

CryElso™ 9Q Cryogenic steel

High quality 9% Nickel steel for cryogenic storage tanks and pressure vessels with service temperature down to -196°C

CryElso™ 9Q is a Quenched and Tempered martensitic steel specifically designed for deep cryogenic applications such as onshore large scale above ground LNG storage tanks. It may also be used for onboard ship fuel tanks and transport vessels as well as for large scale pressure vessel applications.

Thanks to its finely tuned chemical composition associated to a robust and optimized production route, thick sections up to 125 mm (5 inches) can be delivered and used for the fabrication of large equipments servicing at temperatures down to -196°C (-320F).

CryElso™ 9Q is a high strength material with excellent fracture toughness (CTOD) and crack arrest properties. It is optimized for use in storage tanks, pressure vessels, cryogenic pipings and ship storage and transportation applications. CryElso™ 9Q is extensively used by all world-renowned engineering and fabrication companies. It is a suitable solution for the most stringent equipments in the global Liquefied Natural Gas chain.

Properties

Standards

CryElso™ 9Q is compliant with:

- ASTM / ASME A / SA-553 type I (UNS K81340)
- EN 10028-4 X7Ni9 (1.5663)
- EN 10028-4 X8Ni9+QT680 (1.5662+QT680)

*For other standard compliancy, please consult.
Multiple certifications are possible on request.*

Tensile properties

Guaranteed transverse tensile properties at room temperature. *(Measured on every plates)*

Plates thickness (mm)	Yield Strength (MPa)	Ultimate Tensile Strength (MPa)	Minimum Elongation (%)
5 ≤ t ≤ 50	≥ 590	690 - 820	20
50 ≤ t ≤ 100		680 - 820	

CVN Impact properties

Guaranteed transverse Charpy V-Notch impact properties. *(Measured on every plates)*

Specimen size (mm)	Test temperature (°C)	Energy absorption (J)		Lat. expansion (mm)	Shear aspect (%)
		Av. of 3 specimens	Individual		
10 x 10	-196	≥ 100	≥ 75	≥ 0.64	≥ 75
10 x 7.5		≥ 75	≥ 56		
10 x 5		≥ 50	≥ 38		

Chemical composition

Ladle analysis – Expressed in weight percent (wt%)

C	Mn	Si	P	S	Ni	Cu	Cr	Mo	Al	Nb	V
<0.06	0.30-0.80	<0.30	<0.005	<0.002	8.70-9.40	<0.12	<0.10	<0.10	≥0.020	≤0.010	≤0.010

Welding

CryElso™ 9Q is typically welded with nickel-base fillers, such as Alloy 625, 620 or C276. The following table provides some guidance on useable consumables classifications for arc welding processes. (*Non exhaustive list*)

	SMAW	GMAW	FCAW	SAW (Wire + Flux)
AWS	SFA5.11: E NiCrMo-3 E NiCrMo-4 E NiCrMo-6	SFA 5.14: ER NiCrMo-3 ER NiCrMo-4	SFA 5.34: E NiCrMo-3 T1-4	SFA5.14: ER NiCrMo-3
EN	EN ISO 14172: E Ni 6625 E Ni 6276 E Ni 6620	EN ISO 14172: S Ni 6625 S Ni 6276	EN ISO 12153: T Ni 6625 P M21 2	EN ISO 14172: S Ni 6625 EN ISO 14174: S A AF2 5643 AC H5

Delivery conditions

Plates

CryElso™ 9Q can be produced in thicknesses from 5 mm and up to 100+ mm (3/16" up to 4+").

Maximum plate weight: 20 tons per unit. Industeel proposes the following available sizes :

Thickness (mm/inches)	Width (mm/inches)	Length (mm/inches)
4.75mm to 6.99mm - 3/16" to 0.28"	1200mm to 2700mm - 48" to 108" (*)	4000mm to 12000mm - 160" to 480"
7.00mm to 7.99mm - 0.28" to 5/16"	1200mm to 3400mm - 48" to 136" (*)	4000mm to 13000mm - 160" to 520"
8.00mm to 8.99mm - 5/16" to 0.35"	1200mm to 3600mm - 48" to 144" (*)	
9.00mm to 17.99mm - 0.35" to 11/16"	1200mm to 3800mm - 48" to 152" (*)	4000mm to 16000mm - 160" to 640"
18.00mm to 50.00mm - 11/16" to 2"		
50.01mm up to 125mm - 2" to 5"		

Prefabrication

By special agreement, prefabricated pieces can be delivered according to drawings. The following operations can be performed: beveling, bending, rolling of shell to radius, cutting to shape, fabrication of stiffeners and annular plates, pre-welding. (*Non exhaustive list, please consult*)

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Technical data and information are to the best of our knowledge at the time of editing. However, they may be subject to some slight variations due to our ongoing research programme on steels. Therefore, we suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company. Further information may be obtained from the address opposite.