

## CLASSIFICATION

AWS A5.1	E 6013	A-Nr	1
ISO 2560-A	E 42 0 RR 12	F-Nr	2
		9606 FM	1

## GENERAL DESCRIPTION

Rutile electrode, especially for down hand welding in structural steel  
 Smaller sizes (2.0 & 2.5 mm) most versatile for thin plate material  
 Very smooth appearance  
 Self releasing slag

## WELDING POSITIONS (ISO/ASME)



PA/1G



PB/2F



PC/2G



PE/4G

## CURRENT TYPE

AC / DC -

## APPROVALS

ABS	BV	DNV	GL	LR	TÜV
2Y	2Y	2Y	2Y	2Y	+

## CHEMICAL COMPOSITION (W%), TYPICAL, ALL WELD METAL

C	Mn	Si
0.1	0.6	0.4

## MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Condition	Yield strength (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)	Impact ISO-V(J) 0°C
AW	min. 330 min. 420 480	min. 430 500-640 560	min. 17 min. 20 26	not required min. 47 50

## PACKAGING AND AVAILABLE SIZES

	Diameter (mm)	2.0	2.5	3.2	3.2	4.0
	Length (mm)	300	350	350	450	450
Carton + PE foil	Pieces / unit	200	130	140	125	80
	Net weight/unit (kg)	2.4	2.8	4.8	5.8	5.9

Identification Imprint: 6013 / UNIVERSALIS

Tip Color: none

Universalis® rev. C-EN25-01/02/16

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## EXAMPLES OF MATERIALS TO BE WELDED

Steel grades/Code	Type
<b>General structural steels</b>	
EN 10025	S185, S235, S275, S355
<b>Ship plates</b>	
ASTM A 131	Grade A, B, D, AH32 to DH36
<b>Cast steels</b>	
EN 10213-2	GP240R
<b>Pipe material</b>	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52, X60
EN 10216-1/EN10217-1	P235, P275, P355
<b>Boiler &amp; pressure vessel steels</b>	
EN 10028-2	P235, P265, P295, P355
<b>Fine grained steels</b>	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

## CALCULATION DATA

Sizes		Current type	Arc time - per electrode at max. current - [S]*	Energy E[kJ]	Dep. rate H[kg/h]	Weight/ 1000 pcs [kg]	Electrodes/ kg weldmetal/ B	kg electrodes/ kg weldmetal 1/N
Diam. x length [mm]	Current range [A]							
2.0x300	40-65	AC	41	58	0.5	11.4	178	2.0
2.5x350	70-100	AC	51	134	0.8	21.1	93	1.96
3.2x350	100-140	AC	57	281	1.3	39.3	47	1.85
3.2x450	100-140	AC	69	341	1.5	49.6	36	1.79
4.0x450	150-200	AC	69	483	2.1	66.9	25	1.67

\*Stub end 35mm

## WELDING PARAMETERS, OPTIMUM FILL PASSES

Diameter [mm]	Welding positions			
	PA/1G	PB/2F	PC/2G	PE/4G
2.0	50A			
2.5	100A	95A	85A	85A
3.2	130A	120A	115A	105A
4.0	185A	185A	160A	130A

## REMARKS / APPLICATION ADVICE

Best choice for welding thin plates.

High yield strength steels such as S355, L360, P355 and X60 preheat according EN 1011-1