



# Product Data Sheet

E 'Manual metal-arc welding'

OK 68.15

Prepared by A-C Thorsson	Qualified by P-O Oskarsson	Approved by Tapio Huhtala	Reg no EN007400	Cancelling EN007169	Reg date 2016-11-07	Page 1 (3)
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## REASON FOR ISSUE

Hardness data added under Other Data.

## GENERAL

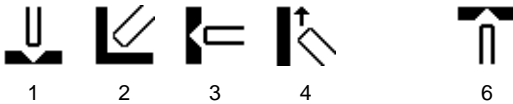
Stainless steel MMA electrode, giving a weld metal of the 13% Cr type. Intended for welding steels of similar composition when CrNi alloyed austenitic stainless steel electrodes cannot be used, e.g. when the construction will be exposed to aggressive sulphuric gases.

**Polarity:** DC+

**Alloy Type:** 13% Cr

**Coating Type:** Lime Basic

## WELDING POSITIONS



## CLASSIFICATIONS Electrode

EN 14700            E Fe7  
EN ISO 3581-A    E 13 B 4 2  
SFA/AWS A5.4     E410-15  
Werkstoffnummer 1.4009

## APPROVALS

Sepro            UNA 272580

## CHEMICAL COMPOSITION

### All Weld Metal (%)

	Min	Max
C		0.06
Si		0.70
Mn		1.0
P		0.030
S		0.020
Cr	11.5	13.5
Ni		0.60
Mo		0.50
Cu		0.20



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## MECHANICAL PROPERTIES OF WELD METAL

Properties	AWS	AWS
	Typ	Typ
	Stress relieved 1 750°C 6h	Stress relieved 750°C 1h
Rp0.2 (MPa)		370
Rm (MPa)		520
A4 (%)		25
Z (%)		65
Charpy V at 20°C (J)	55	
Charpy V at 0°C (J)	35	
Charpy V at -20°C (J)	20	

### Comments:

Interpass 200-250°C. The PWHT at 750°C/1h done immediately after welding. The 750°C/6h treatment done after cooling down to RT in between.

## ECONOMICS & CURRENT DATA

Dimension (mm) Ø x Length	Current (A)		W	η	N	B	H	T	U	Welding Positions
	Min	Max								
2.5 x 350	65	115	2.2	115	0.62	73	1.0	48	25	1,2,3,4,6
3.2 x 450	90	160	4.8	118	0.63	33	1.5	71	25	1,2,3
4.0 x 450	120	220	7.3	108	0.57	24	2.0	73	30	1,2

**W** = Weight (kg / 100 electrodes)

**η** = Efficiency (g weld metal x 100 / g core wire)

**N** = Effective value (kg weld metal / kg electrodes)

**B** = Changes (number of electrodes / kg weld metal)

**H** = Deposit rate at 90% of max current (kg weld metal / hour arc time)

**T** = Fusion time at 90% of max current (s / electrode)

**U** = Arc voltage (V)



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## OTHER DATA

Redrying: 200 °C, 2h

Mechanical properties of the weld metal:

All weld specimens welded with interpass temperature at 200-250 °C.

*).....postheated immediately after welding, >1h at.....	
.....As welded.....	600 °C.....675 °C.....750 °C.....800 °C.....Annealed
Rp0.2 N/mm2...+20 °C.....	370.....1h at 750 °C
.....+100 °C.....	570.....540.....410.....330..... after
.....+200 °C.....	540.....510.....400.....310..... cooling to
.....+300 °C.....	530.....470.....390.....300..... room temp
.....+400 °C.....	490.....430.....380.....285.....
.....+500 °C.....	410.....390.....320.....225.....
Rm N/mm2.....+20 °C.....	900.....680.....570.....520.....450..... 540
A4 %.....+20 °C.....	Low.....17.....22.....25.....30.....25
Z %.....+20 °C.....	Low.....50.....60.....65.....70.....65
KV J.....+40 °C.....	( after 6 h annealing ) .....75
.....+20 °C.....	( after 6 h annealing ) .....55
.....+0 °C.....	( after 6 h annealing ) .....35
.....-20 °C.....	( after 6 h annealing ) .....20

\*) Depending on welding parameters, the structure and consequently the mechanical properties of untreated weld metal can vary within rather large limits.

Hardness data:

Hardness tests conducted on transverse cross sections of ISO joints, interpass temperature 400-450°C, measurements done along a vertical centre line (11-12 indents) and a horizontal line at top layer (8-11 indents), 2 samples tested for each PWHT.

PHWT 1: After welding, cooling down to 100-150°C/2h followed by heat treatment at 675°C/8h: 192-225 HV10, average 213 HV10.

PHWT 2: After welding, cooling down to 100-150°C/2h followed by heat treatment at 750°C/8h: 132-202 HV10, average 176 HV10.