

Outershield® 690-HSR

High strength rutile cored wire

Classification

AWS A5.29-98 : E111T1-K3MJ H4
EN 12535-00 : T 69 4 Z P M 2 H5 T

General description

All position gas shielded rutile flux cored wire, for high strength steel grades like grade S690

Specific design for stress relieved applications

Outstanding operators appeal

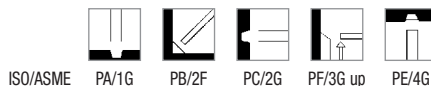
Excellent mechanical properties (CVN >50J at -40°C)

Very low hydrogen H_{DM} <5 ml/100g)

Superior product consistency with optimal alloy control

Good wire feeding

Welding positions



Current type/Shielding gas

DC +
Ar+ (>5-25%) CO₂ (EN 439: M21)
15-25 l/min

Approvals

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

Shielding gas	C	Mn	Si	P	S	Ni	Mo	H _{DM} ml/100g
M21	0.06	1.5	0.2	0.015	0.010	2.0	0.5	3

Mechanical properties, all weld metal

	Shielding gas	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation (%)	Impact ISO-V (J)	
						-30°C	-40°C
Required: AWS A5.29-98			min. 680	760-900	min.15	27	
EN 12535-00			min. 690	770-970	min.17	47	
Typical values:	M21	AW	740	790	19	75	70
	M21	SR	720	770	20	60	60

SR: 1h/580°C, 3G up - V60°

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

Outershield® 690-HSR: rev. EN 15

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Materials to be welded

Steel	Code	Type
Fine grained steel	EN 10137-2	S500-S690

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)% CO₂

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	23-30
1.6	(A)	250-350	250-350	230-280	220-260	170-240
	(V)	24-29	24-29	24-28	24-26	22-26