



Technical Insulation



ISOVER CRYOLENE

for LNG and LPG applications

Engineered thermal insulation solutions for cryogenic applications





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Introduction

Saint-Gobain Group

For more than three centuries, Saint-Gobain has applied its technological expertise and knowledge of markets to supply products that reflect its customers' and partners' needs. The Saint-Gobain Group has acquired a reputation for innovation, responsiveness and productivity through its ability to anticipate and provide a solution for its customers' increasingly complex needs.

By investing almost 300 million euros a year in research and development, the Saint-Gobain Group is able to provide all of its partners with a technological edge and the assurance of an ongoing focus on innovation. Saint-Gobain's presence in more than 64 countries is a source of synergies and a constant exchange of ideas that help deliver the most innovative and the most appropriate solutions.

Isover Technical Insulation

The ongoing rise in energy prices has highlighted the urgent need to reduce energy loss. This has led the insulation industry to focus on developing new and improved structural insulation products. The potential of energy savings in technical areas is still often underestimated or ignored.

As the world's leading insulation company ISOVER has highlighted the importance of effective insulation in the so-called technical areas, such as Marine and Offshore, Industry, HVAC and Original Equipment Manufacturer (OEM), where effective insulation is not only important to save energy, but is often essential to personal protection.

We have used our recognised innovation skills to bring innovative and efficient technical solutions for these critically important markets.





CRYOLENE – Solutions

Design specifications for storage tanks holding cryogenic fluid such as liquefied natural gas (LNG), liquid oxygen or nitrogen for chemical or combustion processes, are not only highly demanding in terms of construction, but also in terms of the insulation systems used. With the tank volume expanding and contracting depending on the level of liquid inside, the insulation must offer high levels of both compressibility and resilience.

To meet this requirement, ISOVER has developed the unique CRYOLENE solution for the insulation of cryogenic tank walls and roofs.

CRYOLENE products are highly resilient mineral wool rolls designed to retain their fibre elasticity over time at temperatures ranging from -170°C to $+120^{\circ}\text{C}$. Different solutions have been developed for tank shells and suspended deck insulation. The product's extended length means that CRYOLENE solutions are easy and fast to install, with reduced thermal bridging.

Different facings, such as reinforced glass tissue or reinforced aluminium foil, give CRYOLENE products high tensile strength.

The properties and performance of CRYOLENE have been extensively tested by external laboratories, and the products are well-proven through decades of successful use worldwide in chemical and LNG applications.



GENERAL DELEGATION FOR
AFRICA AND NORTHERN EUROPE

GENERAL DELEGATION FOR EASTERN EUROPE

GENERAL DELEGATION
FOR RUSSIA, UKRAINE
AND THE COMMONWEALTH
OF INDEPENDENT STATES
(CIS)

GENERAL DELEGATION
FOR AFRICA, EGYPT,
AND TURKEY

GENERAL DELEGATION
FOR INDIA

GENERAL DELEGATION
FOR ASIA-PACIFIC





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CRYOLENE – Specification

Product description:

- CRYOLENE is a highly resilient mineral wool blanket. It is faced on one side either with a reinforced glass tissue (V.V.) or a reinforced aluminium foil (A.A.).
- CRYOLENE is supplied in rolls for use as a resilient thermal insulation for all types of storage tanks and vessels operated at cryogenic temperatures.
- CRYOLENE is suitable for use in combination with Perlite and other cryogenic insulation materials.

CRYOLENE standard product range:

- CRYOLENE 681 for suspended decks
- CRYOLENE 682 for tankshells
- CRYOLENE 684 for pipe connections

Tensile strength:

- Reinforced glass tissue 35g/m² (V.V.): nominal = 80 N/50mm MD.
- Reinforced aluminium foil 18 µm with glass scrim 2x2 (A.A.): 250 N/50mm MD (MD = Machine Direction) – (Data sheets of facings available upon request).
- The facing gives the CRYOLENE blanket its tensile strength.

Fire rating: Euroclass Classification (testing in hand):

- With glass tissue (V.V.): A1
- With aluminium foil (A.A.): A2-s1, d0.

Temperature range: - 170 °C to + 120 °C.



CRYOLENE	tolerance	standard	CRYOLENE 681	CRYOLENE 682	CRYOLENE 684
binder (%)	± 0.8 %	–	4,5 %	7 %	4,5 %
density (kg/m ³)	± 5 %	EN 1602	12	17.5	24
thickness	–	EN 823	50 to 175 (- 0 + 15 mm)	50 to 150 (- 0 + 15 mm)	50 to 120 (- 0 + 5 mm)
width (mm)	± 5 mm	EN 822	1200	1200	1200
length (mm)	- 0 + 200 mm	EN 822	depending on thickness and type of facing		

Resilience: CRYOLENE 682 (Test according to SNCMP)

Load KN/m ²	average (%)	min (%)	max (%)
0.5	65	59	71
1.0	50	44	56
2.5	35	29	40
4.0	29	25	33

Limit values of thickness under load as percentage of the nominal thickness

Thermal conductivity W/(m·K)*

	EN 12667	ISO 8302		
	10 °C	- 50 °C	- 100 °C	- 170 °C
CRYOLENE 681	0.038	0.026	0.019	0.022
CRYOLENE 682	0.035	0.024	0.018	0.02

* FIW test reports N° F.2-1002a/04 and F.2-954a/04

Thermal stability: consistent longterm thermal performance even after temperature „shocks“.

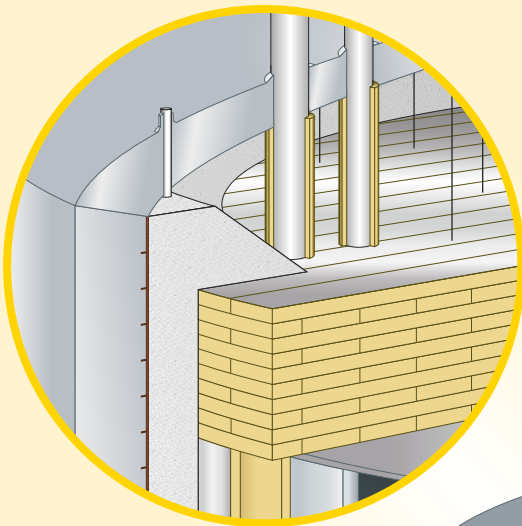
Corrosiveness: meets requirements for use with aluminium, steel or copper.

Water resistance: non-hygroscopic.

Fungus resistance: does not breed or promote fungal growth.

Material Safety Data Sheet: available on request.

CRYOLENE – Installation

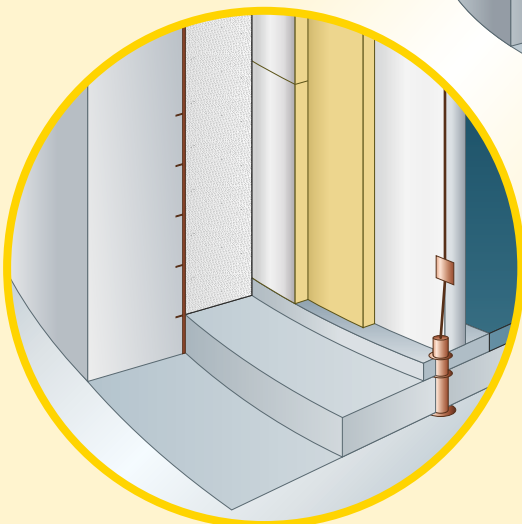
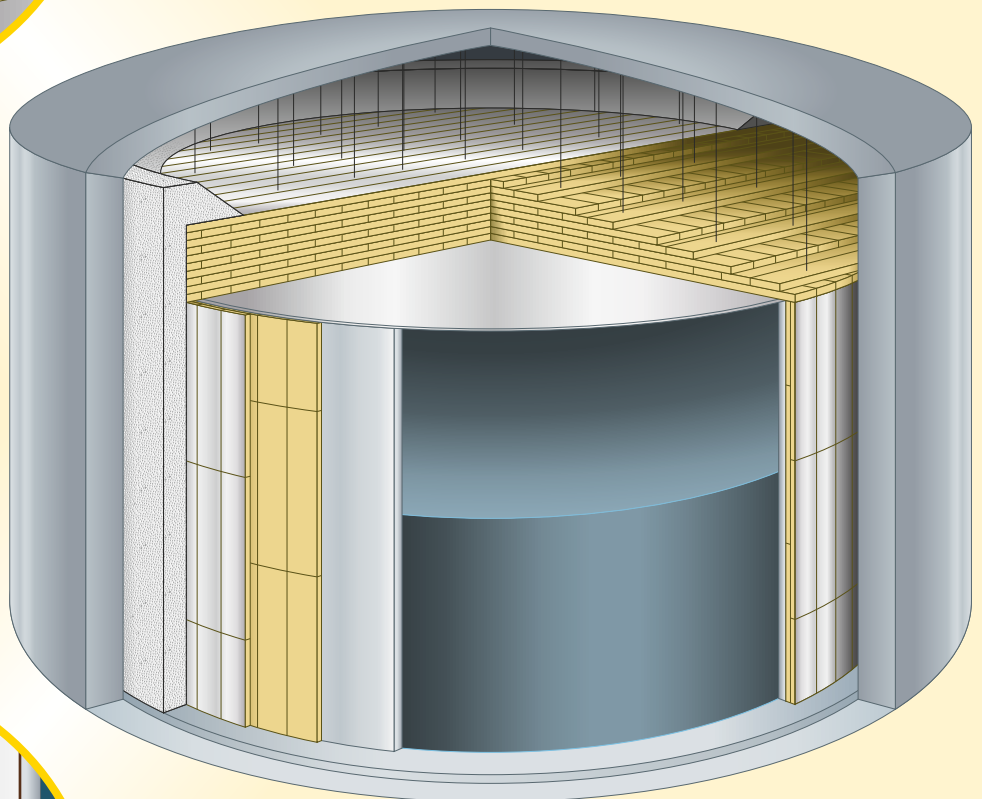


Deck section:

The top layers of CRYOLENE must be covered by FSK facing (Alu glass scrim laminate: a facing for mineral wool that is used as vapour barrier and reflection layer) to avoid dust drop into the insulation. Studs must be taped when penetrating insulation.

Joint section between deck and wall:

The last 2 m section of the deck should be installed after the wall perlite works have been completed.



Vertical section:

All CRYOLENE layers have to be tightly butted, normally staged with alternate layers overlapped.



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CRYOLENE – References

ISOVER has more than 30 years practical experience in LNG insulation gained through participation in major projects worldwide. Sharing knowledge with our clients, we have developed optimised solutions that combine performance with practicality and reliability. ISOVER takes its responsibilities to customers seriously, ensuring quality products through internal and external quality control and certification – coupled with just in time delivery so our products are there when you need them.

Project	Country	Customer	Schedule	Products	Remarks
Montoir	France		1983	CRYOLENE	LNG
Zeebrugge	Belgium		1985	CRYOLENE 682	LNG
Enagas Huelva	Spain	CBI	1986	CRYOLENE	LNG
Dhabol	India	Raven / Insultec / Punj	2001	CRYOLENE 681 & 682	LNG
Hazira	India	Wanner	2002	CRYOLENE 684	LNG
Damietta	Egypt	Wanner	2002	CRYOLENE 684	LNG
Sines	Portugal	Entrepose Contracting	2003	CRYOLENE 681	LNG
Ratnagiri	India	Raven / Insultec / Punj	2006	CRYOLENE 682	LNG
Kharg Island	Iran	Tissot / Technip	2006	CRYOLENE 681 & 682	Ethylene
Reganosa	Spain	Entrepose Contracting	2006	CRYOLENE 681	LNG
Houston Freeport	USA	SPI / Technip	2007	CRYOLENE 681	LNG
Zeebrugge (Fluxys)	Belgium	Technigaz / Saipem	2007	CRYOLENE 681	LNG
Fos Cavaou	France	Sofregaz	2007	CRYOLENE 681	LNG
South Pars	Iran	Raven / Weir	2007	CRYOLENE 681 & 682	LPG
Adriatic LNG	Italy	Raven / Whessoe	2007-2008	CRYOLENE 681 & 682	LNG (GBS)
Canaport	Canada	SNC / CENMC	2008	CRYOLENE 681	LNG
Pearl GTL	Qatar	Qatar Shell GTL	2008	CRYOLENE 684	LNG
Ratnagiri	India	Raven / Insultec / Punj	2008	CRYOLENE 682	LNG
Xinjiang Guanghui	China	Bis-Oki	2009	CRYOLENE 682	LNG
Arzew	Algeria	Entrepose Contracting	2009	CRYOLENE 681	LNG
Gate Rotterdam	Holland	Entrepose Contracting	2009	CRYOLENE 681	LNG
Algeria	Algeria	Prezioso	2009	CRYOLENE 684	LNG
Ratnagiri	India	Raven / Insultec	2009	CRYOLENE 682	LNG
Iran	Iran	Kaefer Wanner	2009	CRYOLENE 684	LNG
Tongyoung	Korea	Haniso / Jeong Yeon	2009	CRYOLENE 682	LNG
Canaport	Canada	CNC / SNAM	2009	CRYOLENE 681	LNG
Tananger	Norway	Glava / Bis Industrier	2009	CRYOLENE 682	LNG
Gate Rotterdam	Holland	Entrepose Contracting	2010	CRYOLENE 681	LNG
Dabhol	India	Raven / Insultec	2010	CRYOLENE 682	LNG
Ningbo	China	Kaefer GmbH	2010	CRYOLENE 682	LNG
Huelva	Spain	UTE ACEC	2010	CRYOLENE 681	LNG
Nynäshamn	Sweden	Glava / Bis Industrier	2010	CRYOLENE 682	LNG
Guang'an	China	Chemtex USA	2010	CRYOLENE 681	LNG
Ningxia Hanas	China	Technip Malaysia	2010	CRYOLENE 681	LNG
UAE	UAE	Kaefer UAE	2010	CRYOLENE 684	LNG



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- Kogas LNG Pipeline Project
- Gaz Plant Project, Spain



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