNiMoTi17-12-2
	Č 4583	X6 CrNiMoNb 17 12 2 (1.4580)	316 Cb	X6CrNiMoNb17-12-2
	ČL 4580	G-X6 CrNiMo 18 10 (1.4408)	-	GX5CrNiMo19-11-2
	ČL 4573	G-X10 CrNiMo 18 9 (1.4410)	-	-

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 320	> 510	> 25	> 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	Cr	Ni	Mo
%	≤ 0,03	0,9	0,8	18,5	12	2,7

RECOMMENDED WELDING CURRENT

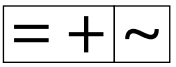
Ø mm	2,0	2,5	3,2	4,0	5,0
A	40 - 60	50 - 85	70 - 125	110 - 165	160 - 230

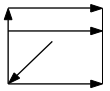
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	79 100	1,1	15 x 1,1 = 16,5
Ø 2,5 x 300	52 800	1,1	15 x 1,1 = 16,5
Ø 3,2 x 350	26 300	1,1	17 x 1,1 = 18,7
Ø 4,0 x 350	18 200	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	9 100	6,0	5 x 6,0 = 30,0

APPROVALS

DB; TÜV





Marking: **EZ - KROM 30 R**
Dry before use 2h/300°C

EZ - KROM 30 Nb

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 19 12 3 Nb R 12	E318-16	1.4576

DESCRIPTION AND APPLICATION

A rutile type coated electrode for welding of identical (stabilized) and similar stainless steels. The weld metal is of Cr-Ni-Mo type with low carbon, stabilized with niobium, resistant to intergranular corrosion up to 400°C and oxidation up to 800°C. Weld metal structure is austenitic with delta ferrite.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High alloy austenitic stainless steels and cast	Č 4573	X5 CrNiMo 17 12 2 (1.4401)	316	X5CrNiMo17-12-2
	Č 45703	X2 CrNiMo 17 13 2 (1.4404)	316 L	X2CrNiMo17-12-2
	Č 4574	X6 CrNiMoTi 17 12 2 (1.4571)	316 Ti	X6CrNiMoTi17-12-2
	Č 4583	X6 CrNiMoNb 17 12 2 (1.4580)	316 Cb	X6CrNiMoNb17-12-2
	ČL 4580	G-X6 CrNiMo 18 10 (1.4408)	-	GX5CrNiMo19-11-2
	ČL 4573	G-X10 CrNiMo 18 9 (1.4410)	-	-

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 400	590 - 690	> 30	> 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

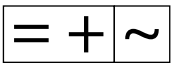
	C	Mn	Si	Cr	Ni	Mo	Nb
%	≤ 0,03	0,9	0,8	18,5	12,0	2,7	> 10x%C

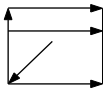
RECOMMENDED WELDING CURRENT

Ø mm	2,0	2,5	3,2	4,0	5,0
A	40 - 60	50 - 85	70 - 125	110 - 165	160 - 230

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,0 x 300	79 100	1,1	15 x 1,1 = 16,5
Ø 2,5 x 300	52 800	1,1	15 x 1,1 = 16,5
Ø 3,2 x 350	26 300	1,1	17 x 1,1 = 18,7
Ø 4,0 x 350	18 200	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	9 100	6,0	5 x 6,0 = 30,0





Marking: **E 318-16**
Dry before use 2h/300°C

EZ - KROM 40 R

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 23 12 2 LR 12	E309LMo-16	1.4459

DESCRIPTION AND APPLICATION

Rutile coated electrode for welding of identical and similar stainless steels. Electrode is also used for welding dissimilar steels (for eg. stainless steel with mild steels), and for claddings on mild and low-alloy steels. Weld metal is of Cr-Ni-Mo austenitic type with delta-ferrite, resistant on temperatures up to 350°C.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 350	> 550	> 30	> 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	Cr	Ni	Mo
%	≤ 0,03	0,9	0,8	22,5	12,5	2,7

RECOMMENDED WELDING CURRENT

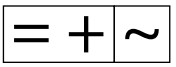
Ø mm	2,5	3,2	4,0	5,0
A	60 - 80	80 - 110	110 - 150	150 - 190

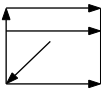
PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	52 800	1,1	15 x 1,1 = 16,5
Ø 3,2 x 350	26 300	1,1	17 x 1,1 = 18,7
Ø 4,0 x 350	18 200	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	9 100	5,5	5 x 5,5 = 27,5

APPROVALS

CE





Marking: **EZ - KROM 40 R**
Dry before use 2h/300°C

EZ - KROM 70

CLASSIFICATION

HRN EN ISO 3581-A	AWS / ASME SFA-5.4	W. Nr.
E 25 20 B 22	E310-15	1.4842

DESCRIPTION AND APPLICATION

A Basic coated electrode for welding and surfacing heat resistant steels of 25/20 Cr-Ni type, ferrite-perlite Cr, Cr-Si and Cr-Al steels and heat resisting steel cast. Weld metal is austenite Cr-Ni type, resistant up to 1200°C.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High alloy heat resistant steels	Č 4578	X15 CrNiSi 25 20 (1.4841)	310 / 314	X15CrNiSi25-21
	-	X12 CrNi 25 21 (1.4845)	310 S	X8CrNi25-21
	-	G-X15 CrNi 25 20 (1.4840)	-	GX15CrNi25-20
	-	X7 CrNi 23 14 (1.4833)	-	X12CrNi23-13
	Č 4586	X20 CrNiSi 25 4 (1.4821)	327	X15CrNiSi25-4
	-	G-X 40 CrNiSi 22 9 (1.4826)	-	GX40CrNiSi22-9
	-	G-X 25 CrNiSi 20 14 (1.4832)	-	GX25CrNiSi20-14
	ČL 4577	G-X 40 CrNiSi 25 12 (1.4837)	-	GX40CrNiSi25-12

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 350	> 550	> 20	> 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

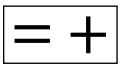
	C	Mn	Si	Cr	Ni
%	0,12	2,5	1,0	25,0	20,0

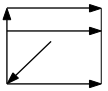
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0
A	65 - 85	90 - 110	125 - 145	150 - 170

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	62 900	1,3	15 x 1,3 = 19,5
Ø 3,2 x 350	32 100	1,2	17 x 1,2 = 24,0
Ø 4,0 x 350	22 000	1,2	16 x 1,2 = 19,2
Ø 5,0 x 450	11 000	6,0	5 x 6,0 = 30,0





Marking: **E 310-15**
Dry before use 2h/300°C

ELECTRODES FOR WELDING CAST IRON

EZ - Fe NIKALJ
EZ - NIKALJ 10

EZ - Fe NIKALJ

CLASSIFICATION

HRN EN ISO 1071	AWS / ASME SFA-5.15
E C NiFe-Cl-1	ENiFe-Cl

DESCRIPTION AND APPLICATION

A basic coated electrode for welding of grey cast iron, temper and steel cast without preheating. It is also suitable for welding of unalloyed, low-alloy and high-alloy steels, and for joining cast iron to steel. Weld deposit is machinable.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HB
190

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

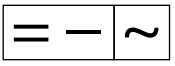
	Ni	Fe
%	55	45

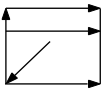
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0
A	60 - 80	90 - 110	120 - 140	150 - 170

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	62 500	1,3	15 x 1,3 = 19,5
Ø 3,2 x 350	32 500	1,3	17 x 1,3 = 22,1
Ø 4,0 x 350	21 800	1,5	16 x 1,5 = 24,0
Ø 5,0 x 450	11 000	6,0	5 x 6,0 = 30,0





Marking: **EZ - Fe NIKALJ**

EZ - NIKALJ 10

CLASSIFICATION

HRN EN ISO 1071	AWS / ASME SFA-5.15
E C Ni-CI	ENi-CI

DESCRIPTION AND APPLICATION

Basic coated electrode for welding of grey cast iron, temper and steel cast without preheating. It is also suitable for welding of unalloyed, low-alloy and high-alloy steels, and for joining cast iron to steel, copper and copper alloys. Preheating is required when welding copper and copper alloys.
Weld deposit is machinable.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

	Hardness HB
	175

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

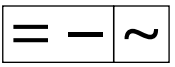
	Ni
%	≥ 98

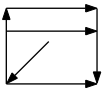
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0
A	60 - 80	90 - 110	120 - 140	150 - 170

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	62 500	1,3	15 x 1,3 = 19,5
Ø 3,2 x 350	32 500	1,3	17 x 1,3 = 22,1
Ø 4,0 x 350	21 800	1,5	16 x 1,5 = 24,0
Ø 5,0 x 450	11 000	6,0	5 x 6,0 = 30,0





Marking: **E Ni-CI**

ELEKTRODA ZAGREB d.d.

ELECTRODES FOR WELDING COPPER AND COPPER ALLOYS

EZ - BAKAR 1
EZ - BAKAR 2

EZ - BAKAR 1

CLASSIFICATION

AWS / ASME	DIN
-	-
-	-

DESCRIPTION AND APPLICATION

Basic electrode for welding copper with steel and for welding copper alloys.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_m N/mm²	A_5 %
> 170	> 20

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

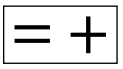
	Cu	Mn	Si	P	Remaining
%	>95,0	≤3,00	≤0,50	≤0,30	≤0,50

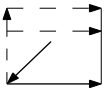
RECOMMENDED WELDING CURREN

Ø mm	3,2	4,0
A	90 - 110	130 - 150

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg
Ø 3,2 x 350	28500	2
Ø 4,0 x 350	18000	2





EZ - BAKAR 2

CLASSIFICATION

AWS / ASME	DIN
SFA - 5.6	-
ECu	-

DESCRIPTION AND APPLICATION

Basic electrode for welding copper alloys and welding copper with steel, gray cast iron and bronzes.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_m	A_5
N/mm²	%
> 170	> 20

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

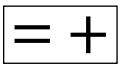
	Cu	Mn	Si	Fe
%	≥98,0	0,10	0,10	0,20

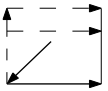
RECOMMENDED WELDING CURRENT

Ø mm	3,2	4,0
A	90 - 110	130 - 150

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg
Ø 3,2 x 350	28500	2
Ø 4,0 x 350	18000	2





ELEKTRODA ZAGREB d.d.

ELECTRODES FOR HARDFACING

EZ - 300 TN
EZ - 400 TN
EZ - 650 TN
EZ - ABRA 60
EZ - ABRA 65

EZ - 300 TN

CLASSIFICATION

HRN EN 14700	DIN 8555
E Fe 1	E1-UM-300

DESCRIPTION AND APPLICATION

A basic heavily coated electrode for medium-hard and wear resisting buildups. When hardfacing apply medium welding current and no weaving of electrode is recommended.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HB
275 - 325

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

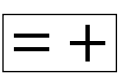
	C	Mn	Si
%	0,15	1,6	1,0

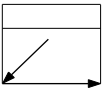
RECOMMENDED WELDING CURRENT

Ø mm	3,2	4,0	5,0	6,0
A	110 - 130	150 - 170	200 - 240	250 - 290

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	31 200	4,1	5 x 4,1 = 20,5
Ø 4,0 x 450	15 700	5,1	5 x 5,1 = 25,5
Ø 5,0 x 450	10 200	5,2	5 x 5,2 = 26,0
Ø 6,0 x 450	7 300	5,2	5 x 5,2 = 26,0





Marking: **EZ - 300 TN**

EZ - 400 TN

CLASSIFICATION

HRN EN 14700	DIN 8555
E Fe 1	E1-UM-400

DESCRIPTION AND APPLICATION

A basic heavily coated electrode for medium-hard and wear resisting buildups. When hardfacing apply medium welding current and no weaving of electrode is recommended.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HB
375 - 450

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

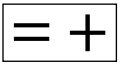
	C	Mn	Si	Cr
%	0,2	2,0	1,0	1,2

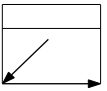
RECOMMENDED WELDING CURRENT

Ø mm	3,2	4,0	5,0	6,0
A	110 - 130	150 - 170	200 - 240	250 - 290

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	28 400	3,7	5 x 3,7 = 18,5
Ø 4,0 x 450	15 000	5,0	5 x 5,0 = 25,0
Ø 5,0 x 450	10 000	5,2	5 x 5,2 = 26,0
Ø 6,0 x 450	7 100	5,5	5 x 5,5 = 27,5





Marking: **EZ - 400 TN**

EZ - 650 TN

CLASSIFICATION

HRN EN 14700	DIN 8555
E Fe 2	E6-UM-60

DESCRIPTION AND APPLICATION

A basic heavily coated electrode for hard buildups. The deposit is hard, tough and abrasion resistant to hardness up to 500 HV. Weld is machinable only by grinding. When hardfacing apply medium welding current and no weaving of electrode is recommended.
At multilayer hardfacing it is recomended to weld buffer layer with electrode EZ - KROM 20.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HRC
57 - 62

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

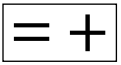
	C	Mn	Si	Cr	Mo
%	0,5	2,0	1,4	6,0	0,6

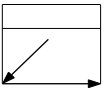
RECOMMENDED WELDING CURRENT

Ø mm	2,5	3,2	4,0	5,0	6,0
A	70 - 90	110 - 130	150 - 170	200 - 240	250 - 290

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 2,5 x 300	53 100	3,2	5 x 3,2 = 16,0
Ø 3,2 x 350	27 600	3,8	5 x 3,8 = 19,0
Ø 4,0 x 450	15 600	4,8	5 x 4,8 = 24,0
Ø 5,0 x 450	10 200	5,4	5 x 5,4 = 27,0
Ø 6,0 x 450	7 100	5,5	5 x 5,5 = 27,5





Marking: **EZ - 650 TN**

EZ - ABRA 60

CLASSIFICATION

HRN EN 14700	DIN 8555
E Fe 14	E10-UM-60-GR

DESCRIPTION AND APPLICATION

A high-efficiency, heavily coated rutile electrode for hard buildups. The metal deposit is extremely resistant to mineral abrasion and impact. Typical application in mining and mineral industry on wearing parts subjected to hard abrasive minerals (e.g. quartz, sand, dross, cement, ore etc.).

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HRC
≈ 60 (20°C)

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

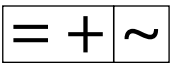
	C	Cr
%	3,2	32

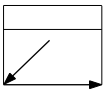
RECOMMENDED WELDING CURRENT

Ø mm	3,2	4,0	5,0
A	100 - 110	150 - 170	170 - 190

PACKAGING

Electrode dimension mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	19 200	3,9	5 x 3,9 = 19,5
Ø 4,0 x 450	8 900	4,8	5 x 4,8 = 24,0
Ø 5,0 x 450	5 600	4,8	5 x 4,8 = 24,0





Marking: **EZ - ABRA 60**

EZ - ABRA 65

CLASSIFICATION

HRN EN 14700	DIN 8555
E Fe 16	E10-UM-65-GRZ

DESCRIPTION AND APPLICATION

A high efficiency, heavily coated basic electrode for hard buildups. The metal deposit is extremely resistant to mineral abrasion and moderate impact at high temperatures (working temperatures up to 700°C). Typical application in mining and mineral industry on wearing parts subjected to abrasion at high temperatures (e.g. crushing mills for incadescent coal, coke, dross etc.).

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness
65 HRC (20°C) 600 HV (700°C)

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

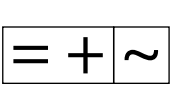
	C	Si	Cr	Mo	Nb	W	V
%	4,5	2,5	23,0	5,0	5,0	3,5	1,0

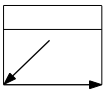
RECOMMENDED WELDING CURRENT

Ø mm	3,2	4,0	5,0
A	140 - 170	180 - 220	230 - 300

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	16 200	4,0	5 x 4,0 = 20,0
Ø 4,0 x 450	8 600	5,1	5 x 5,1 = 25,5
Ø 5,0 x 450	5 400	5,2	5 x 5,2 = 26,0





Marking: **EZ - ABRA 65**

ELEKTRODA ZAGREB d.d.

ELECTRODE FOR GOUGING AND CUTTING

EZ - 12

EZ - 12

DESCRIPTION AND APPLICATION

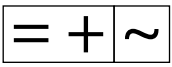
Heavily coated electrode designed for gouging and cutting. Espacially suitable for gouging of grey cast iron before repair welding.

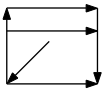
RECOMMENDED GOUGING CURRENT

Ø mm	3,2	4,0	5,0
A	180 - 300	300 - 450	400 - 600

PACKAGING

Electrode dimensions mm	Quantity per ton approx. pieces	Weight of packaging kg	Weight of transport box pcs x kg/pcs = kg
Ø 3,2 x 350	23 100	2,9	5 x 2,9 = 14,5
Ø 4,0 x 350	15 700	2,8	5 x 2,8 = 14,0
Ø 5,0 x 450	8 100	3,7	5 x 3,7 = 18,5





ELEKTRODA ZAGREB d.d.

WIRES AND RODS

ELEKTRODA ZAGREB d.d.

WIRES FOR WELDING
UNALLOYED AND LOW-ALLOY STEELS

EZ - SG 2
EZ - SG 3
EZ - SG Mo
EZ - SG Ti
EZ - SG CORTEN
EZ - SG 100

EZ - TIG SG 2
EZ - TIG SG 3

EZ - SG 2

CLASSIFICATION

HRN EN ISO 14341-A	AWS / ASME SFA-5.18	DIN 8559	W. Nr.
G 42 4 C/M 3Si1	ER70S-6	SG 2	1.5125

DESCRIPTION AND APPLICATION

A copper or bronze coated solid wire for welding in C1 (CO_2) or M21 (Ar/CO_2) shielding atmosphere. Suitable for welding of mild and low-alloy steels with tensile strenght up to 590 N/mm².

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0545	St 33 (1.0035) to St 52-2N (1.0050)	S 185 to E 295 Fe 310-0 to Fe 490-2
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 350 ČRV 250 to ČRV 350	StE 285 (1.0486) StE 355 (1.0562) WStE 285 (1.0487) WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 420	500 - 640	> 22	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	Cu
%	0,06 - 0,13	1,4 - 1,6	0,7 - 1,0	≤ 0,3

SHIELDING GAS

C1 or M21

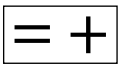
PACKAGING

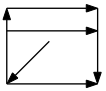
Wire diameter mm	Winding
0,6; 0,8; 1,0; 1,2; 1,6	random-wound (S-L); precision-wound (S-S)

1 kg - plastic spool (wire diameters 0,6 and 0,8 mm)
5 kg - plastic spool (wire diameters 0,6 and 0,8 mm)
15 kg - plastic (S-L or S-S wind) or metal spool (S-S wind) (wire diameters 0,8; 1,0; 1,2 and 1,6 mm)
250 kg - drum (wire diameters 0,8; 1,0 and 1,2 mm)

APPROVALS

DB; TÜV





EZ - TIG SG 2

CLASSIFICATION

HRN EN ISO 636 -A	AWS / ASME SFA-5.18	DIN 8559	W. Nr.
W 42 3 W3Si1	ER70S-6	W SG 2	1.5125

DESCRIPTION AND APPLICATION

Copper coated rod for welding in a protective gas atmosphere Ar. For welding non-alloy and low-alloy steels with strength up to 590 N / mm².

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0545	St 33 (1.0035) to St 52-2N (1.0050)	S 185 to E 295 Fe 310-0 to Fe 490-2
Boiler steels	Č 1202 Č 1204	HI (1.0345) HII (1.0425)	P235GH P265GH
	Č 3133 Č 3105	17Mn4 (1.0481) 19Mn6 (1.0473)	P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 350 ČRV 250 to ČRV 350	StE 285 (1.0486) StE 355 (1.0562) WStE 285 (1.0487) WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 420	500 - 640	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

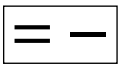
	C	Mn	Si	Cu
%	0,06 - 0,13	1,4 - 1,6	0,7 - 1,0	≤ 0,3

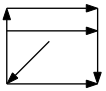
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,6; 2,0; 2,4; 3,2	1000	5





EZ - SG 3

CLASSIFICATION

HRN EN ISO 14341-A	AWS / ASME SFA-5.18	DIN 8559	W. Nr.
G 46 4 C/M 4Si1	ER70S-6	SG 3	1.5130

DESCRIPTION AND APPLICATION

Coppered or bronze coated solid wire for welding in C1 (CO_2) or M21 (Ar/CO_2) shielding atmosphere. Suitable for welding of mild and low-alloy steels with strenght up to 640 N/mm².

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0361 to Č 0563	St 37-3N (1.0116) to St 52-3N (1.0570)	S 235J2G3 to S355J2G3 Fe 310-0 to Fe 490-2
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 460 ČRV 250 to ČRV 460	StE 285 (1.0486) StE 460 (1.8905) WStE 285 (1.0487) WStE 460 (1.8935)	P275N P460N P275NH P460NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 460	530 - 680	> 22	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cu
%	0,08 - 0,12	1,6 - 1,8	0,9 - 1,1	≤ 0,3

SHIELDING GAS

C1 or M21

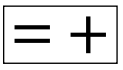
PACKAGING

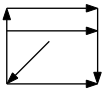
Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - metal spool (S-S) (wire diameter 0,8; 1,0; 1,2; 1,6 mm)
250 kg - drum (wire diameter 0,8; 1,0 i 1,2 mm)

APPROVALS

DB; TÜV





EZ - TIG SG 3

CLASSIFICATION

HRN EN ISO 636-A	AWS / ASME SFA-5.18	DIN 8559	W. Nr.
W 46 4 W4Si1	ER70S-6	W SG 3	1.5130

DESCRIPTION AND APPLICATION

Copper coated rod for welding in a protective gas atmosphere Ar. It is used for welding non-alloy and low-alloy steels with strength up to 640 N / mm².

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0361 to Č 0563	St 37-3N (1.0116) to St 52-3N (1.0570)	S 235J2G3 to S355J2G3 Fe 310-0 to Fe 490-2
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 460 ČRV 250 to ČRV 460	StE 285 (1.0486) StE 460 (1.8905) WStE 285 (1.0487) WStE 460 (1.8935)	P275N P460N P275NH P460NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 460	530 - 680	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

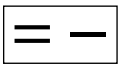
	C	Mn	Si	Cu
%	0,08 - 0,12	1,6 - 1,8	0,9 - 1,1	≤ 0,3

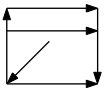
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,6; 2,0; 2,4; 3,2	1000	5





EZ - SG Mo

CLASSIFICATION

HRN EN ISO 21952-A	AWS / ASME SFA-5.18	DIN 8575	W. Nr.
G MoSi	ER70S-A1 (ER80S-G)	SG Mo	1.5424

DESCRIPTION AND APPLICATION

A copper or bronze coated solid wire alloyed with molybdenum, used for welding of mild and low-alloyed steels withe tenslie strength up to 590 N/mm². Application for constructions, pipes and high-pressure vessels with working range temperature up to 500°C.

Steel grade	HRN		DIN (W. Nr.)	HRN / EN / ISO
Constructional steels	Č 0361 to Č 0563		St 37-2 (1.0037) to St 52-3N (1.0570)	S 235JR to S 355J2G3 Fe 360 B to Fe 510 D1
Boiler steels	Č 1202	Č 1204	HI (1.0345) HIII (1.0435)	P235GH P285NH
	Č 3113	Č 3105	17Mn4 (1.0481) 19Mn6 (1.0473)	P295GH P355GH
Tube and pipe steels	Č 1214	Č 1215	St 35.8 (1.0305) St 45.8 (1.0405)	P235G1TH P255G1TH
	Č 7100		15Mo3 (1.5415)	16Mo3

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 430	540 - 640	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Mo
%	0,06 - 0,1	0,4 - 0,6	1,0 - 1,15	0,45 - 0,5

SHIELDING GAS

M21

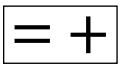
PACKAGING

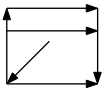
Wire diameter mm	Winding
0,8; 1,0; 1,2	precision-wound (S-S)

15 kg - metal spool (S-S) (wire diameter 0,8; 1,0; 1,2 mm)
250 kg - drum (wire diameter 0,8; 1,0; 1,2 mm)

APPROVALS

TÜV





EZ - SG Ti

CLASSIFICATION

HRN EN ISO 14341-A	AWS / ASME SFA-5.28	W. Nr.
G 42 2 C/M 2Ti	ER70S-2	1.5125

DESCRIPTION AND APPLICATION

A copper or bronze coated solid wire alloyed with titanium for welding of carbon and carbon-manganese steels with tensile strength up to 510 N/mm². Due to it's titanium addition it is suitable for single-pass welding of galvanized, primer coated or oxidized steels.

Steel grade	HRN		DIN (W. Nr.)		HRN / EN / ISO	
Constructional steels	Č 0261 to Č 0545		St 33 (1.0035) to St 52-2N (1.0050)		S 185 do E 295 Fe 310-0 to Fe 490-2	
Boiler steels	Č 1202	Č 1204	HI (1.0345)	HII (1.0425)	P235GH	P265GH
	Č 3133	Č 3105	17Mn4 (1.0481)	19Mn6 (1.0473)	P295GH	P355GH
Tube and pipe steels	Č 1212 to Č 3100		St 35.8 (1.0305) to St 45.8 (1.5415)		DX55D to P355T2	

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 420	540 - 640	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Ti
%	0,04 - 0,06	0,5 - 0,8	1,1 - 1,5	0,1 - 0,12

SHIELDING GAS

C1 or M21

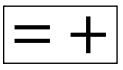
PACKAGING

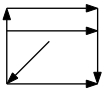
Wire diameter mm	Winding
0,8; 1,0; 1,2	precision-wound (S-S)

15 kg - metal spool (S-S) (wire diameter 0,8; 1,0; 1,2 mm)
250 kg - drum (wire diameter 0,8; 1,0; 1,2 mm)

APPROVALS

TÜV





EZ - SG CORTEN

CLASSIFICATION

HRN EN ISO 14341-A	AWS / ASME SFA-5.28
G 42 2 C/M 0	ER80S-G

DESCRIPTION AND APPLICATION

A copper or bronze coated solid wire alloyed with nickel and copper. It is used for welding of atmospheric corrsion resistant steels (COR-TEN A, COR-TEN B). It is also suitable for welding of mild and low-alloy steels with tensile strength up to 590 N/mm². Shielding atmosphere C1 (CO_2) or M21 (Ar/CO_2).

Steel grade	HRN	DIN (W. Nr.)	HRN / EN / ISO
Constructional steels	Č 0261 to Č 0545	St 33 (1.0035) to St 52-2N (1.0050) COR-TEN A, B, C; Patinax 37	S 185 to E 295 Fe 310-0 to Fe 490-2
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 do L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 350 ČRV 250 to ČRV 350	StE 285 (1.0486) StE 355 (1.0562) WStE 285 (1.0487) WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 420	540 - 640	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Ni	Cu
%	0,06 - 0,10	0,7 - 0,9	1,4 - 1,5	0,5 - 0,8	0,3 - 0,5

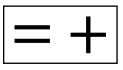
SHIELDING GAS

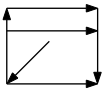
C1 or M21

PACKAGING

Wire diameter mm	Winding
1,0; 1,2	precision-wound (S-S)

15 kg - metal spool (S-S) (wire diameter 1,0; 1,2 mm)
250 kg - drum (wire diameter 1,0; 1,2 mm)





EZ - SG 100

CLASSIFICATION

HRN EN ISO 16834-A	AWS / ASME SFA-5.28
G 69 4 M Mn3Ni1CrMo	ER100S-G

DESCRIPTION AND APPLICATION

A copper or bronze coated solid wire alloyed with manganese, nickel, chromium and molybdenum. It is used for welding of fine-grained steels with tensile strength up to 690 N/mm² like N-A-XTRA 70 and WELDOX steels.

Steel grade	HRN	DIN (W. Nr.)	HRN / EN / ISO
Fine-grained constructional steels	Č 0690	StE 690 V (1.8931)	S690Q

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J
> 690	750 - 940	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Cr	Ni	Mo	Cu	V
%	0,12	0,4 - 0,7	1,3 - 1,8	0,2 - 0,4	1,2 - 1,6	0,2 - 0,3	≤ 0,3	0,05 - 0,13

SHIELDING GAS

M21 or C1

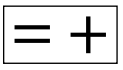
PACKAGING

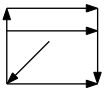
Wire diameter mm	Winding
0,8; 1,0; 1,2	precision-wound (S-S)

15 kg - metal spool (S-S) (wire diameter 0,8; 1,0; 1,2 mm)
250 kg - drum (wire diameter 0,8; 1,0; 1,2 mm)

APPROVALS

TÜV





ELEKTRODA ZAGREB d.d.

WIRES FOR WELDING
HIGH-ALLOY STEELS

EZ - MIG 307 Si	EZ - TIG 307 Si
EZ - MIG 308 LSi	EZ - TIG 308 LSi
EZ - MIG 309 LSi	EZ - TIG 309 LSi
EZ - MIG 310	EZ - TIG 310
EZ - MIG 316 LSi	EZ - TIG 316 LSi
EZ - MIG 318 Si	EZ - TIG 318 Si
EZ - MIG 347 Si	EZ - TIG 347 Si
EZ - MIG 625	EZ - TIG 625
EZ - MIG 2209	EZ - TIG 2209

EZ - MIG 307 Si

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 18 8 Mn	~ ER307	1.4370

DESCRIPTION AND APPLICATION

Austenitic solid welding wire for GMAW of identical and similar stainless steels, dissimilar joints, poor weldability steels and manganase steels. Also, the wire is use for welding of elastic buffer layer at hardfacing. The high proportion of manganese makes weld resistant to hot cracking, and the structure of the weld metal is fully austenitic.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 500	> 25	≥ 100

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni
%	≤ 0,07	6,9	0,7	18,5	8,0

SHIELDING GAS

M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 to 3% O_2)

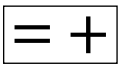
PACKAGING

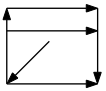
Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - wire spool

APPROVALS

TÜV





EZ - TIG 307 Si

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 18 8 Mn	~ ER307	1.4370

DESCRIPTION AND APPLICATION

Austenitic solid welding rod for TIG welding of identical and similar stainless steels, dissimilar joints, poor weldability steels and manganase steels. Also, the rod is use for welding of elastic buffer layer at hardfacing. The high proportion of manganese makes weld resistant to hot cracking, and the structure of the weld metal is fully austenitic.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 500	> 25	≥ 100

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	C	Mn	Si	Cr	Ni
%	≤ 0,07	6,9	0,7	18,5	8,0

SHIELDING GAS

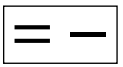
I1 (Ar)

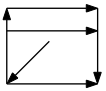
PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5

APPROVALS

TÜV





Marking: **EZ - 307 Si / 1.4370**

EZ - MIG 308 LSi

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 19 9 L Si	ER308LSi	1.4316

DESCRIPTION AND APPLICATION

Austenitic stainless steel solid wire for gas metal arc welding of identical and similar (stabilized and unstabilized) 18/8 CrNi steels. Low carbon content insures a good resistance to intergranular corrosion. Higher silicon content improves welding characteristics.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High-alloy stainless steels of austenitic type and austenitic steel cast	Č 4580	X5 CrNi 18 11 (1.4301)	304	X5CrNi18-10
	ČL 4571	G-X 10 CrNi 18 8 (1.4312)	-	GX10CrNi18-8
	Č 45701	X2 CrNi 19 11 (1.4306)	304 L	X2CrNi19-11
	ČL 45701	G-X6 CrNi 18 9 (1.4308)	-	GX5CrNi19-10
	Č 4582	X6 CrNiNb 18 10 (1.4550)	347	X6CrNiNb18-10
	ČL 4572	G-X5 CrNiNb 18 9 (1.4552)	-	GX5CrNiNb19-11
	Č 4572	X6 CrNiTi 18 10 (1.4541)	321	X6CrNiTi18-10

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 320	> 510	> 30	≥ 80

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni
%	≤ 0,02	1,95	0,8	20,0	10,0

SHIELDING GAS

M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 to 3% O_2)

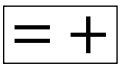
PACKAGING

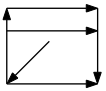
Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - wire spool

APPROVALS

TÜV





EZ - TIG 308 LSi

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 19 9 L Si	ER308LSi	1.4316

DESCRIPTION AND APPLICATION

Austenitic stainless steel solid rod for gas tungsten arc welding of identical and similar (stabilized and unstabilized) 18/8 CrNi steels. Low carbon content insures a good resistance to intergranular corrosion. Higher silicon content improves welding characteristics.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High-alloy stainless steels of austenitic type, and austenitic steel cast	Č 4580	X5 CrNi 18 11 (1.4301)	304	X5CrNi18-10
	ČL 4571	G-X 10 CrNi 18 8 (1.4312)	-	GX10CrNi18-8
	Č 45701	X2 CrNi 19 11 (1.4306)	304 L	X2CrNi19-11
	ČL 45701	G-X6 CrNi 18 9 (1.4308)	-	GX5CrNi19-10
	Č 4582	X6 CrNiNb 18 10 (1.4550)	347	X6CrNiNb18-10
	ČL 4572	G-X5 CrNiNb 18 9 (1.4552)	-	GX5CrNiNb19-11
	Č 4572	X6 CrNiTi 18 10 (1.4541)	321	X6CrNiTi18-10

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 320	> 510	> 30	≥ 80

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	C	Mn	Si	Cr	Ni
%	≤ 0,02	1,95	0,8	20,0	10,0

SHIELDING GAS

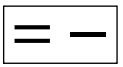
I1 (Ar)

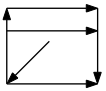
PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5

APPROVALS

TÜV





Marking: **EZ - 308 LSi / 1.4316**

EZ - MIG 309 LSi

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 23 12 L Si	ER309LSi	1.4332

DESCRIPTION AND APPLICATION

Austenitic stainless steel solid wire for GMAW of dissimilar joints. Weld metal is ductile and crack resistant. This wire is also used for cladding.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 320	> 510	> 25	≥ 130

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni
%	≤ 0,02	2,0	0,8	23,5	14,0

SHIELDING GAS

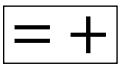
M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 to 3% O_2)

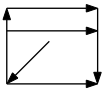
PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)
15 kg - wire spool	

APPROVALS

TÜV





EZ - TIG 309 LSi

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 23 12 L Si	ER309LSi	1.4332

DESCRIPTION AND APPLICATION

Austenitic stainless steel solid rod for TIG welding of dissimilar joints. Weld metal is ductile and crack resistant. This rod is also used for cladding.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 320	> 510	> 25	≥ 130

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	C	Mn	Si	Cr	Ni
%	≤ 0,02	2,0	0,8	23,5	14,0

SHIELDING GAS

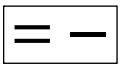
I1 (Ar)

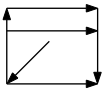
PACKAGING

Rod diameter mm	Rod length mm	Wight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5

APPROVALS

TÜV





Marking: **EZ - 309 LSi / 1.4332**

EZ - MIG 310

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 25 20	ER310	1.4842

DESCRIPTION AND APPLICATION

Austenitic solid wire for GMAW of heat resistant austenitic steels of the 25/20 CrNi types. Weld metal has good oxidation resistance espacially at high temperatures due to it's high Cr content. Weld metal is heat resistant to temperatures up to 1200°C.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High-alloyed	Č 4578	X15 CrNiSi 25 20 (1.4841)	310 / 314	X15CrNiSi25-21
heat resistant	-	X12 CrNi 25 21 (1.4845)	310 S	X8CrNi25-21
steels	-	G-X15 CrNi 25 20 (1.4840)	-	GX15CrNi25-20
	-	X7 CrNi 23 14 (1.4833)	-	X12CrNi23-13
	Č 4586	X20 CrNiSi 25 4 (1.4821)	327	X15CrNiSi25-4
	-	G-X 40 CrNiSi 22 9 (1.4826)	-	GX40CrNiSi22-9
	-	G-X 25 CrNiSi 20 14 (1.4832)	-	GX25CrNiSi20-14
	ČL 4577	G-X 40 CrNiSi 25 12 (1.4837)	-	GX40CrNiSi25-12

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 550	> 20	≥ 120

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni
%	≤ 0,1	1,7	0,4	25,6	21,0

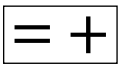
SHIELDING GAS

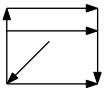
M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 to 3% O_2)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - wire spool





EZ - TIG 310

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 25 20	ER310	1.4842

DESCRIPTION AND APPLICATION

Austenitic solid rod for TIG welding of heat resistant austenitic steels of the 25/20 CrNi types. Weld metal has good oxidation resistance espacially at high temperatures due to it's high Cr content. Weld metal is heat resistant to temperatures up to 1200°C.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High alloyed heat resistant stainless steels	Č 4578	X15 CrNiSi 25 20 (1.4841)	310 / 314	X15CrNiSi25-21
	-	X12 CrNi 25 21 (1.4845)	310 S	X8CrNi25-21
	-	G-X15 CrNi 25 20 (1.4840)	-	GX15CrNi25-20
	-	X7 CrNi 23 14 (1.4833)	-	X12CrNi23-13
	Č 4586	X20 CrNiSi 25 4 (1.4821)	327	X15CrNiSi25-4
	-	G-X 40 CrNiSi 22 9 (1.4826)	-	GX40CrNiSi22-9
	-	G-X 25 CrNiSi 20 14 (1.4832)	-	GX25CrNiSi20-14
	ČL 4577	G-X 40 CrNiSi 25 12 (1.4837)	-	GX40CrNiSi25-12

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 550	> 20	≥ 120

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

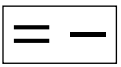
	C	Mn	Si	Cr	Ni
%	≤ 0,1	1,7	0,4	25,6	21,0

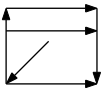
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5





Marking: **ER 310 / 1.4842**

EZ - MIG 316 LSi

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 19 12 3 L Si	ER316LSi	1.4430

DESCRIPTION AND APPLICATION

Austenitic stainless steel solid wire for gas metal arc welding of identical and similar (stabilized and unstabilized) 17/12/2 CrNiMo steels. Low carbon content insures a good resistance to intergranular corrosion. Higher silicon content improves welding characteristics.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High-alloy stainless steels of austenitic type and austenitic steel cast	Č 4573	X5 CrNiMo 17 12 2 (1.4401)	316	X5CrNiMo17-12-2
	Č 45703	X2 CrNiMo 17 13 2 (1.4404)	316 L	X2CrNiMo17-12-2
	Č 4574	X6 CrNiMoTi 17 12 2 (1.4571)	316 Ti	X6CrNiMoTi17-12-2
	Č 4583	X6 CrNiMoNb 17 12 2 (1.4580)	316 Cb	X6CrNiMoNb17-12-2
	ČL 4580	G-X6 CrNiMo 18 10 (1.4408)	-	GX5CrNiMo19-11-2
	ČL 4573	G-X10 CrNiMo 18 9 (1.4410)	-	-

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 320	> 510	> 25	≥ 80

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni	Mo
%	≤ 0,03	1,7	0,8	18,5	12,0	2,6

SHIELDING GAS

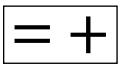
M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 to 3% O_2)

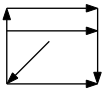
PACKAGING

Wire diameter mm	Winding
0,6; 0,8; 1,0; 1,2; 1,6	precision-wound (S-S)
15 kg - wire spool	

APPROVALS

TÜV





EZ - TIG 316 LSi

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 19 12 3 L Si	ER316LSi	1.4430

DESCRIPTION AND APPLICATION

Austenitic stainless steel rod for gas tungsten arc welding of identical and similar (stabilized and unstabilized) 17/12/2 CrNiMo steels. Low carbon content insures a good resistance to intergranular corrosion. Higher silicon content improves welding characteristics.

Steel grade	HRN	DIN (W. Nr.)	ASTM / AISI	EN / ISO
High-alloy stainless steels of austenitic type, and austenitic steel cast	Č 4573	X5 CrNiMo 17 12 2 (1.4401)	316	X5CrNiMo17-12-2
	Č 45703	X2 CrNiMo 17 13 2 (1.4404)	316 L	X2CrNiMo17-12-2
	Č 4574	X6 CrNiMoTi 17 12 2 (1.4571)	316 Ti	X6CrNiMoTi17-12-2
	Č 4583	X6 CrNiMoNb 17 12 2 (1.4580)	316 Cb	X6CrNiMoNb17-12-2
	ČL 4580	G-X6 CrNiMo 18 10 (1.4408)	-	GX5CrNiMo19-11-2
	ČL 4573	G-X10 CrNiMo 18 9 (1.4410)	-	-

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 320	> 510	> 25	≥ 80

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	C	Mn	Si	Cr	Ni	Mo
%	≤ 0,03	1,7	0,8	18,5	12,0	2,6

SHIELDING GAS

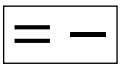
I1 (Ar)

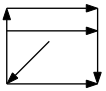
PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5

APPROVALS

TÜV





Marking: **EZ - 316 LSi / 1.4430**

EZ - MIG 318 Si

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 19 12 3 Nb Si	ER318Si	1.4576

DESCRIPTION AND APPLICATION

Stabilized austenitic stainless steel solid wire for GMAW of corrosion resistant stabilized CrNi(Mo) steels, boilers and equipment in the chemical and pharmaceutical industry. The wire is stabilized with niobium which increases resistance to intergranular corrosion. Higher silicon content improves welding properties such as wetting. Wire is recommended for welding parts whose operating temperature does not exceeds 400°C.

Steel grade	DIN (W. Nr.)
High alloy stainless steels	X5 CrNiMo 17 12 (1.4401) X5 CrNiMo 17 13 3 (1.4436) X6 CrNiMoTi 17 12 2 (1.4571) X10 CrNiMoTi 18 12 (1.4573) X6 CrNiMoNb 17 12 2 (1.4580) X10 CrNiMoNb 18 12 (1.4583)

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 550	> 25	≥ 90

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni	Mo	Nb
%	≤ 0,04	1,5	0,85	19,0	12,0	2,5	0,65

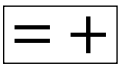
SHIELDING GAS

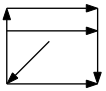
M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 to 3% O_2)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - wire spool





EZ - TIG 318 Si

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 19 12 3 Nb Si	ER318 Si	1.4576

DESCRIPTION AND APPLICATION

Stabilized austenitic stainless steel solid rod for TIG welding of corrosion resistant stabilized CrNi(Mo) steels, boilers and equipment in the chemical and pharmaceutical industry. The rod is stabilized with niobium which increases resistance to intergranular corrosion. Higher silicon content improves welding properties such as wetting. Rod is recommended for welding parts whose operating temperature does not exceeds 400°C.

Steel grade	DIN (W. Nr.)
High alloy stainless steels	X5 CrNiMo 17 12 (1.4401) X5 CrNiMo 17 13 3 (1.4436) X6 CrNiMoTi 17 12 2 (1.4571) X10 CrNiMoTi 18 12 (1.4573) X6 CrNiMoNb 17 12 2 (1.4580) X10 CrNiMoNb 18 12 (1.4583)

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 550	> 25	≥ 90

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

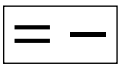
	C	Mn	Si	Cr	Ni	Mo	Nb
%	≤ 0,04	1,5	0,85	19,0	12,0	2,5	0,65

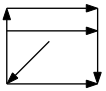
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5





Marking: **ER 318 Si / 1.4576**

EZ - MIG 347 Si

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 19 9 Nb Si	ER347Si	1.4551

DESCRIPTION AND APPLICATION

Stabilized austenitic stainless steel solid wire for GMAW of stabilized 18/9 CrNi steel, boilers and equipment in the chemical and pharmaceutical industry. The wire is stabilized with niobium which increases resistance to intergranular corrosion. Higher silicon content improves welding properties such as wetting. Wire is recommended for welding parts whose operating temperature does not exceeds 400°C.

Steel grade	DIN (W. Nr.)
High alloy stainless steels	X5 CrNi 18 10 (1.4301) X2 CrNi 19 11 (1.4306) G-X6 CrNi 18 9 (1.4308) G-X5 CrNiNb 18 9 (1.4552) X6 CrNiNb 18 10 (1.4550) X6 CrNiTi 18 10 (1.4541)

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 550	> 25	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

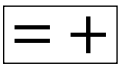
	C	Mn	Si	Cr	Ni	Nb
%	≤ 0,05	1,3	0,8	19,0	9,0	0,70

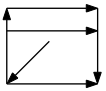
SHIELDING GAS

M12 (Ar + 2,5% CO_2) or M13 (Ar + 1 do 3% O_2)

PACKAGING

	Wire diameter mm	Winding
15 kg - wire spool	0,8; 1,0; 1,2; 1,6	precision-wound (S-S)





EZ - TIG 347 Si

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 19 9 Nb Si	ER347Si	1.4551

DESCRIPTION AND APPLICATION

Stabilized austenitic stainless steel solid rod for TIG welding of stabilized 18/9 CrNi steel, boilers and equipment in the chemical and pharmaceutical industry. The rod is stabilized with niobium which increases resistance to intergranular corrosion. Higher silicon content improves welding properties such as wetting. Rod is recommended for welding parts whose operating temperature does not exceeds 400°C.

Steel grade	DIN (W. Nr.)
High alloy stainless steels	X5 CrNi 18 10 (1.4301) X2 CrNi 19 11 (1.4306) G-X6 CrNi 18 9 (1.4308) G-X5 CrNiNb 18 9 (1.4552) X6 CrNiNb 18 10 (1.4550) X6 CrNiTi 18 10 (1.4541)

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 350	> 550	> 25	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

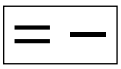
	C	Mn	Si	Cr	Ni	Nb
%	≤ 0,05	1,3	0,8	19,0	9,0	0,70

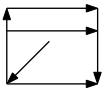
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5





Marking: **ER 347 Si / 1.4551**

EZ - MIG 625

CLASSIFICATION

HRN EN ISO 18274	AWS / ASME SFA-5.9	W. Nr.
S Ni 6625 (NiCr22Mo9Nb)	ERNiCrMo-3	2.4831

DESCRIPTION AND APPLICATION

Austenitic Ni-base solid wire for GMAW of special and high quality corrosion resistant steels and nickel alloys. It's used for welding and cladding of identical and dissimilar steels, for example – CrMn steels, creep resistant CrMo steels and Ni steels. It can be used for great service temperature range: from extremely low temperature (-196°C) to very high (about 1000 °C).

Steel grade	DIN (W. Nr.)
High alloy stainless steels	NiCr22Mo9Nb - Alloy 625 - UNS N06625 (2.4856) X1NiCrMoCuN 25-20-7- Alloy 926 - UNS N08925 (1.4529) 16Mo3 - ASTM A672 (1.5415) P235TR1 - ASTM A53 (1.0254)

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J	KV (-196°C) J
450	760	30	≥ 80	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Mn	Si	Cr	Ni	Mo	Nb
%	≤ 0,03	0,2	0,25	22,0	bal.	9,0	3,5

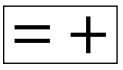
SHIELDING GAS

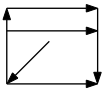
I1 (Ar); M12 (Ar +30% He+0,5% CO_2)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2	precision-wound (S-S)

15 kg - wire spool





EZ - TIG 625

CLASSIFICATION

HRN EN ISO 18274	AWS / ASME SFA-5.9	W. Nr.
S Ni 6625 (NiCr22Mo9Nb)	ERNiCrMo-3	2.4831

DESCRIPTION AND APPLICATION

Šipka na bazi niklja za TIG zavarivanje visokolegiranih korozijski otpornih čeličnih i nikalj legura. Upotrebljava se za zavarivanje i navarivanje istih, ali i raznorodnih materijala, kao CMn čelika, CMo čelika otpornih na puzanje, CrNiMo čelika i čelika legiranih nikljom. Upotrebljava se za vrlo široki raspon temperatura od ekstremno niskih (-196°C) do vrlo visokih (1000°C).

Steel grade	DIN (W. Nr.)
High alloy stainless steels	NiCr22Mo9Nb - Alloy 625 - UNS N06625 (2.4856) X1NiCrMoCuN 25-20-7- Alloy 926 - UNS N08925 (1.4529) 16Mo3 - ASTM A 672 (1.5415) P235TR1 - ASTM A 672(1.0254)

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J	KV (-196°C) J
450	760	30	≥80	≥60

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

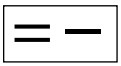
	C	Mn	Si	Cr	Ni	Mo	Nb
%	≤ 0,03	0,2	0,25	22,0	bal.	9,0	3,5

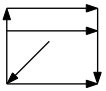
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,6; 2,0; 2,4	1000	5





EZ - MIG 2209

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
G 22 9 3 N L	ER2209	1.4462

DESCRIPTION AND APPLICATION

Stainless steel solid wire for gas metal arc welding of ferritic-austenitic (duplex) stainless steels. Wire can be used in a temperature range from -60°C up to +250°C. The weld metal not only features high strength and toughness, but is also exceptionally resistant to stress corrosion cracking and to pitting and can be used in applications containing chloride and hydrogen sulphide solutions.

Steel grade	DIN (W. Nr.)
Ferritic-austenitic (duplex) stainless steels	X2CrNiMoN22-5-3 (1.4462) X2CrNiN23-4 (1.4362)

Dissimilar materials	X2CrNiMoN22-5-3 (1.4462) i X10CrNiMoNb18-12 (1.4583) X2CrNiMoN22-5-3 (1.4462) i P235GH; P265GH; S255N; P295GH; S355N; 16Mo3

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 510	> 680 - 890	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

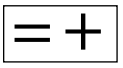
	C	Mn	Si	Cr	Ni	Mo	N
%	≤ 0,02	1,7	0,4	22,5	9,0	3,2	0,15

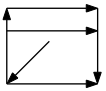
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)
15 kg - wire spool	





EZ - TIG 2209

CLASSIFICATION

HRN EN ISO 14343-A	AWS / ASME SFA-5.9	W. Nr.
W 22 9 3 N L	ER2209	1.4462

DESCRIPTION AND APPLICATION

Stainless steel rod for gas tungsten arc welding of ferritic-austenitic (duplex) stainless steels. Rod can be used in a temperature range from -60°C up to +250°C. The weld metal not only features high strength and toughness, but is also exceptionally resistant to stress corrosion cracking and to pitting and can be used in applications containing chloride and hydrogen sulphide solutions.

Steel grade	DIN (W. Nr.)
Ferritic-austenitic (duplex) stainless steels	X2CrNiMoN22-5-3 (1.4462) X2CrNiN23-4 (1.4362)
Dissimilar materials	X2CrNiMoN22-5-3 (1.4462) i X10CrNiMoNb18-12 (1.4583) X2CrNiMoN22-5-3 (1.4462) i P235GH; P265GH; S255N; P295GH; S355N; 16Mo3

MEHCHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (+20°C) J
> 510	> 680 - 890	> 20	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

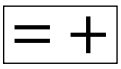
	C	Mn	Si	Cr	Ni	Mo	N
%	≤ 0,02	1,7	0,4	22,5	9,0	3,2	0,15

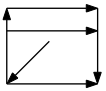
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2	1000	5





Marking: **ER 2209 / 1.4462**

WIRES FOR WELDING
ALUMINUM AND ALUMINUM ALLOYS

EZ - MIG Al99,7
EZ - MIG AlSi5
EZ - MIG AlMg3
EZ - MIG AlMg5
EZ - MIG AlMg4,5Mn

EZ - TIG Al99,7
EZ - TIG AlSi5
EZ - TIG AlMg3
EZ - TIG AlMg5
EZ - TIG AlMg4,5Mn

EZ - MIG Al99,7

CALSSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 1070 / Al 99,7	~ ER1100	3.0289

DESCRIPTION AND APPLICATION

Pure aluminum solid wire for gas metal arc welding of aluminum with similar composition. Soft weld metal has an excellent ductility, electrical conductivity and corrosion resistance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
35	80	> 35

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	Al
%	> 99,7

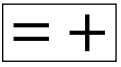
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6; 2,0	Precision-wound (S-S)

5 kg i 7 kg - plastic or wire spool (wire diameter žice 0,8 mm)
7 kg - plastic or wire spool (wire diameter 1,0; 1,2; 1,6; 2,0 mm)



EZ - TIG Al99,7

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 1070 / Al 99,7	~ ER1100	3.0289

DESCRIPTION AND APPLICATION

Pure aluminum solid rod for tungsten inert gas welding of aluminum with similar composition. Soft weld metal has an excellent ductility, electrical conductivity and corrosion resistance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
35	80	> 35

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	Al
%	> 99,7

SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2; 4,0	1000	5

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Marking: **3.0289 / 1100**

EZ - MIG AlSi5

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 4043 / Al Si5	ER4043	3.2245

DESCRIPTION AND APPLICATION

Aluminum solid wire for gas metal arc welding alloyed with 5% of silicon. It is suitable for welding Al-Si and Al-Mg-Si alloys. The silicone addition improves fluidity. The weld metal is not sensitive to hot cracking.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
55	150	> 15

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	Al	Si	Fe	Mn	Zn
%	bal.	5,0	0,15	0,01	0,01

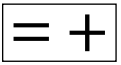
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6; 2,0	Precision-wound (S-S)

5 kg i 7 kg - plastic or wire spool (wire diameter žice 0,8 mm)
7 kg - plastic or wire spool (wire diameter 1,0; 1,2; 1,6; 2,0 mm)



EZ - TIG AlSi5

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 4043 / Al Si5	ER4043	3.2245

DESCRIPTION AND APPLICATION

Aluminum rod for tungsten inert gas welding alloyed with 5% of silicon. Suitable for welding of Al-Si and Al-Mg-Si alloys. The silicon addition improves fluidity. The weld metal is not sensitive to hot cracking.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
55	150	> 15

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	Al	Si	Fe	Mn	Zn
%	bal.	5,0	0,15	0,01	0,01

SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2; 4,0	1000	5

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Marking: **3.2245 / 4043**

EZ - MIG AlMg3

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 5754 / Al Mg3	ER5754	3.3536

DESCRIPTION AND APPLICATION

Aluminum solid wire for gas metal arc welding alloyed with 3% of magnesium. Wire is intended for welding Al-Mg alloys which contains < 3% magnesium. Weld metal has elevated tensile strength and corrosion resistance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
110	230	> 23

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	Al	Mg	Mn	Cr	Si	Fe
%	bal.	3,0	0,2	0,01	0,05	0,12

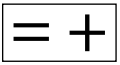
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6; 2,0	precision-wound (S-S)

5 kg i 7 kg - plastic or wire spool (wire diameter žice 0,8 mm)
7 kg - plastic or wire spool (wire diameter 1,0; 1,2; 1,6; 2,0 mm)



EZ - TIG AlMg3

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 5754 / Al Mg3	ER5754	3.3536

DESCRIPTION AND APPLICATION

Aluminum solid rod for TIG welding alloyed with 3% of magnesium. Rod is intended for welding Al-Mg alloys which contains < 3% magnesium. Weld metal has elevated tensile strength and corrosion resistance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
110	230	> 23

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	Al	Mg	Mn	Cr	Si	Fe
%	bal.	3,0	0,2	0,01	0,05	0,12

SHIELDNIG GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2; 4,0	1000	5

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Marking: **3.3536 / 5754**

EZ - MIG AlMg5

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 5356 / Al Mg5Cr(A)	ER5356	3.3556

DESCRIPTION AND APPLICATION

Aluminum solid wire for gas metal arc welding alloyed with 5% magnesium, for welding of Al-Mg and Al-Mg-Si alloys. Relatively high strength weld metal, and very good corrosion resistance make this alloy excellent in marine enviroment. Suitable for welding parts which are going to be anodized.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
120	260	> 25

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	Al	Mg	Mn	Cr	Si	Fe
%	bal.	5,0	0,15	0,10	0,05	0,15

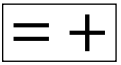
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6; 2,0	Precision-wound (S-S)

5 kg i 7 kg - plastic or wire spool (wire diameter žice 0,8 mm)
7 kg - plastic or wire spool (wire diameter 1,0; 1,2; 1,6; 2,0 mm)



EZ - TIG AlMg5

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 5356 / Al Mg5Cr(A)	ER5356	3.3556

DESCRIPTION AND APPLICATION

Aluminum solid rod for tungsten inert gas welding alloyed with 5% magnesium, for welding Al-Mg and Al-Mg-Si alloys. Relatively high strength weld metal, and very good corrosion resistance make this alloy excellent in marine enviroment. Suitable for welding parts which are going to be anodized.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
120	260	> 25

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	Al	Mg	Mn	Cr	Si	Fe
%	bal.	5,0	0,15	0,10	0,05	0,15

SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod lengtfh mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2; 4,0	1000	5

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Marking: **3.3556 / 5356**

EZ - MIG AlMg4,5Mn

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 5183 / AlMg4,5Mn0,7(A)	ER5183	3.3548

DESCRIPTION AND APPLICATION

Aluminum solid wire for gas metal arc welding alloyed with approx. 4,8% Mg and 0,7% Mn. It is suitable for welding Al-Mg-Mn and Al-Mg alloys. High strength weld metal and good impact properties enable it's wide rane of application in welding aluminum structures. Weld metal has an good corrosion in marine atmosphere.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
140	280	> 24

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	Al	Mg	Mn	Si	Fe
%	bal.	4,8	0,7	0,1	0,2

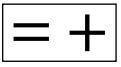
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6; 2,0	Precision-wound (S-S)

5 kg i 7 kg - plastic or wire spool (wire diameter žice 0,8 mm)
7 kg - plastic or wire spool (wire diameter 1,0; 1,2; 1,6; 2,0 mm)



EZ - TIG AlMg4,5Mn

CLASSIFICATION

HRN EN ISO 18273	AWS / ASME SFA-5.10	W. Nr.
S Al 5183 / AlMg4,5Mn0,7(A)	ER5183	3.3548

DESCRIPTION AND APPROVALS

Aluminum solid rod for tungsten inert gas welding alloyed with approx. 4,8% Mg and 0,7% Mn. It is suitable for welding Al-Mg-Mn and Al-Mg alloys. High strength weld metal and good impact properties enable it's wide range of application in welding of aluminum structures.
Weld metal has an good corrosion in marine atmosphere.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %
140	280	> 24

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	Al	Mg	Mn	Si	Fe
%	bal.	4,8	0,7	0,1	0,2

SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
1,2; 1,6; 2,0; 2,4; 3,2; 4,0	1000	5

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Marking: **3.3548 / 5183**

ELEKTRODA ZAGREB d.d.

WIRES FOR WELDING
COPPER AND COPPER ALLOYS

EZ - MIG CuAl8
EZ - MIG CuSi3
EZ - MIG CuSn6
EZ - MIG CuSn10

EZ - TIG CuAl8
EZ - TIG CuSi3
EZ - TIG CuSn6
EZ - TIG CuSn10

EZ - MIG CuAl8

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 6100 (CuAl8)	ERCuAl-A1	SG-CuAl8	2.0921

DESCRIPTION AND APPLICATION

Solid, copper wire alloyed with aluminum for welding of aluminum-bronze. It is also used for plating and metallizing. Weld (deposit) is corosion ressistance and has hardness up to 100 HB.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	Hardness HB
> 180	390 - 450	> 30	100

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	Cu	Al	Mn	Other
%	bal.	7,5 - 8,5	<0,3	≤ 0,5

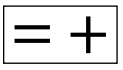
SHIELDING GAS

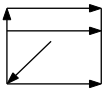
I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - plastic or wire spool





EZ - TIG CuAl8

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 6100 (CuAl8)	ERCuAl-A1	SG-CuAl8	2.0921

DESCRIPTION AND APPLICATION

Copper rod alloyed with aluminum for welding of aluminum-bronze. It is also used for plating and metallizing. Weld (deposit) is corosion ressistance and has hardness up to 100 HB.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	Hardness HB
> 180	390 - 450	> 30	100

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

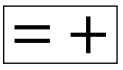
	Cu	Al	Mn	Other
%	bal.	7,5 - 8,5	<0,3	≤ 0,5

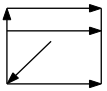
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
2,0; 2,4; 3,2; 4,0; 5,0; 6,0	1000	5





EZ - MIG CuSi3

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 6560 (CuSi3Mn1)	ERCuSi-A	SG-CuSi3	2.1461

DESCRIPTION AND APPLICATION

Solid, copper wire alloyed with silicone for the gas metal arc welding of copper-zinc alloys and low-alloyed copper, for gas metal arc brazing of zinc-coated steel sheets and for cladding of cast iron. Wire is alloyed with silicon and manganese and has good wear resistance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 120	330 - 370	> 40	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

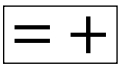
	Cu	Mn	Si	Sn
%	bal.	0,75 - 0,95	2,80 - 2,95	≤ 0,1

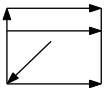
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)
15 kg - plastic or wire spool	





EZ - TIG CuSi3

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 6560 (CuSi3Mn1)	ERCuSi-A	SG-CuSi3	2.1461

DESCRIPTION AND APPLICATION

Copper rod alloyed with silicone for tungsten inert gas welding of copper-zinc alloys and low-alloyed copper, for gas metal arc brazing of zinc-coated steel sheets and for cladding of cast iron. Rod is alloyed with silicon and manganese and has good wear resistance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 120	330 - 370	> 40	≥ 60

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

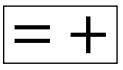
	Cu	Mn	Si	Sn
%	bal.	0,75 - 0,95	2,80 - 2,95	≤ 0,1

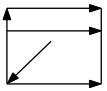
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
2,0; 2,4; 3,2; 4,0; 5,0; 6,0	1000	5





EZ - MIG CuSn6

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 5180 (CuSn6P)	ERCuSn-A	SG-CuSn6	2.1022

DESCRIPTION AND APPLICATION

Solid, copper wire alloyed with tin for the metal arc welding of copper-tin bronzes. Wire is widely used for joining copper-zinc alloys to steel. Weld has good temerature and corrosion resistance and good sliding properties and hardness 100 HB.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 180	330 - 370	> 20	≥ 32

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

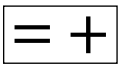
	Cu	Sn	P	Rest
%	bal.	6,00 - 6,60	0,20 - 0,25	≤ 0,5

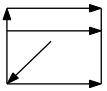
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	Precision-wound (S-S)
15 kg - plastic or wire spool	





EZ - TIG CuSn6

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 5180 (CuSn6P)	ERCuSn-A	SG-CuSn6	2.1022

DESCRIPTION AND APPLICATION

Solid, copper rod alloyed with tin for tungsten inert gas welding of copper-tin bronzes. Rod is widely used for joining copper-zinc alloys to steel. Weld has good temerature and corrosion resistance and good sliding properties and hardness 100 HB.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 180	330 - 370	> 20	≥ 32

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

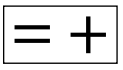
	Cu	Sn	P	Rest
%	bal.	6,00 - 6,60	0,20 - 0,25	≤ 0,5

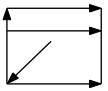
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
2,0; 2,4; 3,2; 4,0; 5,0; 6,0	1000	5





EZ - MIG CuSn10

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 5211 (CuSn10MnSi)	-	-	2.1086

DESCRIPTION AND APPLICATION

Solid, copper wire alloyed with tin and manganese for cladding of cast iron and for welding deep drawn metal sheets. Weld has hardness 115 HB.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 180	330 - 370	> 15	≥ 24

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

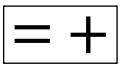
	Cu	Sn	Mn	Si
%	bal.	9,00 - 10,00	0,20 - 0,35	0,20 - 0,30

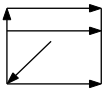
SHIELDING GAS

I1 (Ar)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	Precision-wound (S-S)
15 kg - plastic or wire spool	





EZ - TIG CuSn10

CLASSIFICATION

HRN EN ISO 24373	AWS / ASME SFA-5.7	DIN 1733	W. Nr.
S Cu 5211 (CuSn10MnSi)	-	-	2.1086

DESCRIPTION AND APPLICATION

Copper rod alloyed with tin and manganese for cladding of cast iron and for welding deep drawn metal sheets. Weld has hardness 115 HB.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (20°C) J
> 180	330 - 370	> 15	≥ 24

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

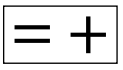
	Cu	Sn	Mn	Si
%	bal.	9,00 - 10,00	0,20 - 0,35	0,20 - 0,30

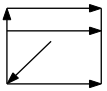
SHIELDING GAS

I1 (Ar)

PACKAGING

Rod diameter mm	Rod length mm	Weight of packaging kg
2,0; 2,4; 3,2; 4,0; 5,0; 6,0	1000	5





ELEKTRODA ZAGREB d.d.

WIRE FOR HARDFACING

EZ - MAG 600 TN

EZ - MAG 600 TN

CLASSIFICATION

DIN 8555	W. Nr.
MSG 6-GZ-60	1.4718

DESCRIPTION AND APPLICATION

Solid wire for hardfacing of parts subjected to impact and medium strong abrasion. It is used for hardfacing parts of the machines in quarries, stone crushers, steel mills, cement plants etc.. Regardless of the high hardness, weld metal is tough and resistant to cracks and corrosion. If hardfacing steel which is prone to crack, it is necessary to preheat workpiece on 200-300°C. Weld metal is machinable only by grinding. If hardfacing in more than one layer it is recommended to weld elastic buffer layer with electrode EZ - KROM 20 or with wire EZ - MIG 307 Si.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HRC
55 - 60

APPROXIMATE CHEMICAL COMPOSITION OF THE WIRE

	C	Si	Mn	Cr
%	0,45	3,0	0,4	9,5

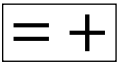
SHIELDING GAS

C1 (CO_2) or M21 (Ar + 18% CO_2)

PACKAGING

Wire diameter mm	Winding
0,8; 1,0; 1,2; 1,6	precision-wound (S-S)

15 kg - wire spool



ELEKTRODA ZAGREB d.d.

ROD FOR OXY/ACETILENE WELDING
UNALLOYED STEELS

EZ - ZP 37

EZ - ZP 37

CLASSIFICATION

HRN EN 12536	AWS / ASME SFA-5.2	DIN 8554	W. Nr.
O I	R 45	G I	1.1116

DESCRIPTION AND APPLICATION

Mild solid rod for oxy-acetylene welding. Weld metal is uniform, mild and well workable.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0461	St 33 (1.0035) to St 44-2 (1.0044)	S 185 to S 275 JR Fe 310-0 to Fe 430 B
Tube and pipe steels	Č 1212 to Č 1213	St 35.4 (1.0309) to St 45.4 (1.0418)	DX55D to L240NB
Cold-reduced steel sheet	Č 0146 to Č 0148	St 12 (1.0330) to St 14 (1.0338)	Fe P01 to Fe P04

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_m N/mm²	A_5 %	KV (+20°C) J	Hardness HB
340 - 410	> 15	≥ 45	100 - 120

APPROXIMATE CHEMICAL COMPOSITION OF THE ROD

	C	Si	Mn
%	0,08	0,1	0,55

PACKAGING

Rod diameter mm	Rod length mm
2,0; 2,5; 3,2; 4,0; 5,0; 6,0	700; 1000

15 kg - rod length 700 mm
20 kg - rod length 1000 mm

ELEKTRODA ZAGREB d.d.

FLUX CORED WIRE

EZ - 71T - 1C

EZ - 71T - 1C

CLASSIFICATION

HRN EN ISO 17632-A	AWS / ASME SFA-5.20
T42 2 P C1 1	E71T-1C

DESCRIPTION AND APPLICATION

Rutile type flux cored wire for welding in shielding atmosfere. Suitable for welding mild and low alloy steels. Weld surface is smooth, spatter is minimum and slag removal is easy. Is provides low fume generation and has good impact strenght at low temperatures.

Steel grade	HRN	DIN (W. Nr.)	HRN / EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570)	S 185 to S 355J2G3 Fe 310-0 to Fe 490-2
Boilers steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 350 ČRV 250 to ČRV 350	StE 285 (1.0486) StE 355 (1.0562) WStE 285 (1.0487) WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
> 420	500 – 640	> 22	≥ 47

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	S	P
%	0,03	1,35	0,38	≤ 0,010	≤ 0,015

SHIELDING GAS

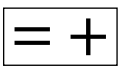
C1

PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	5; 15

APPROVALS

BV



ELEKTRODA ZAGREB d.d.

KISWEL
FILLER MATERIAL FOR WELDING

ELEKTRODA ZAGREB d.d.

FLUX OR METAL CORED WIRES

K - 71 TLF
K - NGS11
KX - 706 M
K - 308 LT
K - 309 LT
K - 316 LT
K - 329 T
K - 800 HT

K - 71 TLF

CLASSIFICATION

HRN EN ISO 17632-A	AWS / ASME SFA-5.20
T46 2 P C/M 1 H5	E71T-1C/1M

DESCRIPTION AND APPLICATION

Rutile type flux cored wire for welding in CO_2 or Ar/CO_2 shielding atmosphere. Suitable for welding mild and low-alloy steels with tensile strenght up to 590 N/mm² and fine-grained steels with yield strength up to 355 N/mm². Weld surface is smooth, spatter is minimum and slag removal is easy. It provides low fume generation and has good impact strength at low temperatures.

Steel grade	HRN	DIN (W. Nr.)	EN / ISO
Constructional steels	Č 0261 to Č 0563	St 33 (1.0035) to St 52-3N (1.0570)	S 185 to S 355J2G3 Fe 310-0 to Fe 490-2
Boiler steels	Č 1202 Č 1204 Č 3133 Č 3105	HI (1.0345) HII (1.0425) 17Mn4 (1.0481) 19Mn6 (1.0473)	P235GH P265GH P295GH P355GH
Tube and pipe steels	Č 1212 to Č 3100	St 35.4 (1.0309) to St 52.4 (1.0581) StE 210.7 (1.0307) to StE 360.7 (1.0582)	DX55D to P355T2 L210 to L360NB
Shipbuilding steels	A, B, D, E AH 32 to EH 36	A, B, D, E AH 32 to EH 36	
Fine-grained steels	ČRO 250 to ČRO 350 ČRV 250 to ČRV 350	StE 285 (1.0486) to StE 355 (1.0562) WStE 285 (1.0487) to WStE 355 (1.0565)	P275N P355N P275NH P355NH
Cast steels	ČL 0300 to ČL 0500	GS-38 (1.0416) to GS-52 (1.0551)	C18D to S355JRC

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
520	570	28	65

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Mn	Si	S	P
%	0,03	1,35	0,38	≤ 0,010	≤ 0,015

RECOMMENDED WELDING PARAMETERS

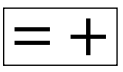
Wire diameter mm	Welding current A	Electric arc voltage V	Shielding gas (gas flow)
1,2	160 - 260	26 - 30	C1; M21 (12 - 16 l/min)

PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	4,5; 15

APPROVALS

ABS (3YSA H10); BV (3S 3YS H10); DNV (IIIYMS(H10)); GL (3YH10S); LR (3Y10SH5)



K - NGS11

CLASSIFICATION

HRN EN ISO 17632-A	AWS / ASME SFA-5.20
T42 Z Y N 1	E71T-11

DESCRIPTION AND APPLICATION

Self-shielded flux cored wire for welding mild and low-alloy steels with tensile strength up to 490 N/mm² where no impact properties are required. Wire is suitable for outdoor welding. It has good arc stability, low spatter generation, high efficiency, good bead shape and slag removal. When welding with self-shielded flux cored wire the emission of fume gases is slightly higher than in welding with flux cored wires with shielding gases. Wire has to use DCEN (electrode negative).

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
500	530	23	-

APPROXIMATE CHEMICAL COMPOSITION OF THE-ALL WELD METAL

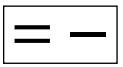
	C	Mn	Si	Al	S	P
%	0,10	0,55	0,10	1,21	≤ 0,006	≤ 0,015

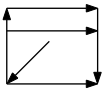
RECOMMENDED WELDING PARAMETERS

Wire diameter mm	Welding current A	Electric arc voltage V	Polarity
0,9	80 - 120	18 - 22	DCEN (DC-)
1,2	120 - 180	21 - 23	DCEN (DC-)

PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
0,9; 1,2	precision-wound (S-S)	4,5; 15





KX - 706M

CLASSIFICATION

HRN EN ISO 17632-A	AWS / ASME SFA-5.18
T46 2 M M 4 H5	E70C-6M

DESCRIPTION AND APPLICATION

Metal type of flux cored wire designed for welding of mild and low alloy steels sith tensile strength up to 490 N/mm². Features of this wire are good penetration, high resistance to porosity, good wetting behaviour as well as low hydrogen contents. It is intended for semi-automatic, automatic, single and multi pass welding.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
480	540	29	70

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	P	S
%	0,04	0,60	1,50	≤ 0,014	≤ 0,010

SHIELDING GAS

M21 (Ar + 18%CO_2) gas flow 15 - 25 l/min

RECOMMENDED WELDING PARAMETERS

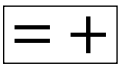
Wire diameter mm	Welding current A	Electric arc voltage V	Polarity
1,2	160 - 340	24 - 32	DCEP (DC+)

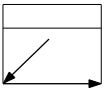
PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	5; 15

APPROVALS

ABS (3YSA); BV (3S3YS); DNV (III YMS); GL (3YS); LR (3YS)





K - 308 LT

CLASSIFICATION

HRN EN ISO 17633-A	AWS / ASME SFA-5.22
T 19 9 L P C/M 1	E308LT1-1/4

DESCRIPTION AND APPLICATION

Flux cored wire designed for MAG welding of lw carbon 18/8 CrNi stainless steels. The weld metal contains optimum ferrite contents in their austenitic structures. Therefore, weldability is excellent with lower crack susceptibility. It has easy slag removal, low spatter generation and good weld soundness of weld metal. C1 (CO_2) or M21 (Ar + 18%CO_2) can be used as shielding gases.

MECAHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-40°C) J	Shielding gas
440	570	39	65	C1
450	580	38	63	M21

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Cr	Ni	FN	Shielding gas
%	0,03	0,6	1,15	20,3	10,5	9,0	C1
%	0,03	0,65	1,25	20,4	10,5	10,0	M21

SHIELDING GAS

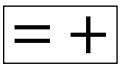
C1 (CO_2) or M21 (Ar + 18%CO_2) gas flow 15 - 25 l/min

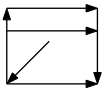
PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	12,5

APPROVALS

ABS (E308T1-1); BV (UP); DNV (308L MS); LR (304L S); TÜV





K - 309 LT

CLASSIFICATION

HRN EN ISO 17633-A	AWS / ASME SFA-5.22
T 23 12 L P C/M 1	E309LT1-1/4

DESCRIPTION AND APPLICATION

Flux cored wire designed for MAG welding of similar stainless steels, and for welding dissimilar joints. Wire is also used for cladding. Weld metal contains comparatively much more ferrite in their austenitic structure, therefore they provide better weldability together with superior heat and corrosion resistance. It is easy to use and operate with powerful penetrating spray arc transfer, minimum spatter formation and self releasing slag. C1 (CO_2) or M21 (Ar + 18%CO_2) can be used as shielding gases.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-30°C) J	Shieding gas
430	560	37	45	C1
440	570	37	48	M21

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Cr	Ni	FN	Shielding gas
%	0,03	0,6	1,12	23,7	13,2	14	C1
%	0,03	0,75	1,2	23,9	13,2	15	M21

SHIELDING GAS

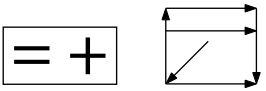
C1 (CO_2) or M21 (Ar + 18%CO_2) gas flow 15 - 25 l/min

PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	12,5

APPROVALS

ABS (E309LT1-1); BV (UP); DNV (308L MS); LR (SS/CmN S); TÜV



K - 316 LT

CLASSIFICATION

HRN EN ISO 17633-A	AWS / ASME SFA-5.22
T 19 12 3 L P C/M 1	E316LT1-1/4

DESCRIPTION AND APPLICATION

Flux cored wire designed for MAG welding of low carbon 18/12/2 Cr-Ni-Mo stainless steels. Wire has low carbon content which gives good resistance to most types of corrosion of the weld metal. Weld metal contains optimum ferrite contents in their austenitic structures and therefore their weldability is excellent with lower crack susceptibility. Wire has self-detaching slag, excellent weldability and increased creep resistance at elevated temperatures. C1 (CO_2) or M21 (Ar + 18%CO_2) can be used as shielding gases.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-60°C) / (-105°C) J	Shielding gas
420	560	38	50 / 38	C1
430	570	38	52 / 40	M21

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Cr	Ni	Mo	FN	Shielding gas
%	0,03	0,6	1,15	19,5	12,7	2,4	7,5	C1
%	0,03	0,65	1,2	19,7	12,7	2,4	8,0	M21

SHIELDING GAS

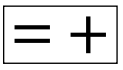
C1 (CO_2) or M21 (Ar + 18%CO_2) gas flow 15 - 25 l/min

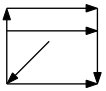
PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	12,5

APPROVALS

ABS (E316LT1-1); BV (UP); DNV (316L MS); GL (4435S); LR (316LS); TÜV





K - 329 T

CLASSIFICATION

HRN EN ISO 17633-A	AWS / ASME SFA-5.22
T 22 9 3 N L P C/M 1	E2209T1-1/4

DESCRIPTION AND APPLICATION

Titania type of flux cored wire designed for MAG welding of 23/9/3 Cr-Ni-Mo duplex stainless steels. It is suitable for welding in chemical plants, shipbuildings as well as in nuclear plants industries. Weld metal is excellent in pitting corrosion resistance and stress corrosion cracking resistance. Wire is used for all-position welding and has a stable welding arc producing a weld with easy slag removal and minimal spatter. C1 (CO_2) or M21 (Ar + 18%CO_2) can be used as shielding gases.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

$R_{p0,2}$ N/mm²	R_m N/mm²	A_5 %	KV (-20°C) / (-40°C) J	Shielding gas
715	818	27	52 / 42	C1
720	825	26	50 / 40	M21

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	Cr	Ni	Mo	FN	Shielding gas
%	0,03	0,52	0,80	23,20	9,60	3,26	36,7	C1
%	0,03	0,54	0,85	23,40	9,60	3,3	36,8	M21

SHIELDING GAS

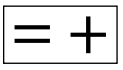
C1 (CO_2) or M21 (Ar + 18%CO_2) gas flow 15 - 25 l/min

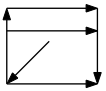
PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2	precision-wound (S-S)	12,5

APPROVALS

ABS (E2209T1-1); DNV





K - 800 HT

CLASSIFICATION

HRN EN ISO	AWS / ASME
-	SFA
-	-

DESCRIPTION AND APPLICATION

Flux cored wire for MAG hardfacing. It is designed for heavy abrasion resistance with martensitic structure. Typical appliations include augers, bucket lips, conveyor screws, blower blades, dozer blades etc.. In order to minimize cracking it is recommended to preheat work piece and obtain interpass temperature around 200°C. C1 (CO_2) is used as shielding gas.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

Hardness HV	Hardness HRC	Hardness HS	Interpass temp. °C	Shielding gas
780	63	87	200	C1

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

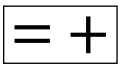
	C	Si	Mn	P	S	Cr	W	Shielding gas
%	0,44	3,40	0,55	≤ 0,013	≤ 0,011	7,5	1,0	C1

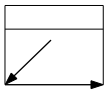
SHIELDING GAS

C1 (CO_2) gas flow 15 - 25 l/min

PACKAGING

Wire diameter mm	Winding	Weight of packaging kg
1,2; 1,4; 1,6	precision-wound (S-S)	15





ELEKTRODA ZAGREB d.d.

SAW WIRES AND FLUXES

EF - 200K x KD-42
EF - 100S x KD-42

EF-200K x KD-42

CLASSIFICATION

Flux EF-200K	EN 756	
	SA CS 1 57 AC	
Wire KD-42	EN 756	AWS / ASME SFA-5.17
	SZ	EM12K
Flux and wire EF-200K x KD-42	EN 756	AWS / ASME SFA-5.17
	S 46 5 CS SZ	F7A(P)6-EM12K

DESCRIPTION AND APPLICATION

Wire and flux for single and multi-pass butt welding of shipbuildings, structural steels, offshore structures and pressure vessels. Excellent impact toughness and crack resistibility. Good resistance to porosity on rust, scales, oil and primer. Applicable on AC or DC (+). Redry the flux at 250 to 350°C for 60 minutes before use. Add new flux periodically when continuosly reusing flux. Excessive flux may bring out poor bead appearance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL2} N/mm²	R_m N/mm²	A_5 %	KV (-50°C) J
550	610	29	80

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	P	S
%	0,08	0,35	1,65	≤ 0,026	≤ 0,009

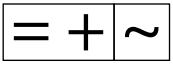
PACKAGING

Wire diameter mm	Weight of packaging kg
1,6; 2,0; 2,4; 3,2; 4,0; 4,8; 5,0; 6,0	25 kg (wire); 20 kg (flux)

Wire is packaged in cardboard box while flux is packaged in metal can.

APPROVALS

ABS (3YTM); BV (A3YTM); DNV (III YTM); GL (3YTM); LR (3YTM)



EF-100S x KD-42

CLASSIFICATION

Flux EF-100S	EN 756	
	SA AB 1 77 AC	
Wire KD-42	EN 756	AWS / ASME SFA-5.17
	SZ	EM12K
Flux and wire EF-100S x KD-42	EN 756	AWS / ASME SFA-5.17
	S 46 2 AB SZ	F7A(P)2-EM12K

DESCRIPTION AND APPLICATION

Wire and flux for single and multi-pass fillet welding of shipbuildings, structural steels, offshore structures and pressure vessels. Excellent impact toughness and crack resistibility. Good resistance to porosity on rust, scales, oil and primer. Applicable on AC or DC (+). Redry the flux at 250 to 350°C for 60 minutes before use. Add new flux periodically when continuosly reusing flux. Excessive flux may bring out poor bead appearance.

MECHANICAL PROPERTIES OF THE ALL-WELD METAL

R_{eL2} N/mm²	R_m N/mm²	A_5 %	KV (-20°C) J
545	600	29	70

APPROXIMATE CHEMICAL COMPOSITION OF THE ALL-WELD METAL

	C	Si	Mn	P	S
%	0,05	0,55	1,60	≤ 0,025	≤ 0,012

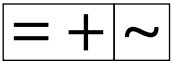
PACKAGING

Wire diameter mm	Weight of packaging kg
1,6; 2,0; 2,4; 3,2; 4,0; 4,8; 5,0; 6,0	25 kg (wire); 20 kg (flux)

Wire is packaged in cardboard box while flux is packaged in metal can.

APPROVALS

ABS



Protection in welding

Welder is at his workplace exposed to many dangers, which have their source in the welding process or in the immediate environment. Therefore, it is essential that the welder is familiar with the dangers and hazards that can be encountered during welding, which may impair his health. Ensuring safe working conditions greatly reduces the chance of welders injury.
Welding produces harmful metal fumes and gases, and long-term exposure to them is one of the biggest problems. The hazard depends on:
- the welding method,
- type and dimension of welding consumable,
- type of base metal,
- paint or any other coating on the base metal,
- ventilation.

In confined spaces welding fumes and gases are extremely dangerous and can be even deadly. Good ventilation is the most common way of controling exposure to harmful fumes and gases. Good general ventilation, local exhaust-ventilation and respirators should be an absolute "must have" in every working enviroment. Also it is necessary to wear protective mask to reduce as much as possible the amount of harmful fumes in the breathing area.

But one must not forget other hazards and ways of preventing injures.
Skin protection is important to prevent burns and other injures. Welders should always wear helmets, boots, gloves, in general flame-retardand clothing. Suitable eye protection protects eyes from radiation (goggles or safety glasses).

Welders are often exposed to noise, so hearing protectors must be worn. Electric shock can be avoided by using proper welding technique, training welders in the electrical hazards and working with good quality equipment only. It is important to understand all hazards, read and understand safety data sheets and labels, read, understand and follow safety instructions.

Packaging

Welding consumables are packed as follows:
- Electrodes for welding unalloyed steels (rutile electrodes) are packed in cardboard box
- Electrodes for welding unalloyed and low-alloyed steels (basic electrodes) electrodes for welding of high-alloyed steels , electrodes for hardfacing, for gouging, welding cast iron and welding non-ferrous metals are packed in a cardboard box, which is afterward wrapped in plastic foil or, on customers demand, in vacuum foil,
- Wires for GMAW unalloyed and low alloyed steels are packed in plastic foil and then in cardboard box,
- Wires for GMAW of high-alloy stainless steels and wires for GMAW of aluminum are packed in heat-treated PVC foil, and then in a cardboard box,
- Rods for GTAW are packed in cardboard box,
- Rod for oxy-acetylene welding is packed in PVC foil,
- Flux cored wire for GMAW unalloyed and low alloyed steels is packed in a PVC vacuum foil and then in a cardboard box,
- wire for SAW is packed in a cardboard box,
- SAW flux is packed in a tin bucket (metal can).

Welding consumables must be in original and undamaged packaging until use.

Storage

Storage of welding consumables must be done in a proper and correct way. Storage area should be dry, ambient temperature between 17 and 25° C and relative humidity up to 60%. For ambient heating, it is recommended to use electric heaters or central heating in order to minimize humidity. Heating with solid fuels is not recommended due to contamination of the environment with flue gases, and increase of humidity.
It is not recommended to store welding consumables for period longer then three years. The issue of welding consumables from warehouse to job sites shall be carried out in a controlled manner and in accordance to the principle: "First in / First out" or: the goods that first entered the warehouse must first leave the warehouse.

Re-drying

Rutile-cellulosic type - no re-drying.
Rutile type electrodes - re-drying usually not necessary.
Basic coated electrodes - it is essential for this type of electrodes to be thoroughly dried before use, for the purpose of controling maximum hydrogen content at 5ml/100g weld metal, and avoiding porosity in weld metal deposit.
Recommended redrying conditions are shown on labels on packaging and in our catalogue. The basic type electrodes and electrodes for welding of high alloy stainless steels should be kept in heated chambers (temp. between 70 - 120°C) to prevent moisture apsorption.

American Bureau of Shipping

Bureau Veritas

Hrvatski Registar Brodova

Deutsche Bahn

Det Norske Veritas

Germanischer Lloyd

Lloyd's Register of Shipping

Technischer Überwachungs Verein

Marking of electrodes for welding of mild and low-alloy steels (according to HRN EN ISO 2560-A: 2010)

example: **EZ - 50 B** E 42 4 B 42 H5

E	covered electrodes for MMA welding

Symbols for the tensile strength and elongation of the all-weld metal

Symbol	Yield strength min. [N/mm²]	Tensile strength min. [N/mm²]	Elongation [%]
35	355	440 - 570	22
38	380	470 - 600	20
42	420	500 - 640	20
46	460	530 - 680	20
50	500	560 - 720	18

Symbols for the temperature of the impact properties (Charpy V)

Symbol	Temperature [°C] impact properties min. [47J]
Z	no requirements
A	+ 20
0	0
2	- 20
3	- 30
4	- 40
5	- 50
6	- 60

Symbols for chemical composition of the all-weld metal

Symbol	Chemical composition [%]¹		
	Mn	Mo	Ni
No symbol	< 2,0	-	-
Mo	< 1,4	0,3 - 0,6	-
MnMo	1,4 - 2,0	0,3 - 0,6	-
1Ni	< 1,4	-	0,6 - 1,2
2Ni	< 1,4	-	1,8 - 2,6
3Ni	< 1,4	-	2,6 - 3,8
Mn1Ni	1,4 - 2,0	-	0,6 - 1,2
1NiMo	< 1,4	0,3 - 0,6	0,6 - 1,2
Z	any other agreed analysis		

¹ If not specified Mo<0,2; Ni<0,3; Cr<0,2; V<0,05; Nb<0,05; Cu<0,3

Symbols for diffusible hydrogen content in all-weld metal

Symbol	Hydrogen content ml H_2/100g deposited all-weld max.
H5	5
H10	10
H15	15

Symbols for the welding position

1	All positions
2	All positions, except vertical down position
3	Flat butt weld, flat fillet weld, horizontal/vertical weld
4	Flat butt weld, flat fillet weld
5	All positions including vertical down position

Symbols for recovery and type of welding current

Symbol	Weld metal recovery [%]	Type of curent Alternating current, AC (~) Direct current, DC (=)
1	≤ 105	AC and DC
2	≤ 105	DC
3	105 - 125	AC and DC
4	105 - 125	DC
5	125 - 160	AC and DC
6	125 - 160	DC
7	> 160	AC and DC
8	> 160	DC

Symbols for the type of electrode covering

A	acid
B	basic
C	cellulosic
R	rutile
RA	rutile-acid
RB	rutile-basic
RC	rutile-cellulosic
RR	heavily coated rutile

example: **EZ - ABRA 60** E Fe 14

E	covered electrode for MMA welding

Alloy symbols and chemical composition

Alloy symbol [1]	Suitability	Chemical composition, [%]									
		C	Cr	Ni	Mn	Mo	W	V	Nb	Other	Balance
Fe 1	p	≤ 0,4	≤ 3,5	-	0,5 - 3,0	≤ 1,0	≤ 1,0	≤ 1,0	-	-	Fe
Fe 2	p	0,4 - 1,2	≤ 7,0	≤ 1,0	0,5 - 3,0	≤ 1,0	≤ 1,0	≤ 1,0	-	-	Fe
Fe 3	s t	0,2 - 0,5	1,0 - 8,0	≤ 5,0	≤ 3,0	≤ 4,5	≤ 10,0	≤ 1,5	-	Co, Si	Fe
Fe 4	s t (p)	0,2 - 1,5	2,0 - 6,0	≤ 4,0	≤ 3,0	≤10,0	≤ 19,0	≤ 4,0	-	Co, Ti	Fe
Fe 5	c p s t w	≤ 0,5	≤ 0,1	17,0 - 22,0	≤ 1,0	3,0 - 5,0	-	-	-	Co, Al	Fe
Fe 6	g p s	≤ 2,5	≤ 10,0	-	≤ 3,0	≤ 3,0	-	-	≤ 10,0	Ti	Fe
Fe 7	c p t	≤ 0,2	4,0 - 30,0	≤ 6	≤ 3	≤ 2,0	-	≤ 1,0	≤ 1,0	Si	Fe
Fe 8	g p t	0,2 - 2,0	5,0 - 18,0	-	0,3 - 3,0	≤ 4,5	≤ 2,0	≤ 2,0	≤ 10,0	Si Ti	Fe
Fe 9	k (n) p	0,3 - 1,2	≤ 19,0	≤ 3,0	11,0 - 18,0	≤ 2,0	-	≤ 1,0	-	Ti	Fe
Fe 10	c k (n) p z	≤ 0,25	17,0 - 22,0	7,0 - 11,0	3,0 - 8,0	≤ 1,5	-	-	≤ 1,5	Si	Fe
Fe 11	c n z	≤ 0,3	18,0 - 31,0	8,0 - 20,0	≤ 3,0	≤ 4,0	-	-	≤ 1,5	Cu	Fe
Fe 12	c (n) z	≤ 0,08	17,0 - 26,0	9,0 - 26,0	0,5 - 3,0	≤ 4,0	-	-	≤ 1,5	-	Fe
Fe 13	g	≤ 1,5	≤ 6,5	≤ 4,0	0,5 - 3,0	≤ 4,0	-	-	-	B, Ti	Fe
Fe 14	g (c)	1,5 - 4,5	25,0 - 40,0	≤ 4,0	0,5 - 3,0	≤ 4,0	-	-	-	-	Fe
Fe 15	g	4,5 - 5,5	20,0 - 40,0	≤ 4,0	0,5 - 3,0	≤ 2,0	-	-	≤ 10,0	B	Fe
Fe 16	g z	4,5 - 7,5	10,0 - 40,0	-	≤ 3,0	≤ 9,0	≤ 8,0	≤ 10,0	≤ 10,0	B, Co	Fe
Fe 20	c g t z	WCa [2]	-	-	-	-	-	-	-	-	Fe
Ni 1	c p t	≤ 1,0	15,0 - 30,0	Balance	0,3 - 1,0	≤ 6,0	≤ 2,0	≤ 1,0	-	Si, Fe, B	Ni
Ni 2	c k p t z	≤ 0,1	15,0 - 30,0	Balance	≤ 1,5	≤ 28,0	≤ 8,0	≤ 1,0	≤ 4,0	Co, Si, Ti	Ni
Ni 3	c p t	≤ 1,0	1,0 - 15,0	Balance	0,3 - 1,0	≤ 6,0	≤ 2,0	≤ 1,0	-	Si, Fe, B	Ni
Ni 4	c k p t z	≤ 1,0	1,0 - 15,0	Balance	≤ 1,5	≤ 28,0	≤ 8,0	≤ 1,0	≤ 4,0	Co, Si, Ti	Ni
Ni 20	c g t z	WCa [2]	-	-	-	-	-	-	-	-	Ni
Co 1	c k t z	≤ 0,6	20,0 - 35,0	≤ 10,0	0,1 - 2,0	≤ 10,0	≤ 15,0	-	≤ 1,0	Fe	Co
Co 2	t z (c) (s)	0,6 - 3,0	20,0 - 35,0	≤ 4,0	0,1 - 2,0	-	4,0 - 10,0	-	-	Fe	Co
Co 3	t z (c) (s)	1,0 - 3,0	20,0 - 35,0	≤ 4,0	≤ 2,0	≤ 1,0	6,0 - 14,0	-	-	Fe	Co
Cu 1	c (n)	-	-	≤ 6,0	≤ 15,0	-	-	-	-	Al, Fe, Sn	Cu
Al 1	c n	-	-	10,0 - 35,0	≤ 0,5	-	-	-	-	Cu, Si	Al
Cr	g n	1,0 - 5,0	Balance	-	≤ 1,0	-	-	15,0 - 35,0	-	Fe, B, Si, Zr	Cr

c - resistance to rusting
g - resistance to abrasion
k - work hardenable
n - cannot be magnetised
p - impact resistance
s - edge retention
t - heat resistance
z - scaling resistance
w - precipitation hardened

(.) - may not apply to all alloys of this type

[1] Alloys which are not included in this table are analogies signified, but letter "Z" shall be put in front.

[2] Tungsten fused carbide or tungsten carbide broken or spherical.

Marking of solid wires for GMAW of mild and low alloy steels in shielding atmosphere (according to HRN EN ISO 14341-A: 2012)

example: **EZ - SG 2**

G 42 4 C/M 3Si1

G	solid wire for GMAW

Symbols for shielding gas

Symbol	Shielding gas
M	shielding gas mixture of M group, according to EN 439, without helium
C	shielding gas of C group according to EN ISO 14175, carbon dioxide (CO_2)
N	symbol for self-shielded flux cored wires whithout shielding gas

Symbols for strength and elongation of all-weld metal

Symbol	Yield strength min. [N/mm²]	Tensile strength [N/mm²]	Elongation min. (%)
35	355	440 - 570	22
38	380	470 - 600	20
42	420	500 - 640	20
46	460	530 - 680	20
50	500	560 - 720	18

Symbols for impact properties of all-weld metal

Symbol	Temperature [°C] for minimum average impact energy of 47J
Z	no requirements
A	+ 20
0	0
2	- 20
3	- 30
4	- 40
5	- 50
6	- 60

Symbols for chemical composition of the wire

Symbol	Chemical composition, [%] [1) 2) 3)]								
	C	Si	Mn	P	S	Ni	Mo	Al	Ti + Zr
0	Any other agreed composition								
2Si1	0,06 - 0,14	0,50 - 0,80	0,90 - 1,30	≤ 0,025	≤ 0,025	≤ 0,15	≤ 0,15	≤ 0,02	≤ 0,15
3Si1	0,06 - 0,14	0,70 - 1,00	1,30 - 1,60	≤ 0,025	≤ 0,025	≤ 0,15	≤ 0,15	≤ 0,02	≤ 0,15
4Si1	0,06 - 0,14	0,80 - 1,20	1,60 - 1,90	≤ 0,025	≤ 0,025	≤ 0,15	≤ 0,15	≤ 0,02	≤ 0,15
3Si2	0,06 - 0,14	1,00 - 1,30	1,30 - 1,60	≤ 0,025	≤ 0,025	≤ 0,15	≤ 0,15	≤ 0,02	≤ 0,15
2Ti	0,04 - 0,14	0,40 - 0,80	0,90 - 1,40	≤ 0,025	≤ 0,025	≤ 0,15	≤ 0,15	0,05 - 0,20	0,05 - 0,25
3Ni1	0,06 - 0,14	0,50 - 0,90	1,00 - 1,60	≤ 0,020	≤ 0,020	0,80 - 1,50	≤ 0,15	≤ 0,02	≤ 0,15
2Ni2	0,06 - 0,14	0,40 - 0,80	0,80 - 1,40	≤ 0,020	≤ 0,020	2,10 - 2,70	≤ 0,15	≤ 0,02	≤ 0,15
2Mo	0,08 - 0,12	0,30 - 0,70	0,90 - 1,30	≤ 0,020	≤ 0,020	≤ 0,15	0,40 - 0,60	≤ 0,02	≤ 0,15
4Mo	0,06 - 0,14	0,50 - 0,80	1,70 - 2,10	≤ 0,025	≤ 0,025	≤ 0,15	0,40 - 0,60	≤ 0,02	≤ 0,15
2Al	0,08 - 0,14	0,30 - 0,50	0,90 - 1,30	≤ 0,025	≤ 0,025	≤ 0,15	≤ 0,15	0,35 - 0,75	0,15

[1)] If not specified, Cr ≤ 0,15; Cu ≤ 0,35; V ≤ 0,03 %. Residual copper content in the steel plus any coating shal not exceed 0,35 % by mass,

[2)] Single values shown in the table are maximum values,

[3)] The results shall be rounded to the same number of significant figures as in the specified value using the rules according to annex B, Rule A of ISO 31-0:1992.

Marking of wire electrodes, wires and rods for fusion welding of stainless steels

(according to HRN EN ISO 14343: 2017)

example: **EZ - TIG 316 LSi**

W 19 12 3 L Si

W	rod for GTAW

Higher silicon content (Si) 0,65 - 1,20%

Explanation of chemical composition of the rod

19 - chromium content (Cr) 18,0 - 20,0%
12 - nickel content (Ni) 11,0 - 14,0%
3 - molybdenum content (Mn) 2,5 - 3,0 %
L - low carbon content (C) ≤ 0,03%

Symbol of alloy designation

Alloy symbol
Martensitic / ferritic type
13
13 L
13 4
17
Austenitic type
19 9
19 9 Nb
19 12 3 L
19 12 3 Nb
Ferritic / austenitic type
22 9 3 N L
25 7 2 L
25 9 3 Cu N L
25 9 4 N L
Fully austenitic type
18 15 3 L
18 16 5 N L
19 13 4 L
20 25 5 Cu L
20 16 3 Mn L
25 22 2 N L
27 31 4 Cu L
Special types
18 8 Mn
20 10 3
23 12 L
23 12 Nb
23 12 2 L
29 9
Heat resisting types
16 8 2
19 9 H
19 12 3 H
22 12 H
25 4
25 20
25 20 Mn
25 20 H
18 36 H

Note

- wire electrodes, wires and rods can also be used for other welding methods and then, instead of W, are following marks:
  G - for GMAW
  P - for plasma arc welding
  S - for SAW

Marking of flux cored wires for GMAW with or without shielding gas

(according to HRN EN ISO 17632-A: 2015)

example: **KISWEL K-71 TLF** T 46 2 P C/M 1 H5

T	flux cored wire

Symbols for the strength and elongation of the all-weld metal (MULTI-PASS WELDING)

Symbol	Yield strength min. [N/mm²]	Tensile strength min. [N/mm²]	Elongation [%]
35	355	440 - 570	22
38	380	470 - 600	20
42	420	500 - 640	20
46	460	530 - 680	20
50	500	560 - 720	18

Symbols for the strength of the all-weld metal (SINGLE-PASS WELDING)

Symbol	Yield strength min. [N/mm²]	Tensile strength min. [N/mm²]
3T	355	470
4T	420	520
5T	500	600

Symbols for impact properties of all-weld metal (Charpy V)

Symbol	Temperature [°C] for minimum average impact energy of 47J
Z	no requirements
A	+ 20
0	0
2	- 20
3	- 30
4	- 40
5	- 50
6	- 60

Symbols for chemical composition of all-weld metal

Symbol	Chemical composition [%]¹		
	Mn	Mo	Ni
No symbol	< 2,0	-	-
Mo	< 1,4	0,3 - 0,6	-
MnMo	1,4 - 2,0	0,3 - 0,6	-
1Ni	< 1,4	-	0,6 - 1,2
1,5Ni	< 1,6	-	1,2 - 1,8
2Ni	< 1,4	-	1,8 - 2,6
3Ni	< 1,4	-	2,6 - 3,8
Mn1Ni	1,4 - 2,0	-	0,6 - 1,2
1NiMo	< 1,4	0,3 - 0,6	0,6 - 1,2
Z	any other agreed composition		

¹ If not specified Mo<0,2; Ni<0,3; Cr<0,2; V<0,05; Nb<0,05; Cu<0,3

Symbols for diffusable hydrogen content in all-weld metal

Symbol	Hydrogen content ml H_2/100g deposited all-weld max.
H5	5
H10	10
H15	15

Symbols for the welding positions

1	All positions
2	All positions except vertical down position
3	Flat butt weld, flat fillet weld horizontal/vertical fillet weld
4	Flat butt weld, flat fillet weld
5	All positions including vertical down position

Symbols for shielding gas

Symbol	Shielding gas
M	shielding gas mixture of M group accordin to EN 439, without helium
C	shielding gas of C group according to EN ISO 14175, carbon dioxide (CO_2)
N	symbol for self-shielded flux cored wires without shielding gas

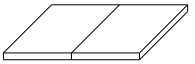
Symbols for type of flux

Symbol	Flag properties	Type of welding	Shielding gas
R	Rutile slow freezing slag	Single and multilayer	Yes
P	Rutile, fast freezing slag	Single and multilayer	Yes
B	Basic	Single and multilayer	Yes
M	Metal powder flux type	Single and multilayer	Yes
V	Rutile or basic / flouride	Single layer	No
W	Basic / flouride, slow freezing slag type	Single and multilayer	No
Y	Basic / flouride, fast freezing slag type	Single and multilayer	No
Z	Other types	-	-

Welding positions according to EN ISO 6947 and ASME

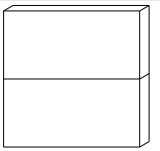
BUTT WELDS PLATE TO PLATE

EN ISO 6947 PA — ASME 1G



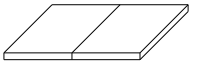
Horizontal

EN ISO 6947 PC — ASME 2G



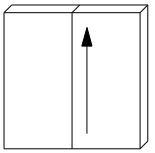
Transverse

EN ISO 6947 PE — ASME 4G



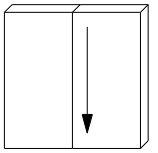
Overhead

EN ISO 6947 PF — ASME 3F



Vertical up

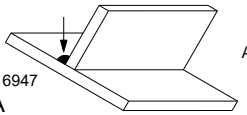
EN ISO 6947 PG — ASME 3G



Vertical down

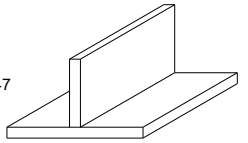
FILLET WELDS PLATE TO PLATE

EN ISO 6947 PA — ASME 1F



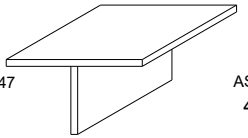
Horizontal

EN ISO 6947 PB — ASME 2F



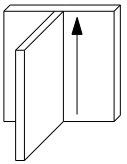
Horizontal (downhead)

EN ISO 6947 PD — ASME 4F



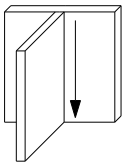
Overhead

EN ISO 6947 PF — ASME 3G



Vertical up

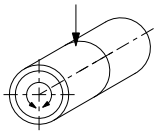
EN ISO 6947 PG — ASME 3F



Vertical down

BUTT WELDS PIPE TO PIPE

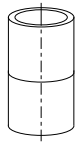
EN ISO 6947
PA



ASME
1G

Pipe rotated; pipe axis horizontal

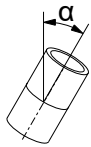
EN ISO 6947
PC



ASME
2G

Pipe fixed; pipe axis vertical

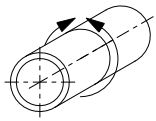
EN ISO 6947
H-LO45
(ascending welding)
J-LO45
(descending welding)



ASME
6G

Pipe fixed; pipe axis angle (e.g. 45°)

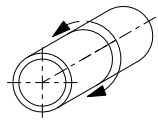
EN ISO 6947
PF



ASME
5G

Pipe fixed; pipe axis horizontal

EN ISO 6947
PG

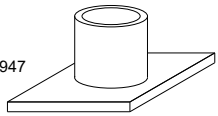


ASME
5G

Pipe fixed; pipe axis horizontal

FILLET WELDS PIPE TO PLATE

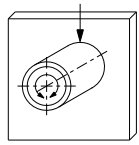
EN ISO 6947
PB



ASME
2F

Pipe fixed; pipe axis vertical

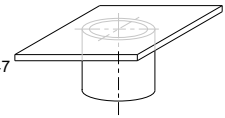
EN ISO 6947
PB



ASME
2F

Pipe rotated; pipe axis horizontal

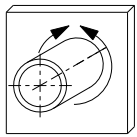
EN ISO 6947
PD



ASME
4F

Pipe fixed; pipe axis vertical

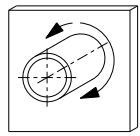
EN ISO 6947
PF



ASME
5F

Pipe fixed; pipe axis horizontal

EN ISO 6947
PG

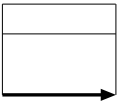


ASME
5F

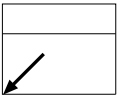
Pipe fixed; pipe axis horizontal

Taking into account the base material, welding conditions and type of electrode covering, welding can be performed in all positions or only some positions.

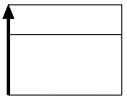
In this catalogue welding positions are indicated with symbols consisting of the arrows. Recommended welding positions are represented with full line arrow. Limited welding positions are represented with dashed line arrow.



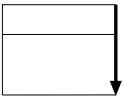
= horizontal welding of butt welds and fillet welds in flat position (PA)



= horizontal welding of fillet welds (PB) (downhead position) (PB)

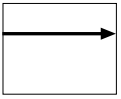


= vertical up position (PF)

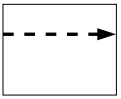


= vertical down position (PG)

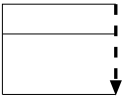
= overhead position (PD)
horizontal overhead position (PD)



= transverse position (PC)



= horizontal-vertical position (conditionally) (PC)

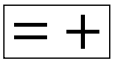


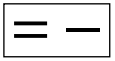
= vertical down position (conditionally) (PG)

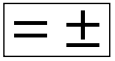
To obtain quality welding job it is very important to use the correct type of welding current (AC or DC), and corresponding polarity when welding with DC (+ or -).

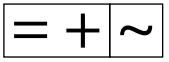
In this catalogue welding current type and polarities are indicated with following symbols.

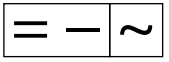

= alternating current AC

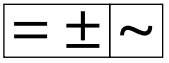

= direct current DC, electrode positive (DCEP)

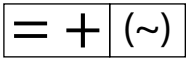

= direct current DC, electrode negative (DCEN)


= direct current DC, electrode positive or negative (DCEP or DCEN)

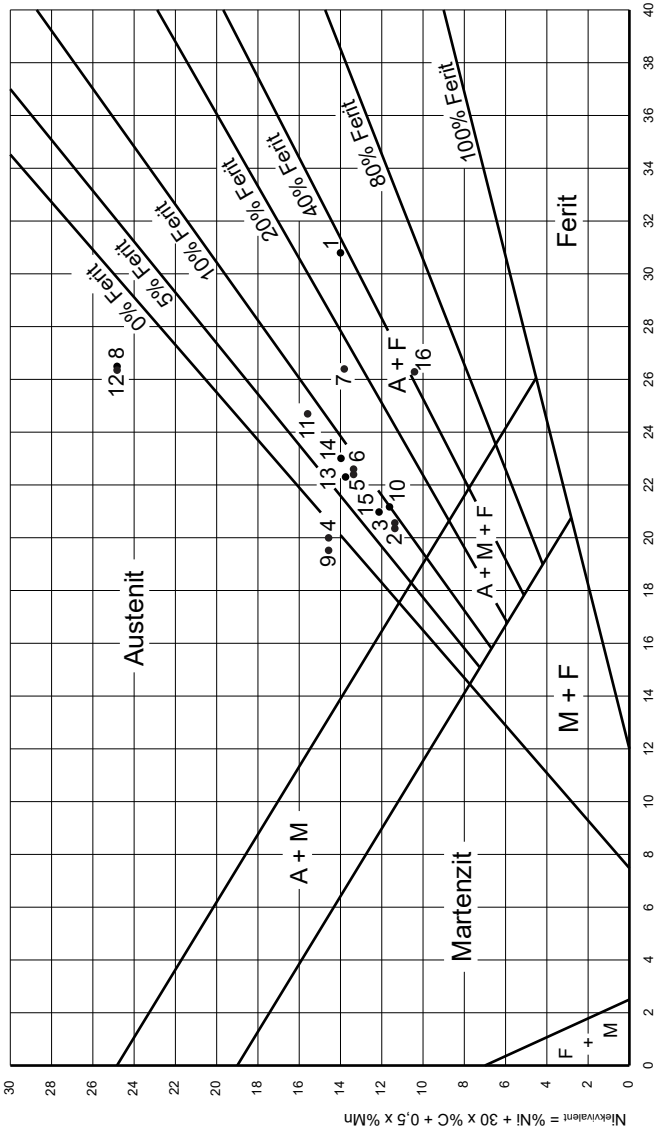

= direct current DC, electrode positive (DCEP)
or alternating current AC


= direct current DC, electrode negative (DCEN)
or alternating current AC


= direct current DC, electrode positive or negative (DCEP or DCEN)
or alternating current AC


= direct current DC, electrode positive (DCEP)
or alternating current AC but conditionally

Schäeffler diagram



Stick electrodes for MMA welding		Wires for GMAW / Rods for GTAW	
1. EZ - KROM 8	6. EZ - KROM 30 Nb	9. EZ - MIG 307 Si / EZ - TIG 307 Si	14. EZ - MIG 318 Si / EZ - TIG 318 Si
2. EZ - KROM 10 R	7. EZ - KROM 40 R	10. EZ - MIG 308 LSi / EZ - TIG 308 LSi	15. EZ - MIG 347 Si / EZ - TIG 347 Si
3. EZ - KROM 10 Nb	8. EZ - KROM 70	11. EZ - MIG 309 LSi / EZ - TIG 309 LSi	16. EZ - MIG 2209 / EZ - TIG 2209
4. EZ - KROM 20		12. EZ - MIG 310 / EZ - TIG 310	
5. EZ - KROM 30 R		13. EZ - MIG 316 LSi / EZ - TIG 316 LSi	

Brinell	Vickers	Rockwell		Shore
HB	HV	HRB	HRC	HS
95	95	52	-	-
97	97	54	-	-
99	99	56	-	-
101	101	58	-	-
103	103	59	-	-
105	105	61	-	-
107	107	62	-	-
109	109	64	-	-
111	111	65	-	-
114	114	67	-	-
116	116	68	-	-
118	118	69	-	-
121	121	71	-	-
123	123	72	-	-
126	126	73	-	-
128	128	74	-	20
131	131	75	-	20
133	133	76	-	21
137	137	77	-	21
140	140	78	-	21
143	143	79	-	22
146	146	80	-	22
149	149	81	-	23
152	152	82	-	23
156	156	83	-	24
159	159	84	-	24
163	163	85	-	25
167	167	86	-	25
170	170	87	-	26
174	174	88	-	26
179	179	89	-	27
183	183	90	-	27
187	187	91	-	28
192	192	92	14	28
197	197	93	15	29
201	201	94	16	30
207	207	95	17	30
212	212	96	18	31
217	217	97	19	31
223	223	98	20	32

Brinell	Vickers	Rockwell		Shore
HB	HV	HRB	HRC	HS
223	223	98	20	32
229	229	99	21	33
235	235	100	22	34
241	241	101	23	35
248	248	102	24	36
255	256	103	25	37
262	263	104	26	37
269	270	105	28	38
277	279	106	29	39
285	287	107	30	40
293	296	107	31	42
302	305	108	32	43
311	316	109	33	44
321	327	110	34	45
330	339	111	35	46
341	350	111	36	48
352	363	112	37	49
363	375	113	38	51
375	389	113	40	52
388	404	114	41	54
(401)	420	114	42	55
(415)	437	115	44	57
(429)	454	-	45	59
(444)	473	-	46	61
(461)	496	-	47	63
(477)	520	-	49	65
(495)	546	-	50	67
(514)	575	-	52	70
(534)	608	-	53	72
(555)	645	-	55	75
(578)	692	-	57	78
(601)	735	-	58	81
(627)	790	-	60	84
(653)	845	-	62	87
(682)	930	-	64	91
(712)	1000	-	66	95
(745)	1085	-	68	100
(780)	1175	-	70	106

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