



Transportable hangar



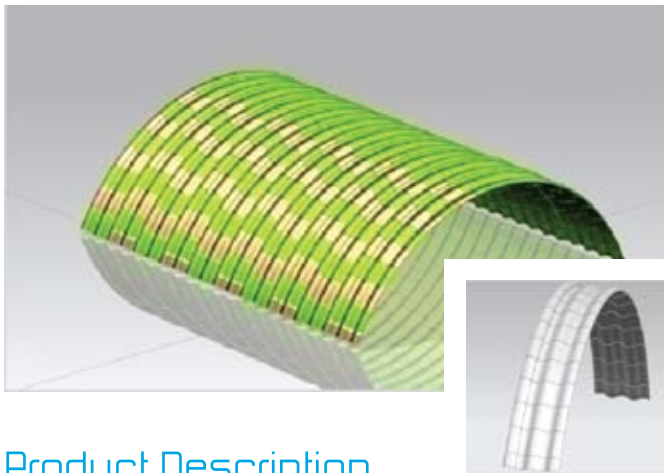
Ideas into life

Introduction

The **transportable hangar** is an innovative product developed by Dasyc and addresses needs for **mobile storage, parking and housing** structures.

The engineering of the hangar is made in such a way that the hangar is produced in **prefabricated panels**, which can be **easily transported** and **assembled** at the designated deployment location. All panels are manufactured from **composite materials** ("sandwich" type) which provide **strength, stiffness, increased thermo-insulating characteristics and simplicity of assembly**.

It is a product **designed by DASYC engineers**, which has been tested and certified in cooperation the National Technical University of Athens (NTUA). The design and engineering is **patented** and the exclusive producer of the hangar is **DASYC**.



Product Description

The hangar is **comprised of arches** of semicircular shape, each consisting of corrugated sandwich panels of two sizes: a) 2,10m x 3,70m and b) 1,15m x 3,70m which are bolted together. Every arch is self-supported and it is bolted to the neighboring ones. The overall length of the Hangar is freely defined by choosing the desirable number of arches.

Panels are assembled together with the use of screws and bolts, while for the sealing of the joints, special elastic gaskets are used. So, for the erection of the Hangar, **only screws, bolts and regular screwdrivers are used**.

The panels, in order to improve the stiffness of the construction, are corrugated with a wave length of 1.5m and wave height 380mm. The panels are "sandwich" structures consisted of a hard polyurethane core and two GFRP (Glass Fiber Reinforced Polyester) skins.

The **total thickness of the panel is 80mm** comprised from a 72mm Hard-PU core and two 4mm outer skins.

The structural polyurethane foam core provides **excellent thermal insulation to the overall structure**.

Dimensions

The transportable hangar is offered in **two standard versions**, each one comprised of 10 arches of semicircular (tole) shape:

- 30,6m width x 11,2m height x 30,70m long, **covered area of 935m²**
- 26,16m width x 6,9m height x 30,70m long, **covered area of 822m²**

The length of each of the two versions can be easily **modified by adding or deducting arches from the construction**, thus adapting the covered surface.

Also, the height can be modified by **removing a constant number of panels from the arches**, reducing in that way the total width accordingly.

Apart from the above **Dasyc can undertake to produce any hangar size**, according to customer requirements (subject to an agreement for a minimum order quantity).



Transportability

All modules that comprise the hangar structure are **stackable** and easily **transportable** by all transport means:

- **Land** (ordinary international forwarding trucks)
- **Sea** (container ships)
- **Air** (transport aircrafts e.g. C-130)



Life expectancy

The panels are constructed from **high-quality composite materials** that are purchased from internationally recognized raw material suppliers. The outer surface is coated with a special gel-coat for **excellent weather resistance**. This combination practically makes the structure when installed **free of any maintenance needs**.

In the exterior, the hangar can be **painted in any color** that can be selected by the customer from the colors available from the gel coat supplier.



Options

a. Covering of sides

Both sides of the hangar can be covered with a **special flexible membrane** (curtain). Two selections of types are offered, a simple and an enhanced:

i. Simple Covering

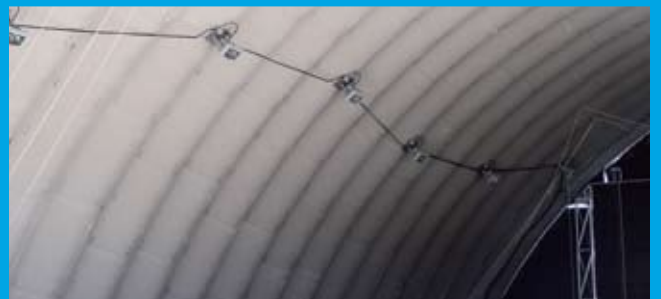
Long stripes of **special military quality fabric** are used to cover the open side. Some of the stripes are fixed and



b. Electrical Installation

An electrical installation can be offered together with the hangar. The installation, depending on the customer requirements can be in accordance with **industrial** or **military specifications** (anti-explosive).

In any case, the headlights and the power cables that are installed internally are placed along the assemblage points of the panels, with the use of fixtures and metallic plates. Also the distribution panels are placed in special made bases in such a way that they do not obstruct the operations of the hangar and they are not subject to chemical or mechanical strain.



some are movable (according to Customer requirements), able to be vertically lifted manually in order to allow an opening area.

On the permanent stripes at the two sides, and according to the customer needs, **access doors** with dimensions 1m x 2m (manholes) can be formed from the same fabric, with the ability to be wrapped manually from bottom to top. The movable fabrics - when deployed - are fixed and pre-tensioned with the use of turnbuckles.

ii. Enhanced Solution

This solution offers a more rigid installation, with a metallic structure which is placed in one and/or both sides of the hangar. The logic of the opening / closing of the tents remain the same but the movable parts are smaller in surface.

This solution is **ideal in cases where a more rapid opening / closing is required as well as the area where the hangar is installed is subject to stronger wind loads**. In addition a solution with an electrical opening and closing can be offered.



c. Lightning Protection System

A **Lightning protection system** can be included in the structure. Again all the parts comprising the system are installed in the structure using the screws and bolts of the panels' junctions..



e. Installation services

Dasyc can undertake through a support contract the **transportation, assembly and disassembly of the Transportable Hangar at the Customer designated site**. In this way the initial investment is decreased since the Customer does not invest in any of the tools & accessories needed.



d. Training Services

Dasyc can undertake the **provision of training services** to the Customer personnel in the assembly, disassembly, packaging and transportation of the Transportable Hangar. In this way, the Customer can be totally independent in the usage of the facility according to his own needs.

Training material (manuals, dvd etc.) is provided by Dasyc.

f. Other options

Other options that are available include the following installations:

- IR painting
- A/C integration
- Integration of photovoltaic panels
- Others upon request





Assembly

The hangar installation **does not require any particular sub terrain preparation**. Only two stripes of concrete floor are needed alongside the footprint of the hangar's arches. On those stripes, the hangar's arches are anchored with the usage of special fixtures (metallic anchor plates).

The hangar is assembled with the **usage of regular tools**, special fixtures (provided by Dasyc) and a crane as follows:

- Initially, the spots where the metallic anchors will be bolted are marked on the ground and then the anchors are bolted.
- The first arch is assembled on the ground and then with the use of a crane the arch is erected and bolted on the floor, in the place where the anchors have been already placed.
- The remaining arches are assembled in groups of 3-6 panels, which are placed in position using as a guide the previous arch that has been already placed and the anchors bolted on the ground.

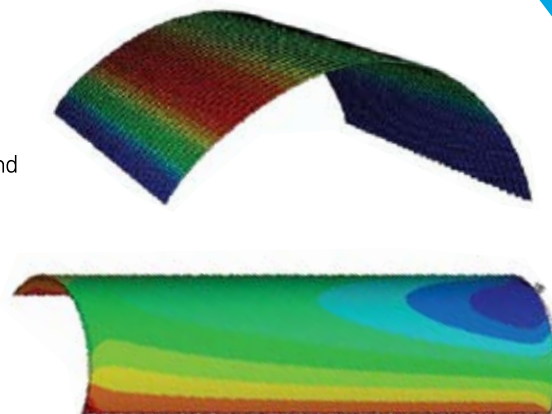
The **total assembly time is less than two weeks** for a standard-size hangar (actual assembly time depends on the available work-force).



Facility Resistance

The Transportable Hangar is **designed to withstand significant loads**, similar to the strength that regular concrete-made buildings have. More specifically the structure can withstand the following loads:

- Wind Load** according to the EC-1 regulation, with reference wind speed $V_{ref} = 33\text{m/sec}$ (equivalent to wind speed 118.80 km/h) leading to a wind pressure of 1,89 kN/sqm.
- Snow Load** according to the EC-1 regulation and specifically
 - Snow load on cylinder roofs
 - $S_k \text{ (Kn/m}^2\text{)} = 0.86$
- Earthquake Load** according to the EC-8 regulation and specifically
 - Importance factor IV
 - Behavior factor $q = 1.5$
 - Ground acceleration $a = 0.36$



Summary of Product Attributes & Advantages

- Unique characteristics in terms of **mobility**
- **Ease of assembly / disassembly**
- Increased **thermal and sound insulating capacity**
- **Maintenance-free**
- **Long life expectancy** especially when compared to fabric-made shelters
- **Dual-use**, for both civilian and military applications
- **Customization of the structure** exactly to the needs of the end-user
- **Low IR and Radar signature**
- **Unrivaled snow & dust bearing capability** and **wind resistance**
- **Easily stored** before and after use
- Investment **increased flexibility** and **utilization**

Areas of Use

The Transportable Hangar is appropriate for civil or military purposes, as a reusable storage facility or provisional space for:

- **Air means** (aircrafts, helicopters) or **vehicles** of any type
- **Equipment** of construction sites, airports etc.
- Provisional **maintenance workshop**
- On-site **personnel support** (accommodation, office space etc.)

- **Field hospital**
 - **Disaster relief** and **emergency response** facility used from civil protection or non-governmental services
- When not in use, the panels of the Transportable Hangar can be **stored in any open space** and when the use of the facility is required then the panels are easily transported and the structure assembled at the place of interest.

Company Profile

Dasyc S.A. is a manufacturing company in the fields of bulk molding compound (BMC), thermo-plastics and composites, established in 1979. The company has solid manufacturing experience and know-how, as well as extensive knowledge in the design and engineering of production processes, tools and molds.

During the last four decades of operation, Dasyc developed an extensive customer portfolio with major international

companies in the automotive, military, aeronautics, electrical & electronics and home appliances industries.

Dasyc owns two production sites in Greece and is ISO 9001:2008 and ISO 14001:2004 certified.

From mould design and construction, parts production, secondary operations and final assembly to packaging and final delivery, Dasyc provides a complete set of services to its customers that **bring ideas into life**.



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