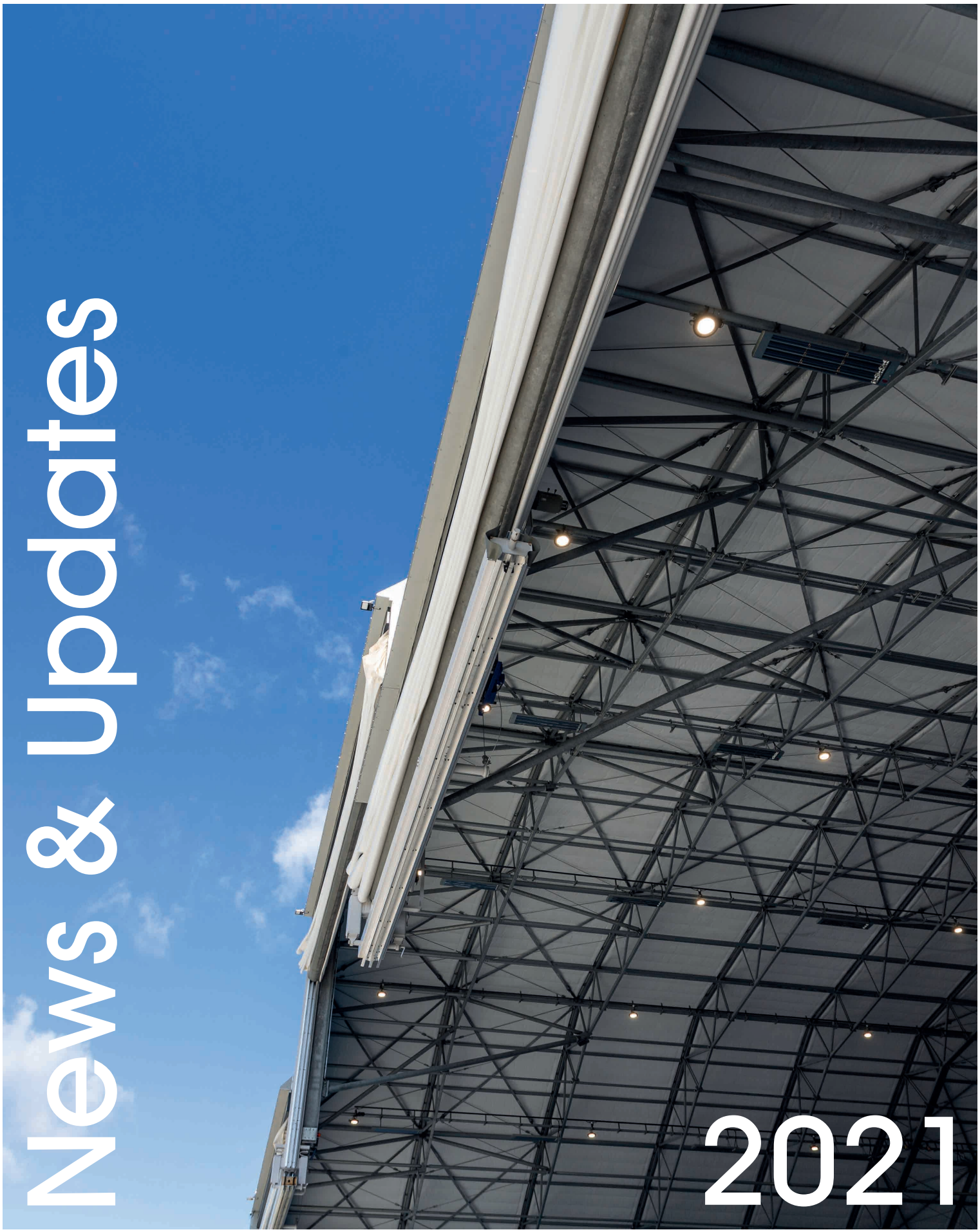
the fabric

engineer

RUBB
Building Systems



News & Updates

2021

in engineering excellence in

welcome to the

fabric engineer

2021 has been a year to remember for many reasons, but for Rubb Buildings Ltd, it will be known for the many impressive and diverse projects completed in the most difficult of global circumstances.

Our team at Rubb Buildings Ltd have completed a narrow-bodied MRO Hangar facility at the New Bro Tathan MRO business park in Cardiff (featured on page 4-5). This project is a clear indicator and testament to the Rubb Product qualities, and demonstrates once again the many benefits of our Thermohall® insulated fabric membrane product.

The Qinetiq project (pages 22-23), based in the harsh environment of the Outer Hebrides, provides a Rubb structure on a rail system to support a repeat customer complete their objectives and whom we are delighted to work with once more. Such a unique design goes to show the many applications our product can be adapted to.

Behind the scenes, we have designed and tested our new 28m EFASS Military Deployable Hangar System, and this will be available from our product range during 2022. We look forward to sharing more on this next year.

We have also completed a wide variety of work in many sectors throughout the year, including Sport, Military and General Industry. There are not enough pages in the Fabric Engineer to cover each of these in-depth, however more info of select projects from the year can be found on our website and social media.

The Rubb product continues to serve our clients and customers outstandingly around the world, and our business qualities continue to shine as the world industry leader.

I am delighted with the hard work and dedication of the team, and I look forward to 2022 with excitement for the projects that lie ahead.

Follow us on social media to keep up to date with all the latest news from Rubb Buildings Ltd, and best wishes for 2022.

Ian Hindmoor
Rubb Buildings Ltd Managing Director

246 Dukesway, TVTE,
Gateshead, NE11 0QE

info@rubbuk.com

+44 (0) 191 482 2211

www.rubbuk.com

- Built to last
- Relocatable
- Code compliant
- Low maintenance costs
- Clear spans
- Turnkey solutions
- Worldwide service
- Rapid construction

In this issue...

4
Aviation

Welsh Gov. MRO hangar **4-5**
STS Aviation MRO hangars **6-7**
Rubb USA MRO project **8**

9
Sport

Pickleball court **9**
Horse riding arena **10-11**
Avoniel MUGA cover **12-13**
The Grammar School at Leeds **14**

14
Storage

Rosenberg Worley's 4th Rubb hall **14**
Eon Element's 'split' hall **15**
Volda Byggservice storage solution **15**
World's first floating wind farm **16**
Larvikittblokka mining solution **17**

18
Ports

The Sprague Energy story **18-19**
Coast-to-coast re-sheets **20**

21
Military

Op Regain update **21**
QinetiQ's mobile building **22-23**
A&P Falmouth: fitting the fleet **24-25**

26
News/Features

Why Rubb hot-dip galvanizes **26-27**
Air-supported vs steel buildings **28-29**
Rubb's re-sheet service **30-31**
It's our round: Rubb gin **32**
Rubbhall AB & Rubb Poland **33-34**
Zurhaar & Rubb AS' new HQ **35**

Ready for take off

Rubb Buildings Ltd has completed its design, manufacture, and full installation of a new MRO hangar on the Welsh Government's 1,200 acres business park in the Vale of Glamorgan.

Rubb UK's 50m (wide) x 50m (long) x 8m (sidewall height) hangar, with an apex height of 18.5m, is capable of housing aircraft such as Boeing B737-800/Airbus A320-A321 and will be used as a compliant Part 145 MRO operational hub while additional hangars are being built at the new airfield site development.

The 1,200 acres business park includes a fully operational 1,800m runway on a commercial airfield operated by Cardiff Airport. Stand-out features include:

- a strategic employment site offering occupiers quick and serviced occupational solutions, as well as a space to grow through a range of design and build opportunities
- a convenient location, within 15 miles of Cardiff, 20 minutes from the M4, and less than five miles from Cardiff Airport, with over 50 direct flights and more than 900 international connections
- access to a skilled workforce, with strong links to local colleges and universities.

The hangar is insulated with 150mm Rubb Thermohall® cladding, featuring a goosewing grey exterior and white interior. The Thermohall® system effectively insulates the MRO hangar, resulting in a facility that can be easily climate controlled to suit usage and operations.

The structure includes a vertical lifting fabric Megadoor entry system, featuring a clear width of 42m and overall clear height of 13.5m. This type of door offers flexibility in accommodating different aircraft that could be maintained in the hangar. Other unique attributes include faster opening and closing times, excellent air tightness and wind resistance, longer lifetime and lower operating costs, safer working thanks to patented safety arrestors and advanced and robust PLC-based control systems.

The MRO facility also features a 500 lux LED lighting system, electric radiant heating, and a full HVAC system.

Many of the world's primary aerospace businesses already operate in the Bro Tathan area, including British Airways, Airbus, GE, and Nordam. The business park is home to eCube Solutions, a global player in the aviation services industry, along with Caerdav, who are creating Europe's most advanced flight training centre of excellence for commercial aviation training and engineering, providing complete training for pilots and cabin crew. Also located at Bro Tathan is global car icon Aston Martin and production of its first SUV, the Aston Martin DBX.

> It's great to have a British company with a global reputation supporting our aviation business ambitions for Bro Tathan.

Global property agent Savills has been commissioned to promote the business park's unique mix of attractions. Savills Director Scott Caldwell said: "Rubb is involved in top-flight projects around the world, so it's great to have a British company with a global reputation supporting our aviation business ambitions for Bro Tathan. Co-locating a commercial airfield with a business park in such a strong strategic location makes for a very attractive proposition to investors, developers and businesses across the UK and internationally."

This aviation facility is the latest in a long line of international projects for Rubb, including hangars for Turkish Technic, easyJet, Aerohub, Hawaiian Airlines, AAR and Bombardier.

Rubb USA supplies STS Aviation with twin MRO hangars

Rubb USA has supplied two narrowbody aircraft MRO hangars to STS Aviation in Melbourne, Florida.

The original contract for the hangars was signed back in autumn 2019, with design and fabrication work starting shortly after. However, the project was put on hold in early 2020 due to the COVID-19 pandemic. The project then recommenced in late 2020, with both hangars being completed in early 2021.

The project includes two 46m wide x 62.5m long x 10m high AVC structures, installed side-by-side with a center gutter/downspout system.

Each hangar includes a 3-panel Megadoor system, with a 40m clear width opening. Pedestrian access is also provided with four 1m x 2m personnel access doors.

The hangars employ Serge Ferrari's 1202 membrane, which meets Florida's "wind-borne debris" building code requirements—a must in high-wind and hurricane-prone regions such as this. This specialized architectural PVC is largely white, but features attractive dark grey cladding to the bottom. The white roof allows natural daylight inside the hangars, illuminating the busy work environments.

Both hangars also utilise foam fire suppression systems used with Group IV (NFPA 409 Fire Code for Aircraft Hangars) membrane hangars. As Rubb's flame retardant fabric does not spread fire throughout the hangar, this system is in place to protect the valuable aircraft within.

Both hangars were designed for a narrowbody aircraft, so they can accommodate models such as the B737, A320, and A321 aircraft.

Rubb's flame retardant fabric does not spread fire throughout the hangar, so the foam suppression system is in place specifically to protect aircraft.

Rubb USA lands new 91m MRO hangar

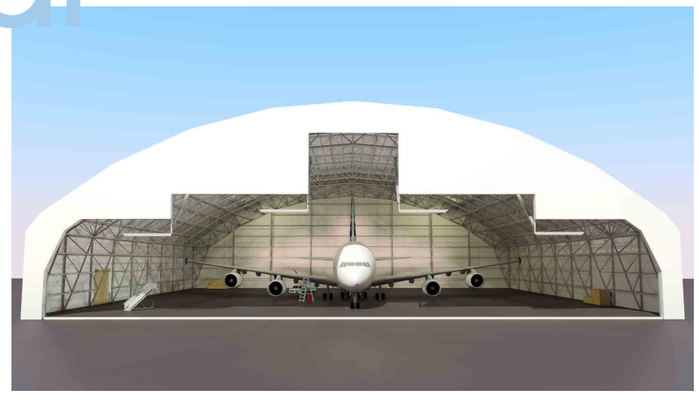
Rubb Building Systems, a world leader in the design and manufacture of custom-made and relocatable engineered fabric structures, has landed a contract to design, fabricate and erect a new 300ft MRO (Maintenance, Repair, Overhaul) hangar.

The 91m (span) x 91m (length) x 12m (leg) hangar will be capable of housing widebody aircraft as large as the Airbus A380. Easy access for aircraft is ensured with the five-panel, vertical-lift Assa Abloy Megadoor system with pivoting mullions. These high-quality doors provide faster opening times and excellent air tightness and wind resistance.

The project will also feature several smaller access points, primarily a 3.5m x 3.5m electrically operated roller shutter door, complimented by four 1m x 2m pedestrian doors fitted with panic hardware and vision windows.

The 10-span hot-dip galvanized steel frame is clad with specialized architectural PVC fabric from Serge Ferrari, which deflects light and heat—ideal for hot days on the runway.

The hangar is part of Rubb Building Systems' AVC range, which has been utilized for other MRO hangars such as AAR's twin-span project located at Chicago Rockford International Airport, completed in 2017. More recently, Rubb Building Systems delivered a 82m x 87.5m x 10m AVC hangar to Turkish Technic's Istanbul Airport operation in 2019.



Rubb serves up

Rubb USA has supplied its first pickleball court to a restaurant chain.

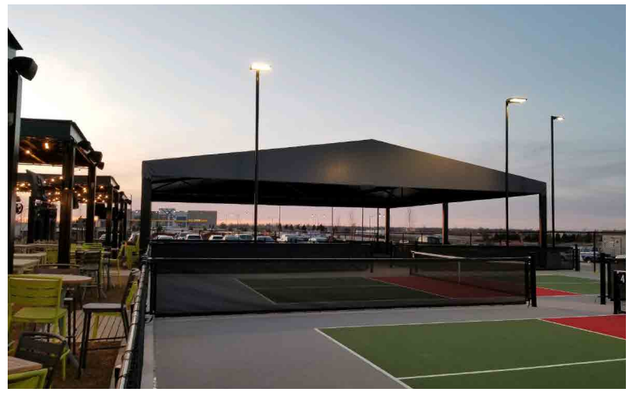
They chose Rubb to incorporate this unique architecture into their overall restaurant plans in order to provide weather protection for their guests playing pickleball.

Pickleball is a paddleball sport that combines elements of badminton, table tennis, and tennis. Invented in the mid-1960s, the sport now has an estimated 3.3 million players.

Pickleball participation grew by a 21.3% last year as people looked for new ways to stay active during the pandemic. It's no surprise that this is a growing sector for Rubb.

The structure stands at 19.5m wide x 19.5m long x 5m high, and uses Grey 932S Serge Ferrari PVC for its membrane.

The steel was coated using high performance paint system to match the other metal finishes at the restaurant.



Rubb's the favourite with bespoke horse riding arena

Rubbhall AS has designed, constructed, and installed a top-class riding arena for Stall Siggerud - Ås horse riding school.

The 25m span, 39m length, 6m leg FXI hall is located in Ås, Norway, and complete with a concrete top-edge and traditional wood cladding to the sidewall.

Indoor riding arenas provide great protection from the weather, which is key in a country such as Norway. The hall is insulated with 150mm of Rubb's Thermohall® system, meaning both the horse and rider can be kept warm in the winter and cool in the summer.

With the combination of an indoor arena and a sand surface, ventilation is essential to prevent dust and debris. To combat this, Rubb included a powerful ventilation and air mixer system to ensure safe and comfortable riding.

4.8m is often seen as the minimum wall height for riding halls, but the client chose a 6m leg allows for extra jumping height— truly making this a first-class facility. Rubb's clear span also means that there are no support beams within the riding area, giving plenty of clearance and further ensuring there are no unintentional obstacles when riding. The client chose to supply their own door for this project to secure additional light from outside. A bright interior is essential for safe riding, so Rubb installed several bright fittings above. There is also an access door to the left for pedestrian entry and exit.

There are many finishing touches—such as the large training mirror to the right of the door—that make this Rubb's most elaborate equestrian project to date.

The client chose Rubb's modular building technique in order to have the option of expanding the length of the facility at a later date to match any increasing business needs. Rubb prides itself on this flexibility offered to the customer, and looks forward to potentially returning to this project in the future.

Elin M. Myhrhaug, operator of Stall Siggerud - Ås, commented: "We have been training our horses in the Rubbhall for a long time now, and can definitely recommend them to everyone. It is an affordable alternative that keeps the heat in despite the weather. Both my horses and I thrive in our Rubbhall. "

Winning Stall Siggerud student pictured.

> "Both my horses and I thrive in our Rubbhall.
>
> Elin M. Myhrhaug,
> operator of Stall Siggerud - Ås

Avoniel scores Rubb and Heron Bros Ltd's third sport facility

Rubb UK has worked with Northern Ireland's Belfast City Council and Heron Bros Ltd to regenerate the Avoniel site.

As part of the £8 million project, Rubb has supplied Avoniel with a 30m span x 60m length x 4m leg height BVE MUGA cover.

The transformation of the former Avoniel Leisure Centre site aims to address the lack of 3G pitches in the area, while also providing flexible indoor space for the community.

Rubb's covered pitches can be comfortably used no matter the weather with the protection of Rubb's PVC cladding. This will be the case for many years to come, as the PVC membrane has a life expectancy of up to 25 years, and the hot dip galvanised framework can last 30.

Belfast Councillor Nicholl said: "This is one of seven new and upgraded leisure facilities that make up Belfast City Council's £105 million Leisure Transformation Programme - the biggest investment of its kind in the UK.

"When it opens, Avoniel will welcome sports clubs, groups and individuals from across Belfast and further afield. It will also play a vital role in improving health and well-being in the local community, one of the key objectives of the Belfast Agenda, the city's community plan."

This isn't the first time Rubb have contributed to this multi-million pound scheme—it's actually the third. In 2019, Rubb worked closely with main contractor Heron Bros Ltd and Ards and North Down Borough Council to supply a 43m span x 59m long mutlisports facility **(1)**. The structure accommodates a diverse range of sports for schools, local sports organisations, and the community at Dairy Hall in Newtownards.

Following the success of the project at Ards Blair Mayne Wellbeing & Leisure Complex, Heron Bros Ltd approached Rubb with the scheme for this particular facility **(3)**, as well as another MUGA cover for Brook Leisure Centre completed last year **(2)**.

Sales executive, Stephnie Coyle, comments: "On all occasions our work for Heron Bros have resulted in great facilities being delivered as part of fantastic overall schemes that Heron Bros have delivered across Northern Ireland."

Rubb UK has a great continuous working relationship with Heron Bros Ltd, and were delighted with the opportunity to work on this project and to develop a building that combines the traditional MUGA cover with Rubb's excellent engineering.

1

2019: Ards Blair Mayne multisport facility

2

2020: Brook Leisure Centre MUGA cover

3

2021: Avoniel MUGA cover

Rubb to provide sports facility for the Grammar School at Leeds

Rubb UK has scored a contract to design and build a new top-class sports facility for the Grammar School at Leeds.

The Grammar School at Leeds approached Rubb to meet their requirement for additional indoor sports space to maximise usage in bad weather. We have no doubt this 38m span, 60m long, 6m leg BVC multi-sports structure will live up to their reputation of sporting excellence.

The Rubb BVC structure is designed with a vertical column leg and a lattice frame roof. This structure type is commonly used for Rubb's larger sports halls, as the column leg design provides a large playing area and maximises the usable width. This allows for more interior clearance over the full width of the building.

Included in the structure is a roller shutter door, measuring 4m wide x 4m high, as well as four access doors to each side of the building.

Sales Executive Stephnie Coyle commented: "It will be a great new addition to their sports facilities; I very much look forward to seeing the project complete and in action."

Work is set to begin in late 2021.

Rubbhall AS delivers 4th Hall for Rosenberg Worley

Rosenberg Worley, a Norwegian company that specialises in designing and building assets for offshore industries, has once again chosen Rubbhall AS to supply its latest storage solution.

Founded in 1896, Rosenberg Worley operates from their Stavanger shipyard, located on the Northwest coast of Norway. This 20m span x 50m length x 6m sidewall Rubb Hall is the fourth project Rubb has supplied to the firm.

The hall is fully kitted with 50mm Thermohall® insulation, 250 lux lighting, 9kW heating, electrics, and dehumidifiers.

As for access, the hall has two 8m x 5m doors placed in the sidewall in addition to two pedestrian entrances.

Rosenberg Worley opted to take advantage of Rubb's flexible financing and rent this latest building with a 24-month lease from Renthall, Rubb's sister company specialising in rental solutions.

Rubbhall AS is proud to with Rosenberg Worley's requirements, and looks forward to many more years of cooperation with this pillar of manufacturing.

Eon Element's split solution

Rubbhall AS has supplied eco-construction company Eon Element with a 20m span x 40m length x 6m sidewall Rubb Hall.

The 20m span Rubb Hall will be used for both production and storage, so the design of the hall had to follow suit.

Its 40m length is divided in two: the 20m production area is insulated with 50mm Thermohall® cladding, while the storage half remains uninsulated and ventilated. A partition divides the sections.

250 lux lighting ensures both areas are bright working environments.

The hall is completed with several doors, including two 4m x 4.5m remote control industrial articulated lift doors (with roofs placed above), a 4m x 3m quick door installed in the partition (with a row of windows), and three personnel access doors. 'EON' is printed on both the side and front, adding another layer of customisation.

The hall was installed by Plamek and was set up in about 3 weeks.

Eon Element finishes elements that make the construction process smoother, faster, and more environmentally friendly.

It's no surprise they chose Rubb to supply this storage solution, as our goals are perfectly matched.

Volda Byggservice chooses Rubbhall AS for FXF solution

Rubbhall AS have supplied masonry and concrete specialist Volda Byggservice with a new 15m span x 20m length x 5m long FXF Rubb Hall.

Efficient utilisation of storage space was the top priority for this project, so Volda came to the right place. Two 4m x 4m remote control electrically operated sectional lift doors are placed in the centre on a single side of the hall in order to maximise storage space while maintaining access. With no stand-alone access doors, each door has a smaller pedestrian access one built into it.

It is always a pleasure to work with companies in adjacent industries to Rubb, as it proves we have the trust of those that know the construction industry best.

Rubbhall AS supports Kværner for world's first floating wind farm

Norwegian engineering and construction company Kværner chose Rubbhall AS' storage solution on behalf of the Hywind Tampen project—the world's first renewable power for offshore oil and gas.

The energy company behind the project, Equinor, explains: "Hywind Tampen is an 88 MW floating wind power project intended to provide electricity for the Snorre and Gullfaks offshore field operations in the Norwegian North Sea. It will be the world's first floating wind farm to power offshore oil and gas platforms.

"It will also be the world's largest floating offshore wind farm and an essential step in industrialising solutions and reducing costs for future offshore wind power projects."

The 15m span x 30m length x 5m sidewall FXF building is fully prepared for the task, with 50mm Thermohall® insulation, 7.5kW heating, electrics, and 250 lux lighting. Access is provided by a 6m x 5m door in the gable alongside a pedestrian door.

Located in Vikebygd, western Norway, the building will be rented with through Renthall, Rubb's sister company and specialist in rental solutions.

Rubbhall AS is proud to be supporting such an important project for the future of offshore wind projects.

> "An essential step in industrialising solutions and reducing costs for future offshore wind power projects.

Larvikittblokka picks Rubbhall AS' mining solution

Rubbhall AS has supplied stone mining company Larvikittblokka with a 15m span x 25m length x 6.4m sidewall FH hall.

Erected by Plamek on top of the Klåstad quarry in Larvik, the Rubb building will assist in the sawing and production of larvikite blocks. Chosen specifically for its deep, dark colour that lends the stone an 'organic, solid, and elegant feel,' Larvikittblokka offers the stone in 0.4m to 1m falling lengths. With blocks this large, it's no surprise they reached out to Rubbhall AS for a flexible storage solution.

"We needed a hall that was both temperature-regulating and had a frost-free indoor climate. At the same time, it was important that the hall was noise-reducing," explained Jan Henrik Hansen, general manager of Larvikittblokka.

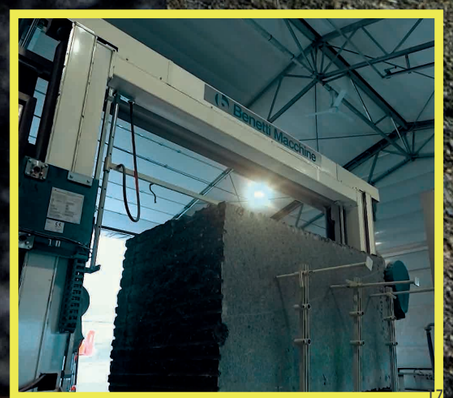
Noise reduction was significant factor the client needed to be addressed, as a good solution to that would allow work to take place on evenings without disturbing their neighbours. To meet this requirement, Rubbhall AS insulated the hall in 100mm Thermohall®. In addition to the glass wool technology's temperature-regulating properties, Rubb's energy efficient solution also insulates sound.

The hall is complete with two ventilation fans in each gable and several doors. An electrically operated 4.8m x 5m motorized industrial articulated lift door; two 1m x 2.1m wicket doors; and a 3m x 3m folding door placed in the gable.

"Rubbhall AS has been very good in both the planning phase and the implementation of this project. The quarry has been given a hall that meets all our requirements and wishes. The collaboration with Rubbhall AS has worked very well. We'll also consider Rubbhall AS on future projects, and can warmly recommend them to others," Jan Henrik Hansen concluded.

Øyvind Kristiansen, key account manager for Rubbhall AS, gave us some final words: "We are very proud to deliver this product, and we are really looking forward to new challenges with the customer."

Jan Henrik Hansen, General Manager, Larvikittblokka



The Sprague Energy Story

> “We’ve always had Rubb… why would we go anywhere else?
>
> Sean McKenzie, Sprague Energy


PD Merril inside a Rubb building


Sprague Energy’s Sean McKenzie

Rubb USA President David Nickerson and Sprague Energy’s Sean McKenzie look back on the companies’ history, spanning 37 years and 7 Rubb buildings.

“The Merrill story is a really good story,” began Rubb USA President David Nickerson. “PD Merrill took a gamble on an unknown company with an unknown product when he bought Rubb 1—the first building we built at a port in the U.S.”

When PD Merrill took that gamble 37 years ago it gave Rubb Building Systems a chance to prove its movable fabric tension buildings were safe, strong, and could withstand the harsh conditions of the Portland, Maine waterfront.

”I’m really proud of the fact that we had a customer that we started with in 1984 that we are still friends with today,” David continued. “Even though PD passed away, the tradition continues with his employees and the people at Sprague which acquired the company.”

The oldest Rubb Building on Portland harbor, appropriately called Rubb 1, was erected in 1983 and still has its original PVC cladding. The harbor now has 7 buildings, with the most recent being erected in 2006.

Some store silicone or seaweed, others have newsprint that has to be kept at a certain temperature and humidity. The 54,000 square foot (5,000 m2) intermodal facility is truly state of the art: in addition to an array of doors, dock seals, dock levelers, rail canopies, and 18m candle lighting system, the 52m x 98m BVE range structure utilizes a sophisticated air turnover and environmental control system.

Nearly 40 years ago Rubb USA President David Nickerson hand painted the Merrill sign for the first Rubb building at the terminal.

“It’s still there! It’s faded and old, but it’s still there!”

Sprague Energy’s Sean McKenzie has nothing but good words for Rubb’s buildings. “They’ve lasted a long period of time—we’ve put them through their paces. They’re pretty durable buildings; they’re still standing.”

The fact that they’re still standing is even impressive: the 7 port warehouses withstood the storm of October 29, 2017, which devastated much of Maine. With wind gusts up to 70mph, only one structure sustained damage worthy of a service call.

Rubb 4, a 35m x 46m x 5m BVL (built in 1995) suffered a tear along a welded seam due to pressure from the wind gusts. The Rubb service team repaired this issue within days, and the fabric clad warehouse still has its original roof membrane over 15 years later.

“Our customers are looking for good value, something that will last, something well-engineered,” David commented. “It’s a relationship where we trust them, and we know they trust us… It’s proven itself over all that time, it’s really rewarding.”

Sean shared some final words: “We’ve always had Rubb. We are completely satisfied, why would we go anywhere else?”

Coast to coast

Rubb USA has supported two ports on opposite sides of the USA with re-sheets of their nearly 30-year-old buildings.

On the west coast, the Port of Los Angeles; and on the east, Pennsylvania's Penn Terminals.

The Port of LA's original structure, a Bi-Link 29m wide x 80m long x 5m high BVE, was designed, engineered, and constructed by Rubb in 1992. While Penn Terminal's building, a single span 30.5m wide x 91.5m long x 5m high BVE, was erected in 1994.

The longevity of Rubb structures provides a long-term, eco-friendly, and cost-effective solution for our customers—even in challenging port environments such as these, which have endured salty ocean spray and storms for 29 and 27 years, respectively.

Now the ports have 'new' buildings that will serve them for many more years to come.

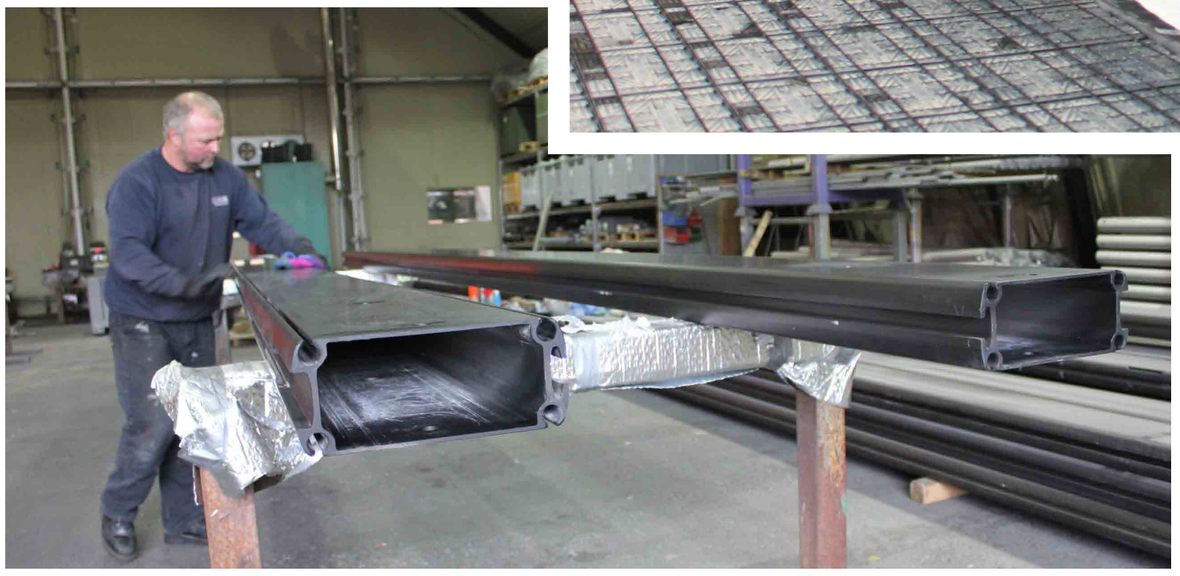
Op Regain: 20/25

Rubb UK continues to assist the MoD with Operation Regain, an effort to consolidate all MoD assets which are spread across the globe.

In just over a year, Rubb has refurbished 17 out of 25 EFASS for MoD's Op Regain (as of September 2021).

Delivery complications are avoided, as Rubb's 20.4m EFASS range can be easily dismantled and each one packed inside a single 20ft ISO container for shipping. This is especially impressive when considering the trident doors to the gable ends of each hangar.

Once on site, Rubb refurbishes the hangars and bring them up to 2021 specifications—electrical regulations, for example, have changed since their original construction and will be upgraded to Zone 1 electrics.



Rubb Sales Manager Andy Knox commented: "Many EFASS have been returned to the UK to undergo refurbishment work to bring them back up to A1 (new) condition. A typical refurbishment to bring the building back to 'good as new' will cost less than 20% of the cost of a new hangar."

After almost 20 years, the EFASS range continues to be the flagship for Rubb's excellence in engineering, and a symbol of our continued relationship with the MoD.

QinetiQ on track for second mobile building

Rubb UK has provided its second mobile structure to British defence technology company QinetiQ.

Located in the Outer Hebrides, the 13.25m span x 19.25m long x 7m sidewall BVR fabric structure was erected to provide shelter for testing and evaluating military assets.

To achieve this, QinetiQ required the shelter to be mobile. It covers and protects the assets from the environment when required, and can then be moved along a set of rails measuring 48m long to reveal the assets for testing procedures.

The building incorporates a specifically designed roller system which allows the smooth transportation of the building along its tracks to and from its permanent location. The rollers attach to the underside of the building footplates and the top of the foundation rail.

The rollers are designed to prevent the building from lifting off the track or sliding transversely. The movement of the building is carried out manually using a four-wheel machine, which attaches to the building's gable end.

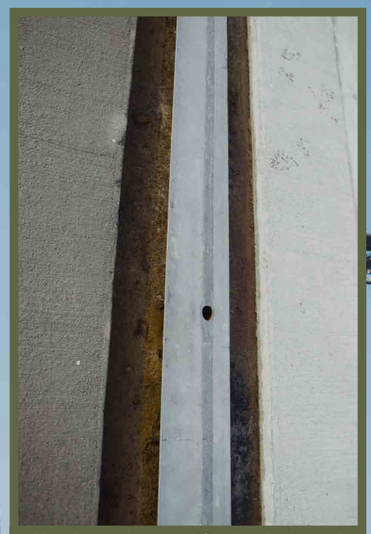
There is a simple locking device using pins to secure the structure longitudinally when it isn't in transportation, and the building has a strict transportation routine to ensure the safest possible operation.

The new structure incorporates a Rubb Heli-Door system, bespoke designed to meet the customer's clearance requirements. This unique vertical lifting door system is designed to counter-act large wind pressures acting upon the door system and structure from the harsh surrounding environment.

Roddy Steele, Hebrides Hard Services Project Manager, commented: "Having previously used Rubb Buildings for a previous environmental shelter in 2015, Rubb Buildings were the obvious choice to design and install this shelter for our 2021 requirement."

Rubb is grateful for the opportunity to design, manufacture, and install such a unique solution, once again proving the adaptability of our fabric tensile structures.

The building will pull back along these rails to reveal the asset.



Up close: the specifically-designed roller system.

Rubb's 2015 project is still regularly used in QinetiQ's testing.

> "Rubb Buildings were the obvious choice to design and install this shelter.
>
> Roddy Steele,
> Project Manager, Hebrides Hard Services

Rubb's 2015 project

Fitting the fleet: Rubb's 13-year history with A&P

Rubb's long history with four Royal Fleet Auxiliary Bay-class vessels perfectly embodies the advantages synonymous with Rubb's fabric-engineered buildings.

For the past 13 years, they have demonstrated the extent of usability, engineering, and service Rubb can offer. No other solution could be dismantled, refurbished, modified, and relocated so many times and still operate to the peak performance Rubb's customers are accustomed to. With over a decade in the harshest maritime conditions across the world, these rugged Rubb buildings have a fascinating story to tell.

It began in 2008 with Rubb being commissioned by shipbuilding company A&P Falmouth to supply and install an onboard storage building for the RFA Cardigan Bay. Rubb have since worked on all four Bay-class ships, which are each 176.6m long, and have a full load of 16,160 tonnes. The 15m span x 18m long steel-framed and fabric-covered NV structures protect valuable equipment onboard the vessel.

The structures, featuring a sidewall height of 5m, include:

- Galvanized roof and leg lattice steelwork with a 3m modular construction
- PVC coated polyester structural fabric cladding on the roof and sidewalls
- Main and auxiliary wind bracing cables in end modules
- Manually operated roller shutter door in front gable
- Three fire/access doors
- Steel foundation ring beam

Ian Hindmoor, Rubb UK Managing Director, commented on the 13 years of work Rubb has accomplished for A&P Falmouth and the Royal Fleet Auxiliary: "These longstanding projects demonstrate the relocatability of Rubb structures. They are easy to build, dismantle, store and relocate—which suits many of our clients perfectly, who must adapt quickly to ever-changing logistical requirements at a moment's notice."

RFA Cardigan Bay

RFA Largs Bay

RFA Mounts Bay

RFA Lyme Bay

2008
RFA Cardigan Bay is fitted with 15m x 18m NV

2009
RFA Largs Bay is fitted with 15m x 18m NV

2010
RFA Largs Bay's NV is dismantled & stored

2011
RFA Largs Bay is refitted with refurbished NV

RFA Mounts Bay is fitted with HMAS Choules' refurbished NV

2014
HMAS Choules' (formerly RFA Largs Bay) NV is dismantled & stored

2015
RFA Cardigan Bay's NV is fitted with a new roller shutter door

RFA Lyme Bay is fitted with a new 15m x 18m NV

2016
RFA Cardigan Bay's NV is dismantled, refurbished, modified, & reinstalled

2018
RFA Lyme Bay's NV is dismantled, refurbished, modified, & reinstalled

2020
RFA Mounts Bay's NV is dismantled

RFA Mounts Bay's NV is refurbished and reinstalled

2021

Why does Rubb hot-dip galvanize its steel?

“Do you want a structure that will rust… or do you want it hot-dip galvanized?

If you are in the market for a steel framed building, careful thought should be given to the construction materials, and ultimately, on the manufacturing process of the structures' framework to ensure its quality and longevity.

You could have the steel painted; although the paint is prone to chipping, which can result in rust damage. You could have the steel pre-galvanized; although the welding process strips off the zinc, making the weld point susceptible to rust . Or you could have the steel hot-dip galvanized, a technique used in the post-production of all Rubb Buildings. But before deciding on a process, it is important to understand what exactly galvanization entails.

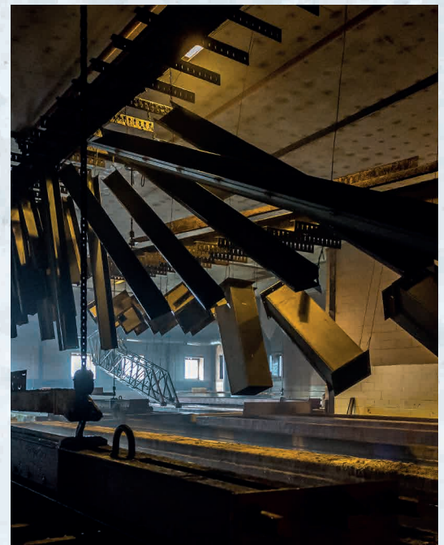
Galvanization is the process of applying a protective zinc coating to steel or iron to prevent rusting. The most common method used today is hot-dip galvanization, in which the steel or iron is submerged in a tank of hot zinc in its fabricated shape to ensure the entire structure gets coated, and therefore, is completely protected from rust and erosion. And you might not think so, but hot-dip galvanization is much more intricate than simply giving the steel a zinc bath.

Before being submerged, the steel must undergo a caustic cleaning. This involves soaking it in a hot alkali solution to remove any contaminants such as oil or grease built up during production. Then the pieces are subjected to pickling, a cycle in which the steel is immersed in an acid solution to remove surface scale and any existing rust. Finally, before getting dipped in zinc, the steel must be put through the fluxing process. The flux is a substance used to remove oxides from and prevent further oxidation of fused metals, and in the case of hot-dip galvanization, zinc ammonium chloride is used. Because the density of the flux is less than that of the zinc, it floats on the surface, allowing for fluxing and coating to be done simultaneously.

Now that you know hot-dip galvanization is, I'm sure the next question on your mind is “How much does it cost?”

Although every structure will have a unique cost depending on the size, shape, and other project specs, you really want to be thinking about how long you want your building to last. Post production hot-dip galvanizing to the framework offers corrosion protection that is far superior to other construction types, minimizing maintenance costs and ensuring long term structural integrity. And that's the key – long term savings. A case study showed that if the Golden Gate Bridge had been hot-dip galvanized, the potential savings would be around $319 million.

So if you are in the market for a steel framed building, you have to decide; do you want a structure that will rust, or do you want it hot-dip galvanized?



Air Supported Buildings

vs.

Steel/Fabric Structures


Air Supported


Steel Supported Fabric

> The ongoing costs of utilities and upkeep will erode the initial price savings in 7-10 years.

Let's get this straight.

Bubbles, sport bubbles, and air supported buildings are popular and affordable alternatives to traditional construction and framed tensioned fabric structures such as Rubb's solutions.

Manufacturers and providers of these products state the following as advantages:

- Inflate when needed, deflate when not needed
- Large clearspan space
- Installed and sourced quickly
- Air structures/bubble cost a fraction of alternatives

Though the points above are generally valid, the question remains: are air structures truly a more cost effective solution? Below are questions that need to be answered prior to making the decision to purchase an air supported structure.

Do these buildings need to be inflated 24/7?
The building needs to be continually inflated by a compressor 24/7/365 or it will collapse. The utility costs of doing this will erode much of the savings of the building over time. You will also need to have a significant back up generator capacity.

What if there is a power failure or damage to the membrane?
The bubble will burst or deflate. Snow, wind, projectiles, and power failures can all cause deflation and the collapse of air structures. It is vitally important to remember that safety is paramount, as many people often occupy these structures, as well as valuable assets and equipment.

In the recent case of a sports dome at a college in New Hampshire, sliding snow damaged the connection between the roof and the doors and tore a hole in the roof, collapsing the structure. As this happened during the winter, the building was out of action until spring.

Is it easy to inflate/set up the building and also deflate the building?
It is true that only one "specialized technician" who understands the building is required to install and deflate the building, but he will need many, many strong friends! Once deflated the building will need to be properly stored to prevent damage and mould growth.

Is the clearspan space within the building all usable?
Due to the design of the building, the base of the sidewall slopes downward toward the connection point with the foundation thereby making much of the area near the sidewalls (interior perimeter) useless.

With a Rubb building, the sidewalls can be designed to make all interior space usable. Why pay for square footage that is unusable?

Air Structure projects can be completed in a very short time frame of 2-3 months?
Yes this is true, however a standard design Rubb fabric structure can also be provided quickly. Though not as quick as an Air Structure, Rubb buildings can be typically completed in half the time of standard construction.

Are Air Structures significantly cheaper?
Yes, however if you analyse the cost of ownership over the life of the building then the answer is no. In Rubb's estimation, the ongoing costs of utilities and upkeep will erode the initial price savings in 7-10 years.

Air supported buildings or "bubbles" are a popular and cost effective solution for:

- Limited seasonal operations where the facility is only needed for a few months
- Very temporary situations where an indoor structure is needed for a short term of a few years (in this case the best scenario would be a lease or agreed buy-back agreement)

At Rubb, all we ask is for the customer to ask the right questions and gather the correct information to make the best business decision before buying a building. Rubb offers complimentary consultations for new buildings with no obligations.

Let us help you get all the facts.

Rubb's re-sheet service revitalises decades-old buildings

One of the main advantages of Rubb's modular design is how quick and easy it is to re-sheet their PVC cladding.

These sheets bear the brunt of the building's exposure to the elements, so many of our customers have taken advantage of Rubb's re-sheet service after decades of use. In fact, the majority of Rubb's re-sheet projects take place more than 30 years since their original construction.

Rubb understands the importance of protecting your investment. For less than the cost of a new building, our customers' existing structures can be given a new lease of life to continue its use decades after purchase.

Many customers that choose to re-sheet their Rubb building also take the opportunity to extend or further enhance their structure with options such as Thermohall® insulation, additional doors, or upgraded lighting.

> The Rubb team were very helpful throughout the process and I would highly recommend Rubb adaptable warehouse solutions.
>
> Jenis Mistry,
> Project Engineer, Port of Tilbury

> I have to say that from beginning to end the attitude in planning, consultation and delivery of the project was excellent.
>
> Nigel Hosier
> Operations Manager, Royal Armories Fort Nelson

This 25m span x 38m length x 3m leg NV structure's sheeting had gone over 30 years without maintenance, so Rubb were brought in to equip the building for many more years of use.

It's our round...

In late 2020, Rubb UK partnered with Poetic License Distillery for an exciting—and delicious—project: Rubb Gin.

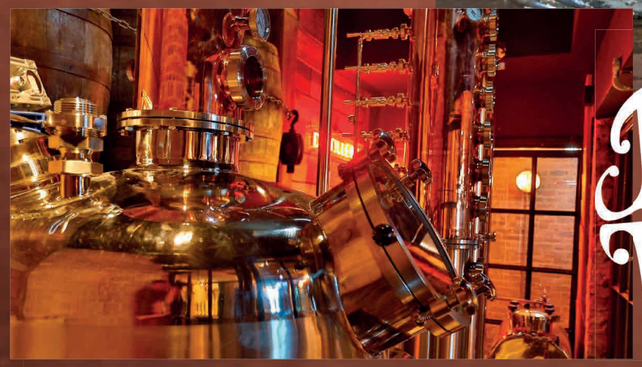
We chose Poetic License, as supporting a local distillery was our top priority. Poetic License was a perfect fit as its distillery is right on Roker's beautiful coastline, close to Rubb's Team Valley headquarters. With Rubb's trident logo, we share this affinity to the sea; our customers also know how well our buildings protect from salty sea spray and violent storms!

Poetic License distil several flavours—from Strawberry & Cream to Tutti Frutti—but we opted for their Northern Dry Gin as a nod to our North East heritage. Poetic License provided the following tasting notes:

A big punch of juniper that is finely balanced with green cardamom for a warm and spicy flavour. With undertones of lemon and eucalyptus, the inclusion of Persian lime intensifies the citrus feel while adding a note of perfume. As for the other botanicals... well, that's our secret for now.

All of Poetic License's gins are distilled on site in a still they've affectionately named Gracie. She's different from traditional pot stills, as Poetic License chose a modern 500 litre column still for their operation.

> We opted for their Northern Dry Gin as a nod to our North East heritage



Although the distillery has a cutting-edge still, Poetic License still use traditional, labour-intensive production methods such as hand-crushing ingredients. This ensures a high-quality spirit which they're proud to put their name to. Rubb shares this commitment to quality, and wholly agrees that cutting corners can never result in a product we'd put our name to.

Distillery Manager Lee Gowland had this to say: "Working with Rubb has been great as a collaboration with another North East business. It's a great opportunity to work with another business from a completely different sector and create something great for them and their group."

Rubb UK will be taking some bottles of Rubb Gin to the events we attend this year, so let us know if you'd like one. We've got a feeling we'll run out fast so head over to our booth early to avoid disappointment!

Drink responsibly.
Not suitable if pregnant.

Hallmaker Lokaluthyrning AB and Rubb AB merge into Rubbhall AB

In 2021, changes have taken place in the Swedish market for the rental and sale of mobile halls.

The merger and name change is the start of a new establishment and greater investment in quality halls, including both Rubbhall AB's uninsulated and flagship Thermohall® structures. The head office and warehouse have been moved to Tranås, but sales take place all over Sweden, necessitating the sharing of offices in Stockholm and Helsingborg with a sister company in the group.

Roger Jonsson is the new CEO and will both work with sales and lead the projects from start to finish with our old and new customers.

The first project undertaken by Rubbhall AB is a Thermohall® building for Arqdesign Byggprodukter AB, which delivers balcony railings and glazing to large construction projects in the Nordic region. The company needed to expand their production area, so Rubbhall AB stepped in with a quality solution. Now glass, packaging, and empty trolleys are stored in the hall and are easily transported by the production staff due to the hall being conveniently attached to the factory. The freed surface is now used to produce balcony railings and glazing instead of being a storage surface.

> It's a very cost-effective way to expand our production area. The alternative of expanding the factory was too expensive, but at the same time we needed to store different materials free from moisture and frost.
>
> Production Manager,
> Arqdesign Byggprodukter AB

Rubb Industries AS takes 100% ownership of Rubb Poland

Rubb Industries AS are very happy to announce that they have been able to buy out minority shareholders in Rubb Poland to take full control of the company in 2021.

Rubb Poland are key to the whole Group, as they are the main manufacturers of Thermohall® insulated fabric for all Rubb companies. Rubb Poland delivers Thermohall® insulated fabric to Rubb companies in Sweden, Norway, UK, and the USA. Naturally, they also supply the local Polish market too.

In 2021, production reached a record high with about 11,000m2 of Thermohall® fabric being manufactured in just a single month. There has been a lot of pressure on all the employees of Rubb Poland as we have had to make record amounts of produce in the autumn of this year, to which the Group is extremely thankful for.

We are very pleased with our management in Poland, led by Erik Storhaug as MD and supported by his excellent managers, Katarzyna Wiśniewska & Marcin Kominiak.

> In 2021, production reached a record high with about 11,000m2 of Thermohall® fabric being manufactured in just a single month.

Rubb Industries AS' new HQ set for 2022

Zurhaar & Rubb AS, the mother company of Rubb Industries, has purchased a new HQ in Oslo: Fornebuveien 5 at Lysaker.

The purpose of the acquisition is to bring together the company's industrial investment—Rubb Industries AS—in a new and separate head office.

Rubb Industries AS, with some of its subsidiaries (Rubbhall AS, Hallmaker AS, and Renthall AS) is currently located in a leased premises in Lysaker—Strandveien 50.

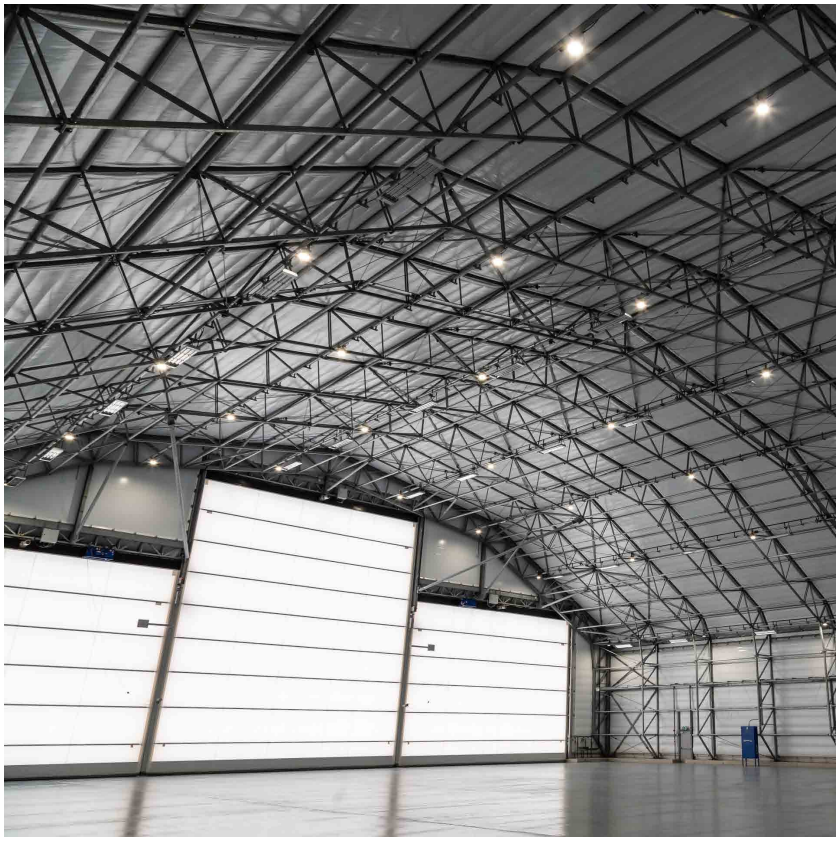
Fornebuveien 5 is currently undergoing refurbishment for the relevant premises where the Rubb companies will move into in early 2022.

Fornebuveien is a distinctive building just outside Oslo city centre with very good links to the motorway.

Following their acquisition of Rubb Industries AS (formerly Hallmaker Group AS) in February 2020, Zurhaar & Rubbhall AS have been looking for their own HQ the area.

We were therefore grateful that our constructive negotiations with Signatur Eiendom AS' Martin Strømmen led to the takeover of the building from April 2021. Christian Valdem, Union Norsk Næringsmegling AS, is also owed our gratitude for initiating the dialogue between the parties.

> The management of the Rubb companies is looking forward to being able to move into their own building.
>
> Rune Birkeland,
> CEO of Zurhaar & Rubb AS



RUBB
Building Systems

excellence in engineering

Rubbhall AS
Tel: +47 32 15 05 00
Email: post@rubb.no
www.rubb.no

Rubbhall AB
Tel: 070-838 83 31
Email: info@rubbhall.se
www.rubb.se

Rubb Buildings Ltd
Tel: +44 191 482 2211
Email: info@rubb.co.uk
www.rubbuk.com

Rubb Building Systems
Tel: +1 207 324 2877
Email: info@rubbusa.com
www.rubbusa.com

Rubb Polska
Tel: +48 71 72 30 307
Email: info@rubbpolska.pl
www.rubbpolska.pl