



Marine & Offshore insulation



U SeaProtect

ULTIMATE lightweight insulation – Marine & Offshore

ISOVER
SAINT-GOBAIN

ISOVER Marine & Offshore

Saint-Gobain Group

Saint-Gobain is the **world leader** in the habitat and construction markets. It designs, manufactures and distributes building and **high-performance materials**, providing since **350 years innovative solutions** to the challenges of **growth, energy efficiency and environmental protection**.



ISOVER Technical insulation

As the **world's leading insulation company**, ISOVER has drawn attention to the importance of **effective and sustainable insulation** in technical areas, including Marine & Offshore, where effective insulation is not only needed to **save energy**, but also to **provide fire safety, acoustical and thermal comfort**.

Saint-Gobain Marine Applications

Saint-Gobain Marine Applications has brought together **six renowned specialists** in the field of **glazing, insulation, flooring, interior finishing, interior boards, valves, pipes, fittings and more**. With the synergies of the combined solutions and the strong expert network created, the goal is to change dead load into paying load.



Norwegian Getaway, Meyer Werft, Germany, 2014
©Meyer Werft

ISOVER offers lightweight insulation solutions to be used in a wide variety of constructions and applications.

Constructions

- cruise ships
- ferries
- luxury yachts
- military ships
- offshore (accommodation platforms, jack-up rigs, living quarters, supply vessels...)



Norwegian Getaway, Meyer Werft, Germany, 2014, ©Hero Lang



Piana, Brodogradjevna Industrija Split d.o.o., Croatia, 2011



Platform Supply Vessel PSV PX 105 CNN. La Naval, Spain, ©Oliver Design



Applications

- Fire protection of steel, aluminium and FRP structures
- Sound protection
- Thermal comfort
- High temperature
- Piping
- Heating, Ventilation and Air Conditioning ducts (HVAC)
- Interior accommodation components
 - fire doors
 - ceiling panels
 - sandwich panels
 - floating floor systems
 - air conditioning units



Co-developments

Clients eager to develop new solutions integrating ISOVER products will receive full technical assistance and support by our Marine & Offshore dedicated team.

ULTIMATE for Marine & Offshore applications

ULTIMATE, get the real performance



What is the secret behind ULTIMATE?

ULTIMATE results from more than 25 years of intense research by ISOVER. ULTIMATE is produced thanks to **an unique and patented fiberizing process**. It results in a **totally shot-free product**, made of long fine interwoven fibres: a **new generation of high-performance mineral wool** with **excellent fire protection** properties and a drastically **reduced weight (up to 50% lighter)** when compared to traditional stonewool solutions.



SMIT Pirahã, Keppel Singmarine
Brasil, Brazil, 2014



Norwegian Jewel, Meyer Werft, Germany, 2005
©Michael Rost



Mein Schiff 3, STX Finland, 2014, © Jouni Saaristo

ULTIMATE U SeaProtect Range

U SeaProtect, a new standard for Marine & Offshore

U SeaProtect solutions

ISOVER's development and sales departments teamed up to develop new solutions specific for Marine & Offshore using ULTIMATE mineral wool, that would **meet the different customers demands**: the U SeaProtect range.

By installing ULTIMATE U SeaProtect insulation solutions, you will be sure to **use the full capacity of the equipment you invested in**.

U SeaProtect solutions combine **fire safety with low weight, ease of installation, optimized logistics and excellent thermal and acoustic properties**.

ULTIMATE All-in-one

-  **Effective Fire Protection**
-  **Unique Lightness**
-  **Easy to Install**
-  **Thin Solutions**
-  **Optimal Acoustic Performance**
-  **Excellent Thermal Insulation**
-  **Optimal Logistics**
-  **Cost effective solutions**
-  **Active environmental protection**



U SeaProtect name structure

ULTIMATE	Product range	Product Form	Density (kg/m³)	Facing	Thickness (mm)
U	SeaProtect	Roll Slab Wired Mat	24 36 56 76 86 90 ...	Alu1 → unfaced G120 → Aluminium G220 → Glass cloth (black) G420 → Glass cloth (white) B-Al → Glass cloth (white) B-Al → B Facing ¹⁾ (Alu outside) B-Gl → B Facing ¹⁾ (Glass cloth outside)	20 mm 25 mm 30 mm 40 mm 50 mm 70 mm 100 mm ...



Products available
with different
certified facings

Steel constructions- Standard Design

Lightweight and easy logistics. Four products to cover all Steel A-Fire Classifications, it is all what it takes.

STEEL FTP Code 2010	Plate		Stiffener		Weight reduction
	Products ²⁾	Weight [kg/m²]	Products ²⁾	Weight [kg/m²]	Up to*
A-15 Bulkhead	U SeaProtect Slab 24 50 mm or U SeaProtect Roll 24 50 mm	1,20	U SeaProtect Slab 76 25 mm	1,90	50 %
			U SeaProtect Slab 24 50 mm or U SeaProtect Roll 24 50 mm	1,20	60 %
A-30 Bulkhead A-60 Bulkhead Restricted	U SeaProtect Slab 36 70 mm or U SeaProtect Roll 36 70 mm	2,52	U SeaProtect Slab 36 70 mm or U SeaProtect Roll 36 70 mm	2,52	40 %
			U SeaProtect Slab 76 25 mm	1,90	45 %
A-60 Bulkhead	U SeaProtect Slab 56 70 mm	3,92	U SeaProtect Slab 76 25 mm	1,90	45 %
A-15 Deck A-30 Deck	U SeaProtect Slab 24 50 mm or U SeaProtect Roll 24 50 mm	1,20	U SeaProtect Slab 76 25 mm	1,90	50 %
			U SeaProtect Slab 24 50 mm or U SeaProtect Roll 24 50 mm	1,20	60 %
A-60 Deck	U SeaProtect Slab 36 70 mm or U SeaProtect Roll 36 70 mm	2,52	U SeaProtect Slab 36 70 mm or U SeaProtect Roll 36 70 mm	2,52	40 %
			U SeaProtect Slab 76 25 mm	1,90	45 %
A-60 Floating Floor	U SeaProtect Slab 90 50 mm	4,50	finishing: steel plate or Weber cement screed		40 %
A-60 Floating Floor	U SeaProtect Slab 90 25mm x 2 U Sea Protect Slab 90 Alu1 25mm	6,75	finishing: any material which has Low Flame Spread certificate according to IMO		

~ 45 % weight savings

Steel constructions- Thin Design

Thin solutions between and around the stiffeners.

The solutions below may help you **gaining space**, often a critical issue when designing a ship.

STEEL FTP Code 2010	Plate		Stiffener		Weight reduction
	Products ²⁾	Weight [kg/m ²]	Products ²⁾	Weight [kg/m ²]	Up to*
A-15 Bulkhead	U SeaProtect Slab 66 30mm	1,98	no insulation around stiffeners	—	—
A-30 Bulkhead Restricted	U SeaProtect Slab 46 40mm	1,84	U SeaProtect Slab 46 30mm or U SeaProtect Slab 46 40mm	1,38	—
A-30 Bulkhead	U SeaProtect Slab 36 70mm or U SeaProtect Roll 36 70mm	2,52	U SeaProtect Slab 76 20mm	1,52	50 %
	U SeaProtect Slab 76 40mm or U SeaProtect Slab 76 20mmX2	3,04	U SeaProtect Slab 76 20mm or U SeaProtect Slab 76 25mm	1,52 1,90	40 %
A-60 Bulkhead	U SeaProtect Slab 56 70	3,92	U SeaProtect Slab 76 20mm	1,52	48 %
	U SeaProtect Slab 86 50mm	4,30	U SeaProtect Slab 76 25mm	1,90	40 %
A-15 Deck	U SeaProtect Slab 36 70mm or U SeaProtect Roll 36 70mm	2,52	no insulation around stiffeners	—	—
A-15 Deck A-30 Deck	U SeaProtect Slab 24 50mm or U SeaProtect Roll 24 50mm	1,20	U SeaProtect Slab 76 20mm	1,52	55 %
	U SeaProtect Slab 76 25mm	1,90	U SeaProtect Slab 76 20mm or U SeaProtect Slab 76 25mm	1,52 1,90	40 %
A-60 Deck	U SeaProtect Slab 66 50mm	3,30	U SeaProtect Slab 76 25mm	1,90	35 %

1) B Facing is a laminated composite facing combining Glass cloth and Aluminum foil.

2) All U SeaProtect products are available for each construction with different facings approved by a recognized test laboratory (Alu facing Alu1, Glass cloth facings G12, G220, G420, B facing, etc.)

* Estimation of the weight for the complete solution is based on the surface ratio traditionally used in Marine industry of 1 for the plate part and 0,7 for the stiffeners.

up to 55% weight savings
& up to 33% less space

Light structures build in Aluminium or using FRP sandwich panels are much more expensive than steel ones. To be consistent with this construction choice, it is a must to **install only lightweight solutions for fire protection** of such structures. U SeaProtect solutions for Aluminium constructions are helping to save up to 35% of weight compared to traditional stonewool solutions.

Aluminium constructions

Aluminium	Plate		Stiffener		Weight reduction
	Products ²⁾	Weight [kg/m²]	Products ²⁾	Weight [kg/m²]	Up to*
A-60 Bulkhead Restricted	U SeaProtect Slab 66 30 mm x 2 or U SeaProtect wired Mat 66 30 mm x 2	3,96	U SeaProtect Slab 66 30 mm x 2 or U SeaProtect wired Mat 66 30 mm x 2	3,96	35 %
A-60 Bulkhead	U SeaProtect Slab 66 70 mm or U SeaProtect Wired Mat 66 70 mm on both sides	9,24	U SeaProtect Slab 66 70 mm or U SeaProtect Wired Mat 66 70 mm	4,62	30 %
	U SeaProtect Slab 66 30 mm x 2 or U SeaProtect Wired Mat 66 30 mm x 2 on both sides	7,92	U SeaProtect Slab 66 30 mm x 2 or U SeaProtect Wired Mat 66 30 mm x 2	3,96	35 %
A-30 Deck	U SeaProtect Wired Mat 66 40 mm	2,64	U SeaProtect Wired Mat 66 40 mm	2,64	—
A-60 Deck	U SeaProtect Wired Mat 66 70 mm	4,62	U SeaProtect Wired Mat 66 70 mm	4,62	30 %
	U SeaProtect Slab 66 30 mm x 2	3,96	U SeaProtect Slab 66 30 mm x 2	3,96	35 %

~ 33 % weight savings

Composite/Fibre Reinforced Polymer (FRP) constructions

FRP	Plate			Stiffener		
	layers	Products ²⁾	Weight [kg/m²]	layers	Products ²⁾	Weight [kg/m²]
FRD-30 Bulkhead	1	U SeaProtect Slab 86 25 mm	5,45		no stiffener	—
	2	U SeaProtect Slab 66 50 mm				
FRD-60 Bulkhead	1	U SeaProtect Slab 86 25 mm	7,60		no stiffener	—
	2	U SeaProtect Slab 86 25 mm				
	3	U SeaProtect Slab 66 50 mm				
FRD-30 Deck	1	U SeaProtect Slab 86 25 mm	5,45	1	U SeaProtect Slab 66 50 mm	6,60
				2	U SeaProtect Wired Mat 66 50 mm	
	2	U SeaProtect Slab 66 50 mm		1	U SeaProtect Slab 66 50 mm	6,60
				2	U SeaProtect Slab 66 50 mm	
FRD-60 Deck	1	U SeaProtect Slab 86 25 mm	7,60	1	U SeaProtect Slab 86 25 mm	8,75
	2	U SeaProtect Slab 86 25 mm		2	U SeaProtect Slab 66 50 mm	
	3	U SeaProtect Slab 66 50 mm		3	U SeaProtect Wired Mat 66 50 mm	



Norwegian Breakaway
Meyer Werft, Germany, 2013
©Michael Wessels

Norwegian Escape,
Meyer Werft, Germany, 2015
©Michael Wessels





Product overview

U SeaProtect offers a **complete range of solutions** for the different requirements of fire, thermal and acoustic insulation in Marine & Offshore applications.

Do not hesitate to contact your ISOVER local representative to get advices on the best solution adapted to your need.

All products are not presented in this brochure. Customized solutions and special dimensions are available on request.

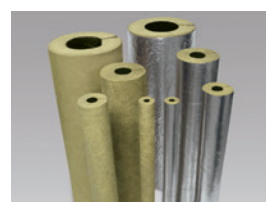
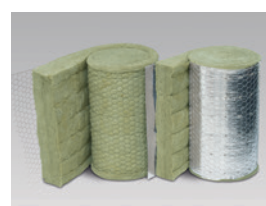
Comfort

Sound protection

Fire protection

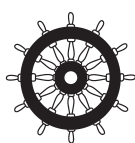
High Temperature

Product	Thickness	Application & Feature
U SeaProtect Roll 13 Alu1	50, 100, 150 mm	Comfort Insulation Reduced space due to very high compression (optimal logistics)
U SeaProtect Roll 24	50, 100 mm	Comfort Insulation Good acoustics (47 dB in 50 mm)
U SeaProtect Roll 24 Alu1	50, 100 mm	A-15 Steel Bulkhead
U SeaProtect Slab 24	50, 100 mm	A-30 Steel Deck
U SeaProtect Slab 24 Alu1	50, 100 mm	Reduced space due to high compression (optimal logistics) and limited waste due to off-cuts in roll formats
U SeaProtect Slab 24 G220	50, 100 mm	
U SeaProtect Roll 36	70 mm	Excellent acoustics (48 dB in 70 mm)
U SeaProtect Roll 36 Alu1	70 mm	A-30 Steel Bulkhead
U SeaProtect Slab 36	70 mm	A-60 Steel Deck
U SeaProtect Slab 36 Alu1	70 mm	Reduced space due to high compression (optimal logistics) and limited waste due to off-cuts in roll formats
U SeaProtect Slab 36 G220	70 mm	
U SeaProtect Slab 56	30, 70 mm	30 mm: Steel stiffeners insulation
U SeaProtect Slab 56 Alu1	30, 70 mm	Easy to bend and wrap around stiffeners
U SeaProtect Slab 56 G220	30, 70 mm	70 mm: A-60 Steel Bulkhead plate
U SeaProtect Slab 66	30, 50 mm	30 mm: A-15 Steel Bulkhead no insulation of the stiffeners ; A-60 Alu construction (double layer) solution
U SeaProtect Slab 66 Alu1	30, 50 mm	Easy to bend and wrap around stiffeners
U SeaProtect Slab 66 G220	30, 50 mm	50 mm: A-60 Steel Deck plate (Thin Design); FRD (composite) solution
U SeaProtect Slab 76	20, 25 mm	Steel stiffeners insulation
U SeaProtect Slab 76 Alu1	20, 25 mm	25 mm: A-30 Steel Deck
U SeaProtect Slab 76 G220	20, 25 mm	Easy to bend and wrap around stiffeners
U SeaProtect Slab 86	25, 50 mm	25 mm: FRP (composite) insulation
U SeaProtect Slab 86 Alu1	25, 50 mm	50 mm: A-60 Bulkhead plate (Thin Design)
U SeaProtect Slab 86 G220	25, 50 mm	
U SeaProtect Slab 90	25, 50 mm	A-60 Floating floor Lightweight and excellent acoustic performance
U SeaProtect Wired Mat 66	50 mm	A-60 Steel equivalent for HVAC ducts
U SeaProtect Wired Mat 66 Alu1	50 mm	FRP (composite) stiffeners insulation Recommended for High Temperature equipment
U SeaProtect Wired Mat 48	100 mm	A-60 Steel Bulkhead equivalent for High Temperature equipment
U TECH Pipe Section MT 4.0		High Temperature pipe insulation
U Protect Pipe Section Alu2		

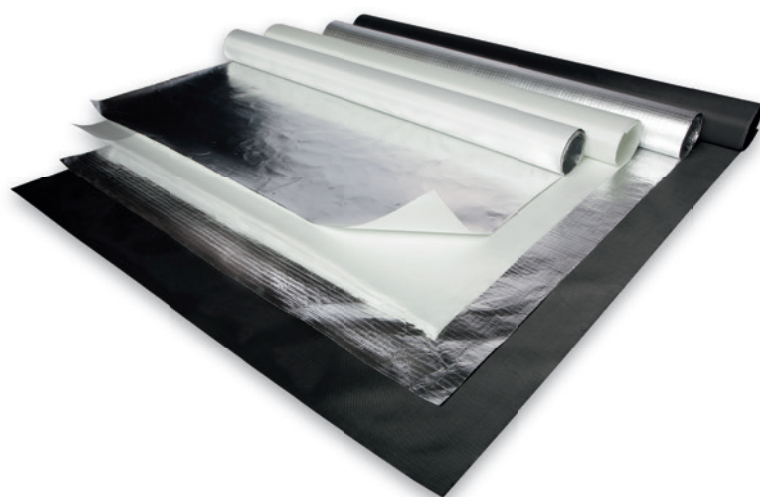




Facings



U SeaProtect products are available with **different facings**. On request ISOVER can deliver these facings also separately in **single rolls format of 20 kg each, easy to carry by one person** and perfectly adapted for worksites.



Type of Facing	Name	Color	Vapour barrier	Mechanical protection	Sound absorption	Other properties
Reinforced Aluminium foil	Alu1	shiny	yes (sensitive to punching)	–	–	cost competitive
Thin Glass tissue	V1 V2	white black	no	–	excellent	
Glass cloth	G 120 G 220 G 420	black white white	no	light strong heavy duty	excellent	good aesthetics
Aluminium foil/ Glass cloth composite	B-Al	shiny (Alu outside)	yes (robust)	heavy duty (resistant to tearing)	–	easy to clean water tight
	B-GI	white (glass cloth outside)				water tight

Tapes

ISOVER supplies **high-quality marine certificated tapes** to seal the joints of products covered with facings in a cost-effective manner (*fast installation*).

ISOVER tapes have been selected and tested in combination with ISOVER facings. They work as a full system to ensure a strong bounding and that no delamination will occur in time.

Marine Tape Alu



- Marine IMO Low Flame Spread certificated
- Excellent bonding properties
- Long-lasting
- Operation Temperature: -40 °C / +80 °C
- Installation Temperature: +5 °C / +30 °C on dry surface

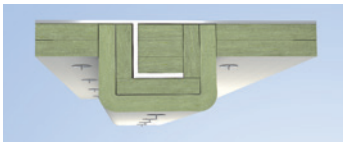
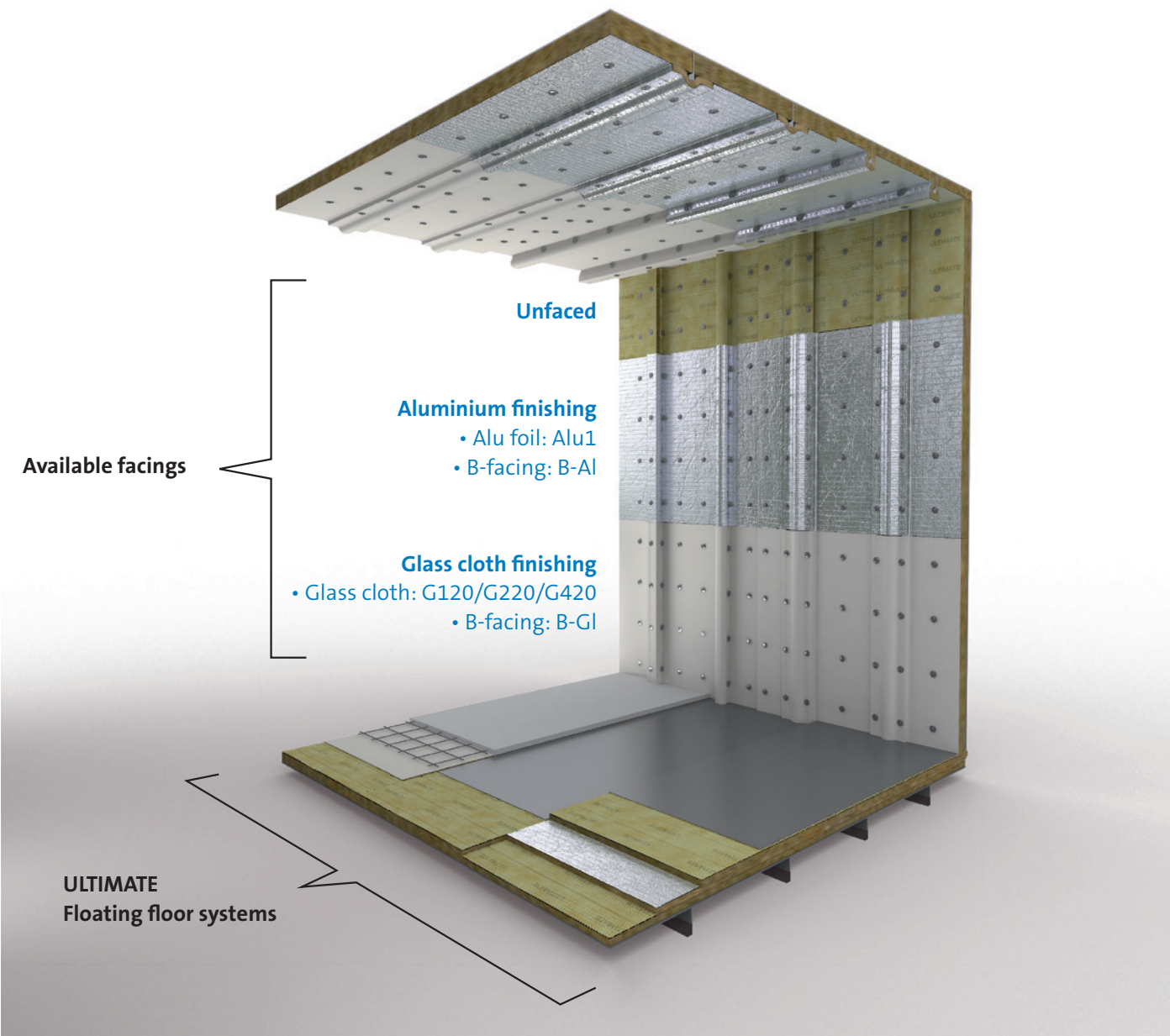
SeaProtect Tape G120



- Marine IMO Low Flame Spread certificated
- Excellent bonding properties
- Long-lasting (no delamination due to high humidity)
- Operation Temperature: -25 °C / +70 °C
- Installation Temperature: +5 °C / +35 °C on dry surface
- Storage conditions: -5 °C / +30 °C in dry conditions and protected from UV

Drawings and installations

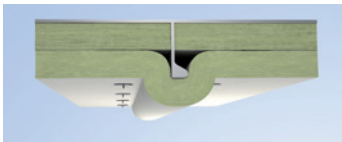
Thanks to its **unique flexibility**, ULTIMATE perfectly adapts to all geometries. Different installation methods can be used depending on the shape and size of stiffeners. Choosing the most adapted one helps **reducing mounting time**, for a **cost-effective installation**.



ALU A-60 Deck



Single layer STEEL A-60 Deck, A-30, A-15



Double layer Thermal and acoustics



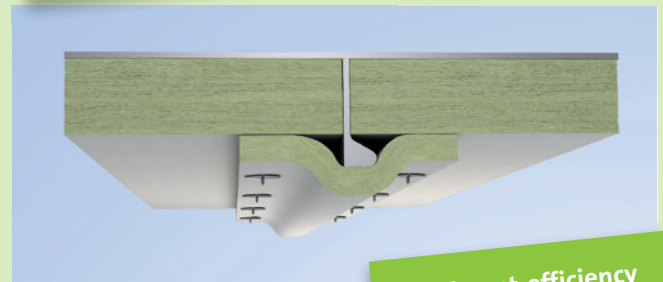
Cost-effective solutions

Quick-Cover system



- No pin on stiffeners
- Drastically reduced mounting time
- No waste due to off-cut
- Extremely fast and easy to install
- User-friendly

BREAKTHROUGH

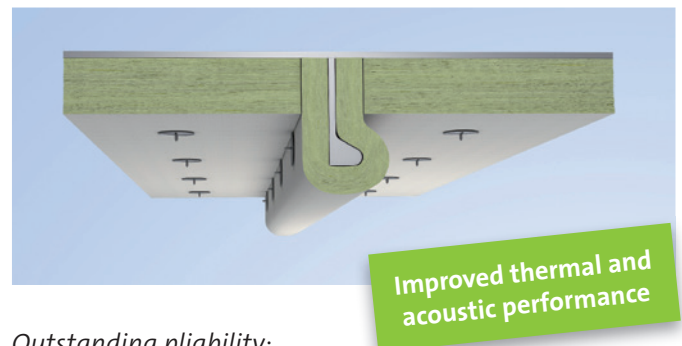


Available for all steel constructions tested according to FTP Code 2010

Wrap installation method



- Optimal safety
- No gap due to open joints
- No thermal bridge



Outstanding pliability: *ULTIMATE* can be “wrapped” around corners and stiffeners without edge breaks.

Less wastes

By using rolls instead of slabs, **wastes due to off-cut** left overs are **drastically reduced**. Customers can easily **save up to 15%** of the total quantity of insulation purchased.



Densities	Thickness	Form	Products Name	Theoretical waste due to off-cut			
				Distance between stiffeners			
				400 mm	450 mm	500 mm	550 mm
24 kg/m ³	50 mm	Roll	U SeaProtect Roll 24 Alu1 50 mm (14 m x 1,2 m)	0,0 %	0,4 %	0,0 %	1,8 %
				0 mm	50 mm	0 mm	250 mm
		Slab	U SeaProtect Slab 24 Alu1 50 mm (0,6 m x 1,2 m)	33,3 %	25,0 %	16,7 %	8,3 %
				200 mm	150 mm	100 mm	50 mm

ULTIMATE U SeaProtect mineral wool solutions enable to **save up to 50% on the weight of insulation** when compared to traditional stonewool solutions. All this is achieved with at least identical levels of safety and comfort.

Lower operating costs

When every extra kilogram means higher costs, the weight savings realized with ULTIMATE will **significantly reduce fuel consumption and emissions**.

Better stability

ULTIMATE solutions help to reduce weight in areas located above the waterline, contributing to a **better stability** of the ship by **lowering the Vertical Center of Gravity**.



Higher revenues

By reducing weight of insulation the deadweight of the ship increases proportionally.

ULTIMATE U SeaProtect solutions enable to **turn deadload into payload**.



- Significantly lower fuel consumption
- Decrease in emissions
- Possibility of higher speed
- Better stability

Case study : RoRo passenger ferry*

	Traditional stonewool	ULTIMATE	Difference
Estimated weight of insulation	575 t	295 t	- 280 t (-50%!)
Vertical center of gravity of the lightship	15,45 m	15,35 m	- 10 cm

With a cruise speed of 23 knots, approximately **180 000\$/year** can be **saved on fuel consumption****.

The reduction of the weight by 280 t corresponds to a potential **increase in the deadweight of this ship by 5,3%**, enabling **higher revenues** for the operator in the same proportion (equivalent weight to 6 trailers of 45 t each).

* Length 210 m, beam 29 m, 2800 passengers, 900 passenger cabins, 2 passenger public decks, 4 passenger cabin decks, 1 car deck.

** Calculation hypothesis: 15 h/day, 340 d/year and 300 t of HFO saved/year at 600 \$/ton of heavy fuel.



From beginning of the design phase, providing a **comfortable and quiet environment** for passengers and crew onboard is a major concern for ship-owners, naval architects and shipyards.

ULTIMATE U SeaProtect solutions for steel and aluminium constructions offer **excellent sound protection and high levels of thermal insulation** while providing ease of installation and substantial weight savings (up to 50% lighter when compared to traditional stonewool).

STEEL constructions



Plate: U SeaProtect Roll 24 50 mm
Stiffener: U SeaProtect Roll 24 50 mm
 $U^* = 0,716 \text{ W/m}^2\text{.K}$

Rw = 46 dB

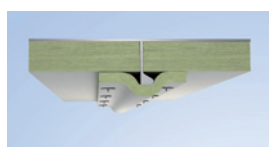


Plate: U SeaProtect Roll 36 70 mm
Stiffener: U SeaProtect Slab 76 25 mm
 $U^* = 0,645 \text{ W/m}^2\text{.K}$

Rw = 48 dB

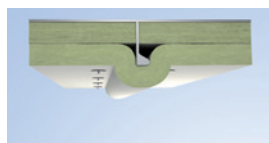
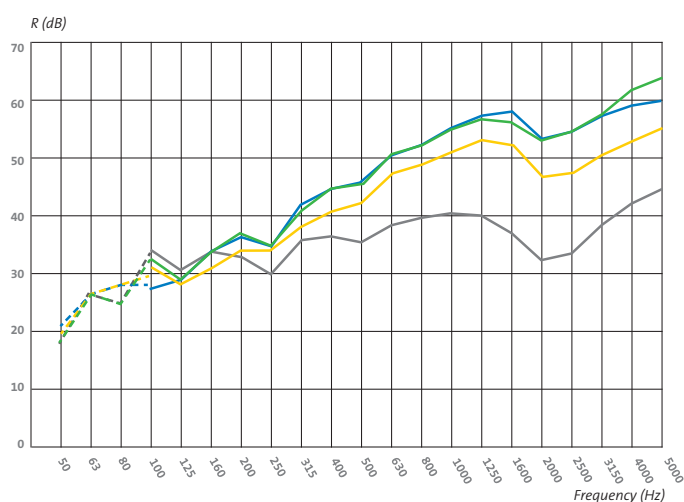


Plate: U SeaProtect Roll 24 50 mm x 2
Stiffener: U SeaProtect Roll 24 50 mm
 $U^* = 0,320 \text{ W/m}^2\text{.K}$

Rw = 49 dB

Steel Plate: 6 mm + Stiffeners x 2 L-shape:
115 mm x 80 mm 10 mm thick



ALU constructions

ALU A-60 Deck

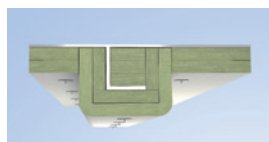


Plate: U SeaProtect Slab 66 30 mm x 2
on one side
Stiffener: U SeaProtect Slab 66
30 mm x 2
 $U^* = 0,574 \text{ W/m}^2\text{.K}$

Rw = 40 dB

ALU A-60 Bulkhead

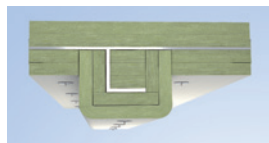
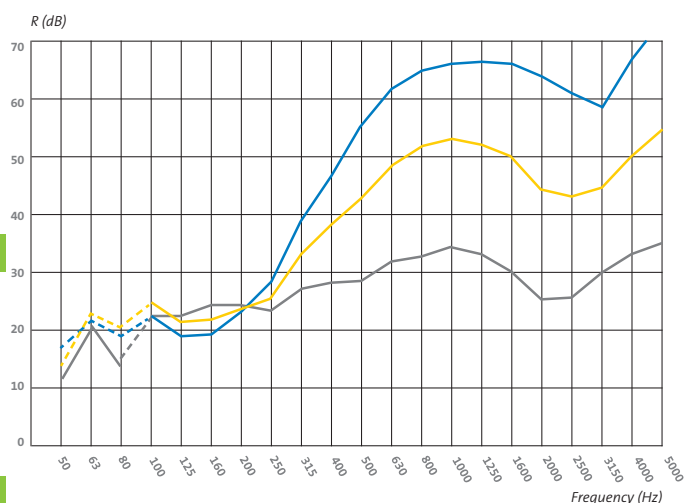


Plate: U SeaProtect Slab 66 30 mm x 2
on both sides
Stiffener: U SeaProtect Slab 66 30 mm
x 2
 $U^* = 0,286 \text{ W/m}^2\text{.K}$

Rw = 41 dB

Aluminium Plate: 6 mm + Stiffeners x 2 L-shape:
100 mm x 75 mm 9 mm thick



* The U-values declared are based on a 3D calculation model to take into account the geometry (presence of stiffeners) and the thermal bridges due to the pins. Reminder: The lower the U-value, the higher the thermal insulation protection.

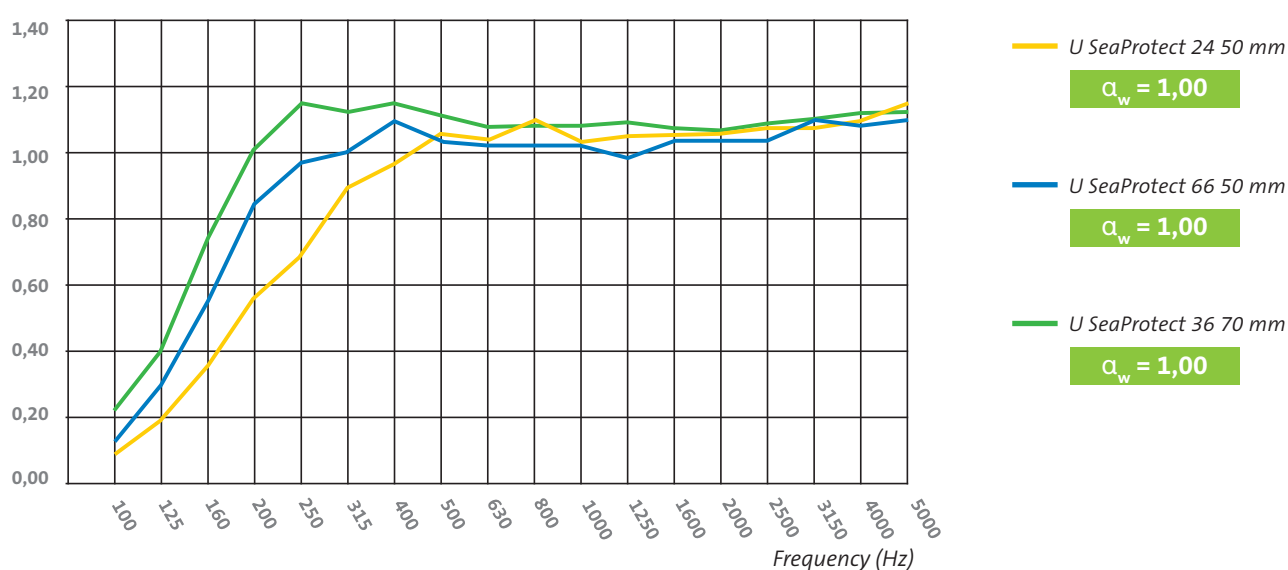


ULTIMATE acoustic properties

Sound absorption

ULTIMATE mineral wool products have **excellent sound absorption properties** thanks to their unique internal micro-structure (insulation mats made of long interwoven fibres). Using ULTIMATE solutions helps to create a **quiet environment** aboard a ship.

Acoustic absorption coefficient α_s

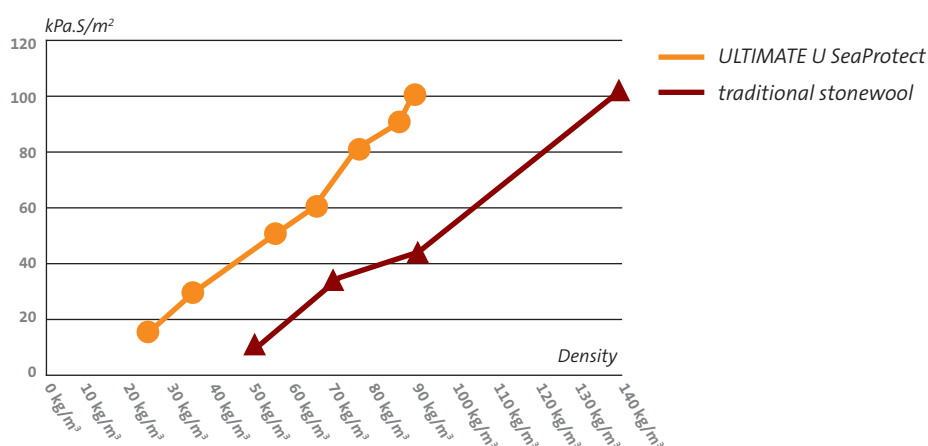


The root of ULTIMATE high acoustic performance

To achieve excellence in sound protection, acoustic theory and measurements concur to show that, for a given thickness, air flow resistivity is the main property to consider for a mineral wool product.

ULTIMATE mineral wool products have outstandingly high air flow resistivity values from density 36 kg/m³ onwards when compared to traditional Marine stone-wool products.

Air Flow resistivity

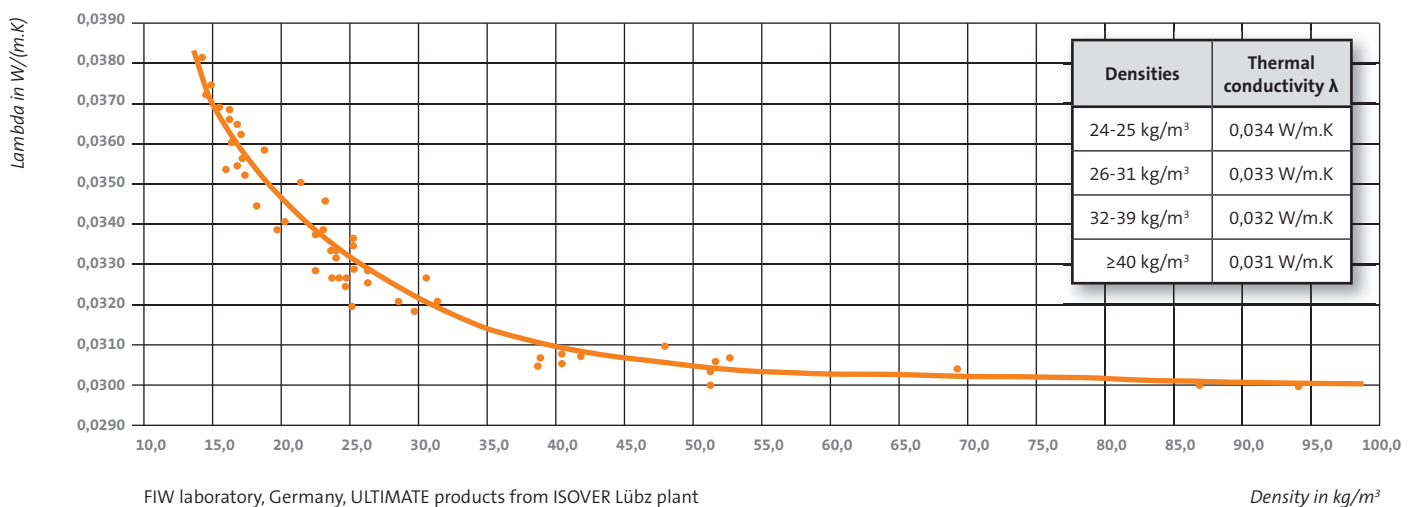




ULTIMATE thermal properties

Energy consumption related to **HVAC** (Heating Ventilation and Air Conditioning) systems constitutes **a large part of the total fuel consumption of a ship** (up to 35% for cruise ships).
Installing solutions which provide high thermal insulation of walls and ducts guarantees **best comfort of passengers and limited operating costs**.

Thermal conductivity (λ) measurement at 10°C



ULTIMATE mineral wool products have **excellent thermal performance** due to an unique internal microstructure (100% fiberized insulation mats, completely free of slugs).

For a same thickness, ULTIMATE U SeaProtect products achieve **equivalent or better thermal insulation** than traditional stonewool products while being **up to 50% lighter**.



Boligkvarter med helikopterdekk ankommer Stord – EG, Norway, GLAVA®



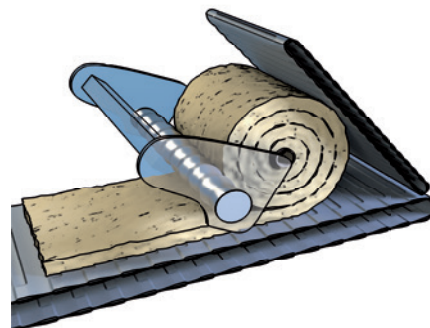
Gran Roque, Murueta, Spain, 2014, © Oliver Design



Optimal logistics

The use of rolls instead of slabs enables to **reduce drastically space and transport costs (~-40%)**.

ULTIMATE mats can be compressed in rolls during the packaging process without losing their mechanical properties. This operation is not possible for slabs.



Densities	Thickness	Form	Products Name	Quantity per pallet	Quantity per Truck (for 22 PAL)	Quantity per HC 40ft container (approx.)
24 kg/m ³	50 mm	Roll	U SeaProtect Roll 24 Alu1 50 mm	201,60 m ²	4.435,20 m ²	3.360,00 m ²
		Slab	U SeaProtect Slab 24 Alu1 50 mm	115,20 m ²	2.534,40 m ²	1.656,00 m ²

The use of rolls 24kg/m³ 50 mm instead of slabs enables to have 75 % more m² on a pallet and as well in a truck. The transport cost paid by m² when using rolls is consequently reduced by 42 %.

From a distributor point of view, for the same amount of products in m², it is also 42% less space occupied for storage and almost 2 times (1,7) less operations required for loading and carrying the pallets with a forklift.

Densities	Thickness	Form	Products Name	Content m ² /pack
24 kg/m ³	50 mm	Roll	U SeaProtect Roll 24 Alu1 50 mm	16,8 m ²
		Slab	U SeaProtect Slab 24 Alu1 50 mm	7,2 m ²

The higher quantity of insulation contained in a roll compared to a pack of slabs helps **reducing the cost of manual handling and carrying** of the products.



Up to
~ 40 %
space saved



Health, Safety & Environment

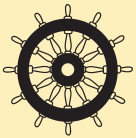
Care for health with ULTIMATE solutions

ULTIMATE mineral wool meets the EU criteria by receiving the **EUCEB** certification. It is even certificated according to **RAL** (stricter German requirement).

ULTIMATE mineral wool fibres are classified as **bio-soluble** and consequently non harmful to health.



Fully certified solutions



ISOVER constantly invests in development to supply its customer with products and systems tested according to latest **IMO regulations**. U SeaProtect solutions are registered to **MED, US Coast Guard, Chinese Class Society and Russian Maritime organization**, they have been approved by different major classification societies.



ULTIMATE marks for maximum safety onboard

ULTIMATE products are “marked” on their surface:

- **ULTIMATE brand** is visible
- a **couple of double digit** numbers are located at regular spaces (**density** and **thickness** of the product)

By helping to **make sure** that the **right products** have been used in the **right place**, ISOVER contributes to a safer environment onboard ships.



ULTIMATE solutions for active environmental protection

ULTIMATE U SeaProtect lightweight solutions are contributing to the protection of the environment on many aspects:

- by **reducing energy consumption** of ships
- by **decreasing fuel emissions** of ships
- by **reducing transport of goods**
- by **using less insulation raw material** for equivalent fire protection than traditional stonewool



MF Ampere, Fjellstrand AS, Norway, 2014, GLAVA®

ISOVER ULTIMATE: a reference in Marine applications

Since their **launch more than 10 years ago**, ULTIMATE lightweight solutions have proven their added value in Marine and Offshore many times. **A wide variety of ships and offshore constructions around the world** have been equipped **with ULTIMATE solutions**.

In the last years, ULTIMATE solutions, uniquely manufactured by ISOVER, were supplied to **all major shipyards building e.g. cruiseships** such as Meyer Werft, Meyer Turku, Fincantieri, Mitsubishi Heavy Industry, STX France.



Quantum of the Seas, Meyer Werft, Germany, 2014, © Michael Wessels / MiWeFotos.de



Natalia Bekker, Abeking & Rasmussen, Germany, 2009



Selbourn Sojourn, Mariotti Yard, Italy, 2010



CSGS Corporal Kaeble V.C., Davie shipyard, Canada, 2012 © Fisheries and Oceans



USS Mount Whitney, Viktor Lenac shipyard, Croatia, 2015



Cecon Excellence, Davie shipyard, Canada, 2014



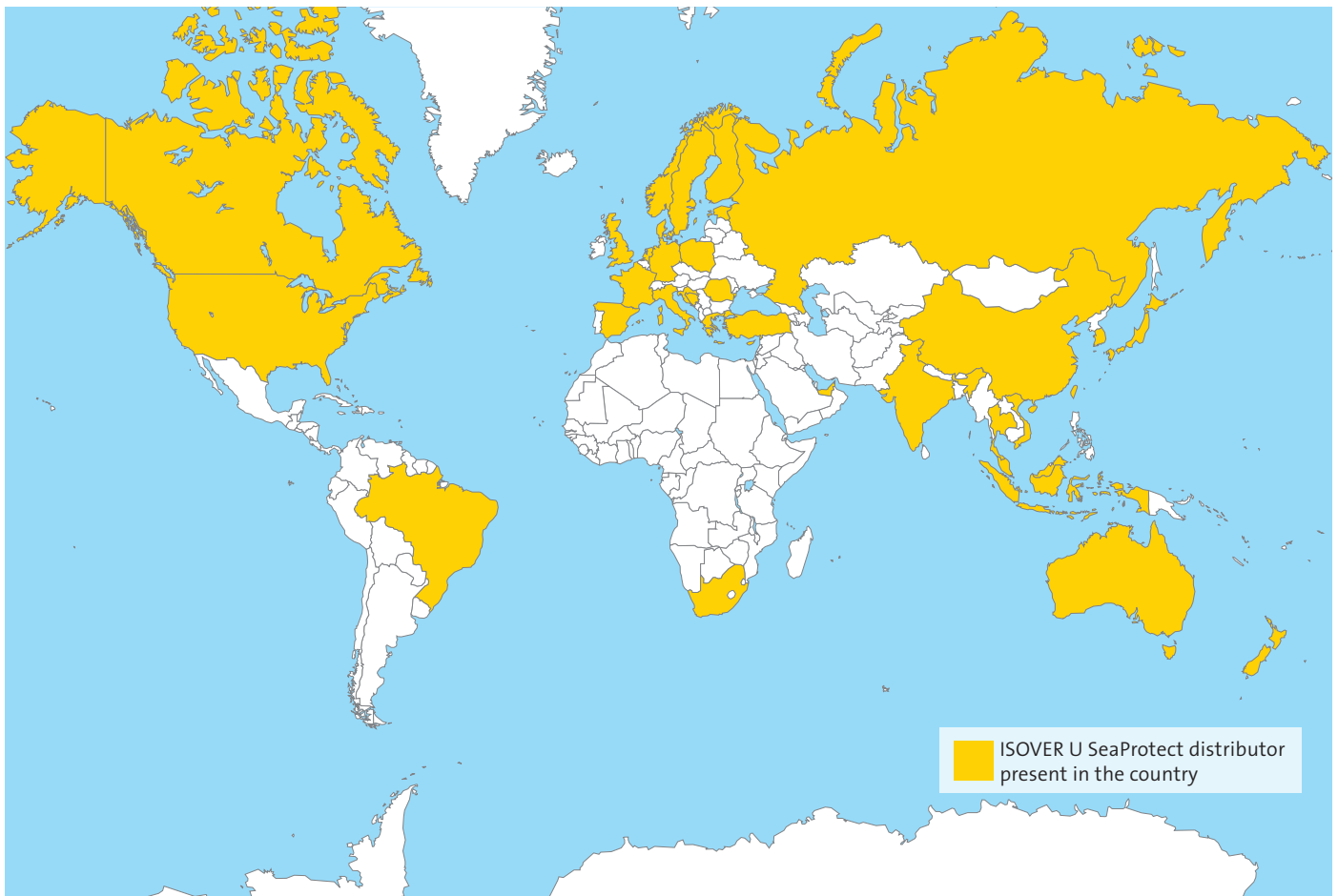
Piana, Brodogradjevna Industrija Split D.O.O., Croatia, 2011



Sleipner A, Sleipner øst Stenning, Norway, © Jyvind Hagen, GLAVA®

ISOVER Marine & Offshore worldwide

ISOVER has developed during the past decade **a wide network of selected distributors and partners** in the Marine & Offshore sector. Do not hesitate to contact us to get advices on the nearest dealer able to supply you in the best way with ISOVER solutions.



Rainbow Warrior III, Fassmer GmbH, Germany, 2011



Norwegian Escape, Meyer Werft, Germany, 2015
© Ingrid Fiebak-Kremer

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MARINE APPLICATIONS