



RUBB MILITARY

EXPEDITIONARY FORCES AIRCRAFT SHELTER SYSTEM

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25m EFASS Hangar
Page 4



20.4m EFASS Hangar
Page 6



EFASS Sunshade
page 8



EFASS Warehouse
Page 10



11.1m EFASS Workshop
Page 12

Advantage points

- EFASS provides a robust, reliable and field maintainable building to support military needs on difficult terrain in harsh climates
- Complete EFASS range packs into 20ft ISO shipping containers
- Components can be unpacked and repacked by military personnel
- Structures can be quickly built without additional mechanical plant (crane or forklift truck)
- Fully demountable for future erect, strike and store cycles
- Multiple spans: 11.1m (36ft), 20.4m (67ft) and 25m (82ft)
- State-of-the-art doors available including Heli-Door, Trident and Roller Shutter options
- Innovative roof mounted crane provides optimal operational capability
- Withstands wind and snow loads to UK Defence Standards: VE 41.6m per second (wind speed); 100kg per m² (snow load)
- Fabric is fire retardant and can be easily repaired
- Client support from Rubb technicians from quotation to installation and beyond

For more details please visit
www.rubbmilitary.com

Expeditionary Forces Aircraft Shelter System

Rubb Buildings Ltd is an innovating world leader when it comes to the design, manufacture and delivery of relocatable helicopter and fixed wing aircraft hangars.

Rubb's EFASS (Expeditionary Forces Aircraft Shelter System) is uniquely suitable for the military services, designed to be rapidly deployed and erected anywhere in the world in the most challenging environments.

With unmatched engineered fabric structures in action

EFASS: Total Quality

Superior structural frame

The backbone of Rubb's Expeditionary Forces Aircraft Shelters is a well engineered aluminium framing system. The 6082 T6 structural aluminium is anodised black and steel components are hot dip galvanised to protect from corrosion.

Simple foundations

EFASS products are supplied with their own integral foundation arrangements to securely anchor the structures to the ground.

across the globe, Rubb has the ideal solution to military and defence application requirements.

With a proven track record, clients include the UK, USA and Canadian forces. Rubb has been meeting the needs of the UK Ministry of Defence for more than 30 years.

Rubb Buildings Ltd has the expertise and facilities to custom make an extensive range of military hangars, buildings, shelters and sunshades to individual specifications.

High quality membrane fabrics and fire safety

High strength, heavy weight, coated military standard fabrics from proven suppliers. The EFASS also offers proven fire safety advantages.

Suitable for difficult sites

The flexible membrane and aluminium frame design allows installation on uneven or sloping sites.

Efficient use of space

The truss frame system provides clear span space to accommodate a wide variety of rotary and fixed wing aircraft and land vehicles.

Complete environmental control

EFASS hangars can be insulated, heated or air conditioned to provide a perfect operating environment whatever the climate.





25m Span EFASS

At present this is the largest hangar in the EFASS range, specifically designed and built around military requirements for front-line maintenance of the MH-47 Chinook.

- The 25m span EFASS is currently being used by many military organisations around the world including UK, USA and Canadian forces
- The completed facility is large enough to accommodate Chinook helicopter maintenance without removing the rotors
- Available with Rubb's unique 2000kg roof mounted gantry crane which was developed around military helicopter maintenance crews' requirements (page 18)
- Typical lengths range from 28m to 100m and are extendable by 4m (13ft) bays
- The 25m EFASS can be equipped with Heli-Door or Roller Shutter Door options
- The Heli-Door concept was specifically designed for this structure on request from military personnel who needed a door that does not require a base foundation and ramps, which can be operated electrically at the touch of a button

To see your aircraft inside the 25m span EFASS please visit www.rubbmilitary.com



Specifications

Span:	25m (82ft)
Leg Height:	6m (20ft)
Overall Height:	10.8m (35.5ft)
Standard Length:	36m (118.1ft)
Module Length:	4m (13ft)

For full EFASS door range see page 13



20.4m Span EFASS

This was the first of the EFASS range to be specifically designed to comply with a stringent military compliance matrix from the UK Royal Air Force.

- The 20.4m span EFASS is currently being used in the field by multiple military forces and civil aviation services
- Performs as a front line maintenance hangar but doubles up as a sunshade with both doors open (Trident door option)
- The 20.4m EFASS can be equipped with Heli-Door, Trident or Roller Shutter Door options
- Standard building (Trident doors x2) and electrics pack into one 20ft ISO shipping container (packed container weighs just 12,000kg)
- Can be easily equipped with Heating, Ventilation and Air Conditioning (HVAC) solutions to provide an environmentally controlled maintenance environment
- Crane application is also available (see page 18)

To see your aircraft inside the 20.4m span EFASS please visit www.rubbmilitary.com



Specifications

Span:	20.4m (66.9ft)
Leg Height:	4.2m (13.8ft)
Overall Height:	8.3m (27.2ft)
Standard Length:	28m (91.8ft)
Module Length:	4m (13ft)

For full EFASS door range see page 13

EFASS Sunshade

The EFASS hangar has been adapted into a functional sunshade to protect vital aircraft and crews from searing temperatures and powerful UV rays. Sunshades can be easily shortened, extended or modified into a hangar or warehouse.

- Rubb's commitment to innovation led to the development of the EFASS sunshade
- Structure features completely open gable ends and a large area of shade for operational aircraft and vehicles
- Rubb uses the highest quality and strongest PVC coated fabric which provides durability, while translucent qualities allow sufficient light within, providing an effective working environment
- Typical lengths range from 12m (39.4ft) to 100m (328ft) and are extendable by 4m (13ft) bays
- Available spans: 11.1m (36ft), 20.4m (67ft), 25m (82ft)
- High grade 6082 T6 aluminium ensures structural superiority
- 25m x 28m sunshade can be erected by a team of eight in just three days

To see your aircraft inside the EFASS Sunshade please visit www.rubbmilitary.com



EFASS Warehouse

The EFASS range of buildings can be easily configured to suit individual needs. The system provides an ideal warehouse space with large internal dimensions that can be shortened, extended or modified into a sunshade or hangar to meet future requirements.

- Available in all span sizes: 11.1m (36ft), 20.4m (67ft), 25m (82ft) by any length
- Typical lengths range from 28m (92ft) to 100m (328ft) (pictured) and are easily extendable by 4m (13ft) bays
- Insulated fabric option can provide a rapid deployable temperature controlled warehouse
- Structure design capabilities are exactly the same as the EFASS hangar
- EFASS warehouses can be built rapidly without additional mechanical plant
- Based on a team of 11 the most recent 25m (82ft) x 100m (328ft) structure was erected in just 13 days



11.1m Span EFASS

- The smallest shelter in the EFASS range was initially designed to accommodate small helicopters
- The 11.1m EFASS can be equipped with Heli-Door or Roller Shutter Door options.
- A crane system with SWL of 2000kg is also available (see page 18)
- Strong but lightweight structural components allow a small workforce to erect buildings in a short time frame

To see your aircraft inside the 11.1m EFASS please visit www.rubbmilitary.com

Specifications

Span:	11.1m (36ft)
Leg Height:	5m (16.4ft)
Overall Height:	6.1m (20ft)
Standard Length:	16m (52.4ft)
Module Length:	4m (13ft)



Heli-Door



This revolutionary door has been specifically designed and manufactured for the EFASS range by Rubb Buildings Ltd, providing a robust, reliable and easy to use system. The main door horizontal members are standard EFASS building roof elements, which comply with the strict standardisation of parts code.

The door is electrically operated via two slow moving helical geared motors, with emergency hand operation capability. This system does not require a base foundation or ramps and there are no locking bolts. The door goes up and down at the touch of a button. Locking and safety devices operate automatically.

Span	Door Size (max)
11.1m	10m x 4m
20.4m	17.7m x 5.5m
25m	21.5m x 7m

Trident Door



Specific to the 20.4m span EFASS, this full end-opening door speeds up aircraft deployment. The door is constructed using the same high quality aluminium framework

as the main structure. Three framed PVC panels are hinged at the base of the hangar and the door operates via a button controlled motorised folding mechanism.

Span	Door Size (max)
20.4	Open Span

Roller Shutter Door



Standard off-the-shelf warehouse type door which can be hand or electrically operated. The door is manufactured to Rubb quality standards with a proven track record. All steel components are hot dip galvanized to extend life and protect from corrosion.

The roller shutter door can also be fitted to the rear of a hangar, allowing stores and equipment to be put inside, avoiding disruption if aircraft is within. This type of door is available with all EFASS span variations.

Span	Door Size (max)
11.1m	5m x 4m
20.4m	5m x 5m
25m	5.1m x 6m



Containers

All EFASS structures can be packed into 20ft ISO shipping containers making transport and delivery quick and easy. The containers have one side and one end opening doors to allow access to ease packing and unpacking. With the structure packed into containers it can be freighted by land, sea or air depending upon specific requirements. Rubb can transport the containers to any destination.



Erection Kit

A full erection kit can be provided for assembling and dismantling the structure. This kit includes all the necessary equipment to erect and dismantle the structure without the need of mechanical plant (crane or forklift truck).

Please note:

- This kit is not required if mechanical plant is available on site.



Packing

The EFASS range has been designed with packing, repacking and fast track transportation high on the priority list. The structure is methodically packed depending upon specific transport requirements. This ensures that all parts are kept together in a pre-determined location which enables the erection crew to unload the items from the containers to suit the build plan.

Typical quantities of containers required for individual buildings

- EFASS 20.4m x 30m long - Trident Door both ends
1x 20ft ISO (weight: 12,000kg)
- EFASS 25m x 36m Long - Heli-Door both ends
4x 20ft ISO (air cargo weight: 9,800kg each)
3x 20ft ISO (sea cargo weight: 11,500kg each)

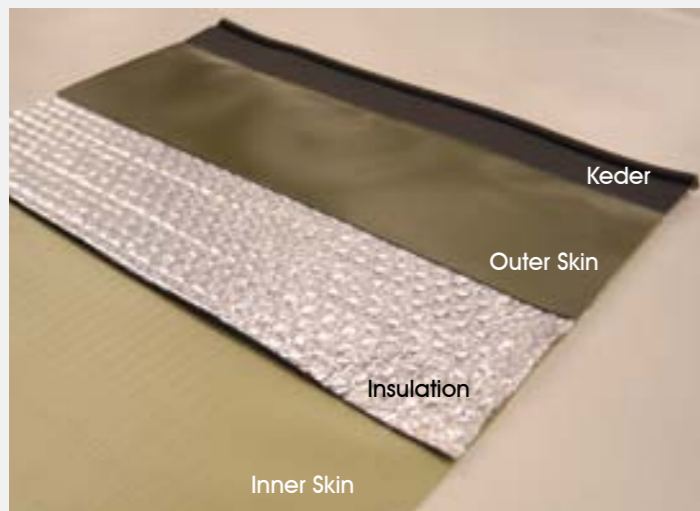


Tool Kit

A full tool kit can be provided for assembling and dismantling the structure. Based on a build team of four, this kit includes all hand and power tools needed for the erection and dismantling of the structure.

Please note:

- A generator or alternative power source is required as this is not supplied within the kit.
- This kit is not required if tools are available.



Double skin insulated fabric panels

The PVC fabric covering sheets of the hangar can be insulated to provide a U value of 1.1w/m²K

Single skin

R Value: 0.28
U Value: 3.57w/m²K

Double skin

R Value: 0.91
U Value: 1.1w/m²K

Double skin insulation facilitates the installation of Heating, Ventilation and Air Conditioning (HVAC) solutions.



Heating, Ventilation and Air Conditioning (HVAC)

The EFASS range of buildings has been designed to allow the user to heat, ventilate or air condition the hangar. Structures are supplied with duct inlet points ready for HVAC unit attachment.

Rubb can provide HVAC units if required or the client can use existing units if they are already available on site.



Electrics

The EFASS range can be supplied with full electrics to suit clients' requirements. All of the items are supplied pre-wired with plug and socket arrangements for ease of assembly and maintenance.

Main Lighting

The EFASS lighting system is provided in kit form to make installation as easy as possible. Once installed the system suspends from the hangar framework, providing an internal lighting level of 300lux at 2m above ground level.

Power Distribution

Easily installed and very simple to use, Rubb's electrical power distribution board is fitted onto the framework of the hangar to provide a compact, non-obstructive solution which controls the structure's electrical system.



Power Sockets

EFASS can be equipped with power sockets located on the sidewalls of the building. This allows users to power hand tools or equipment close to their area of work.

Six twin 230V sockets are provided with the standard power socket kit.



Navigation Warning Light

Fixed at apex positions of the structure, the navigation light system supplies the hangar with illuminated flashing warning lights, ideal when deployed in areas of busy air traffic.

A daylight sensor activates an automatic switch off mechanism.



Emergency Lighting

Should power fail Rubb's emergency lighting will keep the exits illuminated for three hours, allowing the users of the hangar to make a safe exit.

The standard kit comprises of four emergency lights.



Lightning Protection

The aluminium framework of the hangar is sufficient to form a natural Faraday cage in accordance with BS6651:1999, Code of practice for protection of structures against lightning.

The design is based upon a ground installed earth electrode system. The kit provides the necessary quantity of copper earth rods and electrodes to achieve the relevant Ohms level to protect the hangar against lightning strike.



Crane System

Rubb has introduced an integral roof mounted crane system to enhance the EFASS.

This provides the client with the facility to maintain vehicles and aircraft without the need of additional plant within the hangar.

The crane is remote controlled and has a Safe Working Load capacity of 2000kg.

It features a double girder system with articulated suspension motorised bridge and hoist, providing powered movement in all directions.

This accessory was added on request from military personnel who required a lifting facility of sufficient capability to dismantle and rebuild a Chinook helicopter within an EFASS hangar in theatre.

Design Criteria

- Capability to move in two directions and cover as much floor area as possible
- 2000kg Safe Working Load (SWL)
- Capable of operation on unlevel ground
- Maximum lift height
- Remote control (no pendent to hit or obstruct sensitive areas)
- Powered movement in all directions
- Plug and play installation for multiple erection/strike capability
- Compact packing attributes suitable for 20ft container packing requirements
- Light weight for air transportation



Erection Adviser / Supervisor

Rubb can supply an erection adviser to work alongside your own labour force.

With previous build locations including Iraq, Afghanistan, USA and the Seychelles, Rubb has a proven and reliable track record of providing the necessary training or erection service anywhere in the world.

Rubb can also provide training at its plant in the UK. Training advisers are available to instruct end users on erecting and dismantling the structures. The training is straight forward and easy to follow, working in conjunction with the detailed procedure diagrams provided.

Refurbishment

Protect your investment with Rubb's EFASS refurbishment programme.

Rubb has been providing a professional refurbishing and recertifying service to the UK Royal Air Force for the past 15 years.

This involves collecting the structures, carrying out a full inventory of parts, servicing, repairing and repacking ready to be deployed once more.

This ensures the product's high quality performance will continue for many years and multiple deployments.

Refurbishing equipment after use in theatre was never given priority status when military funds were in abundance. Purchasing strategy was usually based upon procurement of the cheapest equipment to do the job in hand. Military spending cuts have changed this mind set, forming a new strategy at a quality level that can be sustained after deployment and made ready for redeployment economically.

Services

- Receive containers from client
- Unload into store awaiting instruction
- Unpack goods from container and carry out full inventory
- Compile status report with indication of cost outlay and repair timescale
- Acquire authorisation for necessary action
- Upgrade to latest authorised specifications
- Clean and repair fabric panels (covers)
- Test and recertify all electrical equipment
- Test and recertify lifting equipment
- Recertify shipping containers
- Re-pack to original schedule and seal
- Log container details, including container number, seal number, date of refurbishment, contents, weight etc



For more details please visit
www.rubbmilitary.com

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we will never stop innovating...



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