

# Outershield® 81Ni1-HSR

## Low temperature rutile cored wire

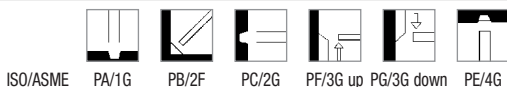
### Classification

AWS A5.29-98 : E81T1-Ni1MJ H4  
 EN 758-97 : T 50 5 1Ni P M 2 H5

### General description

All position gas shielded 1% Ni flux cored wire, offshore and similar applications  
 Specific design for stress relieved applications, guaranteed impact properties after PWHT  
 Superior weldability, low spatter, good bead appearance  
 Outstanding operators appeal  
 Exceptional mechanical properties (CVN >47J at -40°C)  
 Very low hydrogen H<sub>DM</sub> <5 ml/100g)  
 Superior product consistency with optimal alloy control  
 Very good wire feeding

### Welding positions



### Current type/Shielding gas

DC +  
 Ar+ (>5-25)% CO<sub>2</sub> (EN 439: M21)  
 15-25 l/min

### Approvals

DNV  
 IVYMSH5

### Chemical composition (w%), typical, all weld metal

Shielding gas	C	Mn	Si	P	S	Ni	H <sub>DM</sub> ml/100g
M21	0.06	1.4	0.3	0.013	0.010	0.95	3

### Mechanical properties, all weld metal

	Shielding gas	Condition	Yield strength (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)	Impact ISO-V (J)	
						-40°C	-50°C
Required: AWS A5.29-98 EN 758-97			min. 470	550-690	min. 19	min. 27	
			min. 500	560-720	min. 18	min. 47	
Typical values:	M21	AW	570	620	24	120	100
	M21	SR	550	600	24	120	100

SR 1h/600°C, 3G up - V45°

### Packaging and available sizes

Unit type	Net weight/unit (kg)	Diameter (mm)	
		1.2	1.6
Plastic spool S200	4.5	X	
Wire reel B300	15	X	X
Wire reel B435	25		X

Outershield® 81Ni1-HSR: rev. EN 15

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## Materials to be welded

Steel	Code	Type
General structural steel	EN 10025	S185, S235, S275, S355
Ship plates	ASTM A131	Grade A, B, C, D, AH32 to DH36
Cast steel	EN 10213-2	G P 240R
Pipe material	EN 10208-1	L210, L240, L290, L360
	EN 10208-2	L240NB, L290NB, L360NB, L360QB, L240MB, L290MB, L360MB, L415MB, L415NB
	API 5LX	X42, X46, X52, X60
	EN 10216-1/ EN 10217-1	P235T1, P235T2, P275T1 P275T2, P355N
	EN 10028-2	P235GH, P265GH, P295GH, P355GH
Boiler & pressure vessel steel	EN 10113-2	S275, S275, S355, S420
Fine grained steel	EN 10113-3	S275M, S275ML, S355M, S355ML, S420M, S420ML

## Calculation data

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed (cm/min)	Current (A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg weld metal
1.2	20	445	130	20-22	1.6	1.20
		700	180	23-25	2.5	1.20
		950	220	25-27	3.4	1.20
		1270	265	27-29	4.5	1.20
		1590	305	30-32	5.9	1.20
1.6	20	320	170	21-23	1.9	1.20
		510	235	22-24	3.1	1.20
		635	275	24-25	3.9	1.20
		760	310	25-27	4.7	1.20
		890	350	27-29	5.6	1.20
		1015	385	28-30	6.4	1.20
		1080	400	30-31	6.8	1.20

## Welding parameters, optimum fill, shielding gas Ar + (>5 - 25)% CO<sub>2</sub>

Diameter (mm)	Current/Voltage	Welding position				
		PA/1G	PB/2F	PC/2G	PF/3G up	PE/4G
1.2	(A)	230-280	230-280	200-240	200-240	160-220
	(V)	26-32	26-32	25-32	25-28	23-28
1.6	(A)	250-350	250-350	230-280	220-260	170-240
	(V)	24-32	24-32	24-32	24-28	22-28