

Innershield® NR®-152

Self-shielded cored wire

Classification

AWS A5.20/A5.20M : E71T-14

General description

Self shielded: easiest equipment arrangement

Welding galvanized steel

Single pass automatic and semi-automatic

Recommended for sheets from 1.2 to 5.0mm

Welding positions



ISO/ASME PA/1G PC/2G PG/3Gdown PG/5Gdown

Current type

DC -

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

C	Mn	Si	P	S	Al	Ti	N
0.30	0.99	0.24	0.013	0.007	1.63	0.003	0.051

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)
Required:	AWS A5.20	not required	480	not required	not required
Typical values	AW		525*		

* Flat tensile test specimen

Packaging and available sizes

Unit type	Diameter (mm)
	1.6
22.68 kg coil 50C	X

Innershield® NR®-152: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-152

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 t/m DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
1.6	13	75	90	13	0.55	1.11
		125	150	15	0.9	1.11
		280	250	19	2.0	1.11

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position		
		PA/1G	PC/2G	PG/3G (down)
1.6	Wire feed speed (cm/min.)	180	150	200
	Current (A)	205	170	220
	Voltage (V)	16.5	18.5	19.5

Remarks/ Application advice

Spot welds on 0.75mm to 1.5mm thick material

These procedures include automatic processes where excellent striking is required

Galvanized or zinc coated steel may be welded with Innershield NR-152 at travel speeds of 75 to 100 cm/min. The joint design must permit the zinc oxide

Innershield® NR®-203 NiC

Self-shielded cored wire

Classification

AWS A5.29/A5.29M : E61T8-K6

General description

Self shielded: easiest equipment arrangement

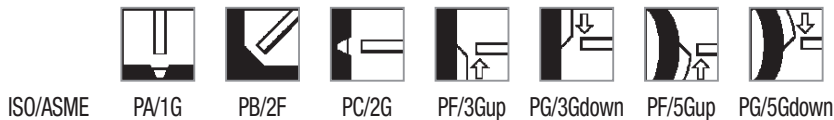
All position welding

Easy to weld in vertical up position

All passes

Good impact and CTOD toughness

Welding positions



Current type

DC -

Approvals

ABS	DNV	LR
3SA	IIIMSH15	3SH15

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

C	Mn	Si	P	S	Ni	Cr	Al	V	Mo
0.06	0.83	0.05	0.004	0.003	0.57	0.08	0.73	<0.1	<0.1

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -29°C
Required:	AWS A5.29	min. 340	410-550	22	27
Typical values	AW	400	490	29	95

Packaging and available sizes

Unit type	Diameter (mm)
	2.0
6.35 kg coil 14C	X
22.68 kg coil 50C	X

Innershield® NR®-203 NiC: rev. EN 21

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Innershield® NR®-203 NiC

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	19	125	145	16	1.10	1.32
		230	235	20	1.95	1.32
		280	275	21	2.40	1.32

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position				
		PA/1G	PC/2G	PF/3G up	PG/5G down	PE/4G
2.0	Wire feed speed (cm/min.)	280	230	200	200	200
	Current (A)	275	235	215	215	215
	Voltage (V)	21	20	19	18	19

Remarks/ Application advice

For mild and higher strength steel not exceeding the yield strength range
 Roundabout groove welds, especially for large diameter heavy tubular constructions
 General plate fabrication, including bridge construction, hull plate and stiffener welding on ships and barges, offshore

Innershield® NR®-203Ni1

Self-shielded cored wire

Classification

AWS A5.29/A5.29M : E71T8-Ni1
EN ISO 17632-A : T 42 3 1Ni Y N 1

General description

Self shielded: easiest equipment arrangement
All position welding
Easy to weld in vertical up position
All passes
Good impact and CTOD toughness

Welding positions



Current type

DC -

Approvals

ABS	BV	DNV	GL	LR	RINA	TÜV
3SA,3YSA	SA3YMHH	IIIMSH10	3YSH10	3S,3YSH15	3S,3YS	+

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

C	Mn	Si	P	S	Ni	Al
0.08	1.1	0.27	0.008	0.003	0.9	0.85

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -29°C
Required:	AWS A5.29	min. 400	480-620	20	27
Typical values	AW	465	540	26	115

Packaging and available sizes

Unit type	Diameter (mm)	
	2.0	2.4
6.35 kg coil 14C	X	
22.68 kg coil 50C	X	X

Innershield® NR®-203Ni1: rev. EN 22

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Innershield® NR®-203Ni1

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	19	125	145	16	1.10	1.30
		230	235	20	1.95	1.30
		355	310	23	3.15	1.30
2.4	19	125	215	18	1.60	1.20
		240	315	21	3.25	1.20
		330	385	24	4.30	1.20

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding parameters						
		PA/1G	PB/2F	PC/2G	PF/3G up	PF/5G up	PG/3G down PG/5G down	PE/4G
2.0	Wire feed speed (cm/min.)	280	330	230	200	200	200	180
	Current (A)	255	300	235	215	215	215	195
	Voltage (V)	21	22	20	19	19	18	19
2.4	Wire feed speed (cm/min.)	280	280	215	180			
	Current (A)	345	345	290	250			
	Voltage (V)	22	22	19.5	19			

Remarks/ Application advice

For mild and higher strength steel, not exceeding the yield strength range of the electrode weld deposit
 General plate fabrication, including bridge construction, hull plate and stiffener welding on ships and barges, offshore
 For semi- and full automatic welding

Innershield® NR®-211-MPE

Self-shielded cored wire

Classification

AWS A5.20/A5.20M : E71T-11

General description

Self shielding: easiest equipment arrangement

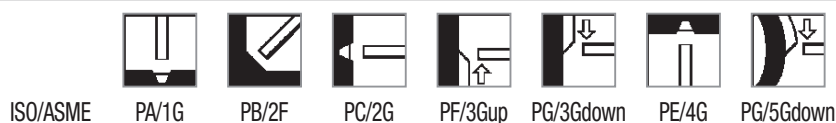
General purpose welding

Easy handling and welding versatility

Recommended for sheets from 2.5 to 12mm

With electrode diameter 0.9mm: excellent for sheets from 1.2mm

Welding positions



Current type

DC -

Approvals

BV	LR
+	AWS

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

C	Mn	Si	P	S	Al
0.21	0.65	0.25	0.010	0.003	1.3

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)
Required:	AWS A5.20	min. 400	480	20	not required
Typical values	AW	450	610	22	

Packaging and available sizes

Unit type	Diameter (mm)			
	0.9	1.2	1.7	2.0
6.35 kg coil 14C	X	X		
6.35 kg coil 14C			X	X
11,34 kg coil 22RR	X	X		
22.68 kg coil 50C			X	X

Remarks/ Application advice

Fabricating and repair of machinery parts, truck bodies, saddles, tanks, hoppers, etc.

Racks, scaffolding, light angle structurals, joints, small roundabouts, etc.

Short assembly welds on brackets, dips, etc.

Galvanized steel

Innershield® NR®-211-MPE: rev. EN

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Innershield® NR®-211-MPE

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
0.9	10	125	30	14	0.3	1.22
		230	90	16	0.6	1.22
		280	120	16.5	0.8	1.22
1.1	14	180	120	15	0.5	1.22
		280	160	17	1.0	1.22
		330	170	18	1.2	1.22
1.7	19	100	120	15	0.8	1.22
		190	190	18	1.5	1.22
		440	320	23	3.5	1.22
2.0	19	130	180	16	1.4	1.09
		190	250	18	2.2	1.09
		380	350	22	4.3	1.09
2.4	19	130	235	16	2.0	1.10
		140	250	18	2.3	1.10
		250	370	20	4.2	1.10

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position				
		PA/1G PB/2F	PC/2G	PF/3G up	PG/3G down PG/5G down	PE/4G
0.9	Wire feed speed (cm/min.)	180	180	150	230	230
	Current (A)	65	65	50	85	85
	Voltage (V)	15	15	14.5	16	16
1.1	Wire feed speed (cm/min.)	230	230	200	280	280
	Current (A)	140	140	130	160	160
	Voltage (V)	16	16	16	17	17
1.7	Wire feed speed (cm/min.)	440	250	190	300	300
	Current (A)	320	230	190	280	280
	Voltage (V)	23	19.5	18	21	21
2.0	Wire feed speed (cm/min.)	330	190		230	190
	Current (A)	320	250		320	250
	Voltage (V)	21	18		19.5	18
2.4	Wire feed speed (cm/min.)	230	180		230	140
	Current (A)	350	275		350	250
	Voltage (V)	19.5	19		19.5	18

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Innershield® NR®-232

Self-shielded cored wire

Classification

AWS A5.20/A5.20M : E71T-8

General description

Self shielded: easiest equipment arrangement

Deposit rate up to 3 kg/h, out of position

Excellent low temperature impact toughness

Ideal for fillet welding and filling

For single and multi-pass welds

Size diam. 1.7mm suitable for contaminated or primed plate

Welding positions



ISO/ASME

PA/1G

PB/2F

PC/2G

PF/3Gup

PE/4G

Current type

DC -

Approvals

ABS	BV	DNV	LR	RINA	TÜV	NKK
3SA,3YSAH15	SA3YMH	IIYMSH15	3S,3YSH15	3YS	+	KSW53NH10

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

C	Mn	Si	P	S	Al
0.18	0.65	0.27	0.006	0.004	0.55

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)	
					-20°C	-29°C
Required:	AWS A5.20	min. 400	480	22		27
Typical values	AW	490	590	26	65	35

Packaging and available sizes

Unit type	Diameter (mm)		
	1.7	1.8	2.0
6.12 kg coil 14C	X	X	X
22.68 kg coil 50C	X	X	X

Innershield® NR®-232: rev. EN 21

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Innershield® NR®-232

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36.
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360, L415
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure Vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355, S420
EN 10025 part 4	S275, S355, S420

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
1.7	12-25	280	170	19	1.7	1.33
		430	250	21	2.7	1.33
		810	400	26	5.1	1.33
1.8	12-25	200	130	17	1.5	1.22
		430	250	21	2.9	1.22
		730	350	24	5.0	1.22
2.0	12-25	150	130	16	1.3	1.22
		330	250	21	2.8	1.22
		550	350	25	4.6	1.22

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position				
		PA/1G	PB/2F	PC/2G	PF/3G up	PE/4G
1.7	Wire feed speed (cm/min.)	635	495		380	380
	Current (A)	310	275		225	225
	Voltage (V)	23	23		19.5	19.5
1.8	Wire feed speed (cm/min.)	635	510	430	390	430
	Current (A)	355	290	255	240	255
	Voltage (V)	11	21	21	20	21
2.0	Wire feed speed (cm/min.)	460	380		330	380
	Current (A)	315	285		250	285
	Voltage (V)	23	22		21	22

Remarks/ Application advice

Designed for the semi-automatic welding of 5mm and thicker steel

Recommended for single and multi-pas welds

Size diam. 1.7mm, is recommended for welds where it is necessary to produce wider passes (weave technique) and for welding plate with contaminations such as oil, rust, paint or primer

Size diam. 1.8mm is recommended to obtain the fastest travel speed on single pass fillet weld

Size diam. 2.0mm is recommended for overhead position

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Innershield® NR®-233

Self-shielded cored wire

Classification

AWS A5.20/A5.20M E71T-8

General description

Self shielded: easiest equipment arrangement

Due to new production technology and formulation: welder friendly wire with wide range of parameter settings

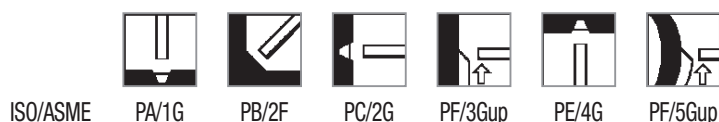
Forgiving arc, with increased penetration gives better quality welds with great bead appearance

High deposition rate, even in out of position welding

Good impact values

NR-233 has been developed to minimize gas marking, even after the electrode has been exposed to the atmosphere

Welding positions



Current type

DC -

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

C	Mn	Si	P	S	Al
0.16	0.65	0.21	0.010	0.003	0.60

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -29°C
Required:	AWS A5.20	min. 400	480	22	27
Typical values	AW	440	570	26	40

Packaging and available sizes

Unit type	Diameter (mm)	
	1.6	1.8
5,7kg plastic spool	X	
11,3 kg plastic spool Foil Bag	X	X

Innershield® NR®-233: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-233

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
1.6	13-32	380	220	17-19	1.9	1.26
		510	245	19-21	2.5	1.31
		640	270	21-23	3.0	1.35
		760	295	23-25	3.5	1.35
		890	315	25-27	4.3	1.31
1.8	19-25	250	185	17-18	1.6	1.25
		380	250	18-19	2.5	1.24
		510	295	20-21	3.2	1.25
		640	330	22-23	4.0	1.26
		760	355	23-24	4.8	1.26

Remarks/ Application advice

Vertical up fillet and groove welds
 Overhead fillet and groove welds
 Seismic structural steel erection
 General structural steel erection
 Ship and barge fabrication

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Innershield® NR®-207

Self-shielded cored wire

Classification

AWS A5.29/A5.29M : E71T8-K6

General description

Self shielded: easiest equipment arrangement
Vertical down filling semi-automatic pipe welding
High quality construction welding in all positions
Good impact and CTOD toughness

Welding positions



ISO/ASME PA/1G PB/2F PC/2G PG/3Gdown PE/4G PG/5Gdown

Current type

DC -

Approvals

BV	DNV	GL	TÜV
SA3YMH	IIIYMSH15	3YH15S	+

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

C	Mn	Si	P	S	Ni	Al
0.07	0.9	0.20	0.005	0.003	0.85	1.0

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation (%)	Impact ISO-V(J) -29°C
Required:	AWS A5.29	min. 400	480-620	20	27
Typical values	AW	420	535	25	110

Packaging and available sizes

Unit type	Diameter (mm)	
	1.7	2.0
6.35 kg coil 14C	X	X
22.68 kg coil 50C		X

Innershield® NR®-207: rev. EN 21

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Innershield® NR®-207

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360, L415
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	19	180	175	17.5	1.4	1.27
		230	220	18.5	1.7	1.27
		250	260	19.5	2.5	1.27

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position			
		PA/1G PB/2F	PC/2G	PG/3G down PG/5G down	PE/4G
2.0	Wire feed speed (cm/min.)	280	230	230	190
	Current (A)	240	220	220	185
	Voltage (V)	21	19	19	19

Remarks/ Application advice

High productivity welding
Where arctic mechanical properties are required in general construction welding
Semi-automatic pipe welding

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-207-H

Self-shielded cored wire

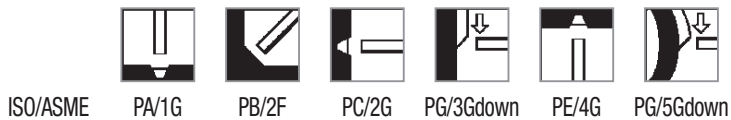
Classification

AWS A5.29/A5.29M : E71T8-K6

General description

Self shielded: easiest equipment arrangement
Vertical down semi-automatic pipe welding
High quality construction welding in all positions
Good impact and CTOD toughness
Low hydrogen weld metal H

Welding positions



Current type

DC -

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

C	Mn	Si	P	S	Ni	Al
0.07	0.9	0.20	0.005	0.003	0.85	1.0

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -29°C
Required:	AWS A5.29	min. 400	480-620	20	27
Typical values	AW	420	535	25	110

Packaging and available sizes

Unit type	Diameter (mm)
	1.7
6.35 kg coil 14C	X

Innershield® NR®-207-H: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-207-H

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36.
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360, L415
API 5LX	X42, X46, X52, X60
EN 10216-1/ EN 10217-1	P235T1, P235T2, P275T1 P275T2, P355N
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/ kg Weldmetal
1.7	19	230	205	17.5	1.5	-
		270	220	18.5	1.8	-
		300	245	19.5	2.0	-

Remarks/ Application advice

- Where low hydrogen weld metal is required
- High productivity welding
- Where arctic mechanical properties are required in general construction welding
- Semi-automatic pipe welding

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-208-H

Self-shielded cored wire

Classification

AWS A5.29/A5.29M : E91T8-G

General description

Self shielded: easiest equipment arrangement
Semi-automatic fill and cap pass welding of X-80 pipe steel in vertical down position
Excellent low temperature toughness
Low hydrogen content ($H_{DM} < 8 \text{ ml/100g}$)

Welding positions



ISO/ASME PG/5Gdown

Current type

DC -

Approvals

TÜV

+

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

C	Mn	Si	P	S	Al	Ni
0.05	1.65	0.25	0.007	<0.003	0.85	0.8

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -30°C
Required:	AWS A5.29	min. 540	620-760	17	
Typical values	AW (1G)	585	650	26	115

Packaging and available sizes

Unit type	Diameter (mm)	
	1.7	2.0
6.35 kg coil 14C	X	X

Innershield® NR®-208-H: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield[®] NR[®]-208-H

Materials to be welded

Steel grades/Standard	Type
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Pipe material

API5LX	X60, X70
EN 10208-2	L 415, L445, L480, L550

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
1.7	19	150	145	15.5	1.0	-
		205	180	17.5	1.3	-
		270	215	18.5	1.8	-
		370	255	20.5	2.4	-

Remarks/ Application advice

Preheat and interpass temperature depending on steel quality
For root pass welding of X-60 to X-80 the Innershield NR-204-H electrode is recommended

Innershield® NR®-305

Self-shielded cored wire

Classification

AWS A5.20/A5.20M : E70T-6

General description

NR-305 is a self-shielded flux cored wire

Not intended for out-of-position welding, but can be used on 15° max. downhill and 5° max. uphill applications

High deposit rates and fast travel speed

Easy handling

Recommended for maximum productivity, downhand welding

Welding positions



ISO/ASME

PA/1G

PB/2F

Current type

DC +

Approvals

ABS	BV	DNV
2SA,2YSA	SA2YMH	IYMS

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

C	Mn	Si	P	S	Al
0.09	0.9	0.20	0.007	0.008	0.80

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -29°C
Required:	AWS A5.20	min. 400	480	22	27
Typical values	AW	470	550	25	40

Packaging and available sizes

Unit type	Diameter (mm)		
	1.7	2.0	2.4
22.68 kg coil 50C	X	X	X

Innershield® NR®-305: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-305

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360, L415
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
1.7	12-25	510	275	24	3.75	1.22
		635	325	25	4.60	1.22
		890	390	27	6.35	1.22
2.0	19-25	510	360	22.5	4.50	1.22
		635	410	25	5.90	1.22
		1140	545	32.5	11.10	1.22
2.4	38-65	405	330	21	5.00	1.23
		610	425	24	7.55	1.23
		1015	525	33	12.70	1.23

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position	
		PA/1G	PB/2F
1.7	Wire feed speed (cm/min.)	635	635
	Voltage (V)	25	25
2.0	Wire feed speed (cm/min.)	890	635
	Voltage (V)	25	24
2.4	Wire feed speed (cm/min.)	710	610
	Voltage (V)	27	24

Remarks/ Application advice

Typical applications include bridge, ship, barge or offshore drilling rig construction and machinery, structural and general fabrication. NR-305 can be used for single and multiple pass fillet and lap welds and for deep groove butt welds in the flat position.

Innershield® NR®-311

Self-shielded cored wire

Classification

AWS A5.20/A5.20M : E70T-7

General description

Self shielded: easiest equipment arrangement
Good penetration, as in column butt welds and narrow gap welds
Fast travel speed
High deposition rates

Welding positions



PA/1G



PB/2F



PC/2G



PG/3Gdown

ISO/ASME

Current type

DC -

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

C	Mn	Si	P	S	Al
0.27	0.40	0.08	0.007	0.005	1.5

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)
Required:	AWS A5.20	min. 400	480	22	not required
Typical values	AW	430	590	24	

Packaging and available sizes

Unit type	Diameter (mm)	
	2.0	2.4
6.35 kg coil 14C	X	
22.68 kg coil 50C		X

Innershield® NR®-311: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-311

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360, L415
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355, S420

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	32	255	190	21	2.2	1.28
		405	275	25	3.6	1.28
		760	4100	28	7.1	1.28

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position			
		PA/1G	PB/2F	PC/2G	PG/3G down
2.0	Wire feed speed (cm/min.)	610	510	410	380
	Current (A)	355	320	280	260
	Voltage (V)	26	26	25	25

Remarks/ Application advice

Horizontal butt welds such as column structural connections
 Fillet and lap welds in the flat horizontal and downhill positions
 Deep groove welds. The penetration and extremely easy slag removal permit using a narrow gap and small bevel angle to minimize the total amount of

Innershield® NR®-400

Self-shielded cored wire

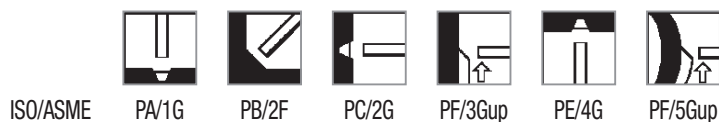
Classification

AWS A5.29/A5.29M : E71T8-K6

General description

Self shielding: easiest equipment arrangement
 Higher strength level, overmatching StE 355
 Excellent impact toughness at -40°C
 CTOD tested, offshore constructions
 All positions, all passes

Welding positions



Current type

DC -

Approvals

BV	LR	TÜV
SA3YMHH	3S,3YSH15	+

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

C	Mn	Si	P	S	Ni	Cr	Al
0.06	0.74	0.17	0.004	0.002	0.75	0.13	0.74

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J) -60°C
Required:	AWS A5.29	min. 400	480-620	20	27
Typical values	AW	435	525	26	100

Packaging and available sizes

Unit type	Diameter (mm)
	2.0
6.35 kg coil 14C	X
22.68 kg coil 50C	X

Innershield® NR®-400: rev. EN 23

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-400

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36.
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355
EN 10025 part 4	S275, S355

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	19	150	150	16.5	1.20	1.37
		230	225	19.5	1.85	1.37
		280	265	20.5	2.35	1.37

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position			
		PA/1G PB/2F	PC/2G	PF/3G(up) PF/5G(up)	PE/4G
2.0	Wire feed speed (cm/min.)	280	230	200	200
	Current (A)	265	225	190	190
	Voltage (V)	20	19	18	18

Remarks/ Application advice

Off-shore oil equipment, piping, storage tanks
 General plate fabrication including bridge construction on ships and barges
 Circumferential groove welds for heavy wall, large diameter tubular construction

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-450-H

Self-shielded cored wire

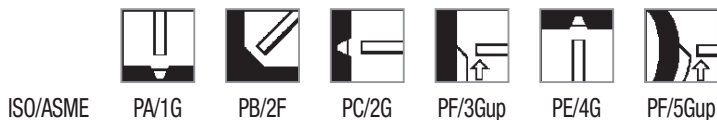
Classification

AWS A5.29/A5.29M : E71T8-Ni2 ¹⁾
¹⁾ also meets: E81T8-Ni2

General description

Self shielding: easiest equipment
Higher strength level, yield strength up to 450 N/mm²
Excellent impact toughness at -40°C
CTOD tested, offshore constructions

Welding positions



Current type

DC -

Approvals

ABS GL LR
3SA,3YSAH10 3YSH10 3S,3YSH10

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

C	Mn	Si	P	S	Ni	Al
0.07	0.26	0.06	0.004	0.002	2.44	0.88

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)	
					-29°C	-40°C
Required:	AWS A5.29	min. 400	480-620	20	27	
Typical values	AW	500	570	28	88	84

Packaging and available sizes

Unit type	Diameter (mm)
	2.0
6.35 kg coil 14C	X

Innershield® NR®-450-H: rev. EN 22

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-450-H

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to EH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360, L415, L445
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355, S420
EN 10025 part 4	S275, S355, S420

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	19	150	140	16.5	1.18	1.44
		230	200	19.5	1.90	1.51
		280	225	20.5	2.35	1.33

Remarks/ Application advice

Off-shore oil equipment, piping, storage tanks
 General plate fabrication including bridge construction on ships and barges
 Circumferential groove welds for heavy wall, large diameter tubular construction

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NR®-550-H

Self-shielded cored wire

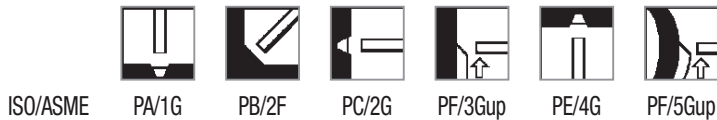
Classification

AWS A5.29/A5.29M : E81T8-Ni2 H8

General description

Self shielding: easiest equipment
Higher strength level, yield strength up to 450 N/mm²
Excellent impact toughness at -40°C
CTOD tested, offshore constructions

Welding positions



Current type

DC -

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

C	Mn	Si	P	S	Ni	Al
0.05	1.14	0.07	0.010	0.003	2.35	0.7

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)	
					-18°C	-29°C
Required:	AWS A5.29	min. 400	480-620	20		27
Typical values	AW	490	585	25	113	100

Packaging and available sizes

Unit type	Diameter (mm)
	2.0
6.35 kg coil 14C	X

Innershield® NR®-550-H: rev. EN 22

Innershield® NR®-550-H

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025 part 2	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 t/m EH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360, L415, L445
EN 10208-2	L240, L290, L360
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Boiler & pressure vessel steel	
EN 10028-2	P235GH, P265GH, P295GH, P355GH
Fine grained steel	
EN 10025 part 3	S275, S355, S420
EN 10025 part 4	S275, S355, S420

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	19	150	140	16.5	1.18	1.44
		230	200	19.5	1.90	1.51
		280	225	20.5	2.35	1.33

Remarks/ Application advice

Off-shore oil equipment, piping, storage tanks
General plate fabrication including bridge construction on ships and barges
Circumferential groove welds for heavy wall, large diameter tubular construction

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NS®-3ME

Self-shielded cored wire

Classification

AWS A5.20/A5.20M : E70T-4
EN ISO 17632-A : T 46 Z V N 3

General description

NS-3ME is a self shielded wire for high deposition rate flat and horizontal welding where impact properties are not required

Recommended for heavy sections or crack-sensitive applications

Can be used for rail joint welding

Welding positions



ISO/ASME PA/1G PB/2F

Current type

DC +

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

C	Mn	Si	P	S	Al
0.23	0.45	0.25	0.006	0.006	1.40

Mechanical properties, typical, all weld metal

	Condition	Yield strength (N/mm ²)	Tensile strength (N/mm ²)	Elongation %	Impact ISO-V(J)
Required:	AWS A5.20	460	530-670	22	not required
Typical values	AW	470	640	27	

Packaging and available sizes

Unit type	Diameter (mm)		
	2.0	2.4	3.0
6.35 kg coil 14C	X		
12,5 kg coil 25RR	X		
22.68 kg coil 50C	X	X	X

Innershield® NS®-3ME: rev. EN 21

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request

Innershield® NS®-3ME

Materials to be welded

Steel grades/Standard	Type
General structural steel	
EN 10025	S185, S235, S275, S355
Ship plates	
ASTM A131	Grade A, B, D, AH32 to DH36
Cast steel	
EN 10213-2	GP240R
Pipe material	
EN 10208-1	L210, L240, L290, L360
EN 10208-2	L240, L290, L360, L415
API 5LX	X42, X46, X52, X60
EN 10216-1/	P235T1, P235T2, P275T1
EN 10217-1	P275T2, P355N
Fine grained steel	
EN 10025 part 3	S275, S355, S420
EN 10025 part 4	S275, S355, S420

Calculation data at normal setting

Diameter (mm)	Electrical Stick-out (mm)	Wire feed speed cm/min	Current (approx. A)	Arc Voltage (V)	Deposition Rate (kg/h)	kg Wire/kg Weldmetal
2.0	50	500	250	29	5.0	1.18
		635	290	30	6.3	1.18
		760	320	31	7.6	1.18
2.4	70	280	250	28	3.8	1.16
		580	400	31	8.1	1.16
		700	450	32	10.0	1.16
3.0	70	380	400	28	7.7	1.23
		450	450	29	9.0	1.23
		570	550	31	12.0	1.23
2.0	95	530	450	35	11.3	1.23
		900	600	38	17.9	1.23

Welding parameters, optimum fill passes

Diameter (mm)	Welding position	Welding position	
		PA/1G	PB/2F
2.0	Wire feed speed (cm/min.)	635	635
	Current (A)	290	290
	Voltage (V)	30	30
2.4	Wire feed speed (cm/min.)	580	580
	Current (A)	400	400
	Voltage (V)	31	31
3.0*	Wire feed speed (cm/min.)	440	440
	Current (A)	445	445
	Voltage (V)	29	29
3.0**	Wire feed speed (cm/min.)	760	
	Current (A)	550	
	Voltage (V)	37	

* Stick-out 70mm - ** Stick-out 95mm

Remarks/ Application advice

Multi-pass fillet and lap welds

Single passes 4.5 to 9mm fillet and lap welds (1F)

Crack resistant fillets on higher strength steels where required joint strength can be obtained by using the proper fillet size

Joint welding of rail steel profiles with placed copperbacking

Liability: All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance **Fumes:** Consult information on Welding Safety Sheet, available upon request