



High-tech doors and façades for the Airbus A400M hangars

Butzbach Aviation supplied five hangar door systems measuring up to 160 m for the new Airbus A400M transport aircraft for the German military.

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Training facility with simulator building



Photo: Bundeswehr / Hähnel

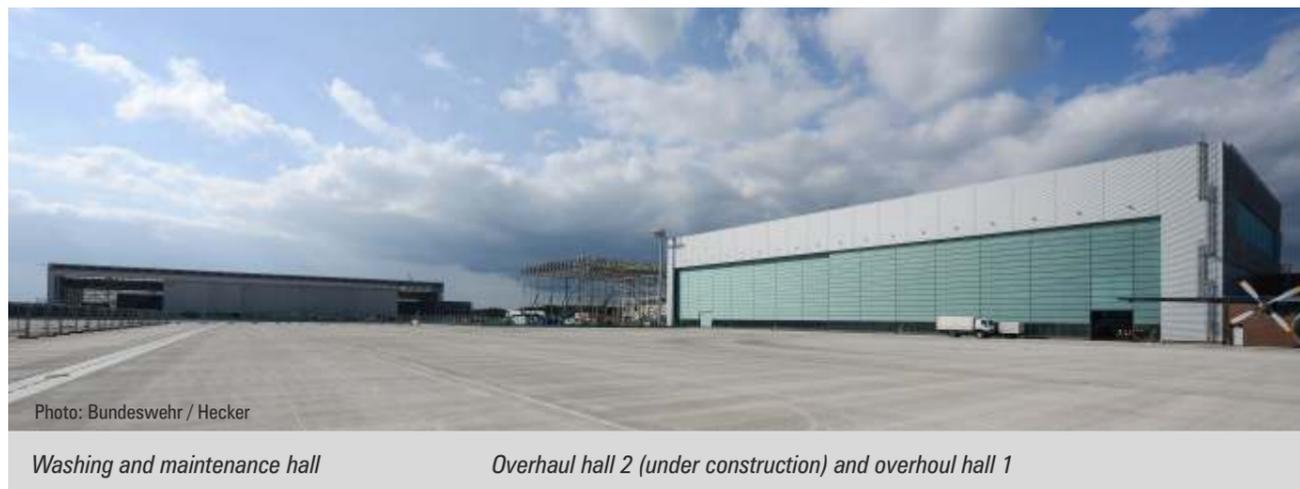


Photo: Bundeswehr / Hecker

Washing and maintenance hall

Overhaul hall 2 (under construction) and overhaul hall 1

5 hangars – most diversified requirements – 1 partner

Situated in Wunstorf in Lower Saxony, the airbase has a long history to which a very extensive new chapter is now being added: the Bundeswehr is expanding the airport to make it the central location for its new transport aircraft, the Airbus A400M. For the new hangars on the site, Butzbach GmbH Industrietore supplied a total of five hangar door systems, each tailored to the particular use of each hangar in terms of equipment, method of opening and security criteria. “Wunstorf is a flagship project that perfectly demonstrates our capability both in the product portfolio and in project management for such extensive

requirement criteria,” explained Dafne Joel, Head of the business unit Aviation at Butzbach. Fitted with fibreglass panels to allow light through, each of the doors are impressive enough just in their dimensions, functions and special features:

In the two overhaul halls, two double-leaf sliding doors 105 x 17.5 m in size give individual access to the 2 docks in each hall. Truck doors and pedestrian doors are integrated into the hangar door.

The training facility has a 51 x 10.5 m round-the-corner door with a 25 x 7 m tail door customized for the T-tail of the A400M. The leaves of the round-the-corner door are led along the side

wall when opened, allowing the whole front of the hall to be accessible.

The simulator building has a smaller sliding door measuring 10 x 10.5 m and two stacking doors of 6.4 x 8 m.

The door for the washing and maintenance hall is the largest one on the entire complex with its 160 x 17.5 m in size, with 3 separately moveable leaves each weighing approx. 44 t. The external building skin and internal separations between the bays have been equipped with a total of 3,800 m² fibreglass curtain walls made by Butzbach.

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The translucent fibreglass panels of the hangar doors and the lateral curtain wall create an outstanding architectural effect

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Maximum operational availability

Butzbach's Aviation Sales Manager Thomas Merk resumes the specific requirements and how they could be met by their special technology: "All doors are configured for simple and reliable year-round operation with heatable rails and electric drive. Manual operation is possible at any time should the power fail, allowing almost 100% operational reliability to be guaranteed.

The Butzbach-specific door tracks also compensate for depressions in the structural frame, so that even high snow loads on the hangar will

not have any impact on operation of the door." Apart from operational availability a number of additional performances were specified: for security reasons, sophisticated security features and a decentralised door monitoring system were installed. To allow the best possible use of daylight, all doors are fitted with transparent fibreglass panels manufactured by Butzbach itself.

These were used for extensive façade areas as well – amounting to 3,800 m² for the washing and maintenance hall alone. With U-values of up to 1.1 W/m²K, they also make a significant contribution to energy saving thanks to optimised thermal insulation alongside a sharp reduction in the need for artificial light because the bright working areas eliminate the casting of shadows.



Extensive list of criteria, from functional reliability to burglar alarm system

Hangar doors need to satisfy many specific requirements that depend mainly on the type of building and the location. Butzbach hangar doors were selected for Wunstorf and many other airfields around the world because they go well beyond the norm. Some of the most important criteria are set out below:

Functional reliability

This criterion is by far the most critical for hangar doors. The doors must function perfectly at all times and under (virtually) all circumstances if delays in the availability of aircraft or even penalty payments resulting from delays are to be avoided. That's why – and this was the case in Wunstorf, too – a huge amount of care was invested in the quality of materials and the technical features of the doors in order to meet this requirement at all times. Functional reliability must be ensured just as much when the power fails as when there is a heavy frost. Butzbach hangar doors are therefore fitted with an easy-to-use mechanical emergency operating system, while reliable drainage and the installation of flat heating cables in the track system (heated rails) prevent door operation being hampered by snow and ice.

Energy efficiency

The best possible energy efficiency is one of the key standards that every building must meet these days – especially structures with the dimensions of an aircraft hangar. With Butzbach hangar doors, high-quality structures and components such as transparent, insulating fibreglass panels with U-values comparable to double or triple insulating glazing, sophisticated seals and permanently resistant EPDM gaskets ensure very good thermal transmittance – throughout the life of the doors.

Freedom from radar reflection

To ensure that pilots are always able to land safely, the structure of the building shell must not deflect or in any other way modify the radar beams of the instrument landing system (ILS). Special twin-walled panels made of fibreglass, a high-grade glass-fibre reinforced plastic that does not affect the radar beams, were used for the extensive door and façade surfaces from Butzbach. This criterion was a major factor in Wunstorf because the new buildings (particularly the washing and maintenance hall) are located near the take-off runway.

Brightness

Natural light creates optimum working conditions in the hangar. Translucent multi-chamber insulation panels made of fibreglass ensure that the door and façade hangars in Wunstorf provide illumination free of glare and shadows. Fibreglass is a special material characterised by very low U-values and a light transmittance of up to 78%, the entire hangar door area can thus be used as a passive light source for cost-free illumination.

Adaptation to the tail unit

The installation of tail doors in the form of stacking doors essentially allows the height of the main door to be reduced, enabling cost savings. As the A400M has a T-tail, this additional requirement on the door system for the training hall in Wunstorf was met by a customized SPACELITE HT200 tail door with 3 leaves each weighing about 3 t.

Burglar protection and security

Butzbach hangar doors feature a mechanical locking system for the door leaves and the integrated pedestrian doors and truck doors as standard. In Wunstorf permanent electronic monitoring is provided by an intruder alarm and an access control system with the corres-



ponding access rights for a selected group of people. Hangar doors from Butzbach also in principle allow burglar resistance measures up to class RC3 to be realised. Security precautions are taken as early as during the construction phase: the Butzbach teams working on the site were given appropriate passes, for instance.

Fire safety

A fire alarm system with extinguishers is generally provided for hangars. How this is realised can vary widely. Smoke can be extracted through the roof (smoke and heat vent system) and the doors can open automatically in the event of fire to provide a source of fresh air, which is how it was done in Wunstorf. Fire safety is always brought up in the planning stage, to which Butzbach's project management team contributes by determining the most appropriate option for the construction project. Project manager Axel Knussmann: "Our many years of know-how are a great help here, for instance, we also have an eye on the follow-up costs for fire safety equipment, which are often underestimated."



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Photo: Bundeswehr / Hähnel

Consistent project management for manufacturing, assembly and logistics

A project manager from Butzbach controls and coordinates the door-related details of the construction project, serving as a point of contact for all participants and overseeing execution from planning through to acceptance. He is also a regular presence on the building site. In the case of the Wunstorf airbase, Axel Knussmann is the relevant project manager. At the start of the project his duties were focused in particular on checking the preceding works on site to satisfy himself that they had been executed properly. Before manufacturing starts, a detailed consultation is held between the participating trades

so that all relevant technical details can be clarified. It takes about 16 weeks to produce a hangar door with the dimensions of those in Wunstorf. Where possible, every door is pre-assembled in the plant, so that only larger components have to be fitted together on site. By this stage the construction site at the place of installation is already up and running. “We plan this down to the last detail so that we can work independently,” explained Axel Knussmann. “The most important areas are those used for storage, taxiing and parking, which means we have to make sure we are absolutely bang on schedule so that there are no delays on site.”

For the Butzbach team around Thomas Merk and Axel Knussmann a project is

only finished when the customer can operate the hangar in a reliable and trouble-free way. The fact that they received all consequent orders for the hangar doors and the fibreglass curtain walls is for them a sign that both the product and the project management could entirely satisfy the expectations of the contractor.



About the Wunstorf airbase

According to the Bundeswehr, the Wunstorf airbase is its largest building site at the moment. Once all the works have been completed, the project will have cost some 565 million euros. The majority of this is being spent on the construction of new buildings and infrastructure for the 40 transport aircraft of type Airbus A400M that will be stationed there in the future. The work began as long ago as 2009.

When the project began Butzbach Aviation won the Europe-wide tenders for the doors. The invitations to tender were issued by two civilian public project management authorities. The

two agencies look after hundreds of properties owned by federal and regional governments. They report to the Lower Saxony regional financial authority, Oberfinanzdirektion Niedersachsen, which ultimately monitors the progress and the appropriate use of the money invested.

The prevailing standard for the doors installed in Wunstorf is the European product standard DIN EN 13241-1. It replaced the national standards a few years ago and regulates safety and performance requirements for all power and manually operated gates and barriers in the private, commercial and public sectors that are intended to allow the passage of persons or goods

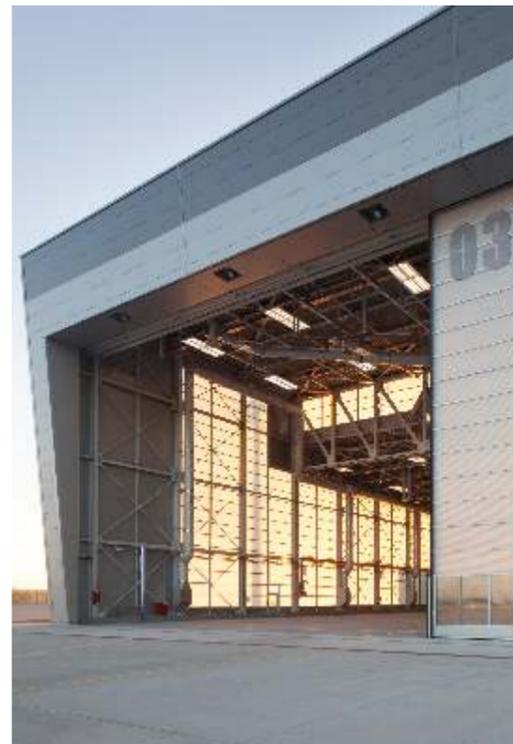
and vehicles accompanied or controlled by them. The doors for the Wunstorf airbase were built in accordance with the requirements of this standard and with other individual specifications.

Assembly of the Hangar Door for overhaul hall 2

Stacking doors in the simulator building of the training facility



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Butzbach hangar door and fibreglass curtain wall installations in Wunstorf in detail

Butzbach hangar doors and their additional equipment are always individual bespoke solutions. In the airbase Wunstorf Butzbach has developed and supplied a total of five hangar doors and nearly 6,000 m² fibreglass curtain walls in four buildings in the time between 2012 and 2017. The buildings and hangar door installations in chronological order were as follows:

1. Overhaul hangar 1st section

Realisation: September 2012 to December 2013

Hangar door 105 x 17.5 m – sliding door with two door leaves.
Specifics:

- Sliding door installation with electric drive, with frame profiles in steel
- 2 individually operating door leaves, with a size of 52 x 17.5 m and a weight of 40 tons each.
- 2 docking bays for overhaul
- Each door leaf has one integrated truck door and one personnel access door
- Heating of the bottom tracks
- 40 mm twin-walled fibreglass panels with a U value of 2.5 W/m²K, colour Emerald-green
- Superior security equipment with de-central access control

Curtain walls: Two VARIOPLANplus curtain walls 98 x 6 m and 45 x 6 m

2. Training facility / Simulator building

Realisation: December 2012 to December 2013

Hangar door 1: 51 x 10.5 m – round-the-corner door with four leaves on two tracks and a tail door SPACELITE HT200, 25 x 7 m

Specifics:

- Round-the-corner door with electro-hydraulic drive systems, frame profile in aluminium and a total weight of 20 tons
- 4 individually operable door leaves 13 x 10.5 m each
- 1 bay for the training on the aircraft
- Each door leaf with one integrated pass door
- Heating of the bottom tracks
- 40 mm twin-walled fibreglass panels with a U value of 2.5 W/m²K, colour Brilliant
- Superior security equipment with de-central access control
- Tail door with 3 door leaves and steel frame profiles in a total dimension of 25 x 7 m and a weight of 10 tons

Hangar door 2: 10 x 10.6 m – single leaf sliding door on one track

Specifics:

- Sliding door installation with electric drive, with frame profiles in Aluminium
- 1 door leaf 10 x 10.6 m
- Heating of the bottom tracks
- 40 mm twin-walled fibreglass panels with a U value of 2.5 W/m²K, colour Brilliant
- Superior security equipment with de-central access control

Stacking doors: two SPACELITE HT60H, 6.4 x 8 m

Realisation: June 2013

3. Washing- and maintenance hall:

Realisation: September 2014 to August 2015

Hangar door 160 x 17.50 m – sliding door with three door leaves

Specifics:

- Sliding door installation with electric drive, with frame profiles in steel, total weight 132 tons
- 3 individually operable door leaves 54 x 17.50 m, each with a weight of 44 tons
- 3 bays, two for maintenance, one washing bay
- Each door leaf has one integrated truck door and two personnel access doors
- Heating of the bottom tracks
- 60 mm twin-walled fibreglass panels with a U value of 1.1 W/m²K, colour Brilliant
- Superior security equipment with de-central access control

Curtain walls: VARIOPLANplus curtain wall 3800 m², three exterior façades and two interior separations between the bays.

4. Overhaul hangar 2nd section

Realisation: February 2015 to February 2016

- Technical execution identical with the overhaul hangar 1st section



Butzbach GmbH Industrietore
Industrieweg 4-8
89299 Unterroth (Germany)
Tel. +49 7343 81-130
Fax +49 7343 81-470
info@butzbach.com
www.butzbach-hangardoors.com