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nfo@weldingtechnolog

INNERSHIELD® wires

HIGH PRODUCTIVITY SOLUTION



LINCOLN ELECTRIC INVENTED THE FIRST SELF-SHIELDED FLUX-CORED WIRE



INNERSHIELD®

FOR OUTDOOR WELDING, ADVANTAGES OVER OTHER COMMON PROCESSES

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Patented in 1958

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Ph: **09 274 1246** info@weldingtechnology.co.nz www.weldingtechnology.co.nz



INNERSHIELD® – THE RIGHT SOLUTION FOR OUTDOOR WELDING OVER STICK WELDING PROCESS





INNERSHIELD[®] ADVANTAGES OVER STICK WELDING PROCESS

- Continuous process
- Longer Arc time and increased operating factor
- Higher deposition rates
- Increased productivity
- Fewer stops and starts = fewer defects

COST SAVING EXAMPLE BETWEEN INNERSHIELD® AND SMAW PROCESSES

APPLICATION BASE MATERIAL: S	5355		CMANA		EFFI	CIENCY
Joint type : A5 FW in PB (2F)			BASIC 7018-1	NR-233	+2	23%
	Welding moda	ality	manual	semi-automatic		
DDOCECC	Current	Amperage	140-180	240-250	DEFUSITION	saving
PROLESS	Diameter	[mm]	4,0	1,6	RATE	
	Deposition rate	[kg/h]	1,7	2,7 🔾		for 1 KM
	COST STUDY FOR 1000	METERS OF W	ELD PER YEAR		+58%	of wolding
	Wire	[€/kg]	3	15,00		of weiding //
	Efficiency	[%]	0,65	0,80 🔘	••••••••••	
WELDING COST	Weight per meter weld	[kg/m]	0,23	0,23		
	Cost per meter weld	[€/m]	1,1	4,3		
	Total cost	[€/kg]	5	19		
	Labour cost	[€/h]	40	40		nct
DODUCTION	Duty cycle	[%]	18	25		031
COST	Weight per meter weld	[kg/m]	0,23	0,23	-55% -4	17%
	Time per meter weld	[h/m]	0,75	0,34	[-51 days] [-1]	
	Cost per meter weld	[€/m]	31	18		
	Total welding time	(h)	752	341 🔾	••••••	
	Total cost	(€)	31,127	17,942 🔿		
	Contact us to calculate	e your ROI				

INNERSHIELD® – SEMI-AUTOMATIC GAS-LESS PROCESS ALLOWS YOU TO SAVE TIME AND COST

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FOR MORE PRODUCTIVITY, MOVE FROM SMAW TO FCAW. CHOOSE INNERSHIELD® IF...

> THE USE OF GAS BOTTLES TYPICAL ISSUES USING GAS

- supply of right gas mixture
- regular delivery of bottles on field
- safe gas bottle handling
- protected store
- continue maintenance of hoses and gas pressure regulators (cost/time lost, gas leakage, dedicated person in charge of)

THE WIND REPRESENTS AN ISSUE

INNERSHIELD® ALLOWS:

- Welding under wind speeds up to 50 km/h and favourable operating characteristics without losing mechanical properties
- Less defects such as porosity and wormholes
- No need to invest in barriers to protect the welding from wind

INNERSHIELD® ADVANTAGES

- Eliminate cylinder rental cost
- Lower maintenance costs: (simpler gun and feeder).
- No requirement for tenting to protect welding point from wind.
- Innershield[®] wires have excellent feedability and root penetration and allows use of long CTWD to enter in narrow groove.
- Deal with surface contaminants, such mill scale, rust, coating, better than solid wire.

QING TECHNOLOGY



info@weldingtechnology.co.nz www.weldingtechnology.co.nz FASTER WELDING ON FIELD WITH INNERSHIELD

INNERSHIELD® – THE PROCESS

Lincoln Electric Company invented the FCAW-S process in 1958, with the Innershield® line of electrodes (Innershield® wires). Innershield® is an important process for steel fabrication in many industries, particularly when done outdoors. It is a primary welding process for structural steel building erection.

TYPICAL APPLICATIONS

- Steel Structure
- \cdot Offshore
- Shipbuilding
- · Field Maintenance
- · Pipelines
- Heavy plate fabrication
- \cdot Sheet metal
- \cdot General fabrication
- · Rail welding
- \cdot Home work DIY

All Innershield® wire are classified according to EN ISO 17632 and are suitable for welding steel structures according to EN 1090

When required:

- Welders need to be qualified according to EN 287-1; training of 1 week is recommended to master the technique.
- Welding procedure shall be qualified according to EN ISO15614-1. (*)

(*) Lincoln Electric can provide support for welder training and procedure qualification



FASTER WELDING ON FIELD WITH INNERSHIELD®

TYPICALLY MADE IN LARGE DIAMETERS

from 1,6 to 3,0 mm
some in smaller sizes:
0,9 mm to 1,2 mm

AVAILABLE IN VARIETY OF PACKAGES

from 0,4 kg to 22,7 kg
bulk reels & drums 227 kg, 273 kg

AVAILABLE IN VARIETY OF FORMULATIONS FOR:

- \cdot mild steel or low-allov
- · flat & horizontal position
- only or all positions



MAIN INNERSHIELD® TYPES*

	4,5 kg		5,7 kg	6,4 kg		11,3 kg		22,7 kg		g		
		AVAILABLE IN DIAMETER (mm)										
Innershield [®] NR [®] -211-MP	0,9	1,1		1,7	7	2,0	0,9	1,1	1,7	1,7	2	,0
Innershield [®] NR [®] -233			1,6				1,6					
Innershield [®] NS-3M			2,4		2,0)				2,4	3	,0
Innershield [®] NR [®] -311Ni						2,4		2,8				
Innershield [®] NR [®] -203Ni1										2,0		
Innershield [®] NR [®] -440Ni2										1,6	2	,0
Innershield [®] NR [®] -555							1,6		2,0			
Pipeliner [®] NR-208-XP				1,7	7	2,0						
Innershield [®] NR [®] -232				1,7	1,8	2,0	1,7	1,8	2,0	1,7	1,8	2,0
Innershield [®] NR [®] -232-H							1,7		1,8			
Innershield [®] NR [®] -305										1,7	2,0	2,4

*Non-exhaustive list. More wires available in www.lincolnelectric.eu



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QUALITY CONTROL

Innershield[®] is a process widely used worldwide in a great variety of applications. Innershield[®] wires are object of strict quality control in production to grant consistent performances.

Innershield[®] wires are approved by third parties such as ABS, DNV, LRS (see product data sheet for better reference).

Some Innershield[®] products are used for building construction in the seismically active regions of the US, where the stringent requirements of AWS D1.1 Structural Welding Code-Steel, and the D1.8 Seismic Welding Supplement apply.



Product:
Classification:

Specification:

Innershield® NR®-233 E71T-8-H8 E71T8-A2-CS3-H8 AWS A5,20:2005, ASME SFA-5,20 AWS A5,36:2016, ASME SFA-5,36

Operating Settings	E71T-8-H8 Requirements	RESULTS
Required Size for Classification	1/16 in	1/16 in (1,6 mm)
Current Type/Polarity	DC-	DC-
Wire Feed Speed, cm/min (in/min)		622 (245)
Nominal Voltage, V		23
Nominal Current, A		270
Average Heat Input, kJ/mm (kJ/in)	(25-55)	1,3 (32,5)
Travel Speed, cm/min (in/min)		29 (11,46)
Contact Tip to Work Distance, mm (in)		22 (7/8)
Pass/Layers		20/6
Preheat Temperature, °C (°F)	(60 min.)	25 (73)
Interpass Temperature, °C (°F)	(325 max.)	165 (325)
Postweld Heat Treatment	As-welded	As-welded

Mechanical Properties of Weld Metal				
Tensile Strength, MPa (ksi)	(70-90)	580 (84)		
Yield Strength, 0,2% Offset, MPa (ksi)	(58 min.)	450 (65)		
Elongation %	22 min.	26		
Average Impact Energy	(20 min.)	49 (36)		
Joules @ -29°C (ft-lbs @ -20°F)		48, 49, 50 (35, 36, 37)		

Average Hardness, HRB	Info. Only	87

Chemical Composition of Weld Metal (weight %)

C	0,30 max.	1,7
Mn	1,75 max.	0,65
Si	0,60 max.	0,21
S	0,03 max.	0,00
P	0,03 max.	0,01
AI	1,8 max.	0,7
Diffusible Hydrogen (per AWS A4,3)	E71T-8-H8 Requirements	RESULTS
Required Size for Classification		1/16 in (1,6 mm)
Current Type/Polarity		1/16 in (1,6 mm) DC-
Required Size for Classification Current Type/Polarity Nominal Voltage, V		1/16 in (1,6 mm) DC- 23
Required Size for Classification Current Type/Polarity Nominal Voltage, V Nominal Current, A		1/16 in (1,6 mm) DC- 23 CC 291
Required Size for Llassification Current Type/Polarity Nominal Voltage, V Nominal Current, A Diffusible Hydrogen, ml/100g	8,0 max.PLIEF	1/16 in (1,6 mm) DC- 23 JC 291 15 OF 3,9 ELDING

Product: Innershiel Classification: E71T8-Ni2 E71T8-A4 Specification: AWS A5,2

Average Hardness, HRB

Innershield® NR®-440Ni2 E71T8-Ni2-JH8 E71T8-A4-Ni2-H8 AWS A5,29:2010, ASME SFA-5,29 AWS A5,36:2016, ASME SFA-5,36

Operating Settings	E71T8-Ni2-JH8 Requirements	RESULTS
Required Size for Classification	1/16 in	1/16 in (1,6 mm)
Current Type/Polarity	DC-	DC-
Nominal Voltage, V		20
Nominal Current, A		200
Wire Feed Speed, cm/min (in/min)		330 (130)
Average Heat Input, kJ/mm (kJ/in)	(25-55)	1,6 (40)
Travel Speed, cm/min (in/min)		15 (5,93)
Contact Tip to Work Distance, mm (in)		22 (7/8)
Pass/Layers		16/8
Preheat Temperature, °C (°F)	(275-325)	135 (275)
Interpass Temperature, °C (°F)	(275-325)	135 (275)
Postweld Heat Treatment	As-welded	As-welded

Mechanical Properties of Weld Metal								
Tensile Strength, MPa (ksi)	(70-90)	550 (79)						
Yield Strength, 0,2% Offset, MPa (ksi)	(58 min.)	460 (67)						
Elongation %	20 min.	27						
Average Impact Energy	(20 min.)	338 (249)						
Joules @ -40°C (ft-lbs @ -40°F)		241, 353, 420 (178, 260, 310)						

Info. Only

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Chemical Composition of Weld Metal (wei	ght %)			
C	0, 12 max.	0,02		
Mn	1,50 max.	1,06		
Si	0,80 max.	0,18		
S	0,030 max.	<0,003		
Р	0,030 max.	0,010		
Ni	1,75-2,75	1,94		
Al	1,8 max.	0,8		
L				
		RESULTS		
Diffusible Hydrogen (per AWS A4,3)	E71T8-Ni2-JH8 Requirements	RESULTS		
Diffusible Hydrogen (per AWS A4,3) Required Size for Classification	E71T8-Ni2-JH8 Requirements	RESULTS 1/16 in (1,6 mm)		
Diffusible Hydrogen (per AWS A4,3) Required Size for Classification Current Type/Polarity	E71T8-Ni2-JH8 Requirements	RESULTS 1/16 in (1,6 mm) DC-		
Diffusible Hydrogen (per AWS A4,3) Required Size for Classification Current Type/Polarity Nominal Voltage, V	E7IT8-Ni2-JH8 Requirements	RESULTS 1/16 in (1,6 mm) DC- 19		
Diffusible Hydrogen (per AWS A4,3) Required Size for Classification Current Type/Polarity Nominal Voltage, V Nominal Current, A	E7IT8-Ni2-JH8 Requirements	RESULTS 1/16 in (1,6 mm) DC- 19 178		
Diffusible Hydrogen (per AWS A4,3) Required Size for Classification Current Type/Polarity Nominal Voltage, V Nominal Current, A Diffusible Hydrogen, ml/100g	E7IT8-NZ-JH8 Requirements 8,0 max.	RESULTS 1/16 in (1,6 mm) DC- 19 178 5,3		
Diffusible Hydrogen (per AWS A4,3) Required Size for Classification Current Type / Polarity Nominal Voltage, V Nominal Current, A Diffusible Hydrogen, ml/100g Abs. Humidity (gr moisture/lb dry air)	E7IT8-NZ-JH8 Requirements 8,0 max.	RESULTS 1/16 in (1,6 mm) DC- 19 178 5,3 65		



MAIN PRODUCTS

Innershield[®] NR[®]-211-MP

- Versatile welding capability on a variety of base materials
- High operator appeal and good bead appearance
- Easy slag removal
- Fast freezing characteristics accommodate poor fit-up
- Restricted to 12 mm plate thickness

Specifications

Specificacions					1.1.1.1	1.00				
Classifications		Annrouals	Chemistry					Mechanical Properties		
AWS A5,36	EN ISO 17632-B	Approvais	С	Mn	Si	S	Р	RP0,2	RM	Elongation (%)
E71T-11-AZ-CS3	T49ZT11-1NA-H15	CE, ABS, CWB, TUV, DB	0,21	0,65	0,25	0,003	≤0,010	450	610	22

Innershield[®] NR[®]-233

- New design increases wire stiffness to aid feedability and promotes smooth arc transfer
- High deposition rates for out-of-position welding
- Meets AWS D1,8 requirements
- Welders of all skill levels benefit from the easy to control arc and forgiving weld puddle even out of position

Specifications

Classifications		Annrouals	Chemistry					Mechanical Properties				
AWS A5,36	EN ISO 17632-B	Approvais	C	Mn	Si	S	Р	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -29°C	
E71T8-A2-CS3-H8	T 49 3 T8-1 N A-UH10	CE, ABS, AWS D1,8,JIS Z 3313	0,15-0,20	0,61-0,65	0,17-0,21	≤0,03	≤ 0,01	435-455	575-595	22	34-54	

Innershield[®] NR[®]-203 Nickel (1%)

- Designed to produce a nickel bearing weld deposit
- Produces weld deposits with impact toughness exceeding 27 J at 29°C
- Color match on weathering steels
- Handles poor fit-up
- Root bead capability

Specifications

									_			Contract of the second s
Classifications		Approvals			Che	mistr	у		Mechanical Properties			
AWS A5,36	EN ISO 17632-A	Approvais	С	Mn	Si	Ni	S	Р	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -29°C
E71T8-A2-Ni1-H16	T42 3 1Ni Y N	CE, DNV, CWB, DB, TUV, ABS, LR	0,08	1,1	0,27	0,9	0,003	0,008	465	540	26	115

Innershield[®] NR[®]-555

- Impact 100J@-50°C
- Self-shielded electrode designed for welding in structural applications
- Welder friendly operability and flat bead face in out-of-position fillets and groove welds
- Meets AWS D1,8 seismic lot waiver requirements
- ProTech[®] foil bag packaging shields against moisture, prevents rust and prolongs storage life

Specifications

Classifications Mechanical Properties Chemistry Approvals EN ISO 17632-A RP0,2 RM Elongation (%) Impact ISO-V (J) -29°C AWS A5,36 ٢ Mn Si Ni Ρ E81T8-A5-K8-H T46 5 Z Y N 1 H10 CE, AWS D1,8 0,05 1,84 0,17 1,12 0,001 0,011 550 630 25

Mild steel – all position welding capability

Applications

Applications

· General & Seismic structural

- · Sheet or thin gauge metal
- · Galvanized sheet metal
- · Robotic/hard automation
- · General fabrication



Low alloy steel – all position welding capability

Applications

- Roundabout groove welds on heavy wall tubular construction • Offshore
- · Bridges and other structural components made from weathering steels
- Structural fabrication
- NACE applications

Applications

 Structural · General Fabrication

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Innershield® NR®-311Ni

- Designed for improved handling of poor fit-up on heavy wall tubes and gaps up to 9,5 mm with 6,4 mm offset
- Fast freezing slag with excellent wash-in
- Root bead capability without back-up bars

Low alloy steel – flat and horizontal welding capability



Classifications		A		(Chemistry			Mechanical Properties			
AWS A5,36	EN ISO 17632-B	Approvais	C	Mn	Si	S	Ni	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -29°(
E70T7-A2-K2-H16, E80TG-A2-K2-	T42 2 1,5Ni W N 5	ABS, LR, DNV, BV, DB, AWS D1.8. CE	0,06-0,08	1,25-1,40	0,18-0,22	≤0,003	1,29-1,56	470-515	575-615	27-30	41-87

Mild steel – all position, except vertical down welding capability

Applications

Applications

Structural fabrication,

including those subject to seismic requirements

General plate fabrication

welding on ships and barges

· Hull plate and stiffener

 Machinery parts, tanks, hoppers, racks and scaffolding

Structural fabrication.

including those subject to seismic requirements

General plate fabrication

welding on ships and barges • Machinery parts, tanks,

hoppers, racks and scaffolding

• Hull plate and stiffener

Innershield[®] NR[®]-232

- 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 diameter 1,7mm suitable for contaminated or primed plate

Specifications

Specifications

Classifications		Annrouals			Cherr	nistry			Mechanical Properties			
AWS A5,20 / AWS A5,36	EN ISO 17632-A	Approvais	С	Mn	Si	S	Р	Al	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -29°C
E71T-8 E71T8-A2-CS3-H16	T 42 3 Y N 2 H15	ABS, BV, DNV, LR, TÜV, DB, CWB	0,18	0,65	0,27	0,004	0,006	0,55	440	570	26	27-35

Innershield® NR®-232-H

- High deposition rates for out-of-position welding
- Penetrating arc
- Fast freezing, easy to remove slag system
- Lower level of diffusible Hydrogen than NR-232

Specifications

Classificat	ions	Annrovala	Chemistry Mechanical Properties									ties
AWS A5,20 / AWS A5,36	EN ISO 17632-A	Approvais	С	Mn	Si	S	Р	Al	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -29°C
E71T-8-H8 E71T8-A2-CS3-H8	T 42 2 Y N 2 H10	CWB	0,18	0,65	0,27	0,004	0,006	0,55	460-520	575-615	25-31	47-75

Innershield[®] NR[®]-305

- 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



Mild steel – flat and horizontal welding capability

Applications

- General plate fabrication
 Structural fabrication,
- including those subject to seismic requirements
- Shipyards, stiffener welding on barges
- Bridges and offshore rigs
- \cdot Welding over tack welds
- made with stick electrode

Specifications			W			NIC					
Classifications			Chen	nistry			Mechanical Properties				
AWS A5,20 / AWS A5,36	C	C Mn Si S P Al						RM	Elongation (%)	Impact ISO-V (J) -29°C	
E70T-6-H16 E70T6-A2-CS3-H16	0,09	0,9	0,2	0,008	0,007	0,80	470	550	24-28	24. 27-40	
							info@		lingtechno		

INNERSHIELD® FOR SPECIAL APPLICATIONS: OFF-SHORE, RAIL, PIPELINE

RAIL TRACK

Innershield® NS-3M

- Versatile welding capability on a variety of base materials
- High operator appeal and good bead appearance
- Easy slag removal
- Fast freezing characteristics help accommodate poor fit-up

Specifications

Classificat	Annrouals		(hemistry		Mechanical Properties				
AWS A5,20 / AWS A5,36	EN ISO 17632-A	Approvais	C	Mn	Si	S	Р	RP0,2	RM	Elongation (%)
E70T-4	T38 Z V N 3	CE, CWB, DB	0,15-0,20	0,61-0,65	0,17-0,21	≤0,03	≤ 0,01	415-450	580-620	25-28

OFFSHORE

Innershield® NR®-440Ni2

- Designed help provide provide optimal weldability in narrow TKY joints and poor fit up conditions
- Expect fast travel speeds and a flat bead face when using vertical-up or vertical-down welding techniques
- Low temperature impact toughness, meets ABS 4YSA and AWS J classification
- Meets H8 diffusible hydrogen requirements over a range of humidity levels

Specifications

Classifications	Approvals			Che	emistry		Mechanical Properties				
AWS 5,29	Ahhinnaiz	C	Mn	Si	Ni	S	Р	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -40°C
E71T8-Ni2-JH8	ABS, DNV, LR	0,01-0,03	0,74-1,12	0,13-0,17	1,77-2,10	0,002-0,004	0,007-0,012	400-485	490-570	22-36	215-460

PIPELINE

Pipeliner[®] NR[®]-208-XP

- Vertical down hot, fill and cap pass welding of up to X80 grade pipe
- Capable of producing weld deposits with impact toughnesss exceeding 122 J at -40°C

Specifications

Classifications			Chemistry	/		Mechanical Properties				
AWS A5,36	C	Mn	Si	S	Р	RP0,2	RM	Elongation (%)	Impact ISO-V (J) -40°C	
E81T8-A4-K12	≤0,02	2,10-2,20	0,12-0,13	< 0,003	0,004-0,007	500-550	575-615	21-28	88-143	



States of C

INNERSHIELD® SELECTION CRITERIA

SELECTION BASED ON MECHANICAL PROPERTIES OF STRUCTURAL STEEL



Innershield® NR®-555 :

EN 10025-4: S460ML, EN 10025-3: S460NL, EN 10025-4: S420ML, EN 10025-3: S420NL. EN 10025-4: S460M, EN 10025-3: S460N, EN 10025-4: S420M, EN 10025-3: S420N

Innershield® NR®-440Ni2:

EN 10025-4: S355ML, EN 10025-3: S355NL, EN 10025-4: S275ML, EN 10025-3: S275NL

Innershield® NR®-233, Innershield® NR®-203Ni, Innershield® NR®-232 & 232-H, Innershield® NR®-305, Innershield® NR®-311Ni:

EN 10025-4: S355M, EN 10025-3: S355N, EN 10025-2: S355J2, EN 10025-2: S355K2, EN 10025-2: S355JR, EN 10025-4: S275M, EN 10025-3: S275N, EN 10025-2: S275J2, EN 10025-2: S235J2

Innershield® NR®-211 MP:

EN 10025-2: S355JR, EN 10025-2: S355J0, EN 10025-2: S275JR, EN 10025-2: S275J0, EN 10025-2: S235JR, EN 10025-2: S235J0

* Suitable for weathering steel according to AWS D1,1 & D1,5

1F PA 2F PB 3F up/down

PF

PG

4F

PD





1G

SELECTION BASED ON WELDING POSITION:

Product Innershield[®] NR[®]-233 Innershield[®] NR[®]-203Ni Innershield[®] NR[®]-440Ni2 Innershield[®] NR[®]-555 Innershield[®] NR[®]-211-MP Innershield® NR®-311Ni* Pipeliner[®] 208-XP Innershield[®] NR -232 & 232-H Innershield[®] NR[®]-305* Innershield® NS-3M

Welding position All except vertical down ALL ALL ALL All except vertical up Flat and horizontal Only vertical down All except vertical down Flat and horizontal Flat and horizontal

* Innershield® for high deposition rate

www.weldingtechnology.co.nz FASTER WELDING ON FIELD WITH INNERSHIELD®

WHICH EQUIPMENT AND ACCESSORIES FOR WELDING WITH INNERSHIELD®?

DIY

Speedtec[®] 180C/200C

- Multiprocess
- Easy to change polarity
- 220A/1phase





OUTDOOR /INDOOR

Flextec[®] 350X

- Easy to setup and easy to operate
- Rugged and flexible enough to be used in most construction, fabrication, shipbuilding and other heavy-duty applications

with LN25X or ACTIV8X - rugged, compact and connected wire feeders:

- CrossLinc Technology allows for remote output control over the welding leads. No control cable needed!
- True Voltage Technology™ (TVT™) automatically compensates for voltage drops across long welding cables.





OUTDOOR

Vantage[®] 410 with LN-25 PRO

- Reliable Engine 4 cylinder 1800 RPM Kubota diesel engine runs smooth and quiet
- Low Noise 97,0dB sound power, one of quietest 400 amps enginedriven welders available



CROSSLINC® TECHNOLOGY

Output Input

GO TO WEB PAGE

CV

CrossLinc technology feeders enable voltage control at the feeder, while eliminating the extra cable. The result helps improve safety greater safety, quality, and productivity on the work site.

YOU ARE HERE	ACROSS-THE-ARC	Pros	Cons
		 Fewer cables Low cost Less jobsite cable clutter 	 No voltage control at feeder Difficult to adjust procedures
	CONTROL CABLE	Pros	Cons
		 Voltage control at feeder Correct procedures for every weld Easier to adjust for voltage drop 	 More cables More jobsite clutter Greater expense More difficult movement
	CROSSLINC®	Pros	Cons
	TECHNOLOGY TECHNOLOGY Ph: 09 274	 Voltage control at feeder Fewer cables Less jobsite clutter Correct procedures for every weld Easy adjustment for voltage drop Increased arc time 	
12		ology.co.nz	
IZ FASTER WELDING UN FIELD WITH INNERSHIE	www.weidingtechno	biogy.co.nz	www.iincolnelectriceurope.com

THE ULTIMATE IN WELDER PROTECTION



Flip'air LS / Zephyr LS

Electronic autodarkening helmets with air flow system.

Cleanspace 2[™]

This unique method of personal respiratory protection delivers significant benefits to workers in industry.





DEDICATED GUNS FOR INNERSHIELD®

Lincoln Electric offers a complete line of guns designed specifically for Innershield[®] process. Unlike MIG guns, Innershield[®] guns do not need to utilize the flow of shielding gas through them to help dissipate heat. Innershield[®] guns are rugged and durable, yet lightweight. Bestesellers among the Innershield[®] guns are the K126TM calssic and K115.

- Rugged
- Durable
- Lightweight
- Easy to handle

K115 & K126 your choice for rugged and durable guns

> **K115** 450A, Ø 2,4 to 3,0



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To connect the Innershield® torch with feeder having EUROconnector, use the adapter code **K10343**

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www.weldingtechnology.co.nz FASTER WELDING ON FIELD WITH INNERSHIELD

K126[®] Classic 350A, Ø 1,6 to 2,4

INDUSTRIAL APPLICATIONS: SOME EXAMPLES

OIL / WATER STORAGE TANKS



For the welding of large tanks, to improve the welder productivity, consider Innershield® over SMAW or GMAW processes.

TO REDUCE WELDING TIME VERSUS SMAW PROCESS, STEEL PILING CAN BE WELDED WITH INNERSHIELD.

Filler metal: Innershield[®] NR[®]-311Ni diam. 2,4 mm Thickness: 30 mm

14

Typical parameters for 2G position welding using Innershield® NR-232 diam. 1,7 mm.

Thickness range: 13-18 mm

Equipment: Flextec 350, feeder LN 25X with crossLinc technology.

Approximate welding parameters for 2G position using mechanization.



Innershield® to improve productivity vs. SMAW



OFF SHORE

INNERSHIELD® NR®-440Ni2

Innershield® NR®-440Ni2 is a best in class electrode primarily for use in the offshore industry on T-Y-K connections and poor fit up conditions.

- Excellent Charpy V-Notch toughness:
 >200 J @-40°C in AWS joint configuration
- CTOD tested up to @-10°C
- Low diffusible hydrogen levels: Meets Agency H5 level (ABS, LRS, DNV)
- Great weldability in all positions: Has both vertical up and vertical down welding capability
- Higher deposition rate than SMAW process



lower cost

using Innershield®

NR 440Ni2 over

stick electrode

<complex-block>

INNERSHIELD® NR®-440Ni2 VS. COMPETITOR'S FCAW-S

PIPELINE

PIPELINER® NR-208-XP

Pipeliner[®] NR-208-XP is the Innershield[®] wire for pipeline welding, it deposits lower hydrogen weld metal in a pipe joint using a downhill progression technique similar to cellulosic pipe welding technique. Ideal for cross-country pipelines.



Mechanical test results (weld metal, as-welded)

Tensile (ASTM E8) All weld metal, 6,35mm (0,250 in) diameter								
	average							
R _{p0,2} (YS _{0,2%})	515MPa							
R _m (UTS)	609MPa							
A ₄ (Elong.)	27%							
Charpy V-Notch (AST	M E23) Mid-wall, 10mm							
-29°C (-20°F)	45J							
CTOD (BS 7448 part 2) NP, SENB Bx2B								
-10°C (+14°F)	0,49mm							



REDUCED ARC TIME, CONTROLLED HEAT INPUT AND LOW HYDROGEN LEVEL CAN HELP TO REALIZE SOUND WELDS AND IMPROVE PRODUCTIVITY

Welding Procedures

Pass1(Root)	1,2 mm Pipeliner® 70S-G (ER70S-G)
	STT process
Pass 2-6	2,0mm Pipeliner[®] NR-208-XP (E81T8-G)
Pass 2 (Hot) Pass 3-5 (Fill) Pass 6 (Cap)	200A, 19,5V DC- 200A, 19,5V DC- 200A, 19,5V DC-
Position	5G Horizontal Fixed
Progression	Vertical-down all passes

Up to 2,0 Kg/h of deposition rate in PG position with Pipeliner[®] 208xp 2,0 mm diameter and higher operating factor than SMAW process.





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How to weld a rail track type "70" (Rm 685 N/mm²)



Alligment and preheat



Rail foot welding using NS-3M diam. 2,0mm



Rail web welding

Recommended filler metal for rail track

Rail track	"70" (Rm 685 N/mm²)	"90" (Rm 885 N/mm²)
Joint	Innershield® NS-3M	Innershield® NS-3M
Surfacing	Innershield® NS-3M	Lincore 33 Wearshield BU

How to weld a rail track type "70" (Rm 685 N/mm²)

In case of rail track type "90" (Rm 885 N/mm²), the last 6mm have to be welded with harfacing filler metal such us Lincore 33 (FCAW-S) or Wearshield BU (SMAW) to grant proper resistance to wearing.

MAINTENANCE WORK, REPARATION, GRATING, FENCE, GALVANIZED GUARDRAIL...

Use Innershield[®] NR[®]-211-MP with Speedtec[®] 180C / 200C very smooth spray arc transfer for easier operation, minimal spatter and easy slag removal.

Welding with NR[®]-211-MP diameter 0,9 mm can be done using normal GMAW torch (LGS 150 G). It is recommended to use the appropriate nozzle for Innershield[®] K10468







EXAMPLES OF MECHANIZED APPLICATIONS

WELDYCAR AND INNERSHIELD®

Effective mechanization can help improve productivity





EXAMPLE OF COST SAVING ACHIEVMENT USING INNERSHIELD® AND MECHANIZATION VERSUS MANUAL WELDING

	APPLICATION						
	BASE MATERIAL: 5275 Thickness: 12 mm Joint type: a5 Fillet Weld in PB (2F)			SMAW BASIC 7018-1	FCAW-S NR-305	EFFICIENCY	
		Welding moda	ality	manual	mechanized		
	DDOCECC	Current	Amperage	140-180	320-330		
	PROLESS	Diameter	[mm]	4,0	1,7		
		Deposition rate	[kg/h]	1,7	4,6 🔾	RAIE	
		COST CALCULAT	ION FCAW-SS	/S MMA		V C E	
	and the second se	Wire	[€/kg]	3	15,00	×2,5	
Fold		Efficiency	[%]	0,65	0,80 🔘		
	WELDING COST	Weight per meter weld	[kg/m]	0,23	0,23		
marthe ())		Cost per meter weld	[€/m]	1,1	4,3		
(and the second		Total cost	[€/kg]	5	19		
		Labour cost	[€/h]	40	40	-23€/m	
	2	Operating factor	[%]	18	60	:	
	PRODUCTION	Weight per meter weld	[kg/m]	0,23	0,23		
		Time per meter weld	[h/m]	0,75	0,08		
		Cost per meter weld	[€/m]	31	8 🔿	••••••	

Innershield[®] NR305 for high deposition rate in flat welding position

Diameter, Polarity	CTWD (mm)	Wire Feed Speed (m/min)	Voltage (V)	Approx. Current (A)	Deposition rate (kg/h)
2,0 mm, DC+	35-51	4,4	20-22	300	4,0
		5,6	21-23	330	5,0
		6,6	22-24	360	5,9
		7,6	24-26	375	6,9
		8,3	25-27	400	7,4
2,4 mm, DC+		4,1	21-23	330	5,0
	41-54	6,1	24-26	425	7,6
		7,6	27-29	475	9,5
		10,2	33-35	525	12,7





Want to learn more? The second second

Ph: **09 274 1246** nfo@weldingtechnology.co.nz www.weldingtechnology.co.nz



On overall it is important that Innershield[®] wires are welded following appropriate guidelines, for this reason please consult our brochure "Innershield[®] wire: FCAW-s welding guide" or ask directly





SUDDING TECHNOLOGY



Ph: 09 274 1246 info@weldingtechnology.co.nz www.weldingtechnology.co.nz faster welding on field with INNERSHIELD®

BEING PRESENT LOCALLY MAKES US MORE AWARE GLOBALLY



TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending

CUSTOMER ASSISTANCE POLICY

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on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

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