THERMOHALL
excellence in engineering

RUBB
Building Systems
Rubb’s Thermohall™ fabric can be used to clad many Rubb structure types, from small standard shelters up to large scale multi-span aircraft hangars. The fabric provides many benefits to help promote energy efficiency.

Thermohall™ cladding consists of a durable external PVC layer and a self-cleaning internal PVC layer, which encapsulate a series of air tight PVC pockets, each featuring a non-combustible glass wool insulation core. The insulated panel system provides a full vapour seal, which minimizes thermal bridging and reduces infiltration losses. This reduces condensation on framing members, improving insulation efficiency.

The cladding is highly resistant to tearing, stretching and movement under load – even in very harsh weather conditions. It is securely fastened to the outside of a galvanized steel support structure and virtually eliminates thermal bridging and air infiltration. These features, together with our use of special high density insulation, mean that Thermohall™ structures typically outperform other systems that have higher insulation densities but lower overall effective thermal resistance.

Innovative Insulated System
The Benefits of Thermohall™

- Insulated panels include outer weather liner, integral glass wool insulation and inner liner
- System provides a full vapour seal, greatly reducing infiltration losses compared to other insulation systems
- U-value flexibility: Thermohall™ can be provided in different levels of insulation value adaptable to customer needs and environmental conditions
- Insulated panels completely cover the structural frame to minimise thermal bridging. This greatly reduces the condensation on framing members and improves insulation efficiency
- The system leaves the structural frame exposed internally, allowing for more efficient installation and service of electrical and mechanical equipment
- Roof and interior surfaces are provided in high gloss white to reduce solar load on the outside and increase reflectance within the building
- Factory pre-fabrication offers significant labour savings on site and greatly reduces installation time
- Rubb Thermohall™ buildings are fully and easily relocatable
- Vacuum packaging reduces shipment volumes
Rubb’s patented Thermohall™ features a flexible insulated fabric system which offers major advantages over other insulating systems:

- Non-combustible glass wool is encapsulated in air and water tight pockets
- Insulation thickness from 50mm to 200mm
- No air gaps in the cladding, which reduces heat loss and helps eliminate condensation
- Buildings are fully relocatable

Development of Thermohall™ started several years ago, with the goal of a new and eco-friendly insulation system. Thermohall™ is now fully developed and patented. Thermohall™ offers great energy savings and is environmentally friendly, both in fabrication and operation.

- We use a heavy-duty PVC fabric with a long, useful life and high density, non-combustible glass wool insulation
- All the materials are recyclable. Steel can be recycled through various means and PVC can be recycled through Texyloop, which is the Serge Ferrari operational recycling chain. The insulation material that Rubb uses is processed from recycled glass
- Rubb Thermohall™ is a properly insulated building which combines the best properties of both conventional buildings and fabric buildings, high thermal insulation and full relocatability and all Thermohall™ buildings can be delivered to suit our customers’ insulation requirements.

The outer membrane of a Thermohall™ building is manufactured using the same high-strength PVC-coated polyester material used on Rubb’s uninsulated buildings. These materials have a self-cleaning exterior finish and feature coated weights ranging from 850 g/m² (25 oz/yd²) to 950 g/m² (28 oz/yd²) for most applications.

PVC battens are welded to the outer cladding panels at regular intervals and then to the inner fabric panels to create closed cells to hold the insulation. The +/- 550 g/m² (18 oz/yd²) inner fabric is white with a self-cleaning coating on the inside face.

Glass wool insulation sections are enclosed within the completed PVC assembly, which is then sealed to prevent movement of insulation and moisture from entering.

**Specification**

| Outer layer | Flame retardant heavy duty PVC fabric |
| Core | High density glass wool insulation |
| Inner layer | Self-cleaning, PVC fabric |

**U-Values (R-Values) US approximate equivalent**

<table>
<thead>
<tr>
<th>Thickness (in)</th>
<th>R Value (US) ft²·°F·hr/BTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>50mm (2in)</td>
<td>R11</td>
</tr>
<tr>
<td>100mm (4in)</td>
<td>R19</td>
</tr>
<tr>
<td>150mm (6in)</td>
<td>R27</td>
</tr>
<tr>
<td>200mm (8in)</td>
<td>R35</td>
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Insulation/Heating
The depth of insulated cladding ranges from 50mm to 200mm, which provides a range of U Values to suit your requirements. Rubb can also supply various heat sources within the structure such as oil or gas fired hot air units, radiant heating, heat pump or electric fan heaters.

Moisture
Thermohall™ has excellent drainage properties, is water repellent and does not absorb moisture or odours. It helps eliminate condensation. We deliver our Thermohall™ clad structures with simple or sophisticated ventilation systems to provide a comfortable working environment.

Soundproofing
Technical regulations and guidelines set standards for sound insulation. Our patented insulated fabric cladding system satisfies the requirements for sound passage, which is essential for our customers who are located in industrial areas or near roads or airports.

Recyclable
All materials used to create a Rubb building can be recycled if necessary. No materials from Rubb structures are considered to create any toxic or hazardous waste. Steel can be recycled through various means and PVC can be recycled through Texyloop.

Sustainability/Eco Friendly
The insulation consists mainly of recycled glass. Thermohall™ cladding can provide many environmental benefits including reduced energy use and helping support a stable indoor temperature all year round. Rubb structures are also fully reusable across the sectors we serve.

Proven Fire Safety Performance
Rubb buildings offer significant fire safety advantages over other building types, including lower risk of combustion, flashover and structural failure, even in severe fires. The fabric will not propagate flame or sustain combustion when exposed to a severe fire.

Alternative Solution
Rubb Thermohall™ structures combine the best properties of conventional buildings and fabric buildings, high thermal insulation, full relocatability, and all Thermohall™ buildings can be delivered to suit the customer’s insulation requirements.

Quality
Thermohall™ features high density non-combustible glass wool insulation encapsulated within a heavy duty PVC fabric cladding system, which is designed and manufactured in-house to suit site specific project requirements. All materials are of the highest quality and meet regulations.

Rubb Thermohall™TM Attributes

- **Moisture**
- **Soundproofing**
- **Recyclable**
- **Sustainability/Eco Friendly**
- **Proven Fire Safety Performance**
- **Alternative Solution**
- **Quality**

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Rubb has the capability and experience to design, manufacture, deliver and install custom structures. With Rubb, you can be sure everything is under control from concept to completion – including cost, quality and delivery. While we generally have the right standard structure available to meet project needs, Rubb can also design custom solutions to meet special requirements. We have the in-house resources to provide a cost effective solution customised to our clients’ needs.

**Design**
Using proven engineering software, we can tailor the project to the specific requirements of the site, type of cargo and logistical needs.

**Production**
Steel and membrane components are fabricated with proper equipment and quality control.

**Installation**
Pre-engineered and pre-fabricated to make on-site installation by a Rubb crew, or your crew, go smoothly and efficiently.

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**THA Shelters**
- Rubb shelters are available in 6m, 8m, 10m, and 12m span widths with 3.3m high sidewalls.
- They are supplied by any length in 3m modules.

**BVI Structure**
The BVI structure type features column legs and roof sections. Ranging from widths of 10m to 30m, by any length.

**BVR Structure**
The BVR structure type features rectangular leg and roof box sections. This takes up less space providing more overall internal clearance.

**BVC Structure**
The BVC is designed with a vertical column leg and a lattice frame roof. This structure type is available in span widths from 40m to 100m.

**BLE Structure**
The Rubb BLE is robust and reliable, designed to be liftable, moveable, extendable and relocatable to meet all our clients’ needs.

**NV Structure**
The NV was the first steel truss span building manufactured by Rubb. The design originated in Norway and has a vertical sidewall.

**EFASS Structure**
The EFASS hangar is lightweight and designed for rapid deployment. These hangars are available in three widths, 11m, 20.4m and 25m, by any length.
Airline easyJet asked Rubb Buildings Ltd to provide a twin span hangar measuring 91.5m wide x 60m long. The structure measures 8.5m to the eaves and 14.8m to the apex of each span. Each front gable measures 45.75m wide and features a 41m wide x 13.5m vertical lifting fabric door.

The hot dip galvanized steel frame is clad with 150mm thick Thermohall™ insulated fabric and the facility provides 5200sq m of usable working floor space. A full LED lighting system, ventilation system and LPG heating system has been installed. To complete the build, two sets of vertical lifting hangar doors were fitted to allow access to the two-bay facility. The hangar is complemented by a 550sqm external logistics and office building.

“The Rubb team who worked on site were absolutely first class. The first steel went in the ground on December 14 and by May 19 we were able to introduce the first aircraft into the hangar. The successful delivery of this project, which has been challenging both in terms of scale and its timeline, is another example of what can be achieved through easyJet’s innovative and lean approach, not only meeting a tight timeline, but also creating strong sustainable partnerships to deliver market leading operational performance.”

Brendan McConnellogue | Head of Maintenance, easyJet

Gatwick Airport, West Sussex, UK
45.75m twin span x 60m long BVL

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The Rockford facility’s two insulated membrane-clad hangars each measure 91.4m long with a 30.5m clear span and 12m sidewalls, culminating in a centre height of 30.5m. Each structure features five-panel, vertical-lifting doors, with pivoting mullions, allowing for comfortable housing of aircraft as large as the Airbus A380. The hot-dip galvanized steel frame is clad with 50mm Thermohall™ insulated fabric. Maintenance requirements are very low.

The vertical lifting doors, with their exceptional seals, allow the facilities to be climate controlled cost effectively all year round. Complementing the curved membrane structures, the doors’ translucent fabric also allows natural light in, creating a great work environment for the technicians, while minimizing lighting costs.

The new MRO facility, operated by AAR, is capable of servicing an Airbus 380 and Boeing 747 at the same time. The 16,500 square-metre facility is expected to operate 24 hours a day.

The Rockford structure represents a high point in Rubb Buildings Systems’ history in providing highly efficient membrane clad commercial aviation hangars.

“Even an extreme blizzard won’t slow the efficiency of Rockford MRO. Five hundred skilled workers will soon enjoy natural light in ideal working conditions at the 24-hour-per-day facility, delivered by Rubb Building Systems, operated by AAR.”

Jeff Polsean | Economic Development Manager, Chicago Rockford International Airport
A Rubb aviation building was selected for Aerohub, a UK aerospace focused Enterprise Zone, based in Newquay, Cornwall.

The project provides a large, custom designed space for Apple Aviation Group’s increased maintenance, repair and overhaul (MRO) operations. Apple Aviation selected Aerohub at Newquay Cornwall Airport as the location for its growing aerospace maintenance facility headquarters.

The main steel framework for the hangar was installed and then Thermohall™ insulated PVC cladding was fixed to the structure to create its roof and walls. The Rubb hangar has the capacity to accommodate the maintenance, repair and overhaul of large fixed wing aircraft such as a Boeing 757. It will also be used for aircraft storage and recycling.

A wide vertical lifting fabric door provides access to the hangar.

“The speed and flexibility of the Rubb hangar construction has enabled the airport to develop new hangarage and respond quickly to a key customer’s requirements. This has been critical in order for business to be undertaken in a competitive marketplace and put NQY firmly on the MRO map with the capability to attract airlines to the facility.”

Al Titterington | Managing Director, Newquay Cornwall Airport
Rubb Buildings Ltd joined forces with construction giant Balfour Beatty to deliver a custom-made sports structure containing a mix of spaces, as well as a main sports hall.

The split level 20m span x 70m long multi sports complex boasts a 7m high x 33m long playing area, based on a four court badminton hall. This area, situated at the rear of the building, can also be converted into one basketball court, one netball court, one tennis court or one 5-a-side football pitch. A 4m high x 57m long amenities block completes the front of the facility and includes an entrance lobby, a dance studio, executive studio, changing facilities, four store rooms, a seminar room and a construction zone.

The sports structure features Rubb’s traditional galvanized internal BVC type steel frame. The walls from the ground up feature 4m high, 100mm thick insulated steel cladding, providing a U-value of 0.21w/m²k. Rubb’s Thermohall™ insulated cladding completes the upper walls and roof.

The environmentally controlled sports hall facilitates internal heating and air conditioning. Three A-rated UPVC windows provide natural lighting to the sports facility.

"Rubb provided an ingenious solution for our new school; they were able to offer a design for a school sports building that met our requirements and those of the planning authorities for a contemporary sports facility, but which was affordable and deliverable within the original planning timelines."

Steve Howley | Estates and Facilities Manager
Rubb USA has completed a 9.7m x 29.5m BVR structure at Summit Station, CH2M Polar Hill Services in Greenland for the National Science Foundation. Located at 72° 36’ N latitude, and at an altitude of 10,600 feet with a mean annual air temperature of -31°, Summit Station has long challenged the physical fitness of its visitors.

Long-time Rubb site supervisor and current salesman Marc Boutet spent nearly a month overseeing the erection of the Rubb building on the polar ice cap. The Rubb building was neatly packed and delivered via a USAF C-130, equipped with skis to land on the ice cap.

The crew's accommodation for the duration of the construction process was a series of specialist tents to protect people from the elements.

The building was set upon a foundation of wood/metal that can be best described as an giant toboggan, so the structure can be moved periodically to prevent being snowed over.

Once the steel framework was constructed, Thermohall™ PVC sheets were pulled/adjusted onto the frame via snowmobile.

The cladding on this building is 0.19 W/m²K rated Thermohall™ with 200mm of high-density insulation. Rubb Thermohall™ is designed to withstand and perform in the harshest of environments.

The BVR is equipped with a generator driven lighting and heating system. The structure will support operations at Summit Station and will primarily serve as an equipment and maintenance shed.

Rubb provided a showroom with a view to a car sales company in Sweden. Family firm CKS Bilservice AB sells Peugeot cars and light trucks, McCormic farm machinery and services Ford cars.

The company moved location and needed a new insulated showroom for care and machinery. Rubb had the perfect solution in a new Thermohall™ concept with windows. CKS Bilservice AB liked this solution and ordered a Rubb building measuring 15m wide x 30m in length.

The windows ensure good lighting conditions in the building and a view into the showroom. Quick delivery, flexibility and good quality prompted the customer to choose Rubb.

The building features Peugeot colour coding, two windows measuring 2600mm x 3950mm and one measuring 2200mm x 3950mm. These include hardened glass with a U-value of 1.1 W/m²K. The building is fitted with a 4m x 4m Prido door with integrated window and a personnel door. Rubb also supplied the lighting system.