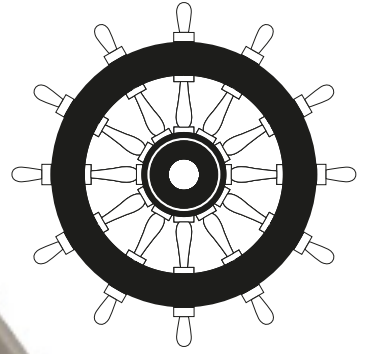


# Renotech GRG



## Product Description

Renotech GRG is a thin shell alpha gypsum based product. Fiberglass reinforced GRG is lightweight, durable, easy to transport and install. GRG parts are delivered fully finished and coated or uncoated to be finished on site.

The shaping possibilities of Renotech GRG are nearly endless. Large GRG elements are manufactured in parts, meaning that there's practically no limit on fully assembled element size.

Renotech GRG is ideal for creating decorative wall and ceiling panels, pillars, ceiling domes and profiles, cornices, dividers and other interior architectural elements.

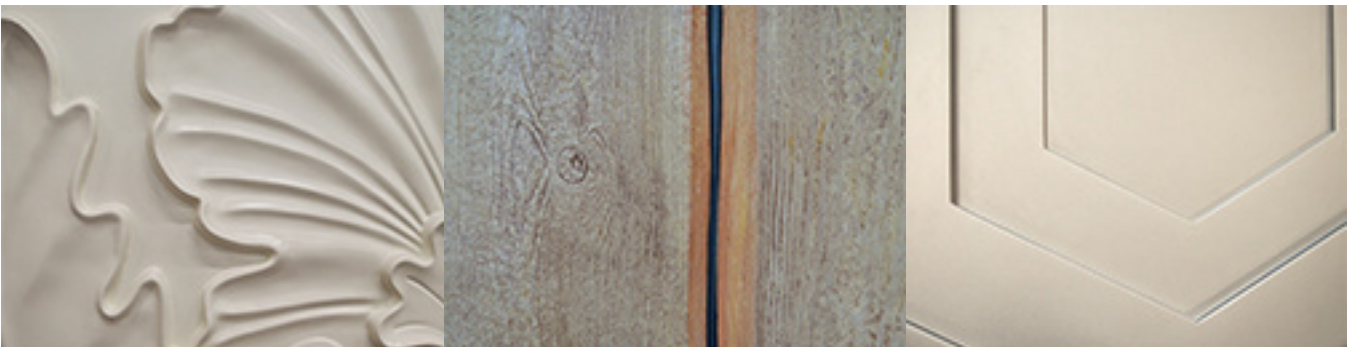


## Properties and Benefits



Renotech GRG is MED approved, non-combustible (fire class A1) and lightweight (approx. 10 kg / m<sup>2</sup>). Compared to conventional gypsum cast products, Renotech GRG is significantly lighter and stronger. Alpha gypsum, GRG base material, is finer and harder setting than conventional gypsum. GRG products are lightweight, strong, durable and easy to install. Mounting profiles are usually embedded in the element for easy fitting – the embedded profiles also act as secondary element reinforcement.

Each GRG product is cast with precise moulds which are custom made according to the specifications of each individual project. Mould precision and dimensional accuracy lowers project final cost by reducing the total installation time required.



Accurate, high quality moulds are key when producing precise and decorative GRG elements.

## Product Data

Material base	Alpha Gypsum
Finish	Smooth, profiled, decorative
Density	1600 kg/m <sup>3</sup> ±150 kg/m <sup>3</sup>
Weight	8–12 kg/m <sup>2</sup>
Shell thickness	5 mm ±1,5 mm
Edge thickness	ca. 20 mm
Embedded parts	Stainless Steel or equiv. (if required)
One Part Length	≤ 3,6 m
One Part Surface Area	≤ 3,5 m <sup>2</sup>
Glass Fiber	ca. 5 %

## Production

### Production Quality Assurance

Renotech Oy production is MED approved by MED Production Quality Assurance, module D. Obtaining approval requires compliance with Production Quality System, which is assessed yearly by approved third party body.



*All Renotech GRG parts are carefully handcrafted to meet MED Production Quality requirements.*

Renotech GRG products are manufactured using CE-marked, A1 fire class alpha gypsum manufactured in Europe in accordance with the EN 13279-1 standard.

### Planning

Each Renotech GRG part is designed and manufactured according to project-specific wishes, taking into account technical requirements determined by environment and intended use. In order to produce functional, high performance, durable and easy-to-install GRG elements, project planning is important. Factors such as the method of fastening, elements and adjacent materials, direction and properties of surrounding lights and possible environmental stress must be taken into account. The shape and number of GRG parts, and the placement of mounting profiles are engineered so that the finished, installed element meets the architect's expectations as closely as possible.

Before the actual production begins, a mock-up is usually made for the customer's evaluation. Production begins only when the mock-up, in co-operation with the customer, has been brought into aesthetically acceptable and technically and functionally durable condition.

### Manufacture

The Renotech GRG production begins with the manufacture of moulds. Mould size, number and material are determined by what was agreed on during planning. The moulds are made of either high-quality mould silicone or durable composite materials.



Renotech Oy has been manufacturing and supplying MED approved products for more than 20 years. Over the years, the manufacturing methods and production quality control procedures have been refined and harmonized so that the performance, durability, functionality and technical properties of the products we supply and manufacture reliably meet the requirements of the Marine Equipment Directive.

Each MED-approved Renotech GRG part is manufactured by hand in our own production facility, under the supervision of our Production Manager. We make sure that all production workers are familiar with quality assuring manufacturing methods.



The functionality of each mould is tested before the actual production begins. The conformity of the test-moulded parts to the drawings (size, etc.) is reviewed. Conformity to drawings is monitored throughout the manufacturing process. Each GRG part is handcrafted. All cast parts are inspected and finished to order. Each part is carefully packed - at the packing stage, the parts are checked again for defects before the shipment is delivered to the destination.

## Installation

The lightweight Renotech GRG parts are designed to be as easy to install as possible.



Renotech provides installation / mounting design assistance free of charge. Installation and finishing work on site can also be included in the order. Our work team installers have long-term experience in installing Renotech GRG elements in shipyard conditions and other work site environments.

### Fastening

GRG parts are glued and fastened with screws from part edges to the backing material. Screws are inserted slightly below shell surface carefully, without breaking the thin GRG shell. Large or shaped GRG parts are equipped with embedded reinforcing mounting profiles.

Large ceiling elements are manufactured in parts and are either screwed directly to the backing structure or suspended with fasteners and steel wires. The GRG parts are connected with either overlap or butt joints. Joints are reinforced with metal bars.

Smaller, lightweight GRG parts are easily installed by just gluing.

### Finishing

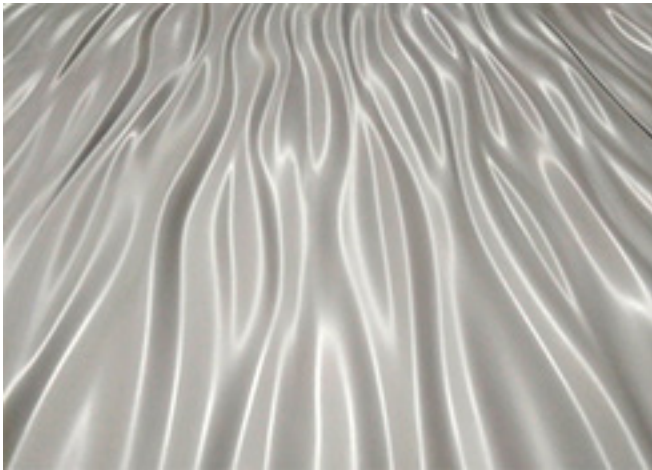
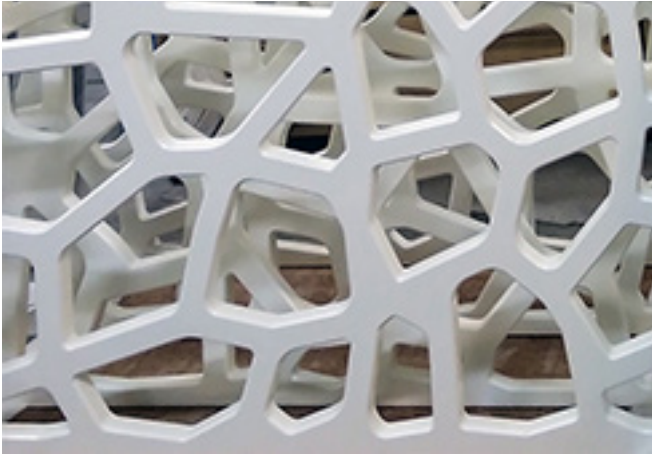
The joints of the GRG assembly are finished with GRG specific gypsum filler. Any part edges not glued to the substrate are reinforced with GRG specific fiberglass and plaster. The drill holes are filled and smoothed with GRG specific gypsum filler.



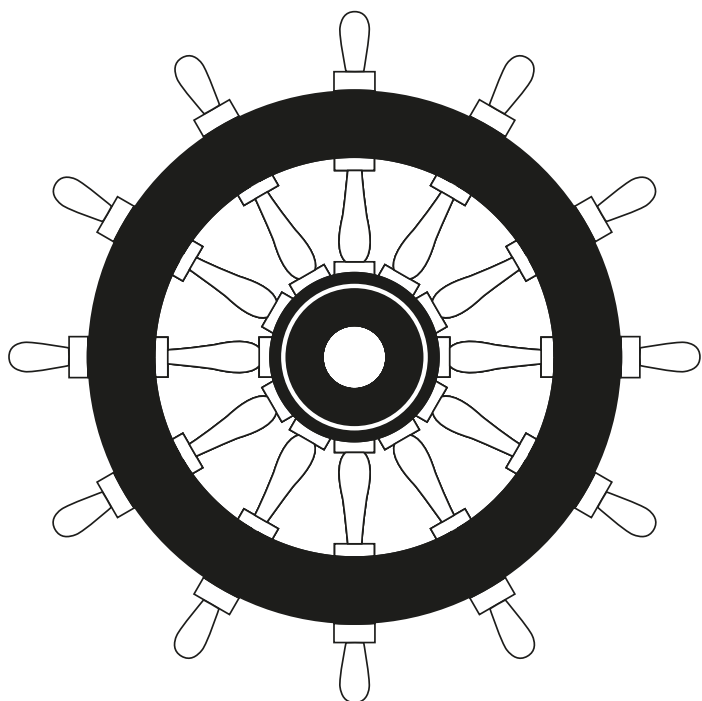
Appropriately finished surface is uniform and seamless.

## Storage and Handling:

The delivery of Renotech GRG parts to site should be scheduled so that the storage time is as short as possible. Renotech GRG parts must be kept clean and stored indoors on a dry surface. GRG parts must not be exposed to moisture. Improper storage may distort or damage GRG components. GRG parts should not be stacked or placed leaning against each other. Protective gloves should be worn when handling unprotected GRG parts.



- |                                                      |                                                         |                                                   |
|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------|
| 1999 Europa - Hapag-Lloyd AG                         | 2003 Cinderella - Viking Line                           | 2011 Allure of the Seas - Royal Caribbean Cruises |
| 1999 Voyager of the Seas - Royal Caribbean Cruises   | 2004 Finnjet - Silja Line                               | 2014 Mein Schiff 3 - TUI Cruises                  |
| 2000 Explorer of the Seas - Royal Caribbean Cruises  | 2004 Birka Paradise - Birka Cruise Line                 | 2015 Mein Schiff 4 - TUI Cruises                  |
| 2000 Costa Atlantica - Costa Crociere S.p.A.         | 2004 Color Fantasy - Color Line                         | 2016 Mein Schiff 5 - TUI Cruises                  |
| 2000 Ulyseus - Irish Ferries                         | 2005 Enchantment of the Seas - Royal Caribbean Cruises  | 2016 AIDAprima - Aida Cruises                     |
| 2001 Carnival Spirit - Carnival Cruise Lines, Inc.   | 2006 Freedom of the Seas - Royal Caribbean Cruises      | 2017 AIDAprima - Aida Cruises                     |
| 2001 Adventure of the Seas - Royal Caribbean Cruises | 2007 Color Magic - Color Line                           | 2017 Mein Schiff 6 - TUI Cruises                  |
| 2001 Carnival Pride - Carnival Cruise Lines, Inc.    | 2007 Liberty of the Seas - Royal Caribbean Cruises      | 2018 Mein Schiff 1 - TUI Cruises                  |
| 2002 Carnival Legend - Carnival Cruise Lines, Inc.   | 2008 Independence of the Seas - Royal Caribbean Cruises | 2019 Mein Schiff 2 - TUI Cruises                  |
| 2002 Navigator of the Seas - Royal Caribbean Cruises | 2008 Celebrity Solstice - Royal Caribbean Cruises       | 2019 Costa Smeralda - Costa Cruise Lines          |
| 2002 Costa Mediterranea - Costa Crociere S.p.A.      | 2009 Celebrity Equinox - Royal Caribbean Cruises        | 2019 Hanseatic Naturre - Hapag Lloyd Cruises      |
| 2003 RMS Queen Mary 2 - Cunard Cruise Line           | 2009 Oasis of the Seas - Royal Caribbean Cruises        | 2019 Hanseatic Inspiration - Hapag Lloyd Cruises  |
| 2003 Mariner of the Seas - Royal Caribbean Cruises   | 2010 Disney Dream - Disney Cruise Line                  | 2020 Mardi Gras - Carnival Cruise Lines           |
| 2003 Carnival Miracle - Carnival Cruise Lines, Inc.  |                                                         |                                                   |



 **Renotech Oy**  
Advanced Material Technology

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