

0809

MARINE AND OFFSHORE PRODUCTS AND SOLUTIONS

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PAROC® MARINE INSULATIONS MEET ALL REQUIREMENTS

The shipbuilding industry sets very high requirements for safety and comfort on board. Products and constructions to be used for fire protection must be tested and approved according to the rules and regulations of IMO (International Maritime Organisation).

NON-COMBUSTIBILITY

PAROC Marine insulations are manufactured from stone and the products have excellent properties as a passive guarantee of the fire safety of ships. PAROC stone wool products are capable of withstanding high temperatures.

The determination of non-combustibility in accordance with IMO FTP Code Part 1 has been performed for all PAROC Marine insulations. Continuous quality control of the products is performed by VTT (Technical Research Centre of Finland).

CONSTRUCTION APPROVALS

PAROC products have been tested in various A- and H-class deck and bulkhead constructions and in numerous fire door and panel constructions.

Paroc marine insulations meet the requirements of their users in the following areas:

- Fire protection of constructions and components
- Heating economy of ships and comfort of their passengers, heat and cold insulations
- Good acoustic properties of constructions and devices
- Insulation materials used as surface materials are functional and easy to clean
- Meeting the requirements of Classification Institutes and National Marine Authorities in accordance with the rules and regulations of IMO and the Marine Equipment Directive (modules B and D).

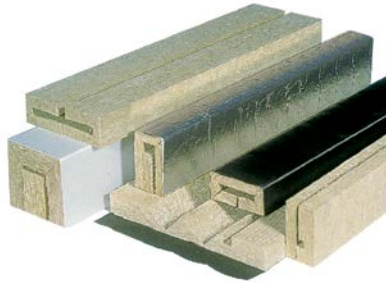
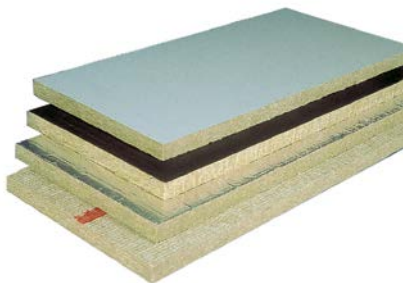
FIRE INSULATION PRODUCTS

Fire insulation on ships must meet very high requirements. Paroc has tested several A-class constructions for aluminium and steel decks and bulkheads. Products are PAROC Marine Wired Mats and PAROC Marine Fire Slabs, both with and without facings.

Plain insulation is used in facilities where it lies behind other constructions or in rooms, where it must be protected by steel sheets (i.e. against mechanical stress).

A functional insulation solution for car decks and engine rooms can be achieved using pre-coated slabs and preformed insulations. Coated products ensure a clean and easily maintained final surface. The range of facings includes glass fibre cloths 50-400 g / m² and aluminium foils.

The quick and easy installation of coated fire insulation ensures considerable cost savings. Coated products also enable using more lightweight overall solutions than before. For the user this means quieter and more comfortable working facilities.



PAROC MARINE NAVIS SLAB 60

- Decks and bulkheads in steel
- Air-conditioning devices and ducts
- Products with facing especially for car decks, engine rooms and air-conditioning machine rooms

PAROC MARINE FIRE SLAB 80

PAROC MARINE FIRE SLAB 100

- Decks and bulkheads in steel and aluminium constructions
- Fire doors
- Wall cassettes
- Air-conditioning devices and ducts
- Products with facing especially for car decks, engine rooms and air-conditioning machine rooms

PREFORMED BLOCKS MADE

- Different kind of beams in various sizes
- Used in combination with: PAROC Marine Navis Slab 60, PAROC Marine Fire Slab 80 and PAROC Marine Fire Slab 100

PAROC MARINE WIRED MAT 80 PAROC MARINE WIRED MAT 100

- Decks and bulkheads in steel and aluminium constructions
- Circular ducts
- Products with facing above suspended ceilings and in maintenance facilities

The product is also available without the net.

THERMAL INSULATION PRODUCTS

Thermal insulation together with fire and sound insulation create the basis for comfort on board. By choosing the right thermal insulation solutions, the optimum indoor climate temperature and energy savings can be achieved. In addition, the excellent acoustic properties of PAROC stone wool can be utilized.

In shipbuilding plain thermal insulation is used in facilities where it lies behind other constructions. Coated slabs and mats are used as thermal insulation above suspended ceilings and in facilities where they remain visible. The range of facings includes several alternatives from aluminium foil to glass fibre cloths.



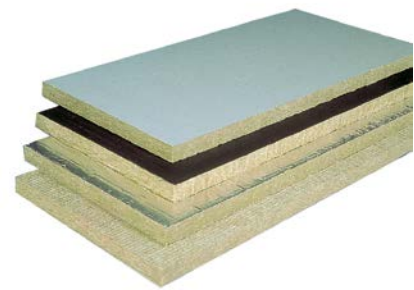
PAROC MARINE WIRED MAT 40

- Decks, bulkheads and outer bulkheads
- Products with facing above suspended ceilings and in facilities where they remain visible
- Machinery and devices with temperature $\leq 200^{\circ}$



PAROC MARINE MAT 35 ALUCOAT

- Thermal and condensation insulation of ducts and devices



PAROC MARINE SLAB 30, 40, 60

- Various applications
- Devices and tanks with flat surfaces
- Sound insulation above suspended ceilings
- With aluminium foil as condensation insulation and in applications where thick insulation is required
- Products with facing in facilities where they remain visible
- Machinery and devices

INSULATIONS FOR AIR DUCTS AND PIPES

PAROC products ensure the comfort, safety and economic efficiency of duct and pipe insulations on board. Several facing options, fit to size pipe sections and a wide range of mats enable easy and fast installation and prepare the way for the optimum end solution.

PAROC Marine Wired Mats are made of stone wool and are used as thermal insulation for smoke ducts and chimneys on ships. If required, the wire net can also be made of stainless steel with a higher temperature resistance than galvanized wire netting. Depending on the application of the PAROC Section, it can also be produced with aluminium foil or glass fibre cloth.

Thermal and condensation insulations for air-conditioning devices are coated with aluminium foil reinforced with glass fibre. These products are ideal for the insulation of rectangular and round ducts.



PAROC HVAC SECTION ALUCOAT T PAROC HVAC COMBI ALUCOAT T

- Thermal and condensation insulation of pipes and ducts
- Tape in the longitudinal seam
- Surface temperature of the facing must not exceed 80 °C



PAROC PRO SECTION 100

- Steam pipes
- Heating pipes
- Fuel oil pipes
- Exhaust gas pipes
- Sprinkler pipes
- Deck pipes
- Sewage pipes
- Maximum service temperature 640 °C.
- The product can also be manufactured with a density of 140 kg/m³ (PAROC Pro Section 140).



PAROC PRO SECTION 100 G4

- Thermal and condensation insulation of pipes and ducts
- For applications requiring excellent durability from the facing e.g. on car decks, engine rooms and passages.
- The product can also be manufactured with aluminium foil on top (facing G7). The overlapping of these facings can be heat sealed.



PAROC MARINE WIRED MAT 100 AND PAROC MARINE WIRED MAT 100 ALUCOAT

- Smoke ducts and chimneys
- Exhaust gas dampers
- Large pipe elbows
- Penetrations of air ducts



PAROC PRO LAMELLA MAT ALUCOAT

- Thermal and condensation insulation of ducts
- For applications where higher compressive strength is required



PAROC MARINE MAT 35 ALUCOAT

- Thermal and condensation insulation of ducts and devices

SPECIAL INSULATION SOLUTIONS

Many kinds of prefabricated products, for example insulations for cabins, panels, fire doors and ventilation machinery are used in the shipbuilding industry. Manufacturers of these products often require customer-specified and tailored solutions.

The purpose of PAROC Marine insulations is to offer a solution for every part of the ship where some kind of insulation is needed.

Our range of products also covers the insulating materials needed by subcontractors within shipbuilding.



PAROC MARINE SLABS

- Wall panels and cassettes
- Suspended ceiling panels
- Floating floors
- As lamellas in wall and floor panels
- Fire doors

PAROC MARINE SLAB 220 AND PAROC MARINE SLAB 250

- Ship cabin constructions and cassettes
- Sound reduction panels
- Draught barriers
- Doors, wall and ceiling panels

PRODUCTS:

PAROC Marine Slab 130
PAROC Marine Floor Slab 140
PAROC Marine Fire Slab 150
PAROC Marine Slab 160
PAROC Marine Slab 180



PAROC MARINE FACINGS

ALUCOAT Reinforced aluminium foil facing, 62–80 g/m²

ALUCOAT T Reinforced aluminium foil facing with tape on the longitudinal seam, available only on pipe sections, 62–80 g/m²

G1 White glass fibre facing, ~210 g/m²

G2 Black glass fibre facing, ~200 g/m²

G3 White glass fibre facing, ~430 g/m²

G4 White glass fibre facing with aluminium below, ~250 g/m²

G7 White glass fibre facing with aluminium on top, ~250 g/m²

N1 Grey non-woven tissue, ~50 g/m²

N3 Black non-woven tissue, ~60 g/m²

N5 Grey non-woven tissue, ~60 g/m²



TECHNICAL DATA

STONE WOOL MATS

| Product | Nominal density kg/m ³ | Compressive stress (10% deformation) kPa | Maximum service temperature °C ^{1) 3)} | Thermal conductivity (W/mK) Mean temperature ³⁾ | | | | |
|-------------------------------|--------------------------------------|--|--|---|-------|--------|--------|--------|
| | | | | 10 °C | 50 °C | 100 °C | 200 °C | 300 °C |
| PAROC Marine Wired Mat 40 | 40 | | 250 | 0.036 | | | | |
| PAROC Marine Wired Mat 80 | 80 | | 640 | 0.036 | 0.040 | 0.046 | 0.064 | 0.089 |
| PAROC Marine Wired Mat 100 | 100 | | 660 | 0.039 | 0.042 | 0.047 | 0.063 | 0.083 |
| PAROC Pro Lamella Mat AluCoat | 50 | | 250 ²⁾ | 0.039 | 0.045 | 0.055 | 0.081 | |
| PAROC Marine Mat 30 | 30 | | 250 | 0.039 | | | | |
| PAROC Marine Mat 35 AluCoat | 35 | | 250 ²⁾ | 0.036 | | | | |

STONE WOOL SLABS

| Product | Nominal density kg/m ³ | Compressive stress (10% deformation) kPa | Maximum service temperature °C ^{1) 3)} | Thermal conductivity (W/mK) Mean temperature ³⁾ | | | | | | | |
|----------------------------|--------------------------------------|--|--|---|-------|--------|--------|--------|--------|--------|--------|
| | | | | 10 °C | 50 °C | 100 °C | 200 °C | 300 °C | 400 °C | 500 °C | 600 °C |
| PAROC Marine Slab 30 | 30 | | 250 | 0.039 | 0.042 | 0.054 | 0.085 | 0.132 | | | |
| PAROC Marine Slab 40 | 40 | 1 | 350 | 0.037 | 0.042 | 0.054 | 0.085 | | | | |
| PAROC Marine Slab 60 | 60 | 3 | 350 | 0.037 | 0.042 | 0.048 | 0.067 | | | | |
| PAROC Marine Navis Slab 60 | 60 | 5 | 550 | 0.032 | 0.038 | 0.045 | 0.063 | 0.086 | 0.116 | 0.153 | |
| PAROC Marine Slab 80 | 80 | 10 | 550 | 0.037 | 0.043 | 0.047 | 0.065 | 0.095 | 0.138 | 0.196 | |
| PAROC Marine Fire Slab 80 | 80 | 10 | 550 | 0.037 | 0.043 | 0.047 | 0.065 | 0.095 | 0.138 | 0.196 | |
| PAROC Marine Fire Slab 100 | 100 | 10 | 550 | 0.037 | 0.043 | 0.047 | 0.065 | 0.095 | 0.138 | 0.196 | |
| PAROC Marine Slab 130 | 130 | 20 | 660 | | 0.042 | 0.046 | 0.060 | 0.081 | 0.110 | 0.147 | 0.192 |
| PAROC Marine Fire Slab 150 | 150 | 20 | 660 | | 0.042 | 0.046 | 0.060 | 0.081 | 0.110 | 0.147 | 0.192 |
| PAROC Marine Slab 160 | 160 | 40 | 660 | 0.039 | 0.042 | 0.046 | 0.060 | 0.081 | 0.110 | 0.147 | 0.192 |
| PAROC Marine Slab 180 | 180 | 50 | 660 | 0.039 | 0.042 | 0.046 | 0.060 | 0.081 | 0.110 | 0.147 | 0.192 |
| PAROC Marine Slab 220 | 220 | 60 | 660 | | 0.047 | 0.050 | 0.058 | 0.071 | 0.087 | 0.107 | 0.131 |
| PAROC Marine Slab 250 | 250 | 80 | 660 | | 0.047 | 0.050 | 0.058 | 0.071 | 0.087 | 0.107 | 0.131 |

STONE WOOL PIPE SECTIONS

| Product | Maximum service temperature °C ¹⁾ | Thermal conductivity (W/mK) Mean temperature ³⁾ | | | | | | |
|------------------------------|---|---|-------|--------|--------|--------|--------|--------|
| | | 10 °C | 50 °C | 100 °C | 150 °C | 200 °C | 300 °C | 400 °C |
| PAROC Hvac Section AluCoat T | 250 ²⁾ | 0.034 | 0.037 | 0.044 | 0.053 | 0.063 | --- | |
| PAROC Pro Section 100 | 640 | | 0.040 | 0.046 | | 0.064 | 0.092 | |
| PAROC Pro Section 140 | 680 | | 0.042 | 0.047 | | 0.065 | 0.087 | 0.115 |

¹⁾ PAROC stone wool products are capable of withstanding high temperatures. The binder starts to evaporate when its temperature exceeds approximately 200 °C. While the insulating properties remain unchanged, the compressive stress weakens. The softening temperature of stone wool products is over 1000 °C.

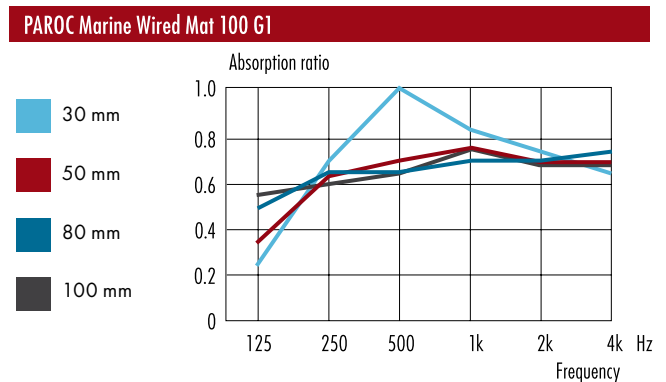
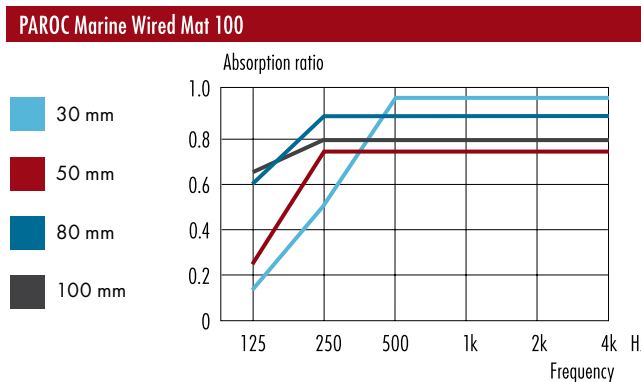
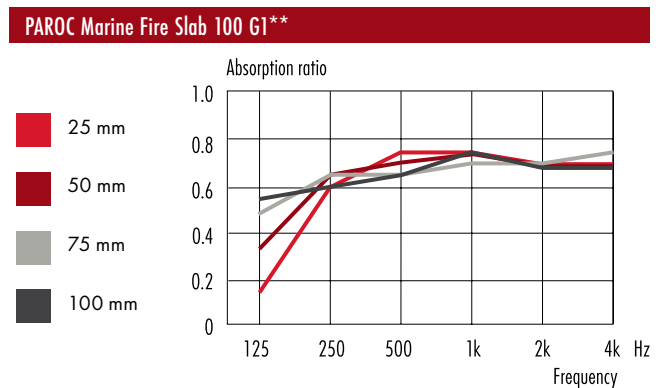
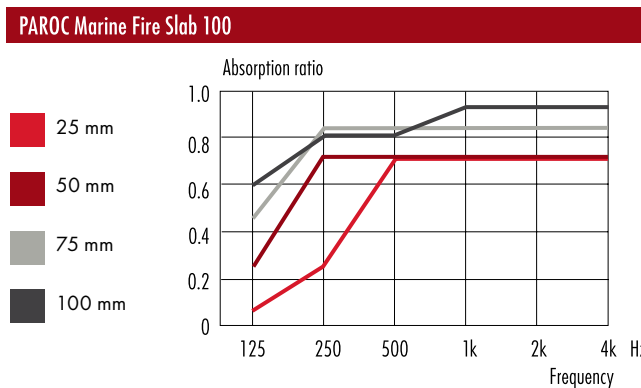
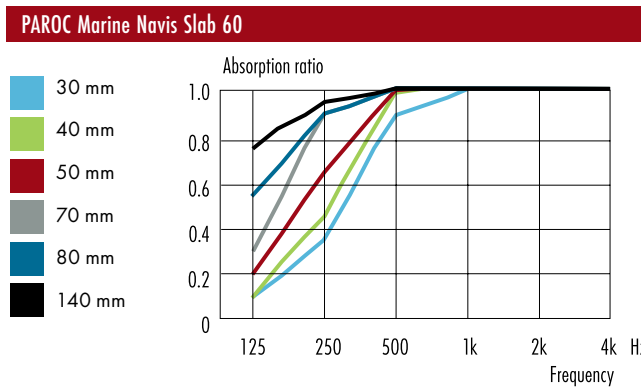
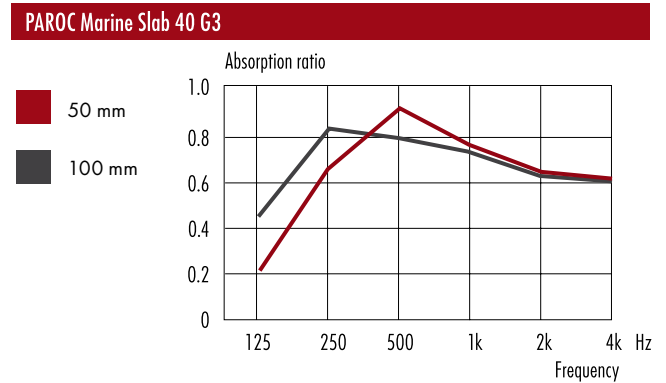
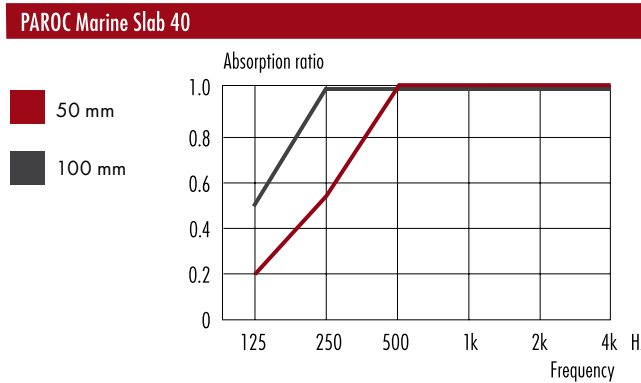
²⁾ The surface temperature of the facing must not exceed +80 °C (temperature restriction determined in accordance with heat resistance of adhesive).

³⁾ Values declared by the manufacturer.

See product data sheets for dimensions and other information.

SOUND ABSORPTION*

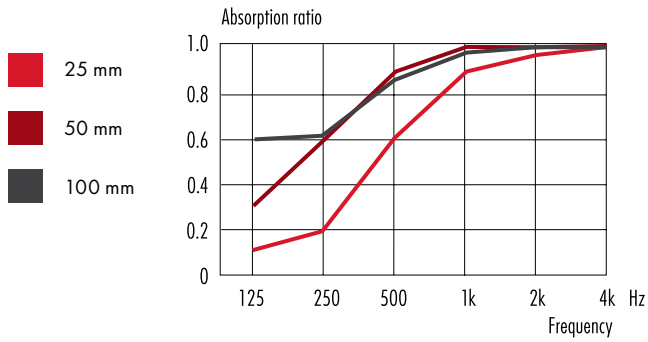
Values tested in accredited testing laboratories according to EN ISO 354:2003 and EN ISO 11654:1997.



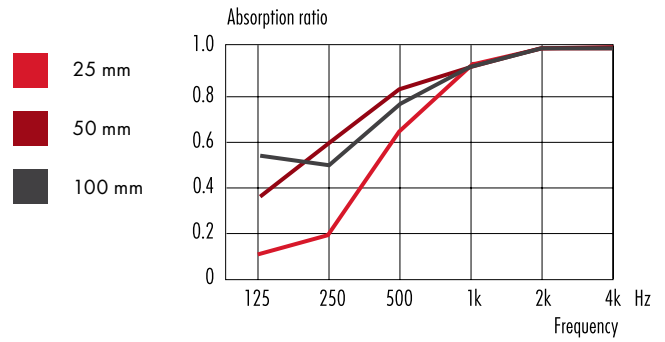
* The following sound attenuation measurements are done by certified Laboratories.

** Estimated values based on existing results.

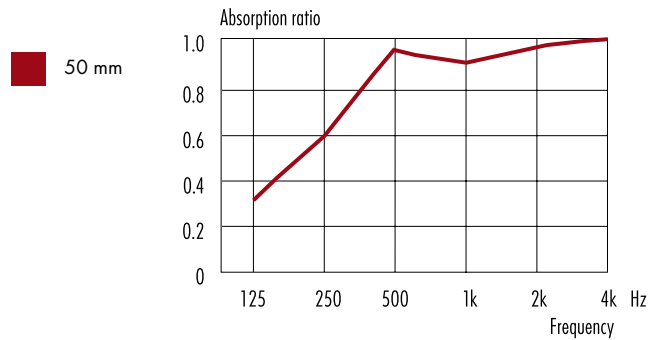
PAROC Marine Slab 130



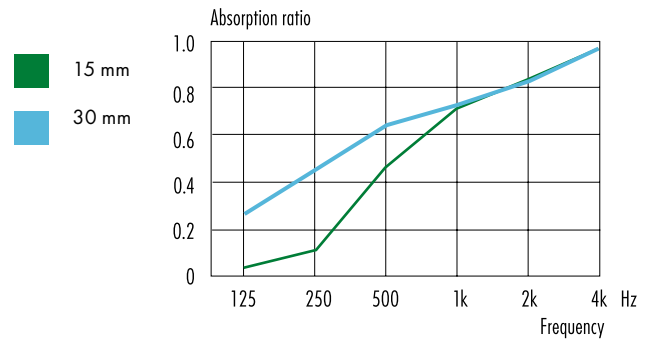
PAROC Marine Slab 160



PAROC Marine Floor Slab 140



PAROC Marine Slab 220



| Product | Weighted absorption α_w | Absorption class |
|---------------------------------------|--------------------------------|------------------|
| PAROC Marine Navis Slab 60, 30 mm | 0.65 (MH) | C |
| PAROC Marine Navis Slab 60, 40 mm | 0.75 (MH) | C |
| PAROC Marine Navis Slab 60, 50 mm | 0.95 | A |
| PAROC Marine Navis Slab 60, 70 mm | 1.00 | A |
| PAROC Marine Navis Slab 60, 80 mm | 1.00 | A |
| PAROC Marine Navis Slab 60, 140 mm | 1.00 | A |
| PAROC Marine Fire Slab 100, 25 mm | 0.55 | D |
| PAROC Marine Fire Slab 100, 50 mm | 1.00 | A |
| PAROC Marine Fire Slab 100, 75 mm | 1.00 | A |
| PAROC Marine Fire Slab 100, 100 mm | 1.00 | A |
| PAROC Marine Fire Slab 100 G1, 25 mm | 0.75 | C |
| PAROC Marine Fire Slab 100 G1, 50 mm | 0.75 | C |
| PAROC Marine Fire Slab 100 G1, 75 mm | 0.70 | C |
| PAROC Marine Fire Slab 100 G1, 100 mm | 0.70 | C |
| PAROC Marine Wired Mat 100, 30 mm | 0.80 (H) | B |
| PAROC Marine Wired Mat 100, 50 mm | 1.00 | A |
| PAROC Marine Wired Mat 100, 80 mm | 1.00 | A |
| PAROC Marine Wired Mat 100, 100 mm | 1.00 | A |
| PAROC Marine Wired Mat 100 G1, 30 mm | 0.80 | B |
| PAROC Marine Wired Mat 100 G1, 50 mm | 0.75 | C |
| PAROC Marine Wired Mat 100 G1, 80 mm | 0.70 | C |
| PAROC Marine Wired Mat 100 G1, 100 mm | 0.70 | C |

| Product | Weighted absorption α_w | Absorption class |
|------------------------------------|--------------------------------|------------------|
| PAROC Marine Slab 40, 50 mm | 0.85 (H) | B |
| PAROC Marine Slab 40, 100 mm | 1.00 | A |
| PAROC Marine Slab 40 G3, 50 mm | 0.70 (L) | C |
| PAROC Marine Slab 40 G3, 100 mm | 0.70 (L) | C |
| PAROC Marine Slab 130, 25 mm | 0.50 (HH) | D |
| PAROC Marine Slab 130, 50 mm | 0.85 (H) | B |
| PAROC Marine Slab 130, 100 mm | 0.85 (H) | B |
| PAROC Marine Slab 160, 25 mm | 0.50 (MH) | D |
| PAROC Marine Slab 160, 50 mm | 0.85 (H) | B |
| PAROC Marine Slab 160, 100 mm | 0.80 (H) | B |
| PAROC Marine Floor Slab 140, 50 mm | 0.90 (H) | A |
| PAROC Marine Slab 220, 15 mm | 0.90 (MH) | D |
| PAROC Marine Slab 220, 30 mm | 0.70 (H) | C |

A-CLASS STEEL DECKS AND BULKHEADS

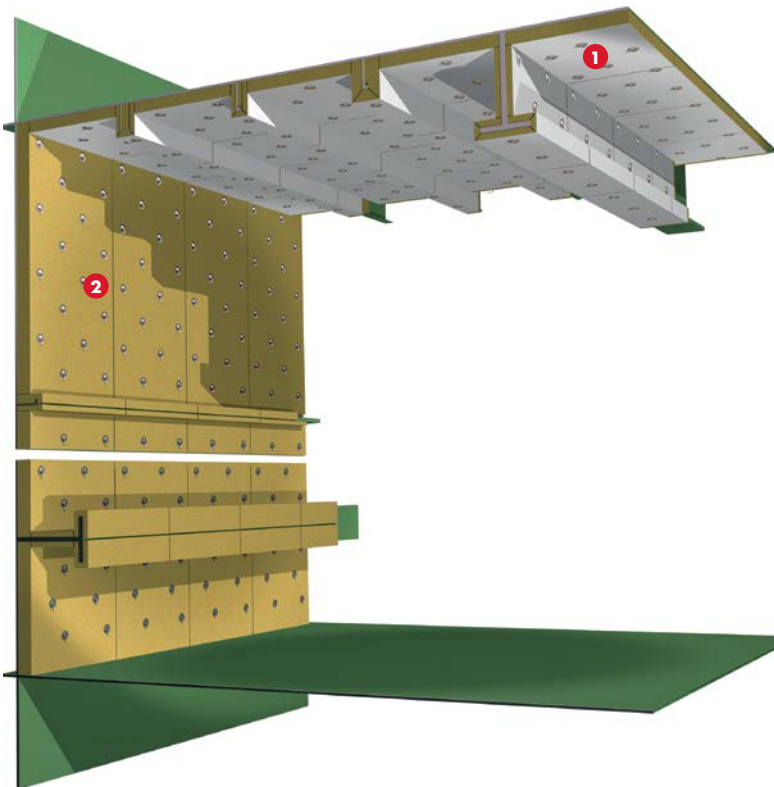
PAROC LIGHT MARINE FIRE PROTECTION SOLUTIONS



Paroc brings lighter weight to the existing, internationally recognised marine offering. PAROC Light Marine are new lightweight solutions for fire insulated decks and bulkheads, suited for weight critical projects.

A-CLASS FIRE PROTECTION

Among the first solutions to receive Light Marine treatment are Paroc slabs for A-class steel decks and bulkheads.



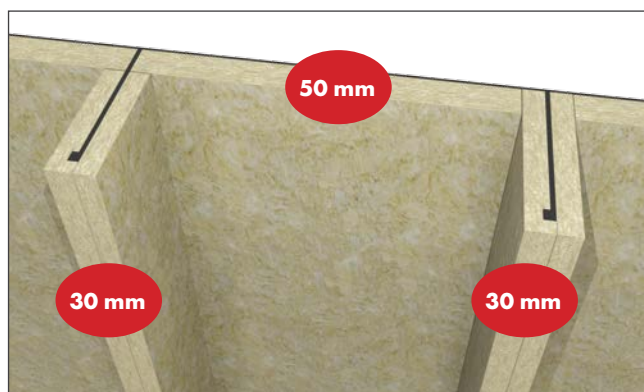
PAROC LIGHT MARINE SOLUTIONS

- Up to 40% weight reduction
- One density – four thicknesses
- Efficient logistics
- Same product for the stiffeners
- Flexible installation

PAROC LIGHT MARINE BENEFITS

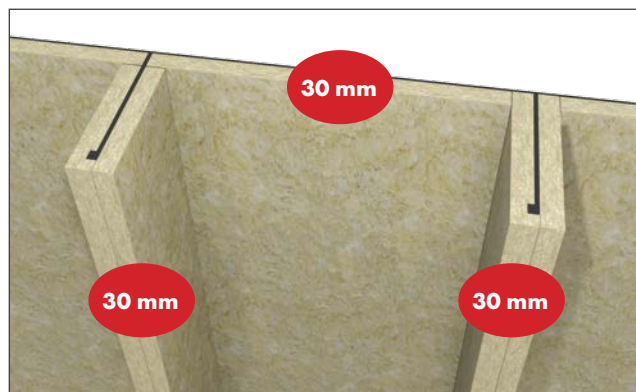
- Financial benefits
- Lower operating costs
- Reduced weight
- Increased speed
- Lower fuel consumption
- Decrease in emissions

STEEL DECKS A60 AND A30



Example of A60 class solution for steel deck with PAROC Marine Navis Slab 60. Insulating thickness on deck is 50 mm and on stiffener 30 mm.

IMO 2010 FTPC 50/30 mm.



Example of A30 class solution for steel deck with PAROC Marine Navis Slab 60. Insulating thickness on deck and on stiffener is 30 mm.

IMO 2010 FTPC 30/30 mm.

STEEL BULKHEADS A60 AND A30



Example of A60 class solution for steel deck with PAROC Marine Navis Slab 60. Insulating thickness on bulkhead is 70 mm and on stiffener 30 mm.

IMO 2010 FTPC 70/30 mm.



Example of A30 class solution for steel deck with PAROC Marine Navis Slab 60. Insulating thickness on bulkhead is 40 mm and on stiffener 30 mm.

IMO 2010 FTPC 40/30 mm.

Notice!

PAROC Marine Fire Slabs can be covered with aluminium foil or with black or white glass fibre facing.

Notice!

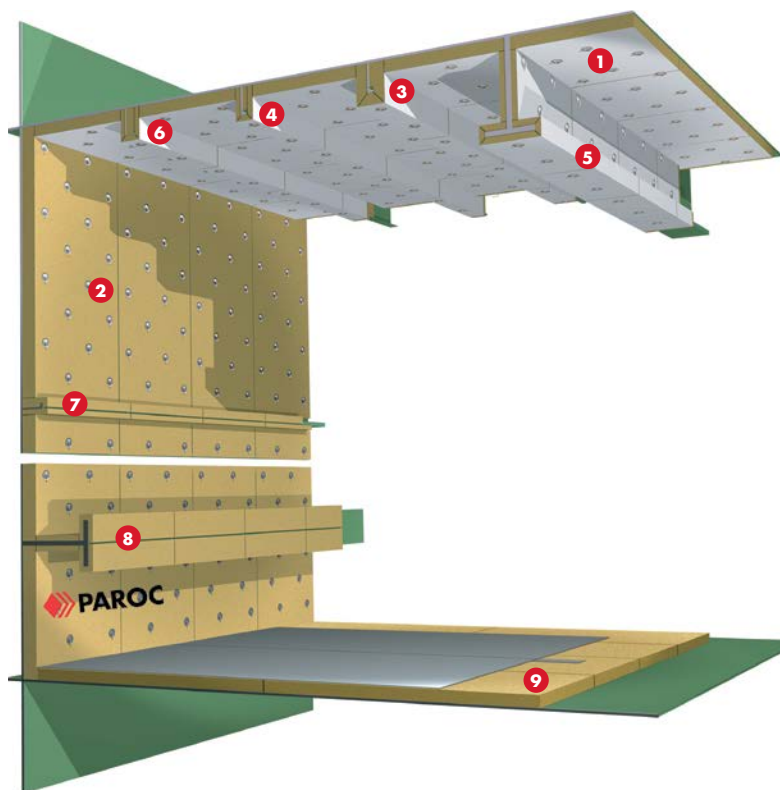
Only rule for pinning is that the maximum distance between the pins is 300 mm.

| Class | Product | Nominal density kg/m³ | IMO 2010 FTPC | | | Sound reduction Rw (C, Ctr), dB |
|------------------|---------|----------------------------|---------------------------|---------------|---------|------------------------------------|
| | | | Level/Stiffener | | | |
| | | | Insulating thickness, mm* | Weight, kg/m³ | | |
| STEEL DECKS: | | | | | | |
| 1 | A60 | PAROC Marine Navis Slab 60 | 60 | 50/30 | 4.2/1.8 | 47 (-1, -6) |
| | A30 | PAROC Marine Navis Slab 60 | 60 | 30/30 | 4.2/1.8 | 46 (-2, -6) |
| STEEL BULKHEADS: | | | | | | |
| 2 | A60 | PAROC Marine Navis Slab 60 | 60 | 70/30 | 3.0/1.8 | 47 (-1, -6) |
| | A30 | PAROC Marine Navis Slab 60 | 60 | 40/30 | 1.8/1.8 | 47 (-2, -6) |

* Please check validity of the certification from Paroc sales.

A-CLASS STEEL DECKS AND BULKHEADS

FIRE PROTECTION SOLUTIONS WITH SLABS



Notice!

PAROC Marine Fire Slabs can be covered with aluminium foil or with black or white glass fibre facing.

Notice!

Only rule for pinning is that the maximum distance between the pins is 300 mm.

Notice!

Only 2 products to cover all 4 solutions in A60 and A30.

| Class | Product | Nominal density kg/m³ | IMO 2010 FTPC | | | |
|----------------------------------|---------|--|---|------------------------------------|------------------------------------|-------------|
| | | | Insulating thickness level/stiffener, mm* | | Sound reduction Rw (C, Ctr), dB | |
| STEEL DECKS: | | | | | | |
| 1 | A60 | PAROC Marine Fire Slab 100 | 100 | 40/25 | 50/25 | 47 (-2, -6) |
| | A30 | PAROC Marine Fire Slab 100 | 100 | 25/25 | 25/25 | 46 (-2, -5) |
| | A30 | PAROC Marine Fire Slab 80 | 80 | 40/40 (160 mm along the stiffener) | | 45 (-1, -4) |
| | A15 | PAROC Marine Fire Slab 80 | 80 | 40/0 | | 45 (-1, -4) |
| STEEL BULKHEADS: | | | | | | |
| 2 | A60 | PAROC Marine Fire Slab 100 | 100 | 60/25 | 75/25 or 50+25/25 | 49 (-1, -6) |
| | A60 | PAROC Marine Fire Slab 100 / PAROC Marine Wired Mat 100 | 100 | | 75/30 | 49 (-2, -6) |
| | A30 | PAROC Marine Fire Slab 100 | 100 | 40/25 | 50/25 | 47 (-2, -6) |
| | A15 | PAROC Marine Fire Slab 80 | 80 | 40/0 | | 45 (-1, -4) |
| PRODUCTS TO USE WITH STIFFENERS: | | | | | | |
| 3 | | PAROC Marine Fire Slab 100, HP | 100 | | | |
| 4 | | PAROC Marine Fire Slab 100, HPL | 100 | | | |
| 5 | | PAROC Marine Fire Slab 100, T | 100 | | | |
| 6 | | PAROC Marine Fire Slab 100, L | 100 | | | |
| 7 | | PAROC Marine Fire Slab 100, Pulb | 100 | | | |
| 8 | | PAROC Marine Fire Slab 100, T | 100 | | | |
| FLOATING FLOOR: | | | | | | |
| 9 | A60 | PAROC Marine Floor Slab 140 | 140 | | 50 | |

* Please check validity of the certification from Paroc sales.

STEEL DECKS A60, A30 AND A15



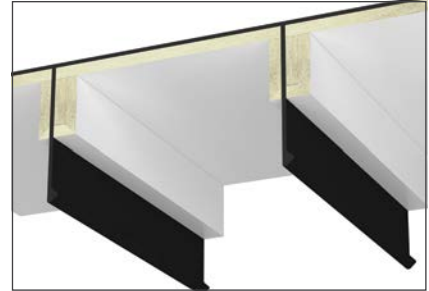
Example of A60 class solution for steel deck with PAROC Marine Fire Slab 100 G1 and preformed block PAROC Marine Fire Slab 100 G1, HPL. Insulating thickness on deck is 40 mm and on stiffener 25 mm.

IMO 2010 FTFC 50/25 mm.



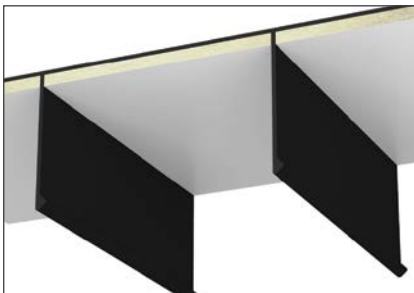
Example of A30 class solution for steel deck with PAROC Marine Fire Slab 100 G1 and preformed block PAROC Marine Fire Slab 100 G1, HPL. Insulating thickness on deck and stiffener is 25 mm.

IMO 2010 FTFC 25/25 mm.



Example of A30 class solution for steel deck with PAROC Marine Fire Slab 80 G1. Insulating thickness on deck is 40 mm and on stiffener 40 mm (160 mm along the stiffener).

IMO 2010 FTFC 40/40 mm, 160 mm along the stiffener.



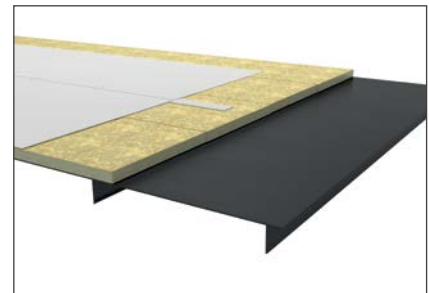
Example of A15 class solution for steel deck with PAROC Marine Fire Slab 80 G1. Insulating thickness on deck is 40 mm. **No insulation on stiffener.**

IMO 2010 FTFC 40/0 mm.

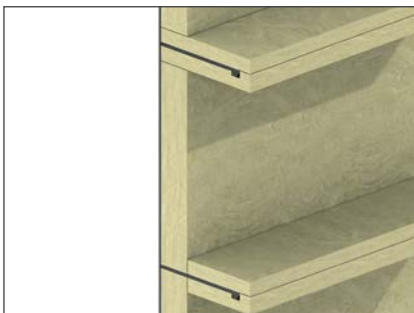
FLOATING FLOOR

Example of A60 floating floor solution for steel deck with PAROC Marine Floor Slab 140, thickness min 50 mm. Slabs are covered by one layer of min. 3 mm steel sheets spot welded or screwed together (pitch max 300 mm) by means of min. 1,5 mm thick steel flats having width of min. 100 mm.

IMO 2010 FTFC 50 mm.



STEEL BULKHEADS A60, A30 AND A15



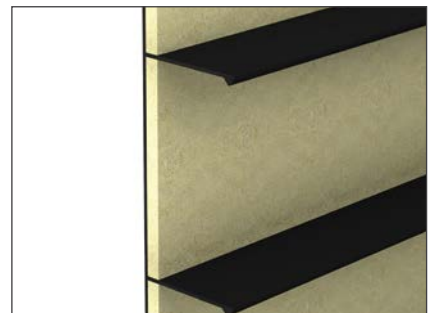
Example of A60 class solution for steel bulkhead with PAROC Marine Fire Slab 100 and preformed block PAROC Marine Fire Slab 100, Pulb. Insulating thickness on bulkhead is 60 mm and on stiffener 25 mm.

IMO 2010 FTFC 75/25 mm or 50+25/25 mm.



Example of A30 class solution for steel bulkhead with PAROC Marine Fire Slab 100 and preformed block PAROC Marine Fire Slab 100, Pulb. Insulating thickness on bulkhead is 40 mm and on stiffener 25 mm.

IMO 2010 FTFC 50/25 mm.



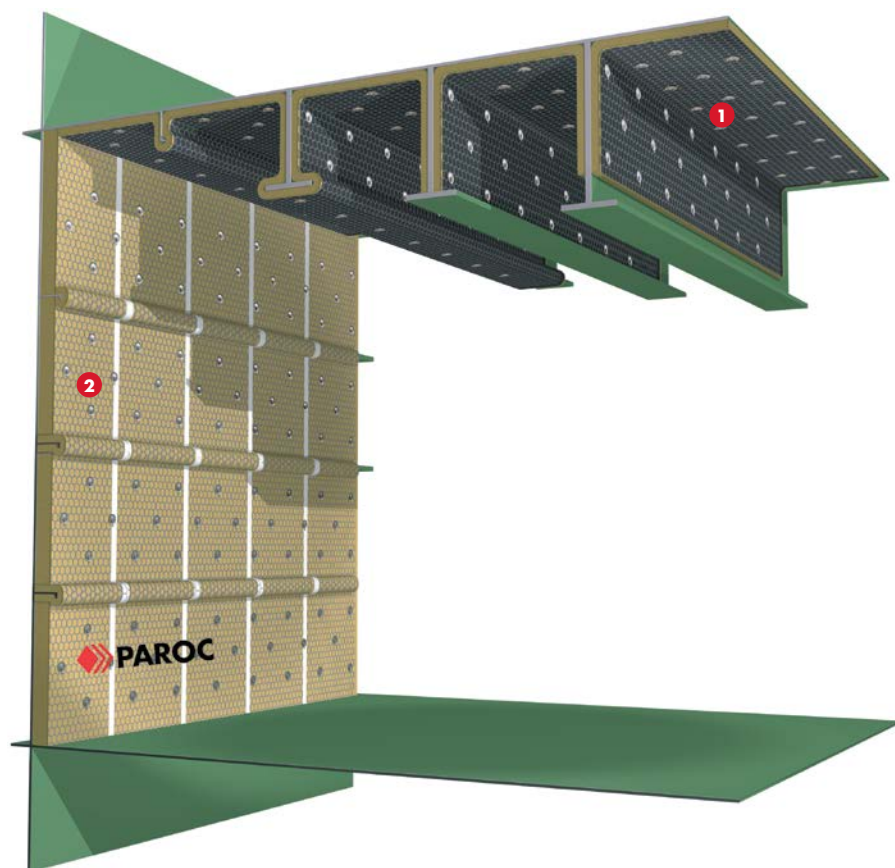
Example of A15 class solution for steel bulkhead with PAROC Marine Fire Slab 80. Insulating thickness on bulkhead is 40 mm. No insulation on stiffener.

IMO 2010 FTFC 40/0 mm.

PAROC Marine Fire Slab 100, 25 mm on the stiffeners can be replaced by PAROC Marine Wired Mat 100, 30 mm.

A-CLASS STEEL DECKS AND BULKHEADS

FIRE PROTECTION SOLUTIONS WITH MATS



Notice!

PAROC Marine Wired Mats can be covered with aluminium foil or with black or white glass fibre clothing.

Notice!

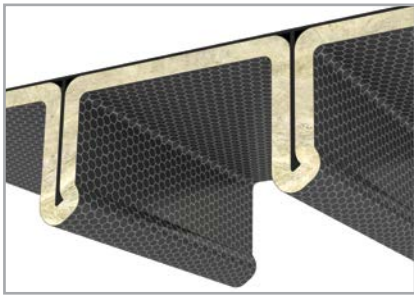
Only rule for pinning is that the maximum distance between the pins is 300 mm.

| Class | | Product | Nominal density kg/m³ | | IMO 2010 FTPC | |
|------------------|-----|---|--------------------------|---|-------------------------------|------------------------------------|
| | | | | Insulating thickness level/stiffener, mm* | | Sound reduction Rw (C, Ctr), dB |
| STEEL DECKS: | | | | | | |
| 1 | A60 | PAROC Marine Wired Mat 100 | 100 | 40/40 | 40/40 | 48 (-1, -6)** |
| | A30 | PAROC Marine Wired Mat 80 | 80 | 30/30 | 30/30 | 47 (-2, -6) |
| | A15 | PAROC Marine Wired Mat 80 | 80 | 30/30 | 30/30 | 47 (-2, -6) |
| STEEL BULKHEADS: | | | | | | |
| 2 | A60 | PAROC Marine Wired Mat 100 | 100 | 80/30 | 80/30 or 40+40/40 or 50+30/30 | 49 (-2, -6) |
| | A60 | PAROC Marine Fire Slab 100/ PAROC Marine Wired Mat 100 | 100 | | 75/30 | 49 (-2, -6) |
| | A30 | PAROC Marine Wired Mat 100 | 100 | 40/30 | 50/30 | 48 (-1, -6) |
| | A15 | PAROC Marine Wired Mat 80 | 80 | 30/30 | | |

* Please check validity of the certification from Paroc sales.

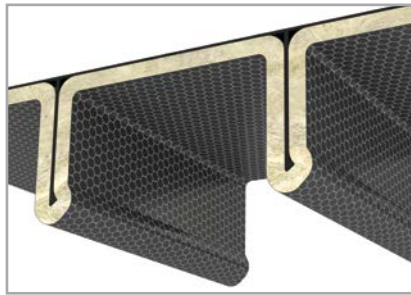
** Estimation based on a set of testing

STEEL DECKS A60, A30 AND A15



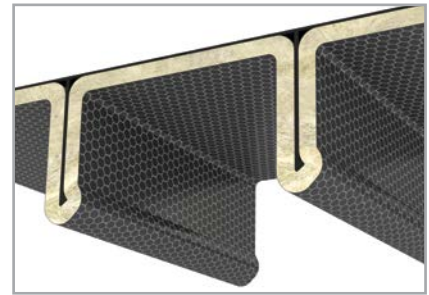
Example of A60 class solution for steel deck with PAROC Marine Wired Mat 100 G2, insulating thickness 40 mm.

IMO 2010 FTPC 40/40 mm.



Example of A30 class solution for steel deck with PAROC Marine Wired Mat 80 G2, insulating thickness 30 mm.

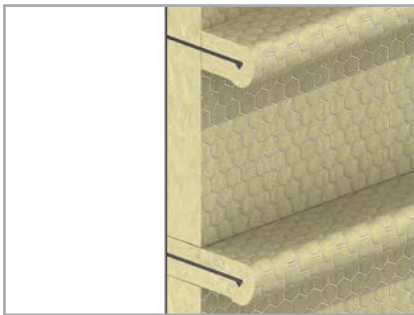
IMO 2010 FTPC 30/30 mm.



Example of A15 class solution for steel deck with PAROC Marine Wired Mat 80 G2, insulating thickness 30 mm.

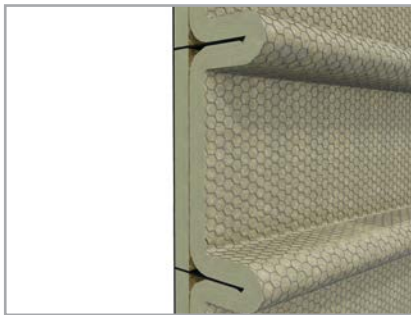
IMO 2010 FTPC 30/30 mm.

STEEL BULKHEADS A60, A30 AND A15



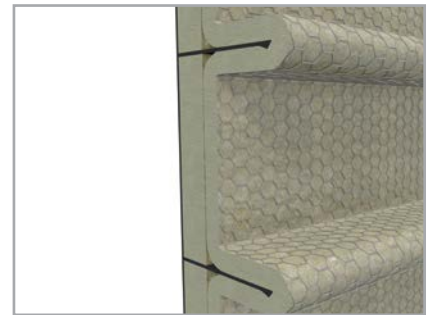
Example of A60 class solution for steel bulkhead with PAROC Marine Wired Mat 100. Insulating thickness on bulkhead is 80 mm and on stiffener 30 mm. PAROC Marine Wired Mat 100, 80 mm between the stiffeners can be replaced by PAROC Marine Fire Slab 100, 75 mm.

IMO 2010 FTPC 80/30 mm.



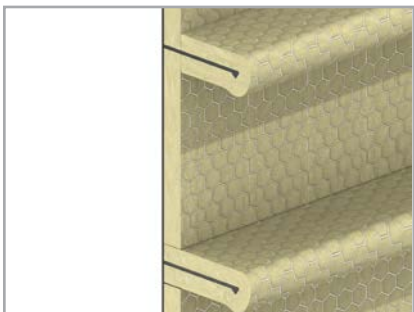
Example of A60 class solution for steel bulkhead with PAROC Marine Wired Mat 100. Insulating thickness on bulkhead is 40+40 mm and on stiffeners 40 mm.

IMO 2010 FTPC 40+40/40 mm.



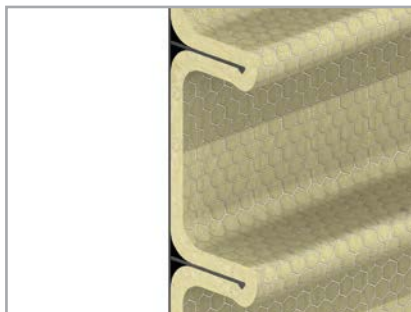
Example of A60 class solution for steel bulkhead with PAROC Marine Wired Mat 100. Insulating thickness on bulkhead is 50+30 mm and on stiffeners 30 mm.

IMO 2010 FTPC 50+30/30 mm.



Example of A30 class solution for steel bulkhead with PAROC Marine Wired Mat 100. Insulating thickness on bulkhead is 40 mm and on stiffener 30 mm.

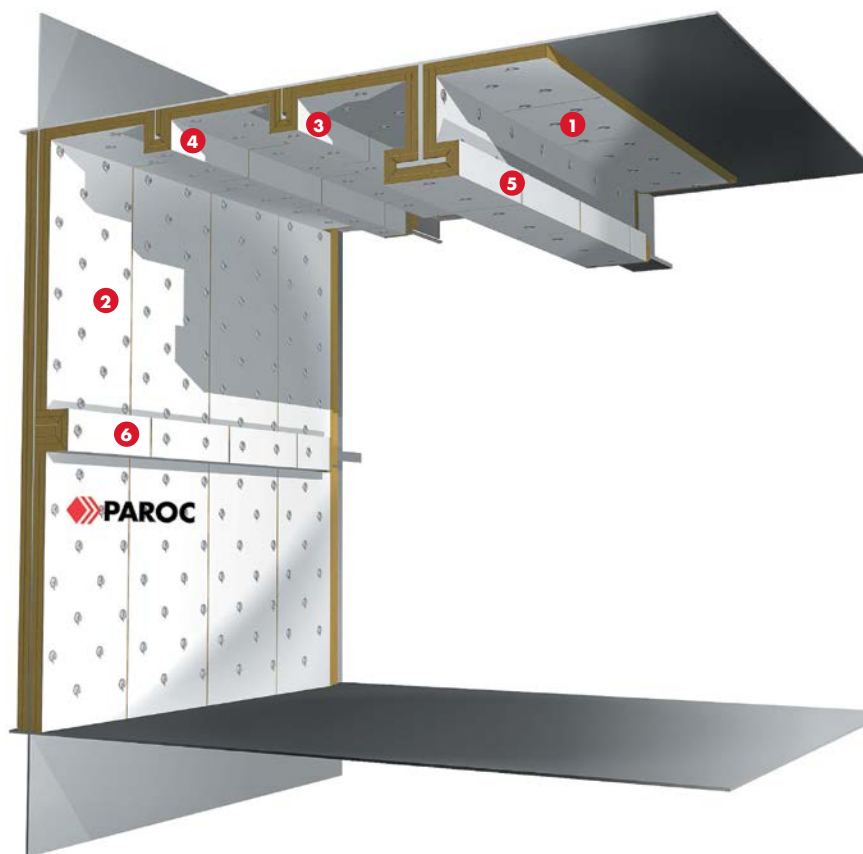
IMO 2010 FTPC 50/30 mm.



Example of A15 class solution for steel bulkhead with PAROC Marine Wired Mat 80, insulating thickness 30 mm.

A-CLASS ALUMINIUM DECKS AND BULKHEADS

FIRE PROTECTION SOLUTIONS WITH SLABS



Notice!

PAROC Marine Fire Slab 100 can be covered with aluminium foil or with black or white glass fibre clothing.

Notice!

Only rule for pinning is that the maximum distance between the pins is 300 mm.

| Class | Product | Nominal density kg/m³ | Insulating thickness level/stiffener, mm* | | |
|----------------------------------|---------|---------------------------------|---|----------------------------------|----------------------------------|
| | | | | IMO 2010 FTPC | |
| ALUMINIUM DECKS: | | | | | |
| 1 | A60 | PAROC Marine Fire Slab 100 | 100 | 25 + 25/25 + 25 | 25 + 25/25 + 25 |
| ALUMINIUM BULKHEADS: | | | | | |
| 2 | A60 | PAROC Marine Fire Slab 100 | 100 | 30 + 30/30 + 30 on both sides | 40 + 40/40 + 40 on both sides |
| PRODUCTS TO USE WITH STIFFENERS: | | | | | |
| 3 | | PAROC Marine Fire Slab 100, HP | 100 | | |
| 4 | | PAROC Marine Fire Slab 100, HPL | 100 | | |
| 5 | | PAROC Marine Fire Slab 100, T | 100 | | |
| 6 | | PAROC Marine Fire Slab 100, L | 100 | | |

* Please check validity of the certification from Paroc sales.

ALUMINIUM DECK A60



Example of A60 class solution for aluminium deck with PAROC Marine Fire Slab 100 G1 and preformed blocks, insulating thickness is 25 + 25 mm.

IMO 2010 FTPC 25+25/25+25 mm.

ALUMINIUM BULKHEAD A60



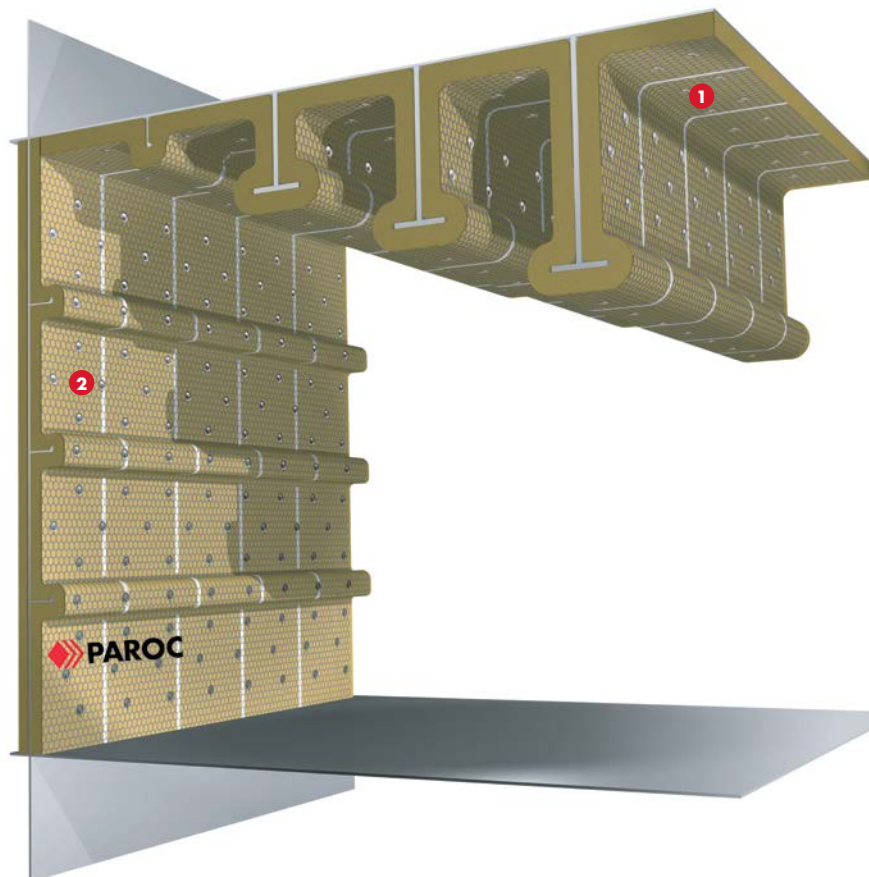
Example of A60 class solution for aluminium bulkhead with PAROC Marine Fire Slab 100 G1 and preformed blocks, insulating thickness is 30 + 30 mm on both sides.

IMO 2010 FTPC 40+40/40+40 mm on both sides.



A-CLASS ALUMINIUM DECKS AND BULKHEADS

FIRE PROTECTION SOLUTIONS WITH MATS



Notice!

PAROC Marine Wired Mats can be covered with aluminium foil or with black or white glass fibre clothing.

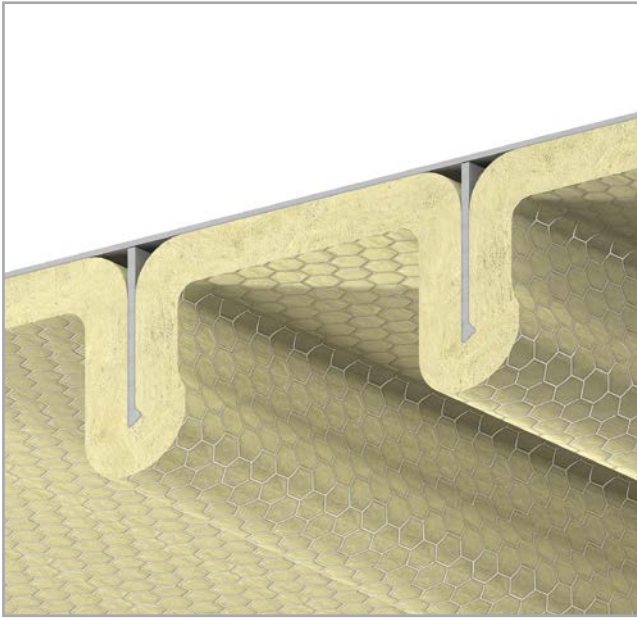
Notice!

Only rule for pinning is that the maximum distance between the pins is 300 mm.

| Class | Product | Nominal density kg/m³ | Insulating thickness level/stiffener, mm* | | |
|----------------------|---------|----------------------------|---|------------------------|------------------------|
| | | | | IMO 2010 FTPC | |
| ALUMINIUM DECKS: | | | | | |
| 1 | A60 | PAROC Marine Wired Mat 100 | 100 | 50/50 | 50/50 |
| ALUMINIUM BULKHEADS: | | | | | |
| 2 | A60 | PAROC Marine Wired Mat 100 | 100 | 60/60 on both sides | 60/60 on both sides |

* Please check validity of the certification from Paroc sales.

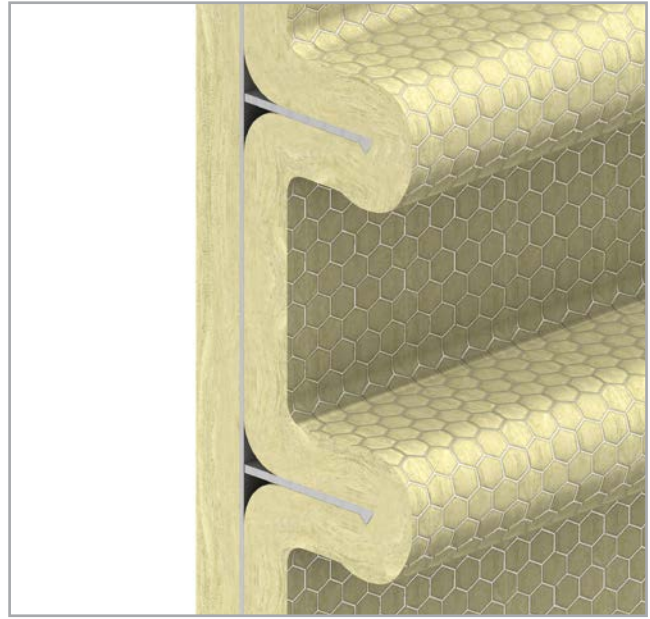
ALUMINIUM DECK A60



Example of A60 class solution for aluminium deck with PAROC Marine Wired Mat 100, insulating thickness 50 mm.

IMO 2010 FTPC 50/50 mm.

ALUMINIUM BULKHEAD A60



Example of A60 class solution for aluminium bulkhead with PAROC Marine Wired Mat 100, insulating thickness is 60 mm on both sides.

IMO 2010 FTPC 60/60 mm on both sides.



H-CLASS STEEL DECKS AND BULKHEADS

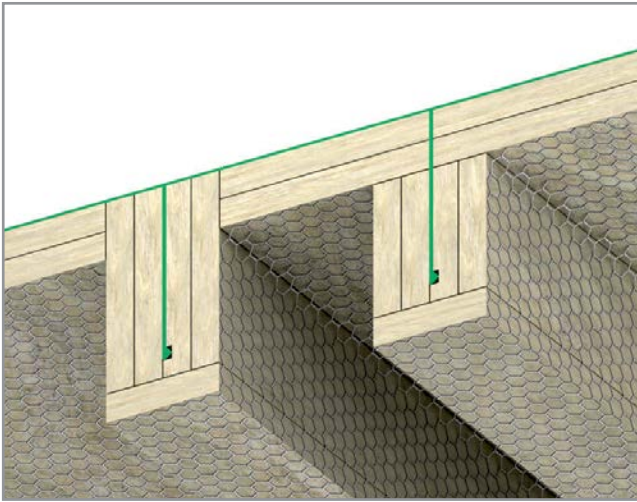


Notice!

PAROC Marine Fire Slab 100 can be covered with aluminium foil or with black or white glass fibre clothing.

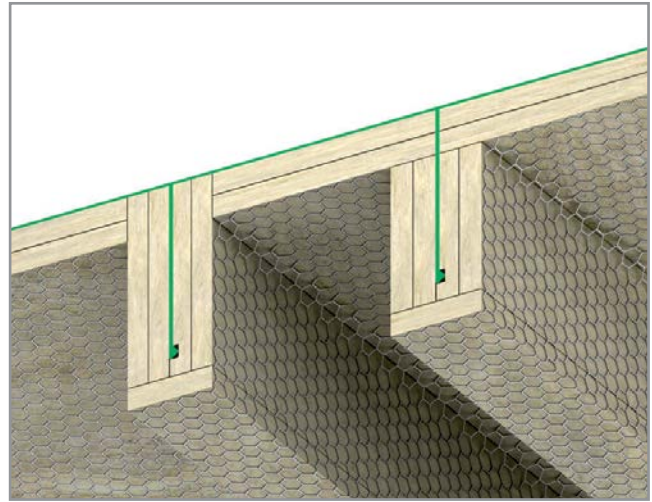
| Class | Product | Nominal density kg/m ³ | Insulating thickness level/stiffener, mm |
|---|----------------------------|--------------------------------------|--|
| STEEL DECKS: | | | |
| H120 | PAROC Marine Fire Slab 100 | 100 | 60 + 60/60 + 60 |
| H60 | PAROC Marine Fire Slab 100 | 100 | 45 + 45/45 + 45 |
| STEEL BULKHEADS: | | | |
| H120, restricted, fire against insulated side | PAROC Marine Fire Slab 100 | 100 | 60 + 60/60 + 60 |
| H60, restricted, fire against insulated side | PAROC Marine Fire Slab 100 | 100 | 50 + 50/50 + 50 |

STEEL DECK H120



Example of H120 class solution for steel decks with PAROC Marine Fire Slab 100, insulating thickness on deck and stiffener is 60 + 60 mm.

STEEL DECK H60



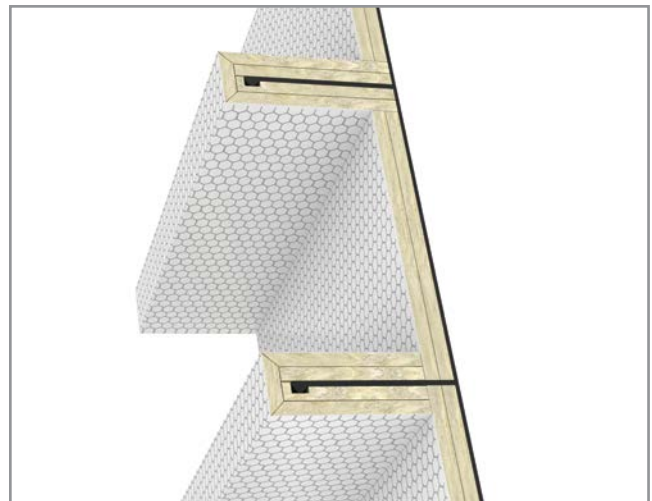
Example of H60 class solution for steel decks with PAROC Marine Fire Slab 100, insulating thickness on deck and stiffener is 45 + 45 mm.

STEEL BULKHEAD H120, RESTRICTED, FIRE AGAINST INSULATED SIDE



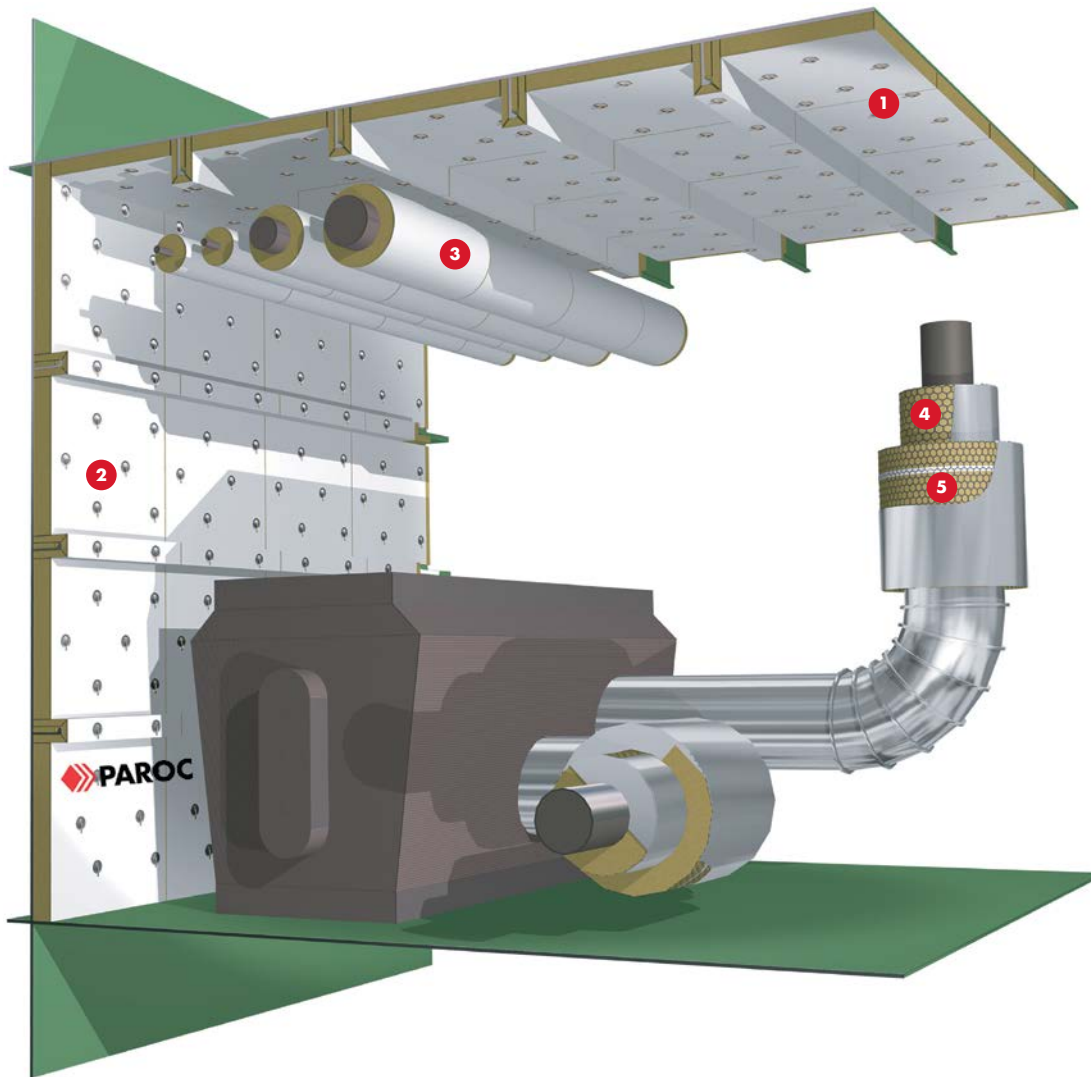
Example of H120 class solution for steel bulkheads with PAROC Marine Fire Slab 100 G1, insulating thickness on bulkhead and stiffener is 60 + 60 mm.

STEEL BULKHEAD H60, RESTRICTED, FIRE AGAINST INSULATED SIDE



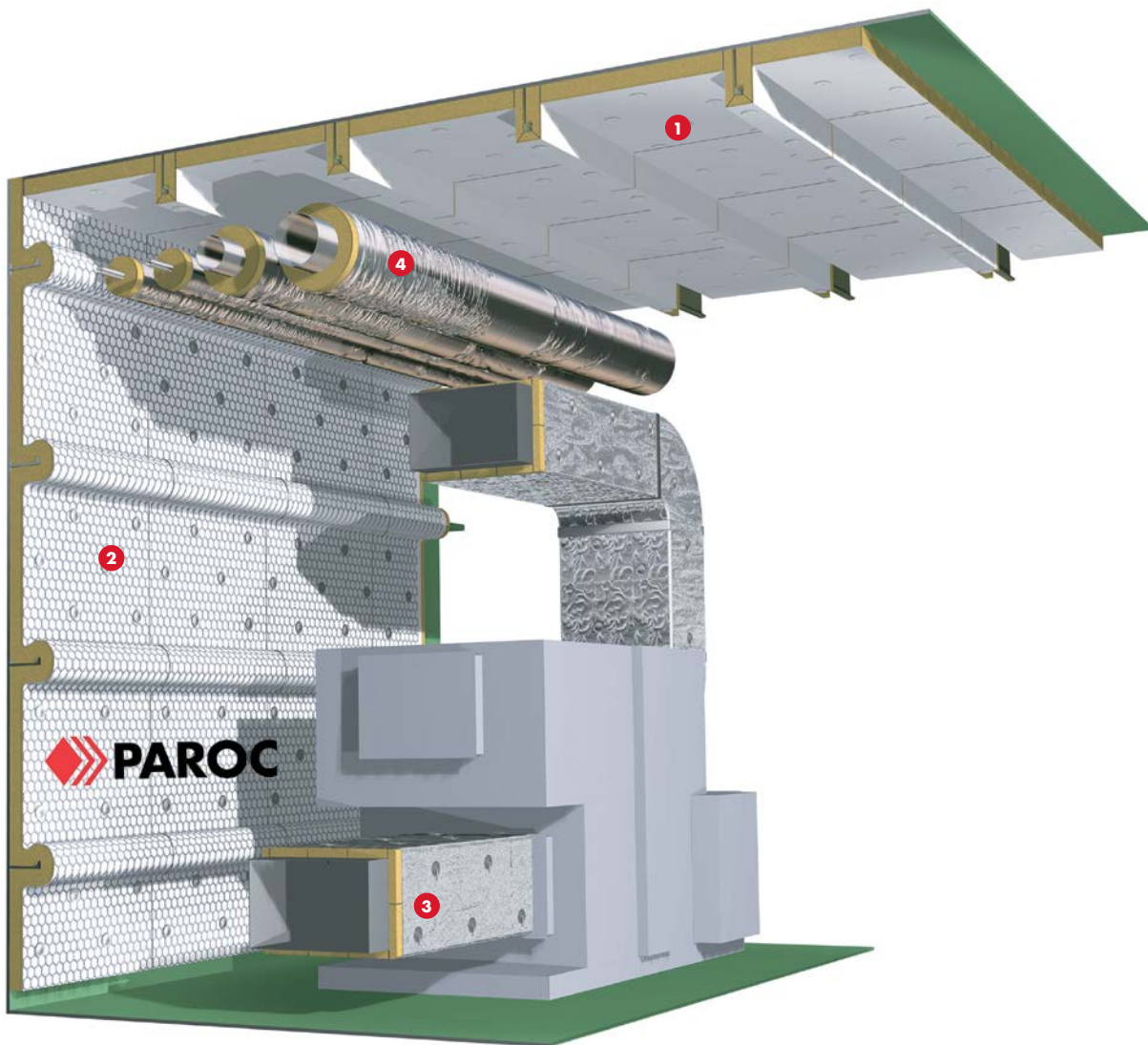
Example of H60 class solution for steel bulkheads with PAROC Marine Fire Slab 100 G1, insulating thickness on bulkhead and stiffener is 50 + 50 mm.

ENGINE ROOMS



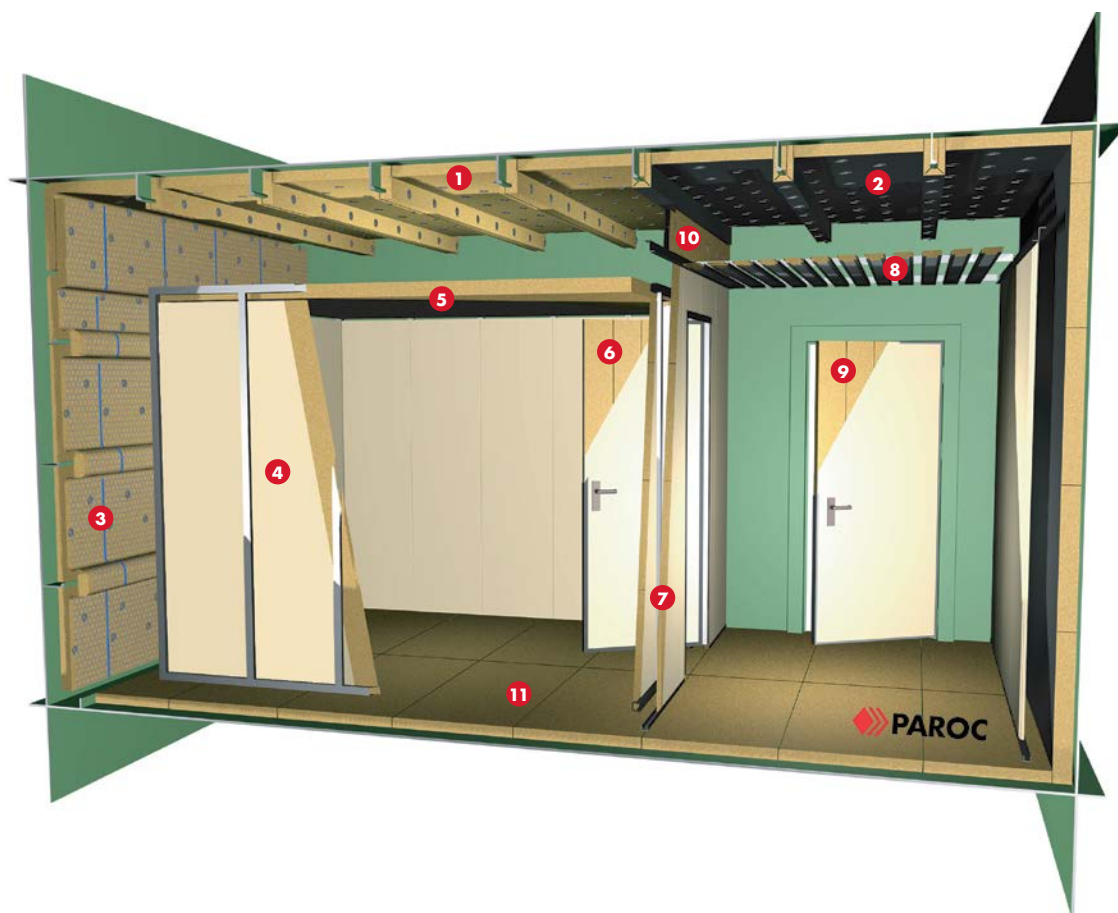
| Class | | Product | Nominal density kg/m³ | IMO 2010 FTPC | |
|--|-----|--|--------------------------|---|--|
| | | | | Insulating thickness level/stiffener, mm* | |
| DECKS: | | | | | |
| 1 | A60 | PAROC Marine Navis Slab 60 + white glass fibre facing | 60 | 50/30 | |
| BULKHEADS: | | | | | |
| 2 | A60 | PAROC Marine Navis Slab 60 + white glass fibre facing | 60 | 70/30 | |
| PIPES (VAPOUR, HEATING, FUEL OIL, SEWAGE, WARM WATER, ETC.): | | | | | |
| 3 | | PAROC Pro Section 100 G4 or G7 | 100 | | |
| EXHAUST PIPE: | | | | | |
| 4 | | PAROC Marine Wired Mat 100 | 100 | 80 | |
| EXHAUST PIPE DAMPERS: | | | | | |
| 5 | | PAROC Marine Wired Mat 100 | 100 | 80 + 80 | |

AIR-CONDITIONING MACHINE ROOMS



| Class | Product | Nominal density kg/m ³ | Insulating thickness level/stiffener, mm |
|--|---|--------------------------------------|--|
| DECKS: | | | |
| 1 | A0 PAROC Marine Slab 40 + white glass fibre facing | 40 | 50/50 |
| BULKHEADS: | | | |
| 2 | A0 PAROC Marine Wired Mat 40 + white glass fibre facing | 40 | 50/50 |
| AIR CONDITIONING DUCTS: | | | |
| 3 | PAROC Pro Lamella Mat AluCoat | 50 | 25 |
| PIPES (COOLING AND COLD WATER): | | | |
| 4 | PAROC Hvac Section AluCoat T or PAROC Hvac Combi AluCoat T | | 20 - 50 |

GENERAL APPLICATIONS



| Class | | | Product | Nominal density kg/m³ | Insulating thickness level/stiffener, mm* | |
|-----------------|----|---------|---|--------------------------|---|---------------|
| | | | | | | IMO 2010 FTPC |
| DECKS: | | | | | | |
| | 1 | A60 | PAROC Marine Fire Slab 100 | 100 | 40/25 | 50/25 |
| | 2 | A60 | PAROC Marine Fire Slab 100 + black glass fibre facing | 100 | 40/25 | 50/25 |
| BULKHEADS: | | | | | | |
| | 3 | Thermal | PAROC Marine Wired Mat 40 | 40 | 50 - 100/50 - 100 | |
| | | Thermal | PAROC Marine Slab 40 | 40 | 50/50 | |
| CABIN: | | | | | | |
| Wall | 4 | B15** | PAROC Marine Slab 220 + grey non-woven tissue | 220 | 15 | |
| Roof | 5 | B15** | PAROC Marine Slab 80 | 80 | 70 | |
| Door | 6 | B15** | PAROC Marine Slab 160 | 160 | 40 | |
| CORRIDOR: | | | | | | |
| Wall | 7 | B15** | PAROC Marine Slab 160 | 160 | 15 | |
| Roof | 8 | Sound | PAROC Marine Slab 80 | 80 | 25 | |
| Door | 9 | A60** | PAROC Marine Slab LO 150 | 150 | 70 | |
| Wall extension | 10 | B15** | PAROC Marine Slab 220 + grey non-woven tissue | 220 | 10 + 10 | |
| FLOATING FLOOR: | | | | | | |
| | 11 | A60 | PAROC Marine Floor Slab 140 | 140 | 50 | |

* Please check the validity of the certification from Paroc sales.

** An example of customer constructions where PAROC products are used.

EXAMPLES OF LATEST PAROC MARINE REFERENCES

| Name | Type | Year | Shipyard | Country |
|--------------------------|---------------------------------------|------|-----------------------------------|---------|
| MSC Meraviglia | Cruise Ship | 2017 | STX France | France |
| MS Asterix | Naval Auxiliary Supply Vessel | 2017 | Chantier Davie Shipyard | Canada |
| Stepan Makarov | Icebreaking Supply/Stand-by vessel | 2017 | Helsinki Shipyard | Finland |
| Fedor Ushakov | Icebreaking Supply/Stand-by vessel | 2017 | Helsinki Shipyard | Finland |
| Tallink Megastar | Car Ferry | 2017 | Turku Shipyard | Finland |
| Gennadiy Nevelskoy | Icebreaking Supply/Stand-by vessel | 2017 | Helsinki Shipyard | Finland |
| Mein Schiff 6 | Cruise Ship | 2017 | Turku Shipyard | Finland |
| Mein Schiff 5 | Cruise Ship | 2016 | Turku Shipyard | Finland |
| Seabourn Encore | Cruise Ship | 2016 | Fincantieri | Italy |
| Viking Sky | Cruise Ship | 2016 | Fincantieri | Italy |
| Seven Seas Explorer | Cruise Ship | 2016 | Fincantieri | Italy |
| Carnival Vista | Cruise Ship | 2016 | Fincantieri | Italy |
| Viking Sea | Cruise Ship | 2016 | Fincantieri | Italy |
| Koningsdam | Cruise Ship | 2016 | Fincantieri | Italy |
| Saffron | Superyacht | 2016 | Mariotti | Italy |
| Genting Dream | Cruise Ship | 2016 | Meyer Werft, Papenburg | Germany |
| Ovation of the Seas | Cruise Ship | 2016 | Meyer Werft, Papenburg | Germany |
| Polaris | Multipurpose icebreaker | 2016 | Helsinki Shipyard | Finland |
| Le Lyrial | Cruise Ship | 2016 | Fincantieri | Italy |
| Viking Star | Cruise Ship | 2015 | Fincantieri | Italy |
| Britannia | Cruise Ship | 2015 | Fincantieri | Italy |
| Murmansk | Icebreaking Supply/Stand-by vessel | 2015 | Helsinki Shipyard | Finland |
| Norwegian Escape | Cruise Ship | 2015 | Meyer Werft, Papenburg | Germany |
| Anthem of the Seas | Cruise Ship | 2015 | Meyer Werft, Papenburg | Germany |
| Mein Schiff 4 | Cruise Ship | 2015 | Turku Shipyard | Finland |
| Mein Schiff 3 | Cruise Ship | 2014 | Turku Shipyard | Finland |
| Regal Princess | Cruise Ship | 2014 | Fincantieri | Italy |
| Costa Diadema | Cruise Ship | 2014 | Fincantieri | Italy |
| Turva | Coast guard vessel | 2014 | Rauma Shipyard | Finland |
| Baltika | Multipurpose energy and rescue vessel | 2014 | Helsinki Shipyard | Finland |
| Searoad Mersey II | RoRo ferry | 2014 | Flensburger Schiffbaugesellschaft | Germany |
| Loch Seaforth | RoPax ferry | 2014 | Flensburger Schiffbaugesellschaft | Germany |
| Sonne | Research vessel | 2014 | Meyer Werft, Papenburg | Germany |
| Aleksey Dhirikov | Icebreaker | 2013 | Helsinki Shipyard | Finland |
| Stella | Ferry | 2013 | Rauma Shipyard | Finland |
| Vitus Bering | Icebreaker | 2012 | Helsinki Shipyard | Finland |
| RV Mirabilis | Fishery research vessel | 2012 | Rauma Shipyard | Finland |
| Viking Grace | Cruise Ship | 2012 | Turku Shipyard | Finland |
| Spirit of France | Car Ferry | 2012 | Rauma Shipyard | Finland |
| Spirit of Britain | Car Ferry | 2011 | Rauma Shipyard | Finland |
| S.A. Agulhas II | Arctic survey and research vessel | 2011 | Rauma Shipyard | Finland |
| Allure of the Seas | Cruise Ship | 2010 | Turku Shipyard | Finland |
| Oasis of the Seas | Cruise Ship | 2009 | Turku Shipyard | Finland |
| Armorique | Cruise Ferry | 2009 | Rauma Shipyard | Finland |
| Baltic Queen | Cruise Ferry | 2009 | Rauma Shipyard | Finland |
| Independence of the Seas | Cruise Ship | 2008 | Turku Shipyard | Finland |
| Viking XPRS | Cruise Ferry | 2008 | Helsinki Shipyard | Finland |
| Baltic Princess | Cruise Ferry | 2008 | Rauma Shipyard | Finland |
| Color Superspeed 2 | Cruise Ferry | 2008 | Rauma Shipyard | Finland |
| Color Superspeed | Cruise Ferry | 2008 | Rauma Shipyard | Finland |
| Color Magic | Cruise Ferry | 2007 | Turku Shipyard | Finland |
| Liberty of the Seas | Cruise Ship | 2007 | Turku Shipyard | Finland |
| Tallink Star | Cruise Ferry | 2007 | Rauma Shipyard | Finland |
| Cotentin | RoPax | 2007 | Helsinki Shipyard | Finland |
| Freedom of the Seas | Cruise Ship | 2006 | Turku Shipyard | Finland |
| Galaxy | Cruise ferry | 2006 | Rauma Shipyard | Finland |
| Fesco Sakhalin | Icebreaking Supply/Stand-by vessel | 2005 | Helsinki Shipyard | Finland |
| Victoria I | Cruise Ferry | 2004 | Rauma Shipyard | Finland |
| Color Fantasy | Cruise Ferry | 2004 | Turku Shipyard | Finland |
| Birka Paradise | Cruise Ship | 2004 | Rauma Shipyard | Finland |
| F124 Hamburg | Frigate | 2004 | Howaldtswerke-Deutsche Werft AG | Germany |
| Nuraghes | Fast ferry | 2004 | Fincantieri | Italy |
| Carnival Miracle | Cruise Ship | 2004 | Helsinki Shipyard | Finland |
| Carnival Valor | Cruise Ship | 2004 | Fincantieri | Italy |
| Costa Crociere | Cruise Ship | 2004 | Fincantieri | Italy |

QUALITY AND ENVIRONMENT

PAROC stone wool products are made from clean, natural material. They are environmentally friendly throughout their lifecycle, causing no harm to nature during or after use. Stone wool does not contain any ingredients or chemicals that prevent or impede recycling. The use of PAROC products increases both the comfort and safety of the environment in which they are installed, creating a better place to work – as well as a more efficient to work – as well as a more efficient process.

Paroc factories have been certified according to the Quality Management System ISO 9001 and Environmental System ISO 14001. Because of these systems, you can be sure that products that emerge from our factories are of a consistently high quality and are produced in a way that emphasises environmental considerations.

HEALTH AND SAFETY

PAROC products are safe to use. No CFCs or HCFCs are used in the production of the products. PAROC products also fulfil Note Q of EU Commission Directive 97/69/EC. This means that stone wool fibres are biodegradable and are not classified as a possible human carcinogenic. They do not contain asbestos.

Our health and safety data sheets are available on our web pages at www.paroc.com.



STORAGE AND HANDLING

PAROC stone wool products are made from a naturally robust material. They are easy to store and install, and safe to handle.

STORAGE

If the products are stored outdoors, they must be protected from rain. Stack the packages on a flat platform that doesn't touch the ground. Cover the stacks with a waterproof tarpaulin or plastic sheet if necessary. If the products get wet despite these measures, they can be dried and used as normal. Stone wool dries quickly and its becoming wet will not change its properties.

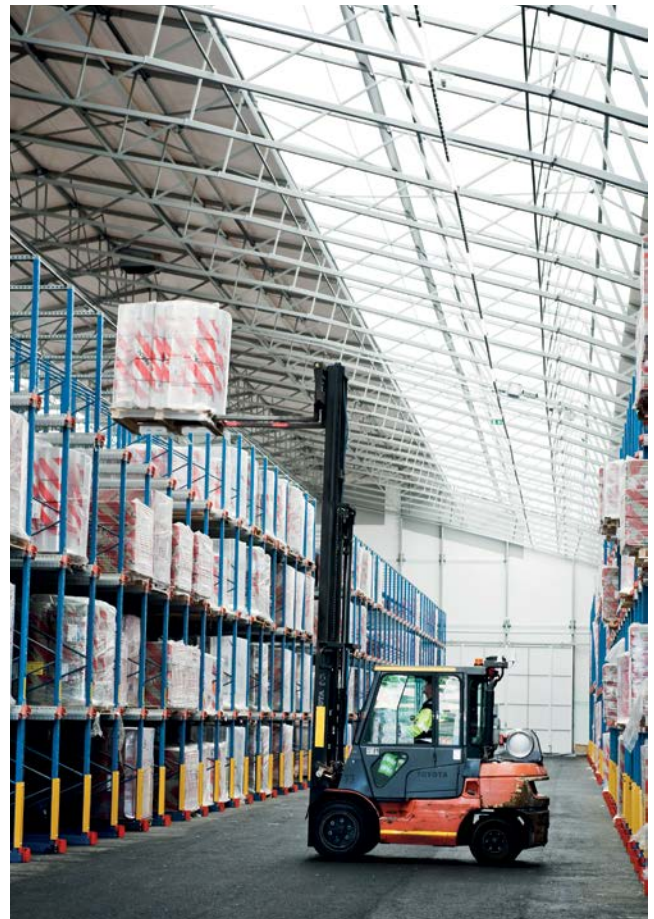
Our preformed insulation components are quick to install and do not need much cutting work on site. Handle the product packages in a manner that prevents damage. Care must be taken not to break the edges or corners of the packages, especially during unloading.

PERSONAL SAFETY EQUIPMENT

Scientific studies show that stone wool fibres do not harm your health, but the use of protective equipment is recommended to avoid skin irritation.

Use personal protection equipment that meets your particular needs, and keep your work clothing separate from your other clothing. It is also advisable to wear protective goggles if your eyes are sensitive to dust. This is particularly important when working with overhead insulation. If you wear contact lenses, you should always wear close-fitting protective goggles. A dust mask is also necessary if the amount of dust is significant.

You can read more about personal safety in insulation work on our web pages at www.paroc.com.



TRUSTED SERVICE AND ADVICE

At Paroc, we do more than produce high quality stone wool insulation products - we also supply the help and advice necessary to make your job as easy and straightforward as possible. We have developed a popular range of practical tools that are as valued by designers as they are by installers. Pocket guides, dimensioning software, simple explanations of laws and regulations, and a content-rich website are just some of the free resources that our customers benefit from. If any of your questions remain unanswered, please let us know – we are always grateful for any tips on how to make our service even better.

INSULATION EDUCATION

At Paroc, we want to share our knowledge in order to help you get the utmost out of our products. That's why we can arrange specialised training on industrial insulation. In our seminars, you can learn, for example, about the purpose of insulation, the difference between insulation for pipes and flue ducts, and how to choose the right solution. We also cover the guidelines and regulations that apply to insulation in your area. Please contact us for further information.

PERSONAL CONTACTS FOR THE BEST SOLUTION

Early contact with Paroc confers many advantages when it comes to identifying the optimal insulation solution for your particular requirements. At the designing and planning stage, it is important to consider what kind of properties the insulation solution should possess. Paroc's specialists are always on hand to help and advice, and are experts on customising products and solutions to fit your specific requirements. It is often beneficial for us to come and visit the site personally so that together we can ascertain the best solution and installation method. This helps to maximise the performance and service life of the insulation.



TECHNICAL ADVICE

Every year we receive a lot of questions about insulation theory and products. No question is too big or too small for our insulation experts. We can advise on the need to insulate, the right products to choose, installation methods, and laws and regulations. If there's a question that we can't answer directly, we'll ask for help from our wide network of contacts in all areas of the insulation field.

PUNCTUAL LOGISTICS

Paroc is justifiably renowned for its punctual logistics operation. Under normal circumstances, you will receive the insulation you need shortly after placing the order. This is a service that our customers value highly and have come to rely on.

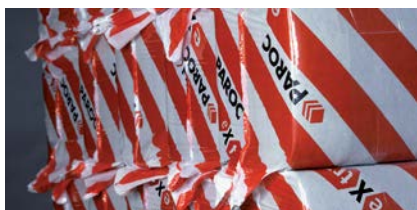
NOTES

[illegible]

NOTES

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Paroc is one of Europe's leading manufacturers of energy-efficient and fire-proof insulation solutions. Throughout our 80-year history, we have earned a reputation for high product performance, technical expertise and sustainability among builders of single-family homes, architects, contractors, dealers and industrial builders. The cornerstones of our operations are customer and personnel orientation, constant innovation, profitable growth and sustainable development. Paroc products include building insulation, technical insulation, marine and offshore insulation, and acoustic products. The products are manufactured in Finland, Sweden, Lithuania, Poland and Russia. Paroc has sales and representative offices in 14 European countries.



Building Insulation offers a wide range of products and solutions for all traditional building insulation. The building insulation products are mainly used for the thermal, fire and sound insulation of exterior walls, roofs, floors and basements, intermediate floors and partitions.



Sound absorbing ceilings and wall panels for interior acoustic control, as well as industrial noise control products, are available in the range.



Technical Insulation products are used for thermal, fire and sound insulation in HVAC systems, industrial processes and pipe work, industrial equipment as well as shipbuilding and offshore industry.



The information in this brochure describes the conditions and technical properties of the disclosed products, valid at the time of publication of this document and until replaced by the next printed or digital version. The latest version of this brochure is always available on the Paroc website. Our information material presents applications for which the functions and technical properties of our products have been approved. However, the information does not mean a commercial guarantee. We do not assume liability of the use of third party components used in the application or the installation of our products. We cannot warrant the suitability of our products if used in an area or conditions which are not provided in our information material. As a result of constant further development of our products we reserve the right to make alterations to our information material at any time.

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