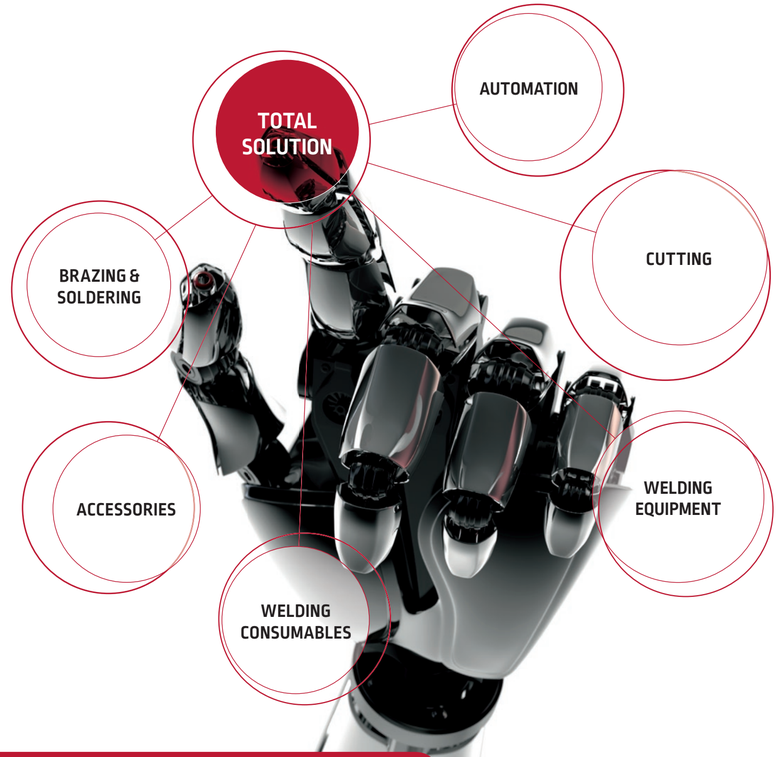
SPECIAL ALLOYS™

TOTAL WELDING SOLUTIONS FOR THE LNG INDUSTRY

www.lincolnelectric.eu

LINCOLN® ELECTRIC
THE WELDING EXPERTS®



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BEING PRESENT LOCALLY
MAKES US MORE AWARE GLOBALLY

Benefit from the Market Leader

SPECIAL ALLOYS™

120 YEARS OF EXPERIENCE

NUMBER ONE IN WELDING

325 R&D ENGINEERS WORLDWIDE

42 SOLUTION CENTERS

11 000 EMPLOYEES WORLDWIDE

2.7 BILLION USD REVENUE

160 ACTIVE IN 160 COUNTRIES WORLDWIDE

LOCATIONS

- Global Headquarters
- Solution Centers

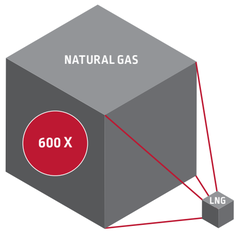
LNG
LIQUEFIED NATURAL GAS

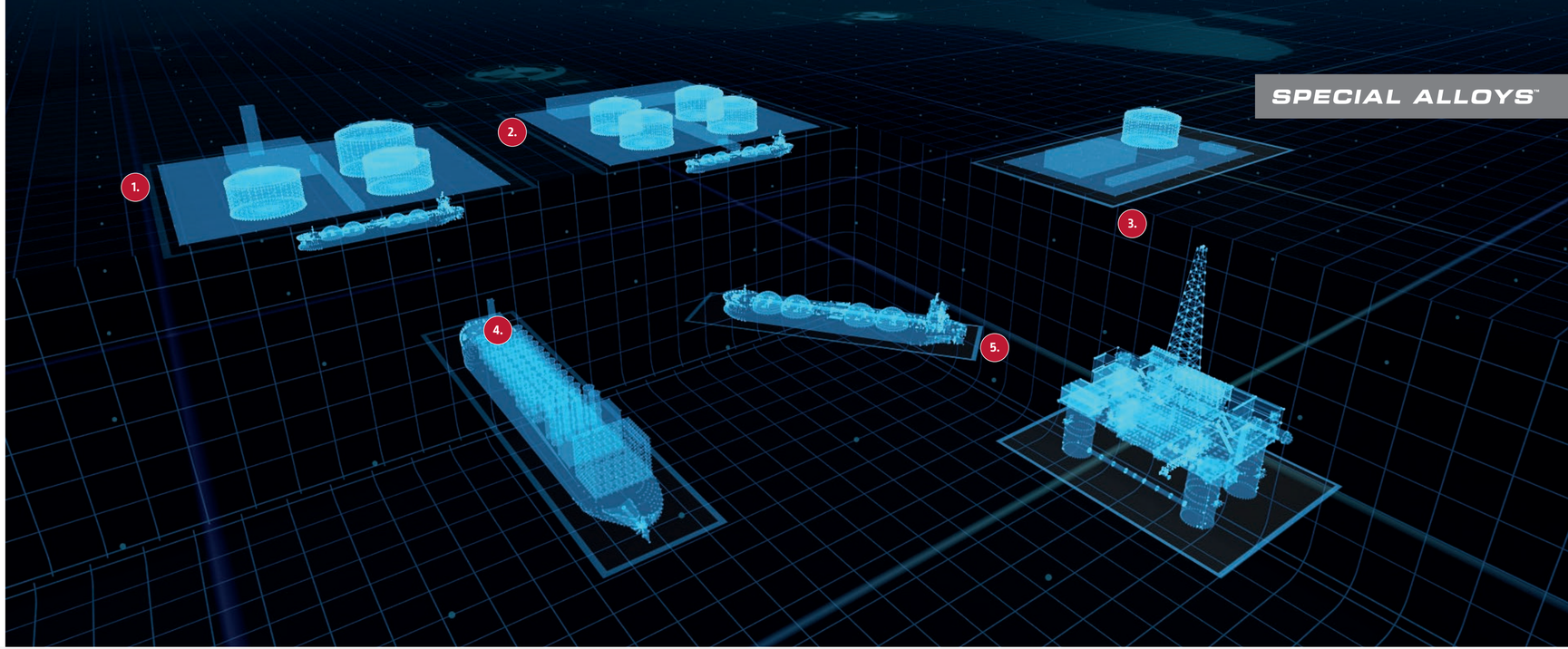
Natural gas mainly in the form of Methane, after being extracted from gas fields , will be processed in a gas processing plant where it's impurities such as CO_2, Water & Sulfur will be removed. Now it is time to transport the gas to the end users for distribution.
Eventually, either a gas pipeline will be used or Natural gas gets liquefied at cryogenic temperature of -265°F (-160°C).
When natural gas is turned into LNG, its volume shrinks by a factor of 600. This reduction in volume enables the gas to be transported economically over long distances.

FIVE DIFFERENT TYPES OF LNG FACILITIES

1. LNG Export Terminal (Liquefaction)
2. LNG Import Terminal (Regasification)
3. LNG Peak-shaving
4. Floating LNG (FLNG)
5. LNG Carriers

Lincoln Electric offers Total Welding Solution for all parts of the LNG value chain. Storage Tanks, Cryogenic Piping, Carriers and Heat Exchanger.





1.

LNG EXPORT TERMINAL (LIQUEFACTION)

Refrigeration process is the core of an LNG plant in which natural gas is cooled and liquefied to −160°C or less using the principle of refrigeration. Because gas is cooled and liquefied to an extremely-low temperature during the process, an enormous amount of energy is consumed. How much this energy can be reduced is important, so various ingenious processes are used. Such as C3-MR, AP-X, Cascade, DMR & SMR. The refrigeration process happens in multiple steps and requires various Heat Exchanger types and Compressor systems.

2.

LNG IMPORT TERMINAL (REGASIFICATION)

LNG will be shipped to destination port. In order to be used as Natural gas again it has to get vaporized (Re-gasified). There are various Heat Exchangers (vaporizers) used to vaporize the LNG. Depending on the vaporizer type, Seawater, Ambient Air, Propane or Burnt LNG is used to vaporize the LNG. We have specialized welding solutions for fabrication of Re-gasification plant components.

3.

LNG PEAK-SHAVING

LNG as fuel has seasonality, in some export terminals there is a peak shaving facility to store the LNG for most of the year and export it at the most demanding season of the year.

4.

FLOATING LNG (FLNG)

Floating LNG is a floating Offshore unit which has the capability of Liquefaction or Regasification of Natural gas right at the Offshore topside. LNG FPSO refers to LNG Floating Production Storage and Offloading Unit which does the gas processing and Liquefaction.

Floating LNG can also be Regasification units. Instead of investing in fix regasification terminals, a floating unit can travel to the end destination to re-gasify the LNG. It is called FSRU referring to Floating Storage & Regasification Unit.

5.

LNG CARRIERS

In order to transport LNG from liquefaction or Peak shaving terminal to an end user location, LNG carriers are needed. There are also ships which sail with LNG as fuel. All such carriers require special materials, insulation and welding solutions. We offer Total welding solutions for all LNG carrier types.

MAIN APPLICATIONS
AND BASE MATERIALS

STORAGE TANKS

1.

- 9% Nickel
- C-Mn steel
- Al 5083
- Piping: 304L

CRYOGENIC HEAT EXCHANGER

2.

- Al 5083
- Al 6063
- 304L
- 316L

CRYOGENIC PIPING

3.

- 304L
- 316L

LNG CARRIER

4.

- 5% Nickel
- 9% Nickel
- Al 5083
- 304L
- FeNi36 (Invar) alloy

LNG PROJECT

A LNG project can take more than 6 years to build from the Final Investment Decision (FID). Due to complexity of construction and high level of safety control, construction of storage tanks alone can take up to 3 years.

Welding is a small but key element in execution of LNG projects. Quality consumables along with mechanized welding solutions minimize the risks.

LNG STORAGE TANKS
& CONTAINMENT TYPES

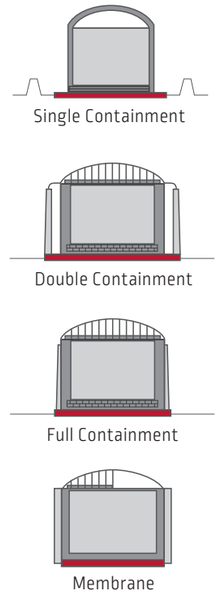
SPECIAL ALLOYS™

LNG storage tanks are highly critical components of LNG industry. Storage tanks can be categorized from different aspects.

- Fix or on carrier tanks
- Containment Type
- Above Ground, In-Ground types & Under-Ground

FIXED STORAGE TANKS CAN NORMALLY BE DESIGNED USING ONE OF FOUR CONTAINMENT TYPES

- Single Containment
- Double Containment
- Full Containment
- Membrane Type



DESIGN
ASPECTS

The balance between the required land, construction, cost and local legislation defines the containment type. Various design codes govern the construction of LNG tanks.

- ASME BPVC Sec. VIII, Div. 1
- ASME BPVC Sec. VIII Div. 2
- API 620
- NFPA 59A
- API 660
- BS EN 14620-1:
- JIS B8265:
- JIS B8267

Liquefaction temperature for some types of gas and its suitable material for transport or storage

9% NICKEL IS THE MAIN GRADE USED FOR FABRICATION OF LNG INNER TANKS CONSIDERING THE VERY LOW OPERATING TEMPERATURE

Table 1) Boiling temperature of cryogenic gases vs materials for liquid storage

Steel grade	Boiling temp. (°C)	Gas
Fine grained steel	-28	CO2 (to 1.5)
1% Ni steel	-42	Propane
2.5% Ni steel	-78	CO2 (solid)
	-84	Acetylene
	-88	Ethane
3.5% Ni steel	-104	Ethylene
5% Ni steel	-153	Krypton
9% Ni steel	-161	Methane
Aluminium	-183	Oxygen
	-186	Argon
	-196	Nitrogen
	-253	Hydrogen
	-269	Helium

Table 2) Typical properties of 9% Nickel steel plates

Item	ASTM	
	A353	A553 Type I
Yield strength 0.2% Proof stress (MPa)	≥515	≥585
Tensile strength (MPa)	690-825	
Elongation (%), t:Thick (mm)	≥20.0	
Charpy (J) at -196°C	≥34	
Lateral expansion*3 (mm) at -196°C	≥0.38	
Thickness (mm)	50	50
Heat treatment	Normalized/T	QT
C (%)	≤0.13	
Si (%)	0.15-0.40	
Mn (%)	≤0.90	
P (%)	≤0.035	
S (%)	≤0.035	
Ni (%)	8.50-9.50	

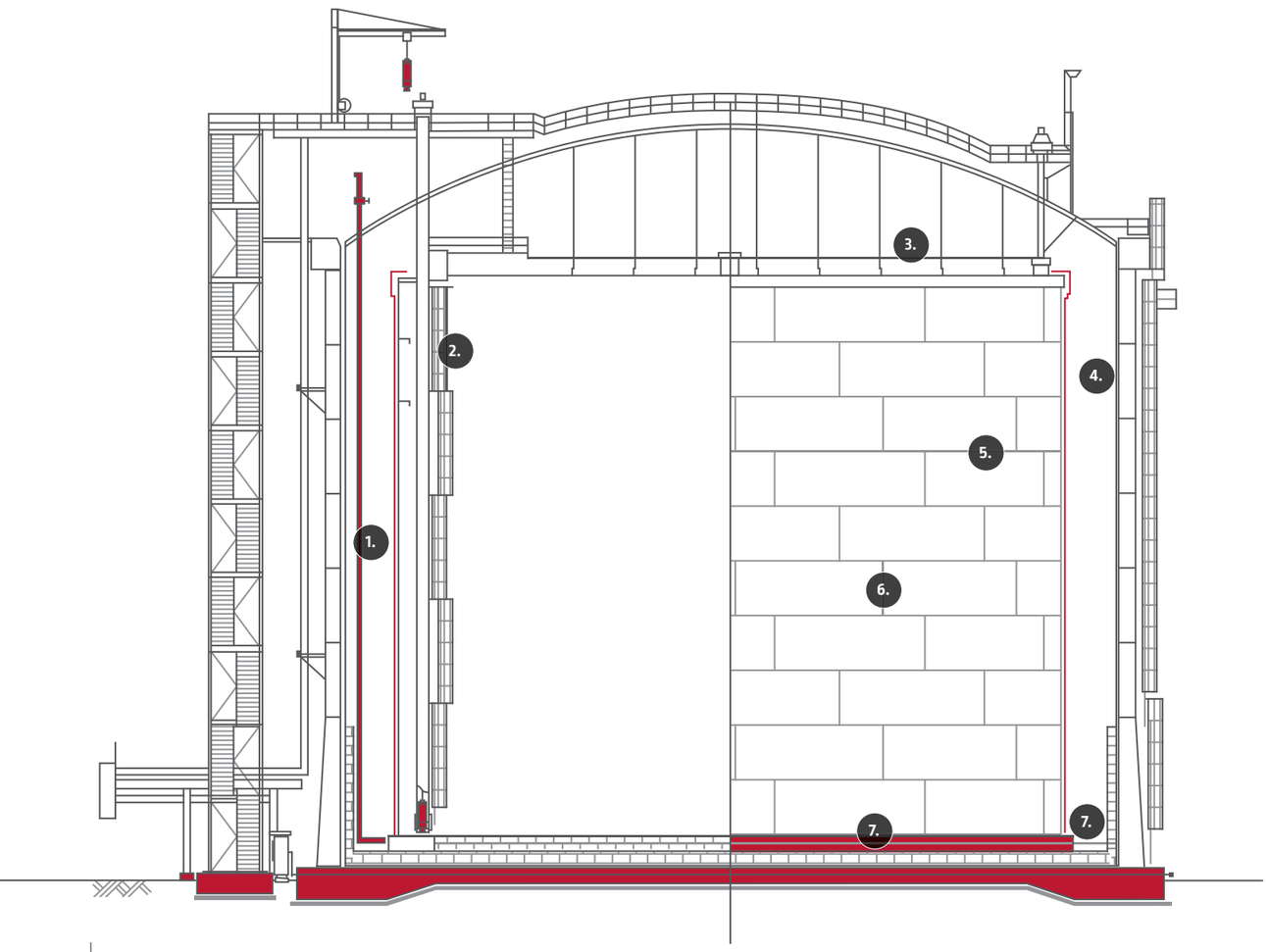
FULL CONTAINMENT
LNG TANK

Full containment has become the most commonly built LNG tank type due to its safety and economical value.

The inner tank is made of 9% Nickel steel and the outer tank is made of Pre-stressed concrete (PC). Between the inner and outer tank there is a vapor barrier made of thin carbon steel plate and many different types of insulations.

The roof can be made of concrete or 9% Nickel material depending on the design. There is an Aluminium suspended deck hanging from the roof. You can view the complete LNG tank fabrication sequence in our LEAD application.

Please find more information according to our new APP on page 18



1. VAPOR BARRIER

It is made of carbon steel and is normally of a very low thickness. This is a protective layer between the inner tank insulation and concrete. Having a very low thickness the best method to weld this application will be cored wire to avoid unnecessary distortion.

2. INTERNAL PIPING

Liquefied gas is transferred to and from the tank via stainless steel piping. The piping requires special consumables to guarantee the required toughness / lateral expansion.

3. SUSPENDED DECK

Carbon or stainless steel rods are attached from deck stiffeners to the roof girders or rafters. The suspended decks require a deck annular plate to provide a vapor seal between the liquid product and the vapor space above the primary containment. The deck is made of Aluminium alloy 5083.

4. INNER TANK KNUCKLE JOINTS

Top stiffener joints require welding in 4F/4G position. To that end we have developed Nyloid 4 electrode to be able to weld in overhead position. The electrode has special slag design ensuring stable arc and providing sound weld metal.

5. INNER TANK HORIZONTAL JOINTS

Each two 9% Nickel plates are welded in the vertical up position. Welding can be performed simultaneously from both sides or one followed by another. Typically alloy 276 is used for this application.

6. INNER TANK VERTICAL JOINTS

9% Nickel vertical joints are welded in vertical up. For this reason either SMAW electrode is applied manually or FCW for semi-automatic and fully automatic welding.

7. INNER TANK BOTTOM

The bottom plates corners are normally welded in the 2G welding position. In most of the designs a horizontal 2G joint is used. Normally bottom plates are pre-joined in workshop using the SAW process and then will be welded together with FCAW or SMAW on the jobsite.

SPECIAL ALLOYS™

SMAW:
- Conarc 51
- Conarc 49C

FCAW:
- Outershield MC460VD-H

SMAW:
- Ultramet 308LCF
- Ultramet 316LCF

FCAW:
- Supercore 308LCF
- Supercore 316LCF

GTAW:
- ER308LCF
- ER316LCF

SAW:
- ER308LCF + P2007
- ER316LCF + P2007

GTAW:
- Superglaze 5183

GMAW:
- Superglaze 5183

SMAW:
- Nyloid 4

SAW:
- LNS NiCroMo 60/16 + P2007
- LNS NiCro 60/20 + P2007
- Techalloy 276 + P2007
- Techalloy 625 + P2007

SMAW:
- Nyloid 2
- NIMROD 625KS

FCAW:
- Supercore 625P

SMAW:
- Nyloid 2
- NIMROD 625KS

FCAW:
- Supercore 625P

SAW:
- LNS NiCroMo 60/16 + P2007
- LNS NiCro 60/20 + P2007

INNER TANK
HORIZONTAL JOINTS

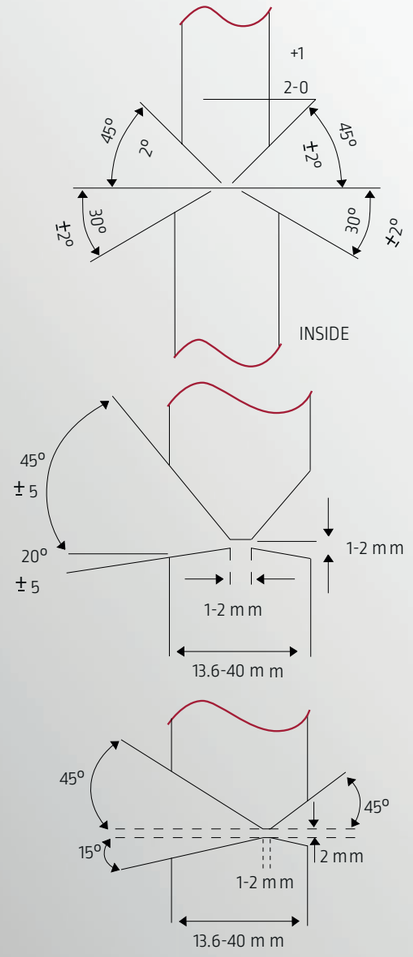
Welding of horizontal joints in the 2G welding position is one of the most critical steps of LNG tank fabrication. Lincoln electric offers a full product portfolio of consumables and equipment as well as the automation package.

A 200,000m³ LNG TANK CAN HAVE AN INNER TANK WITH 10 SHELL COURSES.

- Welding Sequence
  - > Single sided
  - > Double sided
- Joint Symmetry
  - > Compound ½ - ½
  - > Compound ⅓ - ⅔
- Joint Opening
  - > With Opening
  - > W/O Opening

SAW is the dominant process for welding of Horizontal joints. It offers the highest productivity. It is key to keep the balance among penetration, dilution and deposition rate.

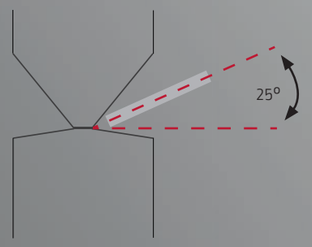
Figure 1) Various joints design for 2G SAW



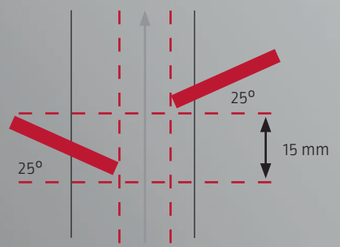
THERE ARE GENERALLY TWO METHODS OF SAW WELDING OF 2G JOINTS:

- Single-sided: Whether it is a single V joint or a compound joint, welding will be finished on one side and then welding on the opposite side will be started.
- Double-sided welding: Will be performed on compound joint, which has currently become a standard joint design for thicknesses above 11mm

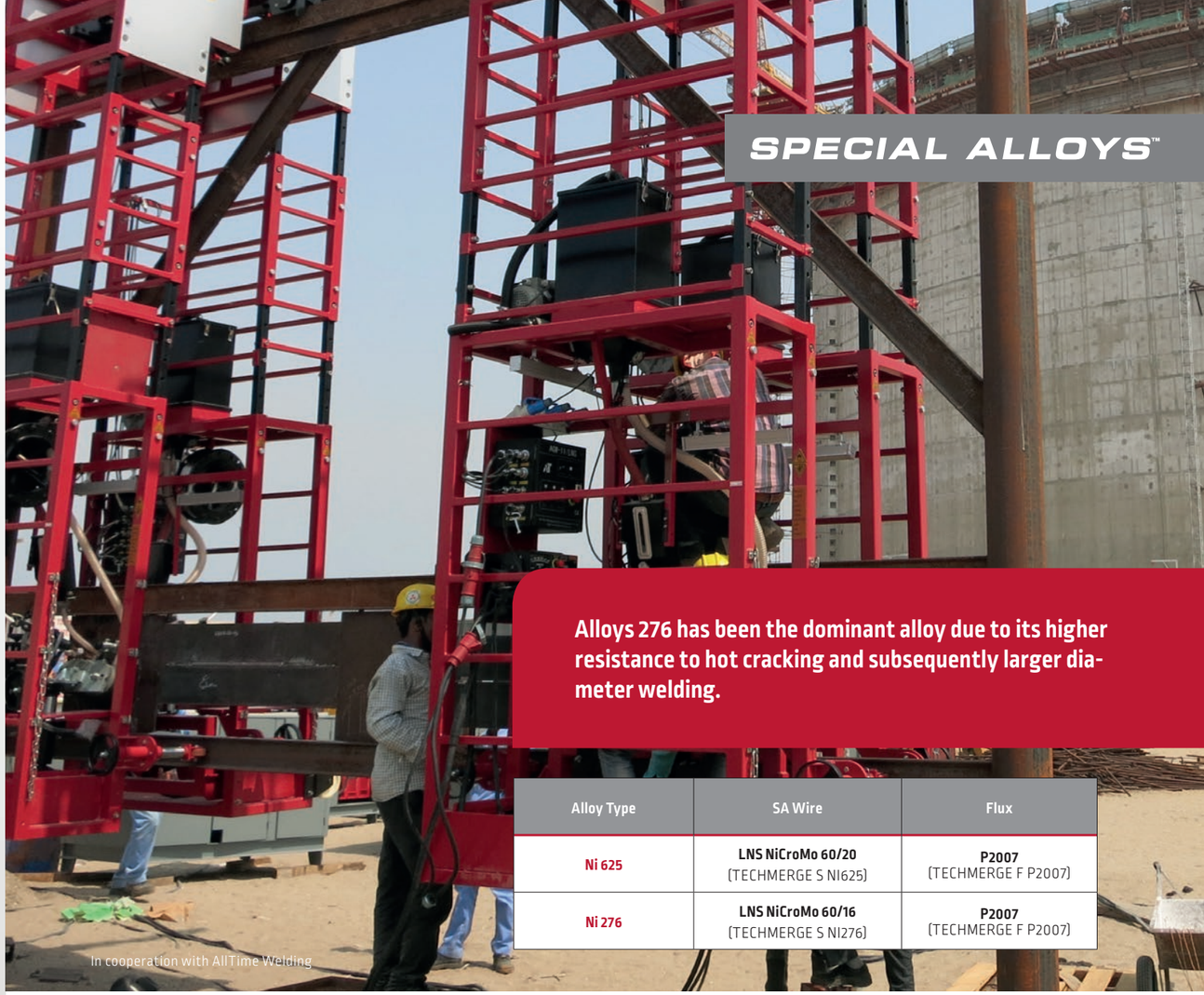
Figure 2) Torch positioning for 2G double sided SAW



Torch Angle - Front view



Torch Angle - Top view



Alloys 276 has been the dominant alloy due to its higher resistance to hot cracking and subsequently larger diameter welding.

Alloy Type	SA Wire	Flux
Ni 625	**LNS NiCroMo 60/20** (TECHMERGE S NI625)	**P2007** (TECHMERGE F P2007)
Ni 276	**LNS NiCroMo 60/16** (TECHMERGE S NI276)	**P2007** (TECHMERGE F P2007)

With the help of PowerWave® and Waveform Control Technology we can achieve a balance among penetration, mechanical properties, heat input and productivity.

We have conducted numerous trials and been able to design a special Waveform for Nickel base alloys applied for double sided SAW horizontal welding.

Table 3) Effect of AC/DC balance on welding parameters and heat input of double sided 2G welding

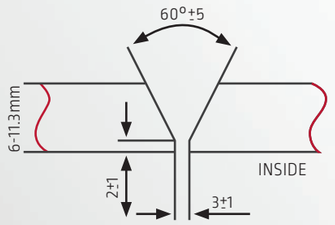
Arc	Pass	Voltage	Current	WFS (IPM) (cm)	Wave Balance	DC Offset	Frequency	Phase Angle	Travel Speed (IPM) (cm/min)	Deposition Lb/Hr (Kg/Hr)	Head Input kJ/in (kJ/mm)
Side 1	Root	26	290-310	100 (254)	60	0	80		13 (33)	12.6 (5.7)	36 (1.4)
Side 2	Root	27	290-310	100 (254)	60	15	80	180	13 (33)	12.6 (5.7)	37.4 (1.5)
Side 1	2	29	300-320	105 (267)	60	10	80		20 (51)	13.25 (6)	26.8 (1.05)
Side 2	2	29	300-320	105 (267)	60	10	80	180	20 (51)	13.25 (6)	26.8 (1.05)
Side 1	3	29	300-320	105 (267)	60	10	80		20 (51)	13.25 (6)	26.8 (1.05)
Side 2	3	29	300-320	105 (267)	60	10	80	180	20 (51)	13.25 (6)	26.8 (1.05)
Side 1	4	29	300-320	105 (267)	60	10	80		24 (61)	13.25 (6)	23.5 (925)
Side 2	4	29	300-320	105 (267)	60	10	80	180	24 (61)	13.25 (6)	23.5 (925)
Side 1	5	29	300-320	105 (267)	60	10	80		24 (61)	13.25 (6)	23.5 (925)
Side 2	5	29	300-320	105 (267)	60	10	80	180	24 (61)	13.25 (6)	23.5 (925)
Side 1	6	29	300-320	105 (267)	60	10	80		24 (61)	13.25 (6)	23.5 (925)
Side 2	6	29	300-320	105 (267)	60	10	80	180	24 (61)	13.25 (6)	23.5 (925)

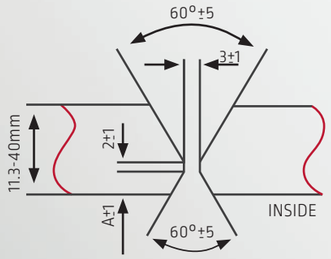
INNER TANK
VERTICAL JOINTS

FOR VERTICAL JOINTS SMAW AND FCAW ARE THE DOMINANT PROCESSES.

For manual process Nyloid 2 has been used for decades in many projects worldwide as the electrode of choice and Supercore 625P FCW is proven to offer the best combination of excellent weldability and mechanical properties.

Nyloid 2 has been applied for decades in numerous LNG projects. Its extra high metal recovery revolutionized the manual welding of the vertical joint.





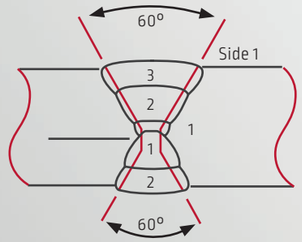


Table 4) All weld metal mechanical properties of Supercore 625P
(weld type: as per AWS A5.34; shielding gas: M21; Test condition: As-welded)

Welding position	Tensile properties					Impact toughness -196°C		Fracture toughness -170°C
	Rp0.2, MPa	Rm, MPa	A4, %	A5, %	Z, %	CVN, J	LE, mm	CTOD, mm
PA-1G	500	770	44	43	41	70	1.20	-
PF-3G	500	760	46	43	42	86	1.44	0.50

Table 5) 9%Ni steel joint procedure test data of Supercore 625P
(shielding gas: M21; Test condition: As-welded)

Welding position	Method	Thickness mm	Joint type[1]	Cross-weld tensile	Bend test			Charpy impact test -196°C		
				MPa	T-V[2]	L-face[3]	L-root[3]	Location	CNV, J	LE, mm
PF-3G	Semi-Auto	13	60° D-V (2/3, 1/3)	750	pass	pass	pass	Mid-T	89	1.22
PF-3G	Semi-Auto	20	60° D-V (1/2, 1/2)	739	pass	pass	pass	Mid-T	75	1.05
PF-3G	Full mech.	25	60° D-V (2/3, 1/3)	715	pass	pass	pass	Mid-T	86 72	1.6 0.9
PF-3G	Semi-Auto	13	45°+15° (2/3, 1/3)	742	pass	pass	pass	Mid-T	91	0.79

Note : [1] D-V=double V; [2] T=transverse; [3] L=Longitudinal

SPECIAL ALLOYS™

Supercore 625P is now the reference FCW that combines excellent weldability and mechanical properties.

Process	Classification	Product Name
SMAW	A5.11: ENiCrMo-3	**NIMROD 625KS** (TECHTRODE NI625KS
SMAW	A5.11: ENiCrMo-6	**Nyloid 2** (TECHTRODE NI620)
FCAW	A5.34: ENiCrMo3T1-4	**Supercore 625P** (TECHCORE NI625P)

In cooperation with AllTime Welding

CRYOGENIC PIPING
STAINLESS STEEL

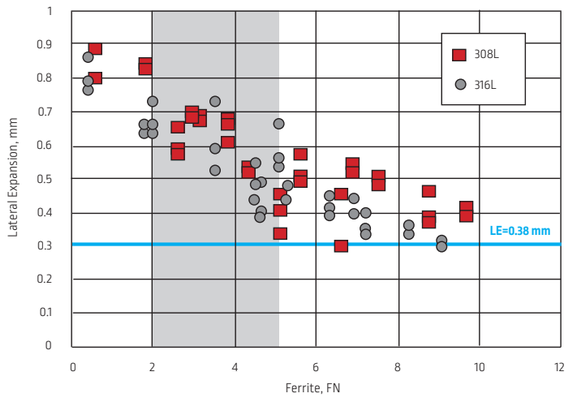
FERRITE CONTROL
Base materials are carefully processed. Weld metals are as-cast and do not necessarily achieve the required toughness.

HOW TO ACHIEVE WELD METAL IMPACT PROPERTIES?
- Solution annealing
- Fully austenitic consumables
- Gas shielded processes
- Specially designed **Controlled Ferrite** consumables

VARIOUS STANDARDS HAVE FERRITE LIMITS FOR STAINLESS STEELS, FOR EXAMPLE:
ASME III requires 5FN minimum; 3-10FN for service above 427°C. API 582 has 3FN minimum, it is noted that for cryogenic service lower FN may be required.

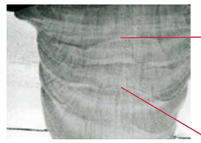
It is proven that a narrow controlled Ferrite between 2-5FN guarantees the required mechanical properties under cryogenic conditions. Our LCF consumables have been welded in LNG projects for the last 3 decades.

308L & 316L welds: ferrite control range



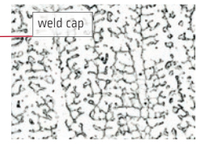
Figures 3) Effect of FN on lateral expansion for Austentic grades

Supercore 308LCF



Predicted ferrite WRC = 4FN

5FN measured



4FN measured

HEAT
EXCHANGER

Various heat exchanger are used in LNG facilities

Heat exchangers in LNG industry play a huge role. The entire refrigeration or re-gasification process relies on multi step exchange of heat.

C-Mn and stainless steel or Aluminium alloys are applied. Aluminum alloys of 6XXX and 5XXX are most commonly used grades. Our Superglaze products have a long presence in LNG applications

LIQUEFACTION:
- Main Cryogenic Heat Exchanger (MCHE)
- Spiral Wound Heat Exchanger (SWHE)
- Plate-Fin Heat Exchanger (PFHE)

REGASIFICATION:
- Vaporizers
- Boil-off gas Re-condenser

LNG
CARRIERS

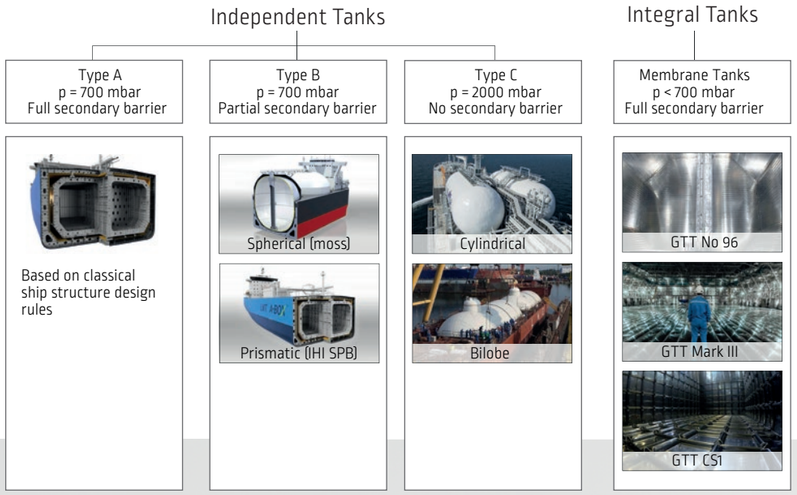
SPECIAL ALLOYS™

LNG CARRIER HAVE DIFFERENT STORAGE TANK DESIGNS:
- Integral (Dependent)
- Independent

Integral tanks are built inside the carrier hull. The base material is carbon steel covered by Insulation and on top of the insulation there is membrane cladding with stainless steel or Invar (36% Nickel) straps.

INDEPENDENT TANKS ARE
- Type ‚A' (fully refrigerated)
- Type ‚B' (typical LNG tank)
- Type ‚C' (fully pressurized)

Depending on the design of the independent tank different materials such as Aluminium Alloy, Austenitic stainless, 5% & 9% Nickel material is utilized



ALUMINIUM
WELDING

Let us put our experience to work for you

FULLY INTEGRATED ALUMINIUM MIG WIRE FACILITY
As a major supplier of welding wire, Lincoln Electric is the leader in GMAW wire manufacturing technology. We carry that same technology and expertise to our Aluminium GMAW wire manufacturing. Lincoln Electric has the only fully integrated Aluminum GMAW wire facility in the world. We start from raw primary aluminum and then use state-of-the-art equipment to produce a complete range of aluminum alloys including 1100, 1070, 2319, 4043, 4047, 5087, 5183, 5356, 5554 and 5556. This gives us full control of welding chemistry throughout the process as well as the ability to always deliver product to our customer, regardless of market conditions.

DOWNLOAD
LEAD (APP)

Download our **L**incoln **E**lectric **A**pplication **D**ata center (LEAD for short) and find out more information about numerous Industry applications and consumables

In cooperation with AllTime Welding

VERTICAL JOINTS

HORIZONTAL JOINTS

PLASMA GOUGING

SPECIAL ALLOYS™

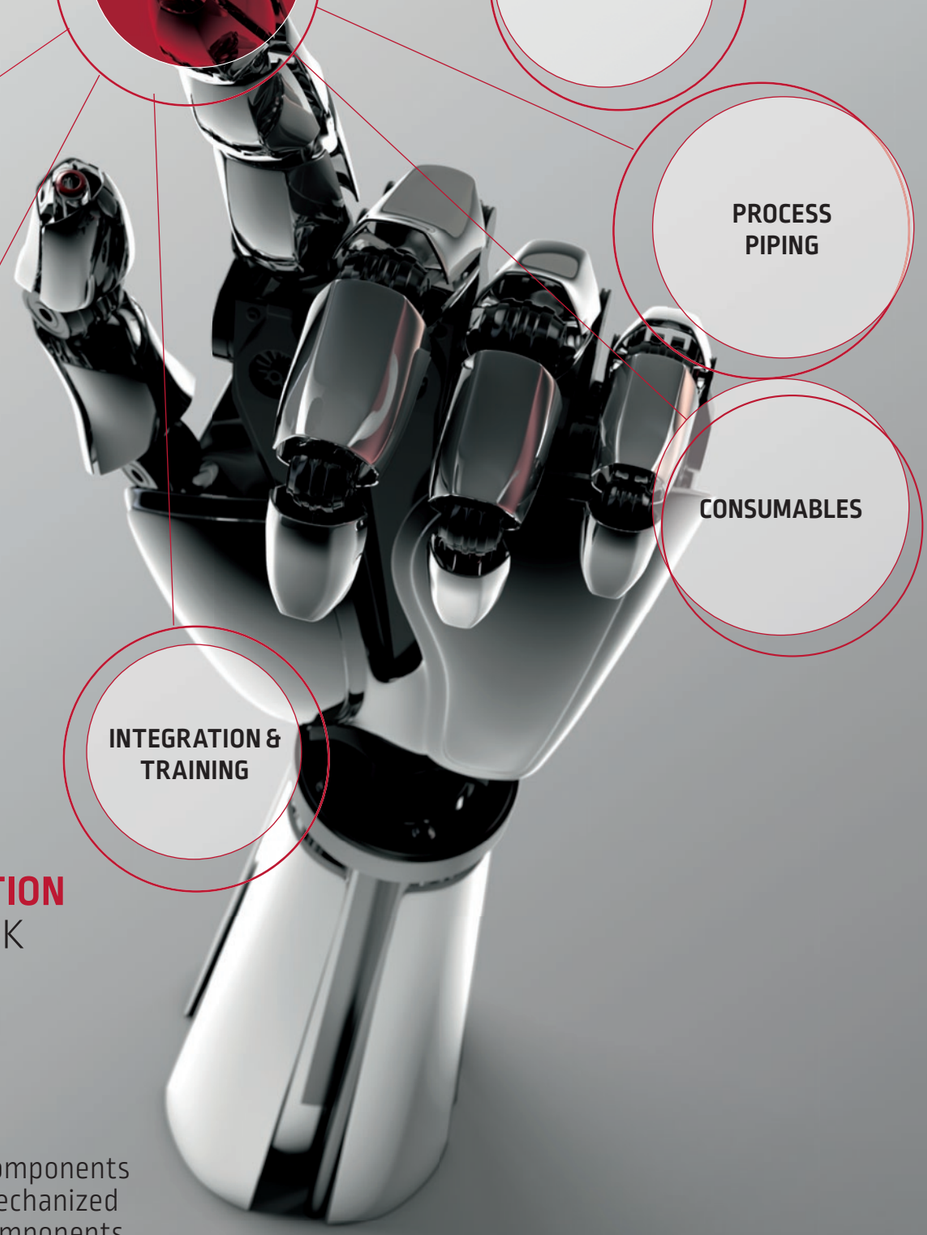
MECHANIZED SOLUTIONS

GRINDING

PROCESS PIPING

CONSUMABLES

INTEGRATION & TRAINING



TOTAL SOLUTION
FOR LNG TANK AND PIPING FABRICATION

We can offer all components for manual and mechanized welding of LNG components.

UNALLOYED STEELS // MILD STEEL CONSUMABLES

Alloy Type	Welding Process	Product Name and Specification		
		Product Name	AWS	BS / EN / ISO
C-Mn	SMAW	**CONARC 49C**	A5.1: E7018-1-H4R	BS EN ISO 2560-A: E 46 4 B 32 H5
		CONARC 51	A5.1: E7016-1-H4R	BS EN ISO 2560-A: E 42 4 B 12 H5
	GMAW	**SUPRAMIG ULTRA**	A5.18: ER70S-6	BS EN ISO 14341-A: G50 5 M21 4Si1/G46 3 C1 4Si1
	GTAW	**LNT 25**	A5.18: ER70S-3	BS EN ISO 636: W 42 5 W2Si
		LNT 26	A5.18: ER70S-6	BS EN ISO 636: W 42 5 W3Si1
	MCAW	**OUTERSHIELD MC460VD-H**	A5.18: E70C-6M H4	BS EN ISO 17632-A: T 46 2 M M 1 H5
	SAW (780)	**L-61**	A5.17: EM12K	BS EN ISO 14171-A: S2Si
	SAW (P230)	**L-50M**	A5.17: EH12K	BS EN ISO 14171-A: S3Si

STAINLESS STEEL // CRYOGENIC STAINLESS STEEL CONSUMABLES

Alloy Type	Welding Process	Product Name and Specification		
		Product Name	AWS	BS / EN / ISO
Cryogenic 308L	SMAW	**ULTRAMET 308LCF** (TECHTRODE 308LCF)	A5.4: E308L-16	BS EN ISO 3581-A: E 19 9 L R 3 2
		ULTRAMET B308LCF (TECHTRODE 308LBCF)	A5.4: E308L-15	BS EN ISO 3581-A: E 19 9 L B 4 2
	GTAW	**ER308LCF** (TECHTIG 308LCF)	A5.9: ER308L	BS EN ISO 14343-A: W 19 9 L
	FCAW	**SUPERCORE308LCF** (TECHCORE 308LCF)	A5.22: ER308LT1-1/4J	BS EN ISO 17633-A: T 19 9 L P C/M 2
	SAW (P2007)	**ER308LCF** (TECHMERGE S 308LCF)	A5.9: ER308L	BS EN ISO 14343-A: S 19 9 L
Cryogenic 316L	SMAW	**ULTRAMET 316LCF** (TECHTRODE 316LCF)	A5.9: ER308L	–
		ULTRAMET B316LCF (TECHTRODE 316LBCF)	A5.4: E316L-15	–
	GTAW	**ER316LCF** (TECHTIG 316LCF)	A5.9: ER316L	BS EN ISO 14343-A: W 19 12 3 L
	FCAW	**SUPERCORE316LCF** (TECHCORE 316LCF)	A5.22: ER316LT1-1/4J	BS EN ISO 17633-B: TS 316 L FM1
	SAW (P2007)	**ER316LCF** (TECHMERGE S 316LCF)	A5.9: ER316L	BS EN ISO 14343-A: S 19 12 3 L

NICKEL BASE ALLOYS // ALLOY C & B CONSUMABLES

Alloy Type	Welding Process	Product Name and Specification		
		Product Name	AWS	BS / EN / ISO
59	SMAW	**NIMROD 59KS** (TECHTRODE NI59KS)	A5.11: ENiCrMo-13	BS EN ISO 14172: E Ni 6059
	GMAW	**HAS 59** (TECHFIL NI59)	A5.14: ERNiCrMo-13	BS EN ISO 18274: S Ni 6059
	GTAW	**HAS 59** (TECHTIG NI59)	A5.14: ERNiCrMo-13	BS EN ISO 18274: S Ni 6059
C276	SMAW	**NIMROD C276KS** (TECHTRODE NI276KS)	A5.11: ENiCrMo-4	BS EN ISO 14172: E Ni 6276
		TECH-ROD 276	A5.11: ENiCrMo-4	–
	GMAW	**HAS C276** (TECHFIL NI276)	A5.14: ERNiCrMo-4	BS EN ISO 18274: S Ni 6276
		TECHALLOY 276	A5.14: ERNiCrMo-4	–
	GTAW	**HAS C276** (TECHTIG NI276)	A5.14: ERNiCrMo-4	BS EN ISO 18274: S Ni 6276
		TECHALLOY 276	A5.14: ERNiCrMo-4	–
	SAW (P2007)	**LNS NiCroMo 60/16** (TECHMERGE S NI276)	A5.14: ERNiCrMo-4	BS EN ISO 18274: S Ni 6276 (NiCr15Mo16Fe6W4)
	SAW	**TECHALLOY 276**	A5.14: ERNiCrMo-4	–

NICKEL BASE ALLOYS // 625 ALLOY CONSUMABLES

Alloy Type	Welding Process	Product Name and Specification		
		Product Name	AWS	BS / EN / ISO
625	SMAW	**NIMROD 625KS** (TECHTRODE NI625KS)	A5.11: ENiCrMo-3	BS EN ISO 14172: ENi 6625
		TECH-ROD 112	A5.11: ENiCrMo-3	
	GMAW	**62-50** (TECHFIL NI625)	A5.14: ERNiCrMo-3	BS EN ISO 18274: SNi 6625
		TECHALLOY 625	A5.14: ERNiCrMo-3	
	GTAW	**62-50** (TECHTIG NI625)	A5.14: ERNiCrMo-3	BS EN ISO 18274: SNi 6625
		TECHALLOY 625	A5.14: ERNiCrMo-3	
	FCAW	**SUPERCORE 625P** (TECHCORE NI625P)	A5.34: ENiCrMo3T1-1/4	BS EN ISO 12153: T Ni 6625 P C/M 2
	SAW (2007)	**LNS NiCro60/20** (TECHMERGE S NI625)	A5.14: ERNiCrMo-3	BS EN ISO 18274: SNi 6625
	SAW (2007)	**TECHALLOY 625**	A5.14: ERNiCrMo-3	

NICKEL BASE ALLOYS // SPECIALLIST NICKEL BASE ALLOY CONSUMABLES

Alloy Type	Welding Process	Product Name and Specification		
		Product Name	AWS	BS / EN / ISO
NiCrMo-6	SMAW	**NYLOID 2** (TECHTRODE NI620)	A5.11: ENiCrMo-6	BS EN ISO 14172 : E Ni 6620
		NYLOID 4 (TECHTRODE NI620A)	A5.11: ENiCrMo-6	BS EN ISO 14172 : E Ni 6620

ALUMINIUM ALLOYS

Alloy Type	Welding Process	Product Name and Specification		
		Product Name	AWS	BS / EN / ISO
Al 5183	GMAW	**SUPERGLAZE 5183**	AWS A5.10 : ER5183	–
	GTAW	**SUPERGLAZE 5183**	AWS A5.10 : ER5183	–

FLUX FOR SUBMERGED ARC WELDING

Flux Type	Wire	Specification	Basicity Index	Polarity
780	L-61	BS EN ISO 14174: S A AR/AB 1 78 AC H5	0,7	DC/AC
P230	L-50M	BS EN ISO 14174: S A AB 1 67 AC H5	1,6	DC/AC
P2007 (TECHMERGE F P2007)	ER308LCF ER316LCF LNSNiCro 60/20 LNS NiCrMo 60/16 TECHALLOY 276	BS EN ISO 14174: S A AF 2 64 AC H5	1,6	DC +/-

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