

Definitions

A60 insulation: insulation designed under the IMO rules to provide passive structural fire protection aboard steel and aluminium vessels required to provide fire safety and vessel structural integrity for the initial 60 minutes of a fire event. A60 Insulation may be installed on steel and aluminium ships inclusive of vessel classed under the HSC code. This is the safest type of insulation as it complies with the non-combustibility criteria as per IMO requirements.

60-minute fire resisting division: insulation design to provide passive structural fire protection only onboard aluminium vessels built under the HSC Code (this type of insulation cannot not be use on steel ships or aluminium vessel unless the aluminium vessels built under the HSC Code). 60-minute fire resisting divisions do not provide as high a fire rating as this type of insulation does not need to comply with non-combustibility requirements.

	Steel Vessels	Aluminium Vessels	HSC Vessels	A60	60-minute fire resisting division	Non combustible	Reversible	Development year
RAC+	✓	✓	✓	✓		✓	✓	2019
RAC			✓		✓			2000
RAS	✓	✓	✓	✓		✓		1991

RAC+ Technical Information

RAC+ is the result of more than 5 years of R&D investment commitment with the objective of overcoming gaps that the RAC and RAS system presented and launch the next generation of lightweight panelised structural fire protection.

Why RAC+ supersedes and exceeds older systems.

Below is a summary of the design philosophy of RAC+ when compared to RAC, we have included this information as part of this submission to provide you with an insight into our views when comparing different systems.

Cost saving

Relative to the RAC system, CBG systems has managed to constrain price increases of the RAC+ system even throughout high inflationary periods. We are constantly evaluating the supply chain to attempt to find new efficiencies. Furthermore, as the system is fully manufactured by CBG systems we have full control over the optimisation of processes allowing us to share savings with our customers.

Additional weight savings

Not only are the panels lightweight, but they last for due their premium, intrinsic water repellent properties. When compared with our previous RAC system, RAC+ eliminates the

combination of dissimilar materials (felt, honeycomb panels and epoxy) which while lightweight when new, have a tendency to increase their weight during the life of the system due to water absorption. Our RAC+ system incorporates state of the art formulation that makes it the most water repellent A60 insulation in the market hence remaining lightweight for decades. Our internal testing (short term submersion in a water bath) suggests that even after short term exposure to water the RAC panel will gain as much as 60% whereas the RAC Plus panel will be mostly unaffected.

Premium safety:

“A60” as opposed to “60-minute fire resistance division”: RAC+ is an A60 fire protection material as opposed to a 60-minute fire resisting division like RAC. The A60 certification brings with it compliance with full non combustibility rather than been reliant on the special dispensations of the High-Speed craft Code that allow use of combustibility materials.

High fire resistance margin:

RAC+ has been fire tested with high margin of fire resistance, on average our fire tests carry a temperature margin of ~15°C. This gives us confidence that our system will perform when required within real operational environments.

Homogenous symmetry.

RAC+ panels are homogeneous and symmetric, which increasing the fire safety in real fire scenarios dramatically. This allows RAC+ to provide incredibly consistent fire performance when compared to more active intumescent system that the RAC system employs.

Reversible:

RAC+ has the option to be manufactured as reversible. This means that in case off blemishes on one side the panels can be turn around and make use of the other side. This is achieved thanks to the panels homogenous symmetry. This feature contributes to the efficiencies and less waste through the life of the vessel.

Note: Reversible panels weight an additional 0.1 kg/m²

Better design to cope with battery fires:

RAC+ semirigid (and non-intumescent natures) makes it the best solution to contain the typical characteristics of batteries fires. Battery fires are characterised by their potentially more aggressive, longer lasting and more difficult to extinguish fire curves. RAC+ non-combustible, non-intumescent properties together with its generous tested fire resistance margins makes it the safest system in the world. CBG have completed fire integrity testing using the RAC+ system for as long as 120 minutes. Furthermore, 120 minute fire resistance can be achieved via simple modifications if required.

Minimal air gap:

RAC+ has been designed to reduce intrusion into the operation space to give the ship operator as much space as possible. RAC+ can be installed directly on to the stiffeners of the vessel, so long as a minimal airgap between the back of the panel and shell plate is maintained.

Enhanced panels impact resistance:

RAC+ is a semirigid panel made of a semirigid glass board coated with a hybrid inorganic polymer developed by CBG and CSIRO. This makes RAC+ panels semirigid and prevent easy indentation on the face of the panels when compared with RAC which is made of a soft insulation felt with a lining on top. CBG also offer a HD variant of the RAC Plus system which increases inherent impact resistance further, the HD variant is ideal for higher wear spaces.

Note: HD panels weight an additional 1.5 kg/m²

Reduced environmental impact:

RAC+ has been conceived as a system designed to lessen the environmental footprint, this is achieved thanks to its extended usability due to its reversible nature, recyclable raw materials such as glass fibres and metakaolin and production in Hobart with 100% hydro and solar power source.

Further R&D

Further Weight reductions

CBG is in the process to requalifying RAC+ system with an additional weight saving, adding to our already lightweight system. More specifically, we are re-testing and re-certifying RAC+ with the same panel but with 2 key parts of our supporting structure (channel and corner support bracket made of aluminium instead of stainless steel. This will produce additional 0.7 kg of weight reduction per m².