

# *Gläserne Automobilmanufaktur Volkswagen AG, Dresden*



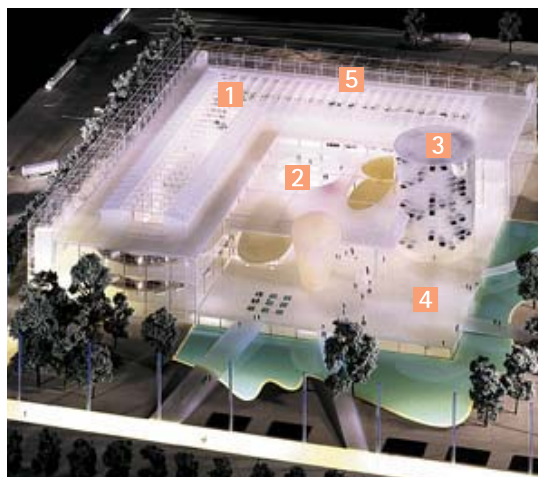
Architect/overall design: *Henn Architekten, Munich/Berlin*  
Production planning: *Volkswagen AG, PP Dept., Wolfsburg*  
Glass/metal curtain walling visitors' forum:  
*Anders Metallbau, Fritzlar*

# Mission

What other corporations hide behind closed doors is, at Volkswagen AG, showcased as a unique spectacle. The car manufacturer's Transparent Factory offers customers and visitors a first-hand taste of how its Phaeton luxury-class saloon is put together. The same transparency informs the entire architectural concept.

## Forward-looking urban design

The Transparent Factory – the German name, "Gläserne Manufaktur", literally means "factory made of glass" – at Straßburger Platz in the heart of Dresden is something of an urban novelty: firmly rooted in the city's historic core, it actively engages with civic cultural life.



General view from west with assembly area (1), visitors' forum (2), vehicle cylinder (3), basement terrace (4) and logistics yard (5)

## Transparent architecture

Offering a wealth of insights, not only into automobile production, the Transparent Factory wholeheartedly embraces the principle of openness. Both the exteriors and interiors of the square-shaped ensemble are fully glazed. Alongside the proper factory, the site also includes a multi-faceted visitors' forum. This is not just a pick-up point for customers to collect their new cars; it also serves as a venue for constantly changing "presentations". Exhibitions on automobiles and the Volkswagen Group, technical simulations as well as general cultural events, such as concerts, book readings and TV shows, are all part of the supporting programme.



General view from north-east by night

## Design concept

With the Transparent Factory, architect Prof. Dr. Gunter Henn has added an imposing new dimension to automobile production. With the help of his design team, he fashioned an architectural concept that dispenses with high-tech gimmicks and capricious details, and makes no attempt to outshine the elegance of the cars. The Transparent Factory is a cluster of buildings comprising the assembly area, the visitors' forum, the "vehicle cylinder" (for storage of the finished automobiles) and a logistics yard. The assembly process commences on the upper level of a 25 m tall, L-shaped glass block, stretching 150 m in either direction. The visitors' forum sits between the two wings of this block on a large terrace over the basement level.

Its expansive glass fronts, facing towards the city centre and adjoining

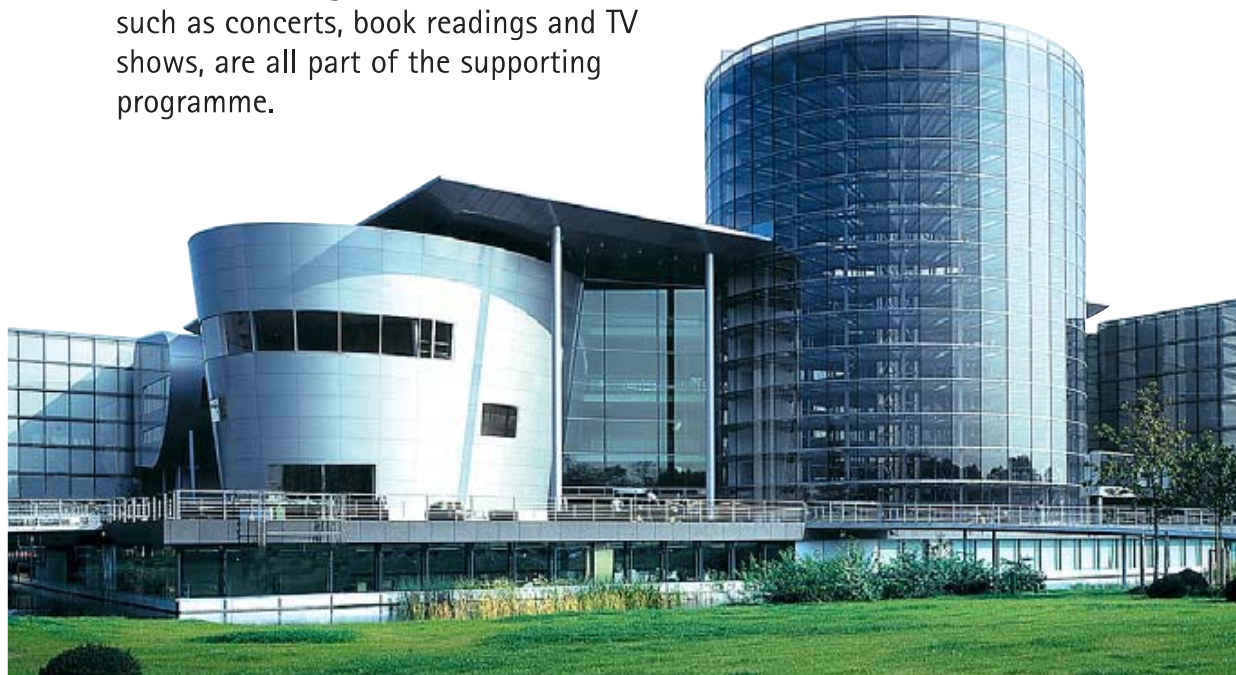
baroque gardens, are punctuated by the 40 m high vehicle cylinder, the largely blank exterior of the pick-up area and customer (VIP) lounge, and the small administration block.

## Factory area

With its plain and unpretentious architecture, the two-level, L-shaped assembly area hosts a demonstration of the car manufacturing process. Glass partitions, parquet flooring and lighting effects celebrate the creation of the artefact as a work of fine craftsmanship. Conveyor belts transport the vehicles down to the ground level while lift tables carrying materials weave their way across the shop floor. Prior to their "wedding" with the motor and chassis, the car bodies dangle from tracks on the ceiling.

## Visitors' forum

In contrast to the unemotional assembly zone as a place of synchronized production, the visitors' forum asserts itself with amorphous forms and curvilinear terraces. Customers and visitors reach this multifarious world of discovery via a sequence of bridges over the parkland water features at the front.



Left: General view of visitors' forum with administration block, VIP lounge, vertical facade and vehicle cylinder

# Structural & Facade Design

Our engineers and technicians exploit all the benefits of leading-edge technology to furnish you with a comprehensive palette of services. Apart from offering technical planning, outline scheme and design analysis services, our expert team is fully versed in turning specifications and working drawings into reality.

■ **Specialized engineering services to meet supreme quality standards**

The Transparent Factory perfectly exemplifies how engineering know-how, backed up by state-of-the-art technology and a start-to-finish



*Glass facade of vehicle cylinder*

quality assurance, can deliver outstanding facade compositions.

The Dresden project involved the fabrication and installation of several custom-built assemblies. All design work was carried out in close collaboration



*Internal view: vertical facade and VIP lounge*

with the architect and facade consultant.

The two main elements installed were the vertical facade and the vehicle cylinder curtain walling, both of which were implemented as suspended constructions. The vertical loads from the facades are transmitted to the structure via suspension points at the top.

In developing these solutions, our experts paid close attention to the architectural particularities of the scheme.

The production process was preceded by comprehensive structural calculations and a thorough technical analysis by our in-house design team.

■ **Anders Metallbau: an expert in glass facade construction**

Inaugurated at the end of March 2002, the automobile assembly plant at Dresden is unmatched worldwide. The project was based on a sophisticated and technically demanding architectural concept that truly merited expert attention. Anders Metallbau was duly invited to assist in the creation of the futuristic ensemble.

In July 2000, Automobilmanufaktur Dresden GmbH appointed us to handle the curtain wall package for the visitors' forum. The highly varied tasks required our in-depth know-how and experience. Our in-house engineers

were responsible for designing the following elements ...

- Steel/glass curtain wall visitors' forum
- Steel/glass curtain wall vehicle cylinder
- Glazing to administration block
- Metal cladding to administration block
- Aluminium rainscreen cladding as cold facade to VIP area
- Glazing to VIP area
- Coping
- Glass curtain wall glass studio
- Bullet-proof curtain wall lodge building
- Wall cladding vehicle test track
- Automatic sliding doors



*Administration block*

- Smoke detector system
- Doors in link corridors

In many areas, the above elements were specified as custom-designed assemblies, geared to the specific architectural and technical features of the facades. The special aluminium assembly solutions were developed in collaboration with the system supplier, Schüco International KG in Bielefeld. The technical design work for the special curtain walling was performed by our own engineers.

The extraordinarily high demands placed on the facade glazing – which, in many cases, reached the limits of technical feasibility – repeatedly called for purpose-designed solutions.



*Vertical facade*



*VIP lounge*

# Fabrication

In-depth know-how, high-tech resources and an integral approach enable us to deliver projects with maximum efficiency. Equipped with modern production lines, Anders Metallbau guarantees consistently high-grade, quality-assured fabrication of curtain walls, windows and rooflights.

## ■ Fabrication of steel/glass curtain wall vehicle cylinder

The steel/glass curtain wall for the vehicle cylinder was wholly manufactured at our Fritzlar workshops. Utmost precision was required to meet the exceptionally low tolerances of  $\pm 1$  mm.

Our experienced and highly skilled workers used modern machining centres to fabricate the add-on aluminium construction as stick system.

## ■ Fabrication of vertical facade

All steel components for the vertical facade were fabricated to our working drawings and specifications. Regular quality checks were performed during production to ensure full compliance with our requirements and the attainment of consistently high quality standards.

## ■ Fabrication of steel/glass curtain wall glass studio

Due to the circular building geometry, the glass studio facade placed high demands on fabrication. All works



*Coping*

our workshops. Every effort was made to maximize the level of prefabrication. The large, curved, custom-made metal cladding units necessitated the production of special sheet formats



*Glass studio*



*VIP lounge*

The steel mullions were constructed as welded sections with approx. three-tonne unit weights.

A further complicating factor was the need to provide an electrical heating band on the inner side of the facade.

The add-on aluminium construction was custom-fabricated as a stick system by Anders Metallbau. For guaranteed top quality, special machining centres were used to process all aluminium sections.

were subject to tight tolerances and required precision workmanship. Here too, our engineers developed a customized steel/glass facade solution, based on the Jansen VISS system, which took due account of fire-safety requirements. The curtain wall components were produced at our workshops in Fritzlar.

## ■ Fabrication of metal cladding and glazing for administration block

The support frame and shaped metal parts for the coping were fabricated at

and bending tools. All components were fabricated at our metalworking shops in Borken. To minimize distortion, the smooth, level surfaces, in particular, required high-precision metalworking. All welding needed for the shaped metal parts was performed by officially certified welders.

## ■ Fabrication of facade VIP area

The working drawings for the entire VIP lounge facade, plus incorporated door and window units, were prepared by our in-house design team.

The steelwork support frame, like the door and window units, were fabricated at our workshops and erected on site by our own installers.

Due to the outward-sloping geometry, all doors and windows were fabricated as individual elements.

Sawn, 4 mm aluminium sheet was used as the cladding material. The individual units were prefabricated as arch segments, then rolled to the necessary radii. The concealed fixings attached to the rear face allowed the creation of a neat facade with crisp lines and a precise joint pattern that fully met the client's quality requirements.

# Installation

Our own installer teams guarantee the highest quality standards in the execution of each and every project. From design to installation, our customers benefit from perfectly co-ordinated services that guarantee top quality, absolute reliability and on-time completion.

## Installation of vehicle cylinder facade

The vehicle cylinder's glass envelope comprises a single-skin, single-glazed curtain wall. Insulation glazing was fitted in the areas bounding the interior of the visitors' forum.



*Vehicle cylinder*

The 40 m tall curtain wall was designed as a suspended construction. The facade's self-weight is transmitted to height-adjustable suspension points at the top of the structure.

The curtain wall support frame consists of 70 x 40 mm solid steel mullions and 80 x 150 mm hollow steel transoms.

The vehicle cylinder has a segmental floor plan. Purpose-developed support brackets in the form of milled stainless-steel components were incorporated at the mid-span points to accommodate the positive/negative wind pressure and thermal expansion loads acting on the facade.

Thermal expansion is accommodated at the foot of the curtain wall by movable facade connections. The add-on construction and gaskets make similar provision for temperature-driven



*Installation of sheet-steel cassettes for administration block*

expansion and contraction up to 30–40 mm across the whole facade.

To facilitate erection, the entire vehicle cylinder was enclosed by scaffolding. The components were lowered into position by tower crane.

Thanks to the efforts of our experienced team, the installation process was completed with a minimum period of time.



*Glazing of vehicle cylinder*

## Installation of vertical facade

Erection of the vertical facade posed another stiff test for our specialist operatives. Given the approx. three-tonne weight of each finish-coated mullion, the utmost care and precision



*Installation of metal base for rooftop plantroom in VIP area*



*Welding works to steel mullions in VIP area*

were needed for proper installation. The mullions were suspended near the roof, at the head of the facade. Movable horizontal bearing brackets were installed at the base to accommodate positive and negative wind pressure. The facades were braced through the provision of structurally continuous connections between one end of each transom and the adjoining mullion.

The glass panes, which weighed up to 800 kg, were fitted using special glass suckers. Given that the construction geometries – especially at the junctions with the VIP lounge and administration block – dictated extremely tight tolerances, our employees had to exercise maximum precision when fitting all glass units. All on-site assembly works were performed by our own installer teams.

These teams were superintended by a project manager, site manager and several foremen, who remained present on site throughout the contract period.

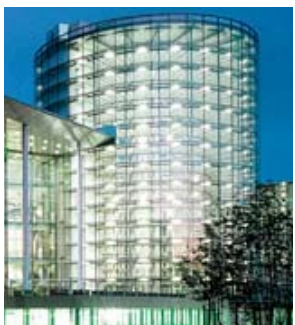
Top priority was attached to continuous quality control for all works. The majority of components, on account of their geometry, had to be installed to a high level of accuracy. In the final analysis, the complete absence of defects or flaws in any of the executed works fully vindicated the strategy adopted by Anders Metallbau.

# Interiors

The Transparent Factory excels by its formal design and simple architectural detailing. The expansive glass fronts nonetheless give more than a hint of its subtle and ingenious inner life. Glass, parquet flooring and light transform the interior into an intriguing and exciting world of discovery.

## New benchmark for industrial architecture

The interior design concept delights by its scrupulous modelling, clearly delineated forms and intelligent lighting design. Although the illumination is not allowed to encroach on the exquisite parkland surrounding the Factory, "Großer Garten", the gleaming glass facades still make a dazzling impact at night. Indirect light, reflected by prismatic mirrors, brings out the full elegance of the building interior.



Fascinating views of vehicle cylinder by day and night

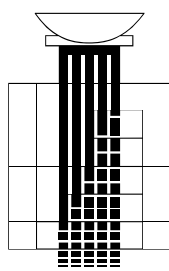


Customers waiting to pick up their luxury saloons can relax in the spacious VIP lounge, which overlooks the "Großer Garten" and neighbouring Hygiene Museum.

## Facts and figures: the essentials in brief

Client:	Volkswagen AG, Wolfsburg	Vehicle cylinder:	39.90 m high; 30.02 m dia.
Architect/overall design:	Henn Architekten, Munich/Berlin	Car body warehouse:	29.00 m high, 65.50 m long, 9.70 m deep
Design concept:	Prof. Dr. Gunter Henn, Joachim Bath, Christian Bechtle, Igor Grozdanic	Production capacity:	150 vehicles per day
<b>Design team:</b>		<b>Works completed by Anders Metallbau in visitors' forum:</b>	
Structural design:	Leonhardt, Andrä und Partner, Berlin	VIP lounge curtain wall:	Approx. 1,800 sqm
Landscape design:	Stötzer & Näher, Berlin	Vehicle cylinder glass curtain wall:	Approx. 3,400 sqm
Lighting design:	Kardorff Ingenieure, Berlin	Glazed vertical facades:	Approx. 1,000 sqm
Facade consultant:	Hussak Ingenieurgesellschaft, Lauingen	Admin block curtain wall:	Approx. 1,800 sqm
Infrastructure design:	IHG Ingenieurgesell. Höpfner, Dresden	Glass studio curtain wall:	Approx. 250 sqm
Production planning:	Volkswagen AG, PP Dept., Wolfsburg	Roof edge trim:	Approx. 256 m
<b>Investment volume:</b>		Slab soffits:	Approx. 750 sqm
Total:	€ 185 million	Electric sliding doors, complete SHEVS, fire-rated glazing:	Approx. 250 sqm
<b>Construction:</b>		Bullet-proof glazing:	Approx. 120 sqm
Glass/metal curtain wall visitors' forum:	Anders Metallbau GmbH, Fritzlar	<b>Glass/facade systems:</b>	
<b>General project data:</b>		Glass:	Products supplied by Interpane, Lauenförde
Workplaces:	Approx. 800	Aluminium systems:	Customized by Schüco International KG, Bielefeld
Overall complex:	147 m long, 147 m wide Main block: 24.90 m tall		

**anders**  
metallbau



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**SCHÜCO**