



**Cryogenic insulation materials
for safe transport and reliable
storage of LNG, LEG and LPG**



Cryogenic insulation for pipelines

For long-lasting pipelines

For the cryogenic insulation of pipelines we offer our insulating composite material Durolight® and our laminated densified wood Lignostone® cryogenic. Both materials are especially designed to meet the thermal and mechanical requirements of load bearing supports.

Durolight® supports assembled in a cradle
© Pipe Supports Ltd.

Properties

The extraordinary properties of Durolight® and Lignostone® cryogenic make them ideal for cryogenic insulation of pipeline systems:

- low thermal conductivity
- high mechanical strength
- resistance to abrasion and wear
- resistance to physical and chemical decay
- temperature range between -190 °C to +200 °C (depends on grade used)
- low specific weight

Durolight®

Durolight® is manufactured from a special formulation of selected synthetic resins in combination with high-strength glass reinforcements. Five different grades are today used widely in the market:

- Durolight®
- Durolight® S
- Durolight® S1
- Durolight® S2
- Durolight® S3

Detailed technical data upon request

Durolight® is **approved** for example by:

- Bechtel Group
- Linde AG
- Tractebel S.A./N.V.
- Technip
- Engie

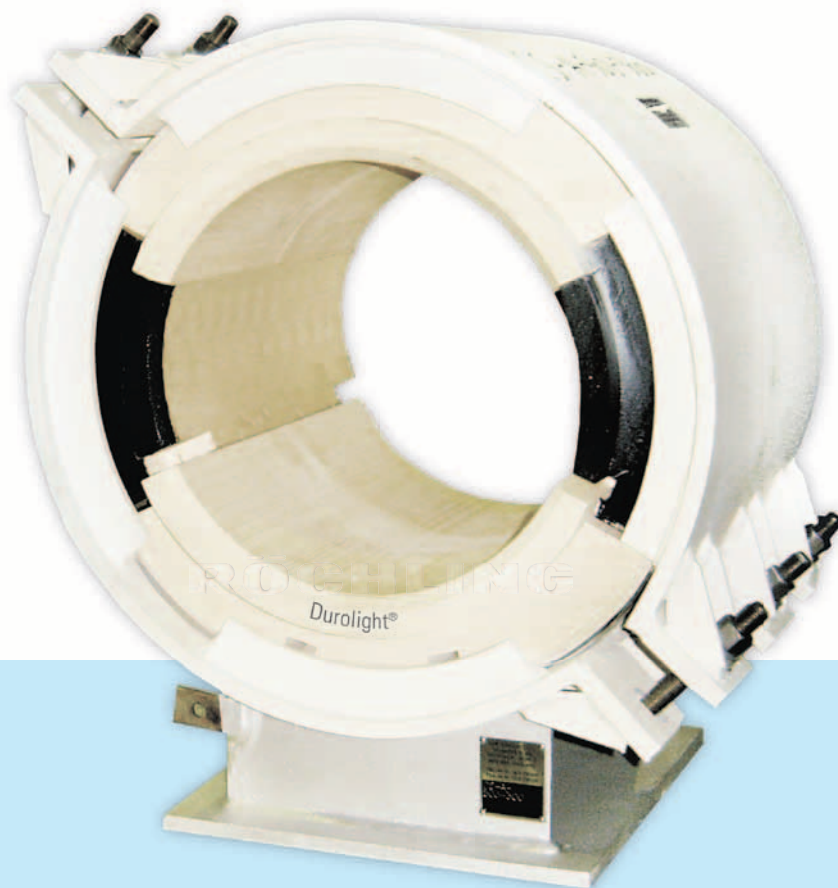
Lignostone® cryogenic

Lignostone® cryogenic (H II/2/30) is a unique material manufactured from selected beech veneers, impregnated under vacuum with thermosetting synthetic resin and densified under heat and pressure. Lignostone® cryogenic is **approved** for example by:

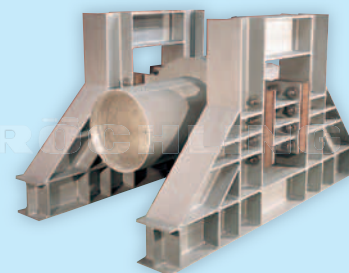
- M.W. Kellogg

Products

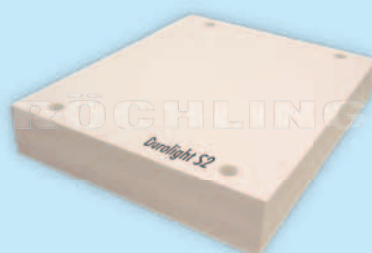
- anchor supports
- base supports
- trunnion supports
- cable cleats
- pipe supports



Durolight® S pipe supports 140°



Pipe supports with Lignostone® cryogenic blocks



Support block made of Durolight® S2



Base supports made of Lignostone® cryogenic

Cryogenic insulation for LNG, LEG and LPG carriers

Safe transport and reliable storage of LNG and LPG

Lignostone® cryogenic (H II/2/30) has been used in international shipping for decades to provide cryogenic insulation in LNG, LEG and LPG carriers with volumes of up to 165,000 m³. The laminated densified wood insulates the large-dimensioned gas tanks from the ship's hull and is approved by many leading companies.

Products

Lignostone® cryogenic can be customised for your application, such as

- tank supports
 - anti-floating chocks
 - anti-pitching chocks
 - anti-rolling chocks
 - fixed blocks
 - sliding blocks
 - hardwood keys
- in
- IMO type A, B and C containment systems
 - prismatic tanks LNG (e.g. 165,000 m³)
 - cylindrical tanks (bi-lobe)
 - floating storage tanks LNG
 - ethylene carriers
 - FPSO/FLNG

Properties

- low thermal conductivity
- outstanding temperature resistance: -196 °C to +90 °C
- withstands high mechanical loading
- resistance to abrasion and wear
- low coefficient of sliding friction
- low specific weight
- low moisture absorption

Detailed technical data upon request.

Approved quality

Lignostone® cryogenic is approved by the following major classification societies and tank system manufacturers:

- IHI/JMU
- LR
- BV
- NKK
- DNV-GL
- BV
- CCS

and many others

Globally proven quality: Lignostone® cryogenic has been used in international shipping for decades to provide cryogenic insulation in LNG and LPG carriers – manufactured here as a tank support based on a customer drawing



Cryogenic insulation for LNG fuel tanks

For reliable and powerful LNG engines

Shipping companies and naval architects are faced with a challenge: following the entry into force in 2015 of the emissions regulations of the International Maritime Organisation (IMO) for ECAs (Emission Controlled Areas) such as the North Sea and Baltic Sea, ships must in future be equipped with a low-emissions propulsion, such as modern and environmentally friendly LNG engines.

Shipping companies must modify their existing fleets and design new ships in order to meet the new requirements. Two points are of particular importance: firstly, modification of the ships must be completed rapidly if laid-up times and loss of revenue are to be minimised. Secondly, the new LNG engines must be both reliable and powerful.

That means naval architects need a lot of know-how for the design – and the right materials. Either Lignostone® cryogenic (H II/2/30) or one of our Durolight® grades will fit perfectly for your design.

Your advantages

Lignostone® cryogenic and Durolight®:

- reliably insulate the LNG fuel tank and piping from the ship's structure
- thereby enhancing the reliability and long life of your ship's drive system

Applications

LNG fuel tanks for:

- container vessels
 - cruise liners
 - ferries
- and others



Reliable insulation required: LNG fuel tanks of modern LNG propulsion systems have to be insulated permanently from the ships structure



The tremendous weight, carried by these giant cranes, is later to rest on the Lignostone® cryogenic supports. Reliability is a must!



Fits precisely to the LNG fuel tank: Lignostone® cryogenic machined to customers' drawings

New: Wessels Reederei GmbH & Co. KG, Haren, is the first shipping company in the world to convert a container ship, the „Wes Amelie“, to a modern, environmentally friendly liquid-gas drive. Lignostone® cryogenic permanently insulates the LNG fuel tank of LNG engines from the ship's structure, enhancing the reliability and long life of the ship's propulsion system



Cryogenic insulation materials

For safe transport and reliable storage

We offer you materials **specifically developed for cryogenic insulation**. Our laminated densified wood Lignostone® cryogenic and our fibre-reinforced composite material Durolight® have been successfully applied in numerous projects worldwide for many years. With their special properties, they are helping to ensure the safe transport and reliable storage of LNG and LPG.

References are available on specific request.

Your Advantages

- Lignostone® cryogenic and Durolight®:
- reliable avoidance of thermal bridges
 - high mechanical stability
 - allow efficient transport and storage of LNG and LPG
 - robust and maintenance-free
 - approved/specified by numerous companies
 - used throughout the world – proven quality

Technical advice

Each application requires individually tailored cryogenic insulation materials. We are happy to advise you on the selection of suitable cryogenic insulation materials for your particular application. Just contact us. Machined Lignostone® cryogenic and Durolight® components are available according to your specifications and drawings.

Material	Characteristics
Durolight® Fibre reinforced material	<ul style="list-style-type: none"> • operating temperature from -196 °C to +200 °C • very low density of 1.1 g/cm³ and excellent thermal conductivity • good flame retardancy
Durolight® S Fibre reinforced material	<ul style="list-style-type: none"> • high mechanical properties combined with low thermal conductivity • good flame retardancy
Durolight® S1 Fibre reinforced material	<ul style="list-style-type: none"> • low density of 1.3 g/cm³ • low thermal conductivity
Durolight® S2 Fibre reinforced material	<ul style="list-style-type: none"> • high mechanical properties • good flame retardancy
Durolight® S3 Fibre reinforced material	<ul style="list-style-type: none"> • superior mechanical properties • low thermal conductivity
Lignostone® cryogenic (H II/2/30) Laminated densified wood	<ul style="list-style-type: none"> • low thermal conductivity • outstanding temperature resistance: -196 °C to +90 °C • withstands high mechanical loading • resistance to abrasion and wear • low coefficient of sliding friction μd 0.19 • good electrical insulation • low specific weight



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