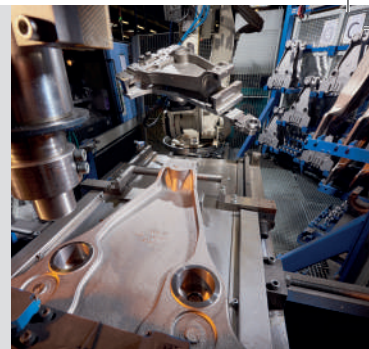


VDL Groep



# Strength through cooperation





# VDL Groep

**THE ESTABLISHMENT OF 'METAALINDUSTRIE EN CONSTRUCTIEWERKPLAATS P. VAN DER LEEGTE' IN 1953 LAID THE BASIS FOR WHAT TODAY IS VDL GROEP. THROUGH TARGETED ACQUISITIONS AND AUTONOMOUS GROWTH, THIS FAMILY BUSINESS HAS GROWN TO BECOME AN INTERNATIONAL, INDUSTRIAL COMPANY WITH MORE THAN 90 OPERATING COMPANIES, SPREAD THROUGHOUT 19 COUNTRIES AND OVER 15,000 EMPLOYEES.**

VDL Groep, with its head office in Eindhoven, develops, produces and sells high-quality semi-finished products, buses and coaches, a wide range of finished products, and assembles passenger cars, around 80% of which are destined for export. These products, often hidden from view, ultimately find their way into numerous different markets including the automotive industry, semiconductors, medical, agriculture, infrastructure, solar power, energy, waste processing and food. VDL Groep is committed to controlled growth, emphasising the innovation, improvement and expansion of both the production methods and product range.

## **STRUCTURE AIMED AT DECISIVENESS**

VDL Groep offers continuity. This is made possible by the unique structure of the group: a family of flexible, independent companies, each with its own speciality in various product/market combinations, both at national and international level. VDL Nederland and VDL Holding Belgium provide support to the operating companies in the areas of financial affairs, IT, social affairs, environment and safety, insurance, subsidies, legal affairs and communications. Supported by a financially strong organisation, the VDL subsidiaries are able to concentrate fully on market developments and their own core activities. The short lines of communication between the operating companies make it possible to pool capacity and knowledge whenever necessary. This allows each individual company to serve its customers as a full-service partner and co-maker. The strength of the organisation clearly lies in the cooperation between the individual companies. Together they form a single, strong team.

VDL Groep

VDL Nederland

VDL Holding Belgium

■ Subcontracting	■ Car Assembly	■ Buses and Coaches	■ Finished Products
Metalworking		Chassis & chassis modules	Production automation systems
Mechatronic systems and system supply		Coaches	Suspension systems
Plastics processing		Public transport buses	Heat exchangers
Surface treatment		Mini & midi buses	Container handling equipment
		Second-hand buses	Cigar-making and packaging machines
		Parts & services	Sunbeds and roof boxes
			Systems for the agricultural sector
			Systems for the industrial sector

**ADVANCED TECHNOLOGY FOCUSED ON QUALITY**

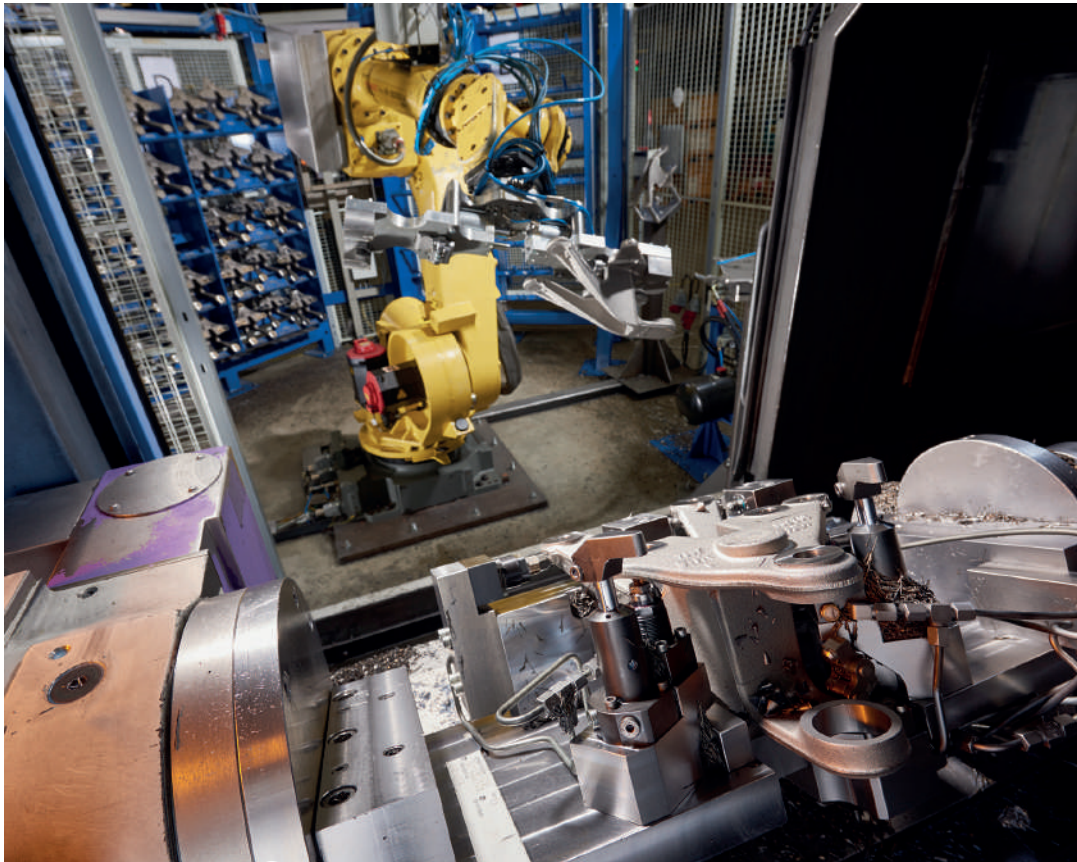
The overall policy of VDL Groep is intended to stimulate innovation of products and production methods, with a focus on costs and quality management as well as sustainability. The organisation continuously seeks the best solution by carefully listening to the customer's wishes and developing those ideas into efficient solutions in a creative and flexible manner. Against that background, VDL Groep invests in establishing the necessary conditions, including state-of-the-art machinery, good facilities and optimum logistics, a critical policy for quality and world-class craftsmanship.

**PROFESSIONALS MAKE THE DIFFERENCE**

The heart of VDL Groep is formed by dedicated employees and their excellent craftsmanship delivered at all levels. All the operating companies have attained and maintained their competitive position through the efforts of motivated and flexible professionals. VDL maintains this high level of quality by carefully selecting its employees and providing internal training and refresher courses. Equally as important is the continuous effort that is put into improving the no-nonsense culture, in which informal, personal and open communication prevails. Strength through cooperation is our credo.



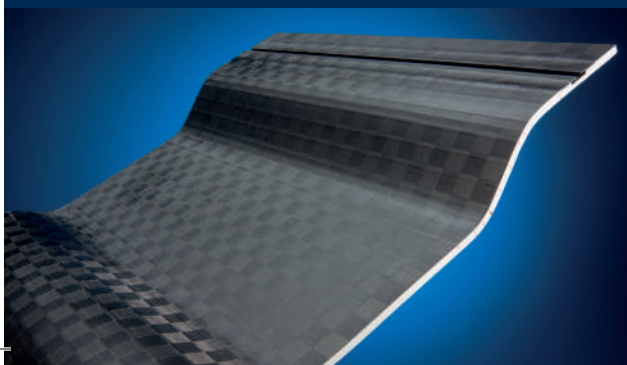




## ■ Subcontracting

THE SUBCONTRACTING DIVISION OF VDL GROEP HAS BUILT UP AN EXCELLENT NATIONAL AND INTERNATIONAL POSITION. THE DIVISION CONSISTS OF A LARGE NUMBER OF SUBCONTRACTING COMPANIES THAT MANUFACTURE HIGH-QUALITY METAL AND/OR PLASTIC PRODUCTS, RANGING FROM SIMPLE TO COMPLEX AND INTEGRATED PROCESSES. THIS CAN BE EXTENDED TO INCLUDE SURFACE TREATMENT, ASSEMBLY PROCESSES OR LOGISTICS SERVICES.

VDL Groep is responsible for the entire project from design and prototype through to manufacturing, assembly and testing. Thanks to professional project management, VDL is capable of taking complete responsibility for these projects. If desired, installation and maintenance can also be provided. VDL offers all the necessary disciplines, in-house. All VDL companies have developed a high degree of specialisation while focusing on versatile and flexible capacity, fast delivery and excellent value for money. VDL constantly strives to improve efficiency through automation and robotisation.

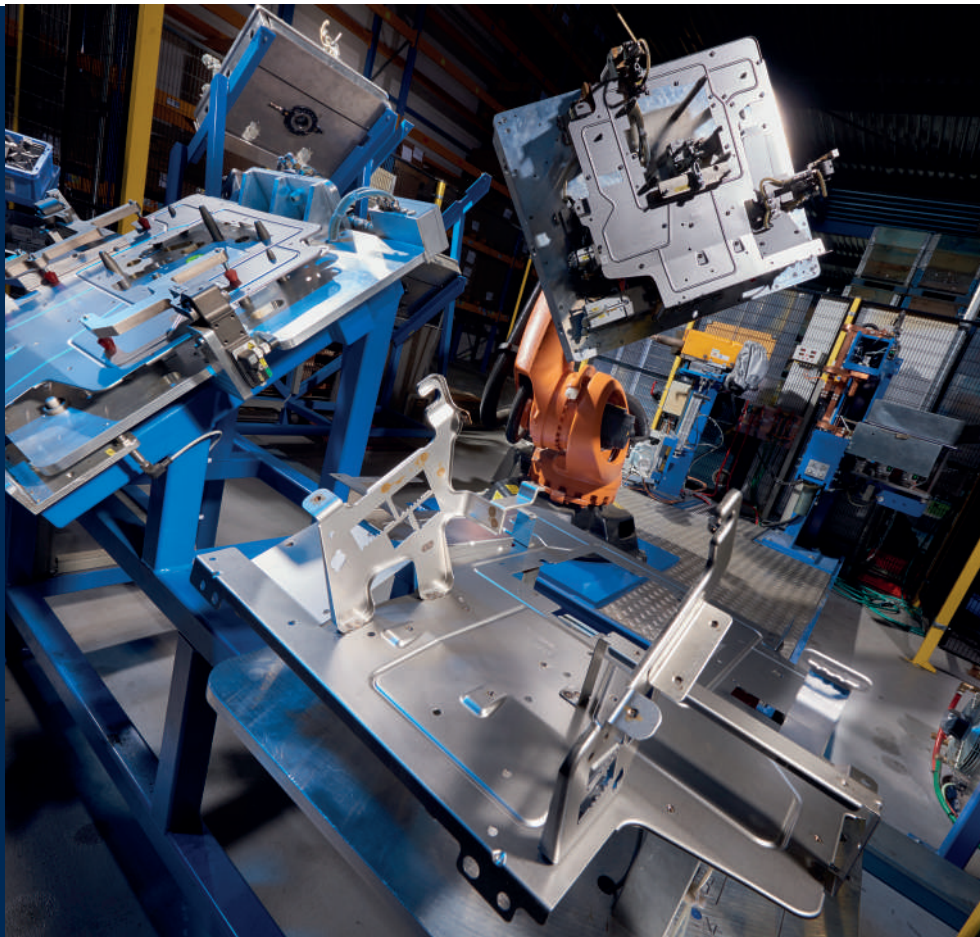
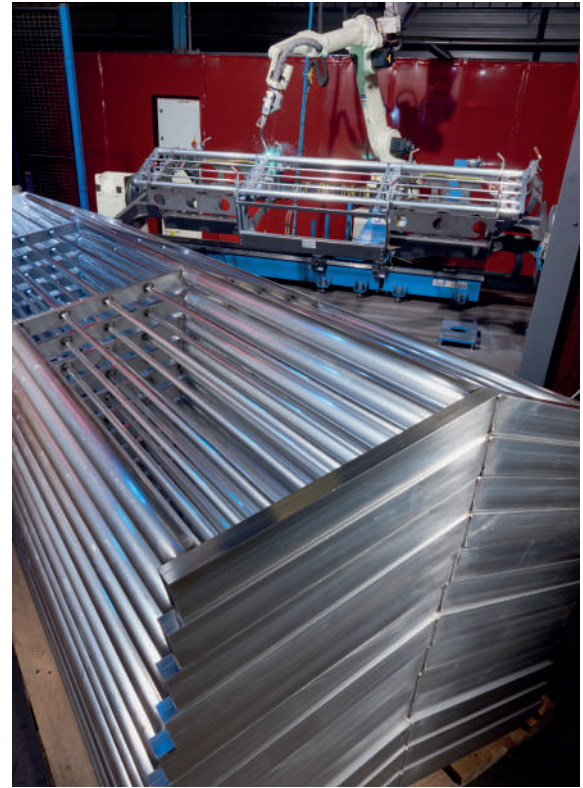




## METALWORKING

In the field of metalworking, VDL Groep masters practically every relevant competence, from iron casting, sheet metal and construction work, robot welding, pipe bending and laser cutting through to laser welding, water jet cutting and ultra-precision turning and grinding work. In addition, all machine processes such as turning, drilling, milling and setting are carried out fully automated. Constant investments are made in the most advanced machinery, with a view to continuous optimisation of production processes.

- Development
- Engineering / Design
- Mould development and production
- Iron casting
- Prototype building
- Production
- Assembly
- Testing
- Installation and service
- Supply Chain Management



## Sheet-metal working

- Autogenous welding
- (CNC) Bending / Folding
- Deep drawing
- (CNC) Clinching
- Cutting
- (CNC) Laser welding
- (CNC) Laser cutting
- Automatic pressing (30 - 800 tonnes)
- Hydraulic pressing (30 - 1,800 tonnes)
- (CNC) Pipe bending
- (CNC) Plasma cutting
- (CNC) Punching
- Robot Bending / Folding
- (CNC) Torch cutting
- (CNC) Setting
- 3D (Tube & Pipe) laser cutting

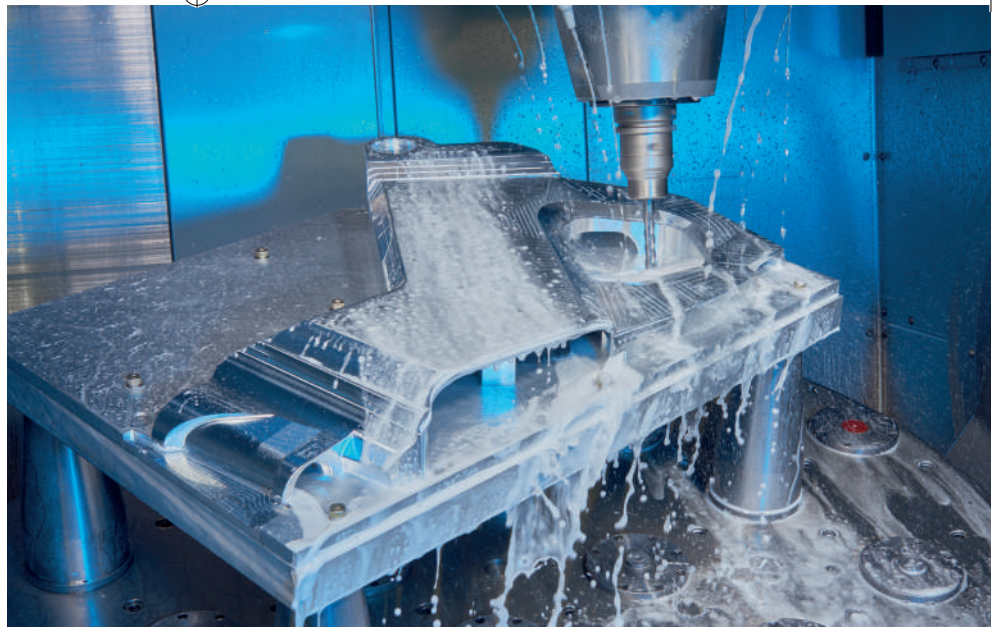


### Machine processes

- (CNC) Grinding
- (CNC) Turning
- (CNC) Milling
- (CNC) Tapping
- Ultra-precision turning and milling
- Sawing
- (CNC) Drilling
- (CNC) Automatic turning
- (CNC) Broaching

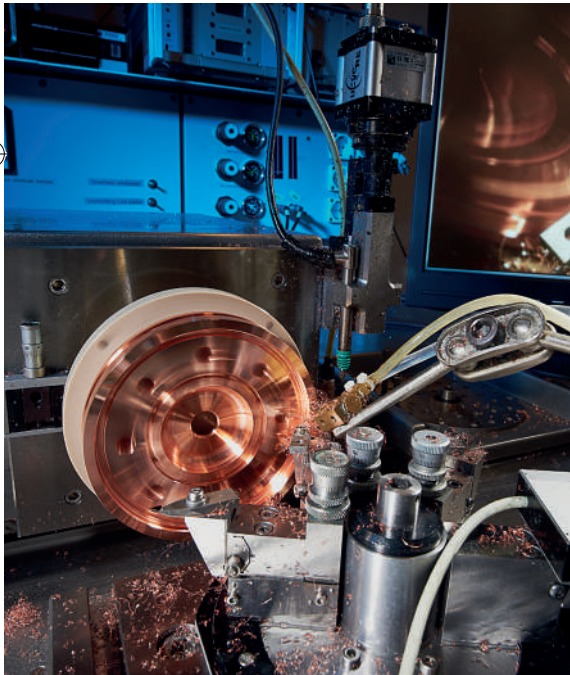
### Other processes

- (CNC) 3D measuring
- MIG/MAG and TIG welding
- Micro TIG welding
- Stainless steel welding
- Ultrasonic welding
- Robot welding
- (CNC) Spot welding
- Micro laser welding
- Seam welding
- CMT welding



- Wire erosion
- Steel grit blasting
- Assembly
- Soldering
- Vibrating
- Rolling
- Water jet cutting
- Zinc spark erosion

- Stainless steel grit blasting
- Plasma and Ultrasonic / Alkalic cleaning
- (CNC) Rob-Cad simulation
- Copper bench working
- Orbital welding
- Vacuum soldering
- Residual Gas Analysis (RGA)



### MECHATRONIC SYSTEMS AND SYSTEM SUPPLY

VDL is a worldwide player in the field of complex and innovative mechatronic systems. The company develops and manufactures individual components and modules, as well as complete systems for high-tech production equipment, analysis and medical systems. VDL offers the full process from product design, value engineering, supply chain management, part manufacture and (cleanroom) assembly through to testing and customer delivery.

- Market research
- Product development
- Process development
- Project management
- Electronic / Mechatronic assembly
- Functional testing
- Logistic chain management
- Vacuum applications
- Precision positioning in nano range
- Cleanroom assembly
- Handling systems
- High accuracy
- High positioning speeds
- Process validations





## PLASTICS PROCESSING

The VDL plastic processing companies offer customers total solutions, from product development to production of semi-finished products and even assembly of complex products. Product finishing processes, such as polishing, gluing, welding, printing, painting and chroming, are also provided.

### Product development

- Designing products and (complex) assemblies
- Mould design and production
- Developing (inline) production automation systems
- Mould flow analysis
- Prototyping and design validation
- Strength analysis (FEM)
- Reversed engineering

### Validation

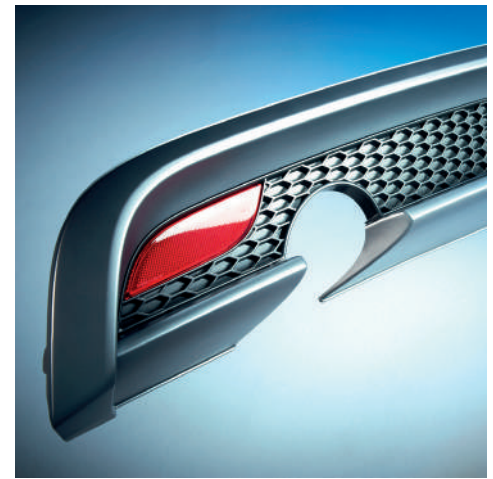
- Endurance testing
- 3D measurement
- X-Ray / NDT

### Production methods

- Injection moulding (up to 2,000 tonnes)
- Vacuum forming
- Hot press moulding (SMC and Sandwich)
- Polyurethane RIM (solid and foam)
- Resin transfer moulding (RTM, VA-RTM)
- Pultrusion
- Drape forming
- Hot bending
- CNC turning
- CNC milling of plastics

### Semi-finished product manufacture

- Production of Sheet Moulding Compound (SMC)
- Continuous Acrosoma Sandwich Stitched panel



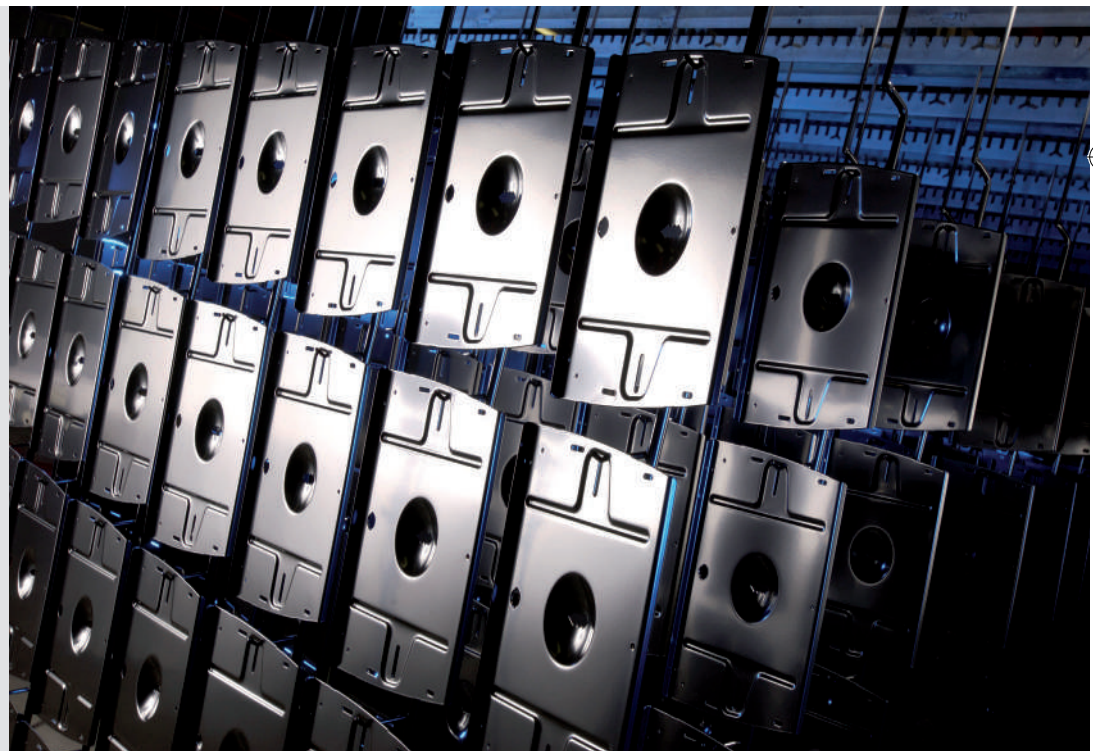
### Specialisations

- Gas injection moulding
- Insert moulding
- Over moulding
- Outsert moulding
- Multi-component injection moulding
- Mucell
- Injection Compression
- IMF (In Mould Foil)
- IML (In Mould Labelling)
- Embossing

## SURFACE TREATMENT

VDL is specialised in steel grit blasting, zinc phosphating, cataphoresis coating, powder coating, wet coating, assembly and warehousing. In addition, the group has a manual blast cabinet and an automated belt conveyor blast machine with twelve turbines. VDL also operates a fully-automated cataphoresis and powder coating line including zinc phosphate pre-treatment.

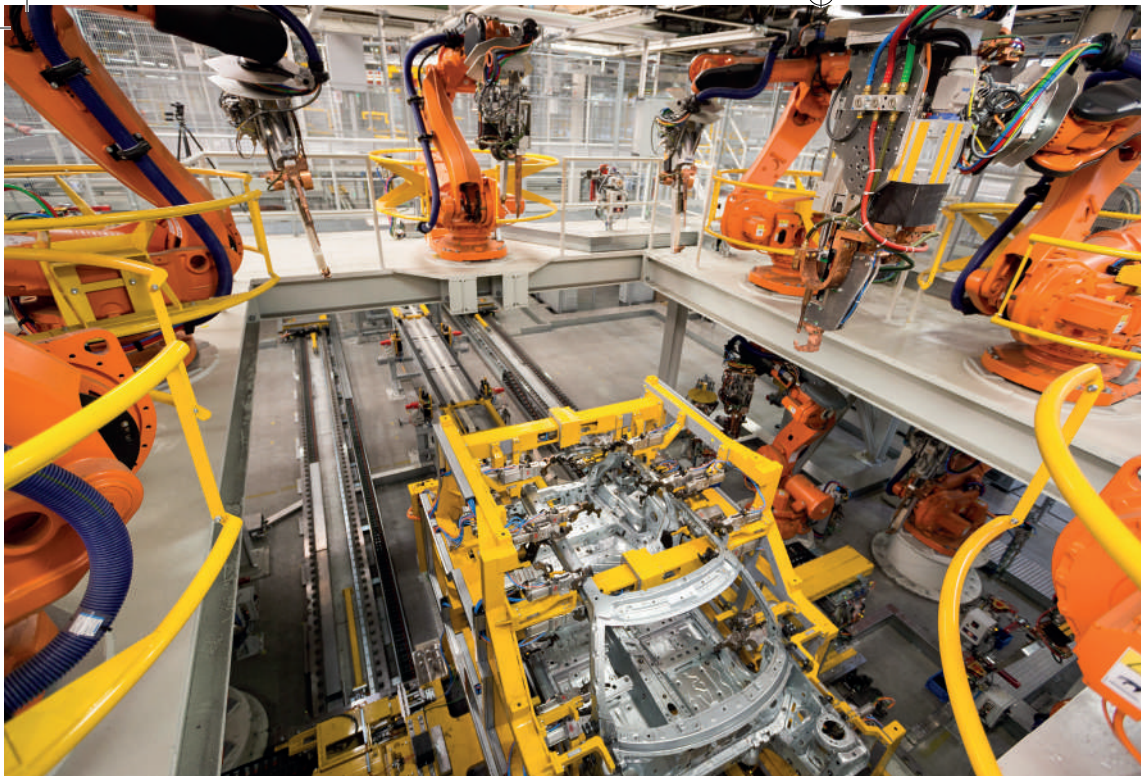
- Degreasing
- Steel grit blasting
- Zinc phosphating
- Wet coating
- Cataphoresis coating (12- 50 micron)
- Screen printing
- Powder coating



### MAIN SUPPLIER

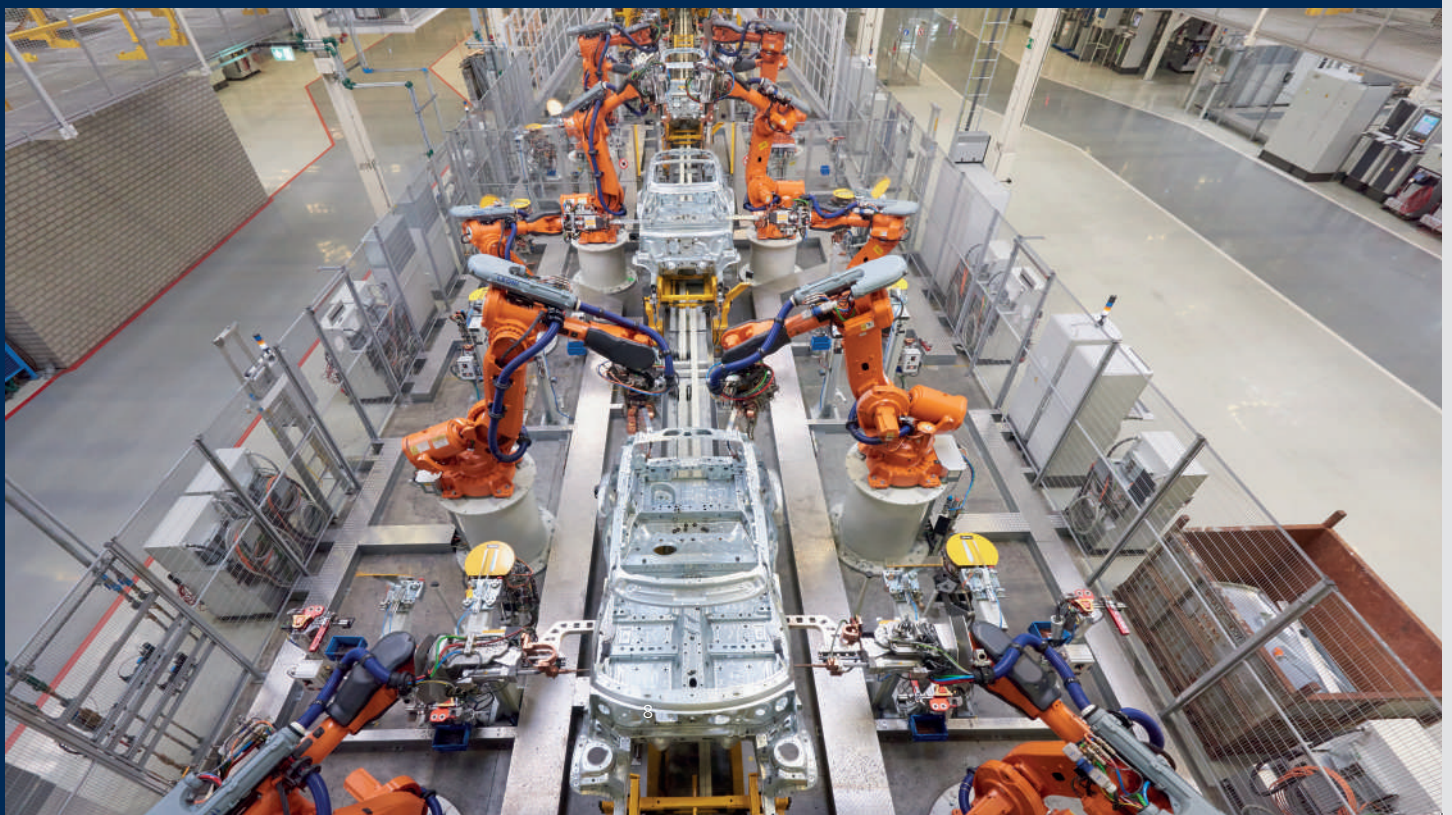
Thanks to a flexible organisation with short communication lines, every VDL company can act as a main supplier. The total offering may range from co-design to the delivery of fully-treated and assembled constructions or complete products. Besides the services of their VDL business partner, customers have access to the extensive facilities of VDL Groep as a whole.





## Car Assembly

WITHIN THE CAR ASSEMBLY DIVISION, PASSENGER CARS ARE ASSEMBLED FOR THIRD PARTIES AT VDL NEDCAR IN BORN. VDL NEDCAR IS THE ONLY MAJOR AUTOMOTIVE PLANT IN THE NETHERLANDS. THE ENTIRE PRODUCTION PROCESS FROM THE PRESS SHOP VIA THE BODY SHOP AND THE PAINTING LINE THROUGH TO FINAL ASSEMBLY IS CARRIED OUT WITHIN THE COMPANY. VDL NEDCAR HAS A PRODUCTION CAPACITY FOR SOME 200,000 VEHICLES A YEAR, BASED ON A TWO-SHIFT SYSTEM.







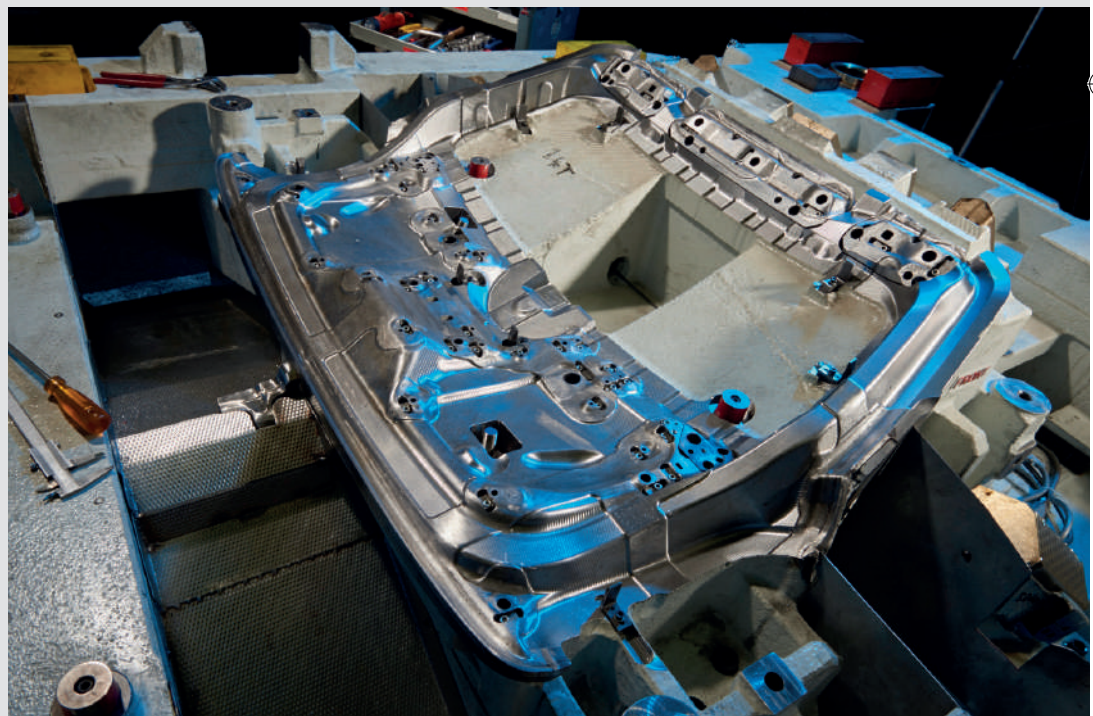
In the ultramodern facility, with approx. 330,000 m<sup>2</sup> of buildings, multiple models of passenger cars of several different car brands can be produced, according to the highest possible quality standards. Thanks to years of experience, VDL Nedcar has established a solid reputation for quality and craftsmanship.

#### PRESS SHOP

The press shop operates eight lines of mechanical presses with a capacity of between 400 and 1,800 tonnes. Deep drawing, bending, cutting, punching and trimming on structure parts and outside body parts are elements of the basic process; skills that our dedicated workers in the press shop completely master. Production is also subject to continuous process control and quality checks. The production process is characterised by high efficiency and flexibility, rapid tool changes, minimum disruptions and minimum material consumption.

The tool shop has extensive experience in the development of new products and processes.

VDL Nedcar also produces high-quality deep drawn products on behalf of OEM and truck manufacturers.







#### **BODY SHOP**

At a startlingly fast pace, some 1,200 robots connect the body parts using a variety of techniques including spot welding, laser welding, folded seams and screw and glue fastenings. These fastenings are produced to the nearest tenth of a millimetre. The accuracy is measured using special cameras at more than 300 measuring points, at different stages of the process.

All spot welds are checked several times a day using special ultrasonic test equipment, while cameras automatically inspect all sealed fastenings. The result is absolute top quality without a single concession, all in the interests of safety.

#### **PAINT SHOP**

The entire routing through the plant has been efficiently laid out. The bodysells are automatically transported from the body shop to the paint shop.

In the paint shop the bodysell will be immersed first in a series of anti-corrosion baths. Then the sealing process follows, whereupon all dust particles will be removed from the shell by more than 10,000 emu feathers. Eventually the four water-based paint layers can be applied.

Finally, the paint is precisely inspected in the light tunnel for any imperfections.







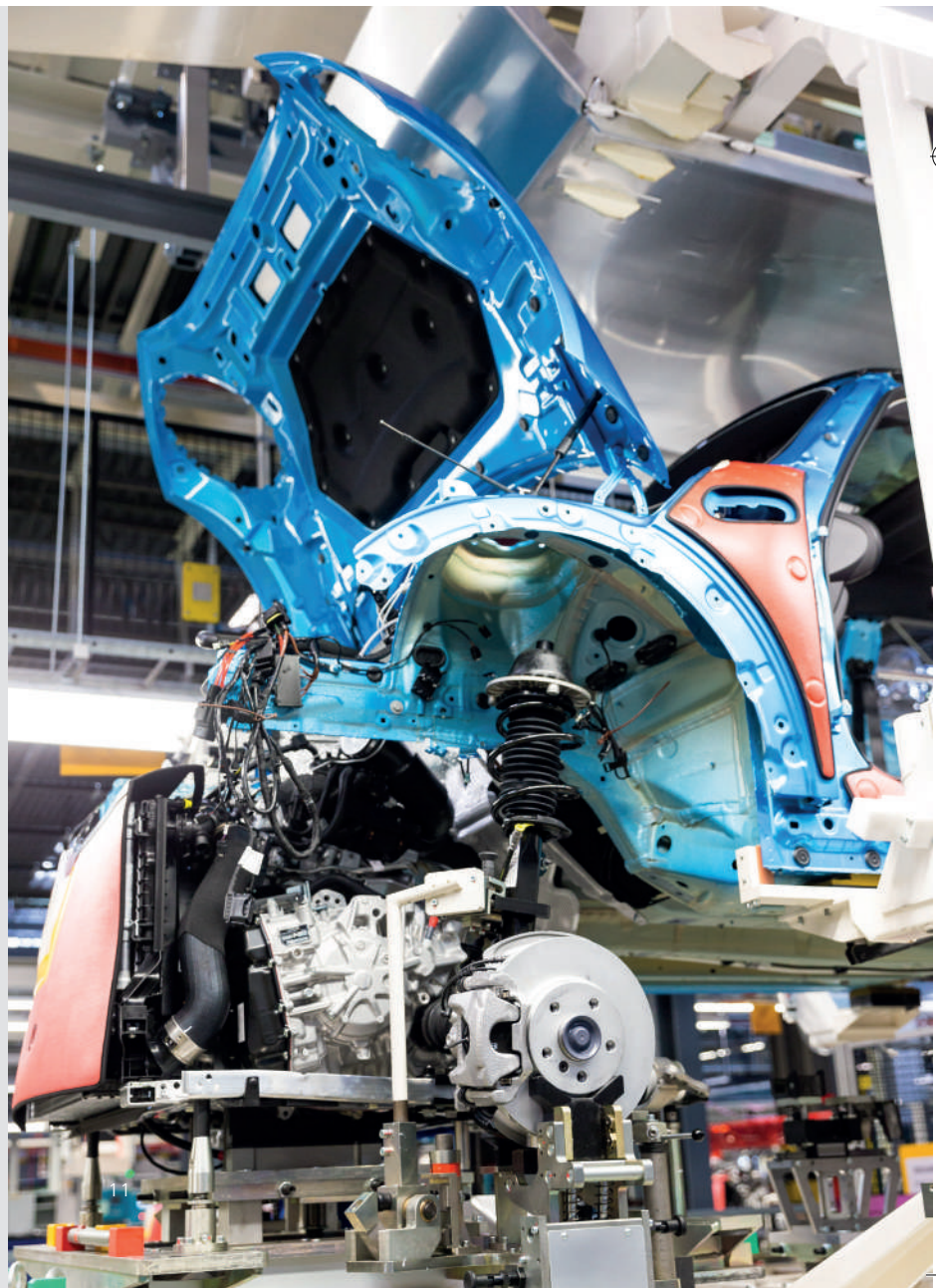
#### FINAL ASSEMBLY SHOP

The Final Assembly Shop (FAS) represents the ultimate combination of smart, ergonomic production techniques and ingenious logistics.

At the start of the process, the doors are removed to increase accessibility to the car. Later they are reunited with the vehicle at the right moment. The mats, cable harnesses, dashboards and other components are installed, and at the end of the line the engine is united with the body: the so-called 'marriage point'.

The overall scale of the logistic process and the complexity of the plant management system becomes clearly visible in the Final Assembly Shop. Every single vehicle is assembled to order, and every component is supplied at precisely the right moment.

Multiple quality inspections are performed throughout the entire production process. This ensures that every car fully meets the customer's requirements.







## ■ Buses and Coaches

SINCE THE 1990S, VDL GROEP HAS ESTABLISHED A SUCCESSFUL BUS AND COACH DIVISION. VDL BUS & COACH CONSISTS OF MULTIPLE BUS COMPANIES THAT OPERATE UNDER ONE NAME IN THE GLOBAL MARKET. THEY FORM A POWERFUL UNIT THAT HAS SET ITS SIGHTS ON PROVIDING THE HIGHEST POSSIBLE QUALITY AT COMPETITIVE PRICES. VDL GROEP HAS ANNOUNCED THE AMBITION TO BECOME A WORLD PLAYER IN THE ELECTRIFICATION OF SO-CALLED HEAVY-DUTY MOBILITY.







#### COMPLETE RANGE OF TRANSPORT SOLUTIONS

VDL Bus & Coach offers its customers a complete product line. The extensive product range includes chassis & chassis modules, coaches, public transport buses, mini & midi buses, and second-hand buses.

Production is based on a quality strategy in which safety, a long service life, comfort, low maintenance costs, low fuel consumption and concern for the environment are top priorities. The product range is distinguished by versatility and characteristic designs. VDL's use of lightweight materials in combination with an aerodynamic design is setting the trend for the industry.





#### SALES & SERVICE

Sales are organised via a worldwide network consisting of corporate-owned sales offices, importers and agents in more than 30 countries. For after sales service and maintenance, the client can count on quick, effective assistance from employees at one of the many service locations. An extensive distribution network ensures that parts and bus-related accessories are delivered to the requested destination as quickly as possible.

By combining the knowledge, expertise and capacities of all VDL bus companies, VDL Bus & Coach has grown to become one of Europe's largest bus manufacturers.



#### VDL BUS & COACH

- Chassis & chassis modules
- Coaches
- Public transport buses
- Mini & midi buses
- Special vehicles
- Second-hand buses
- Parts & services







### STRATEGY

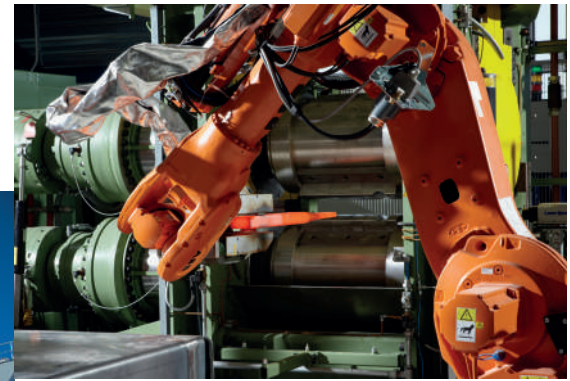
VDL Bus & Coach operates on the basis of a clear, customer-oriented strategy rooted in strong brand values. Lightweight construction, in combination with lower fuel consumption and high passenger and baggage capacity, results in maximum profit of ownership for the customer. Superb driving characteristics and an efficient, logically organised driver's cockpit contribute to safety and comfort. A harmonious interior, comfortable seats and a top-notch climate control system provide the perfect environment in which to enjoy a pleasurable travel experience.

### E-MOBILITY

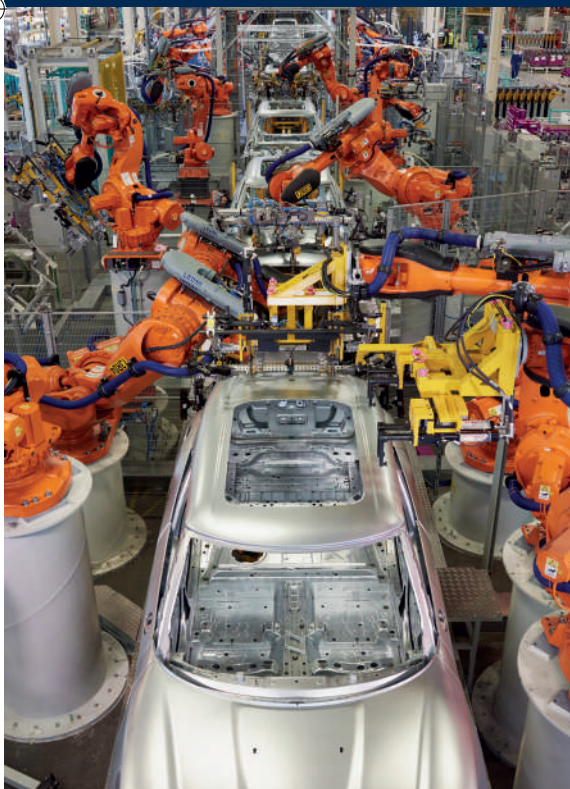
The modular construction of the Citea range allows for a large number of electric versions with customized solutions in the areas of design, powertrains and battery packs. This makes VDL Bus & Coach a frontrunner in the transition to efficient, zero-emission public transport systems. Moreover, many customers opt for one-stop shopping. This means that not only the bus but also the implementation, maintenance and supply of charging infrastructure and power are provided by VDL. As such, VDL Bus & Coach actively contributes to a cleaner environment, lower energy consumption and a quieter and healthier living environment.







## ■ Finished Products



VDL DEVELOPS AND MANUFACTURES A WIDE RANGE OF FINISHED PRODUCTS FOR BOTH THE INDUSTRIAL MARKET AND THE CONSUMER MARKET. THE OPERATING COMPANIES INDEPENDENTLY DETERMINE THEIR OWN MARKET POSITION BOTH ON A NATIONAL AND INTERNATIONAL LEVEL. THE COLLECTIVE FOCUS IS AIMED AT OBTAINING THE HIGHEST QUALITY AND FLEXIBILITY AT THE LOWEST OVERALL COST PRICE. INNOVATIVE CAPACITY AND EFFICIENT MANAGEMENT RESULT IN FREQUENT COOPERATION WITH SUBCONTRACTING COMPANIES WITHIN VDL GROEP. ANOTHER STRONG COMMON FEATURE IS THAT PRODUCTS ARE ALMOST ALWAYS DEVELOPED IN CLOSE COOPERATION WITH OUR CUSTOMERS.





### PRODUCTION AUTOMATION SYSTEMS

- Development, engineering and turnkey delivery of customer-specific robotised production systems for the assembly of body parts for the automotive industry
- Robotised production systems for the assembly of systems and components (e.g. final assembly for the automotive industry)
- Product development, engineering and series production of special machines, mechatronic modules and systems, industrial vehicles and Automatic Guided Vehicles (VDL AGV)
- Delivery and maintenance of (semi-)automatic parking systems

### SUSPENSION SYSTEMS

- Air suspension systems for trailers, trucks and buses
- Specially shaped push axles and tag axles
- Leaf and parabolic springs for the OEM and replacement market
- Axle lifts
- Truck and trailer parts



### CONTAINER HANDLING SYSTEMS

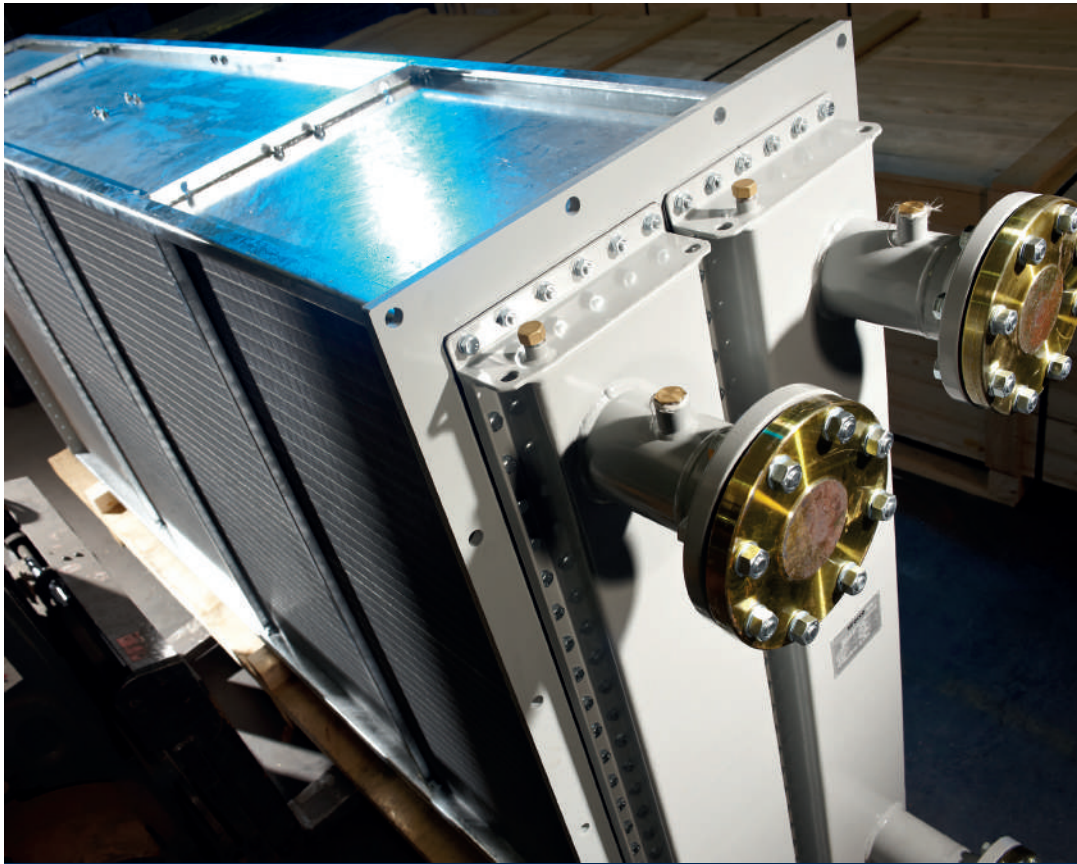
- Spreaders
- Automatic guided vehicles
- Hook lift systems
- Portal arm systems
- Cable installations
- Chain systems
- Container trailers
- Containers

### WASTE COLLECTION SYSTEMS

- Side loaders with various lifting systems:
  - With set-down system
  - In a rigid body variant
- Underground container systems
- Unique screw press for optimum compaction and compression forces





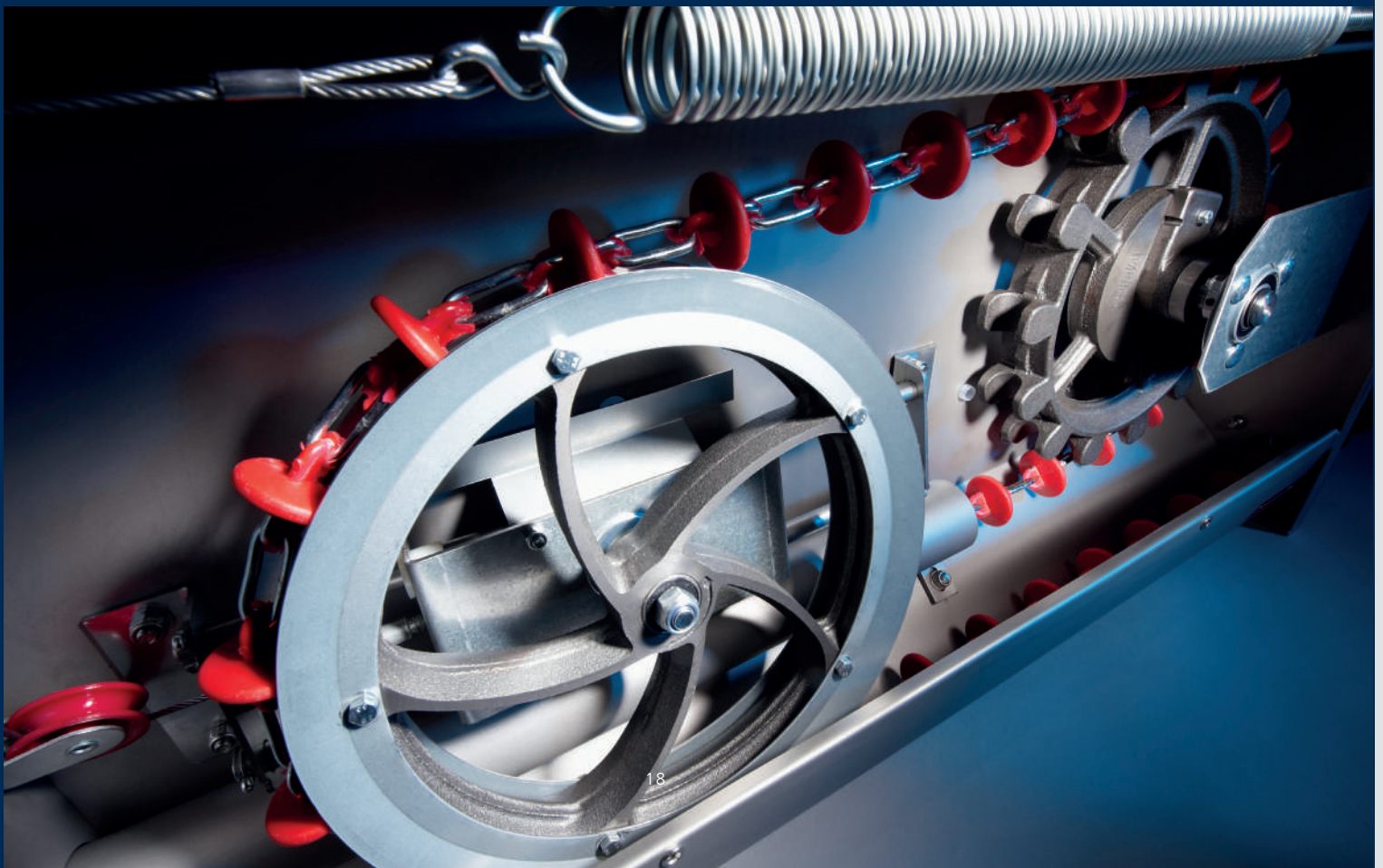


#### HEAT EXCHANGERS

- Customer-specific engineering, design and manufacturing of various types of heat exchangers, pressure vessels, devices and modules
- Market segments:
  - Oil & Gas
  - Petrochemistry
  - Power generation
  - Ship transport
  - Chemical industry
  - Foods

#### SYSTEMS FOR THE AGRICULTURAL SECTOR

- Fully-automated stall systems for the intensive livestock industry
- Engineering and construction of turnkey projects
- Manure drying tunnels
- Drying tunnels for industrial drying







#### SUNBEDS AND CAR ROOF BOXES

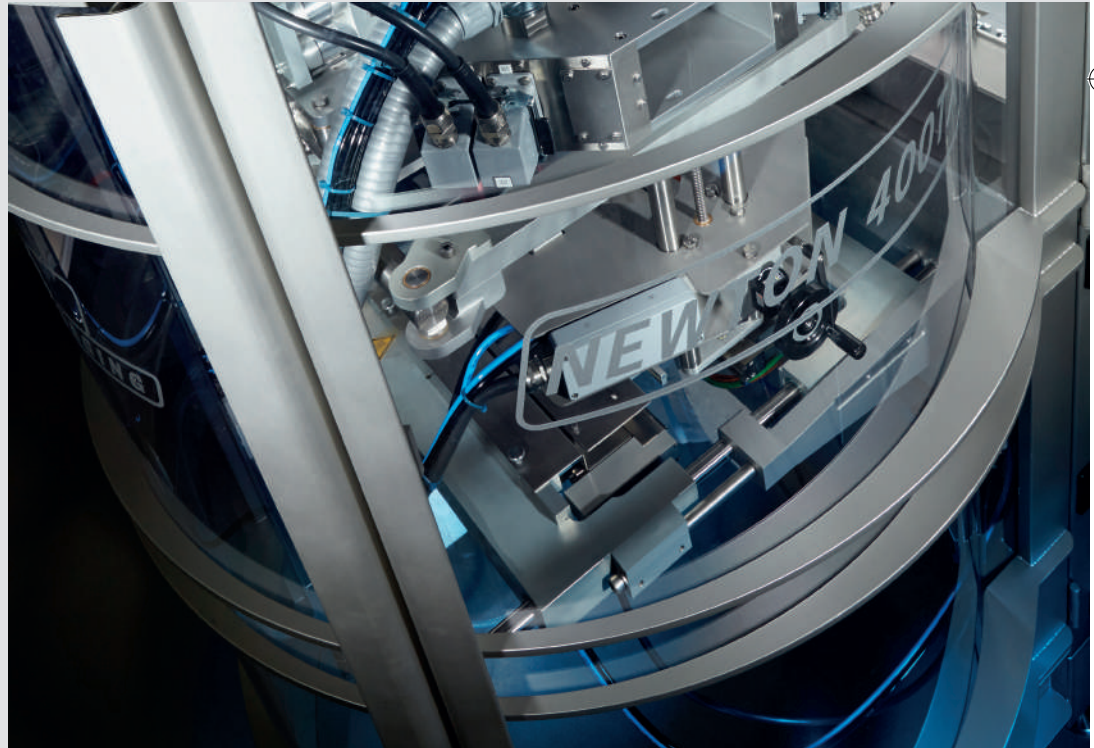
- Sunbeds
- Anti-aging equipment
- Car roof boxes
- Load carriers
- Bicycle carriers
- Water filter systems for swimming pools and ponds

#### EXPLOSION PROTECTION AND BULK HANDLING

- Components for extraction systems, bulk goods handling and pneumatic transport
- Complete systems for explosion and fire protection of industrial processes

#### CIGAR-MAKING AND PACKAGING MACHINES

- Production machines, upgrade kits and revisions for the cigar industry
- Vertical form, fill and seal machines for (among others) the food, snack, cereal, animal feed and detergent industry



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