Competence in **Iron Casting**

*Success through partnership*

Brake disks  Brake drums  Flywheels  Casings

M. BUSCH
It was in 1830 when Michael Busch set up as a blacksmith to make scythes at a site close to our Wehrstapel plant. Thirty years later, a hammer mill and a grey-iron foundry rose on the same site. As early as 1924, the Busch company began developing into a major manufacturer of castings (such as brake drums and drum hubs) for the commercial-vehicle industry.

Surely there is nothing wrong in feeling a little pride in more than 180 years of successful entrepreneurship. In our own self-perception, however, Busch’s corporate history is only one aspect among many. Other fundamental elements include close ties with our location and a deliberate focus on core competences. Added to this is a marked feeling for innovative developments, the ability to translate the wishes of our customers into intelligent solutions, and the art of forming and sustainably cultivating close partnerships. All these features have accompanied our history through the years, and they will not change. Nor will our corporate culture change, characterised as it is by dialogue, responsibility, and mutual respect. So we are looking forward to a future that is marked by a spirit of true partnership, internally as well as externally.

Continuity of values
Investment and qualification

The last few decades bear the hallmark of dynamic development and growing competitive pressure in our industry. Our company met these challenges by investing and adapting flexibly. In exemplary fashion, our employees have been supporting the company in coping with frequently trenchant changes that tested the ‘we-awareness’ of the workforce and the management. On the one hand, this awareness rests on social responsibility, recognition, and in-house human-resources development; on the other, motivation and dependability are regarded as a matter of course. It is really typical that Busch should have implemented the pay framework agreement as early as 2005 and paid all employees under a common pay system ever since.

At present, coping with the effects of demographic developments is our key concern. To this end, we are implementing a forward-looking human-resources policy.

Example 1: Cooperation between factories and schools. The related programme includes short and long-term internships for pupils in parallel to their school education, visits to lessons by trainers and trainees, and even internships for interested teachers.

Example 2: By giving lectures at the Meschede University of Applied Sciences, foundry experts from our company promote the exchange of ideas with professors and students. In addition, we are cultivating close contacts with other universities and technical colleges.

Example 3: We support first-year and undergraduate students of engineering and economics – preferably at Meschede University – through so-called ‘co-op contracts’. Students agree to do hands-on work on special tasks and projects during the holidays, for which they are paid a fixed monthly emolument. To secure the future and optimise the performance of our company, we continuously address foundry-specific questions relating to process and materials engineering as well as moulding-material technology, with a special focus on optimising mould and core-making processes. In these fields, we are enjoying the benefits of close and trustful cooperation with the foundry technology institutes at Duisburg and Düsseldorf.

Team spirit plus technology

Our success is founded on the cultivation of classical virtues like accountability, reliability, and deadline compliance. To this end, we employ a workforce whose strength is based on skills, competence, and team spirit. In addition, systematised workflows, leading-edge production facilities, and automated measuring and inspection methods ensure precision and efficiency in every stage of production. Thanks to this harmonious collaboration between team and technology, every single product made by us precisely conforms to the customer’s wishes.
Progress through partnership

These customers set landmarks

Mutual trust no doubt forms the most important basis for the long-term success of a company. Even after years of cooperation, we keep furnishing evidence of our quality and dependability. We keep a firm hold on our processes. Materials, production, logistics – everything cast from one mould! Moreover, we offer to cooperate with our customers in the development of innovative solutions. This is how we practise partnership! Mutually profitable and thus enduring.

Brake discs and drums
Our range includes brake disks and drums for trailers and commercial vehicles, mainly for the high-volume 22.5”, 19.5”, and 17.5” wheel sizes.

Flywheels
Our product portfolio also includes flywheels for diesel engines.

Transmission casings
In addition, we make grey-iron transmission casings of a size that fits our moulding box.
Our material is cast iron.

We use the entire varied range of options to influence the microstructure of a material so as to adapt it as closely as possible to the end use. To make brake disks, we use a largely pearlitic matrix to which we add suitable alloying elements to adjust the material’s heat resistance so that it remains stable over the widest possible time and temperature range and its wear resistance is adequate in any situation. The outstanding precision of our processes and the fact that our quality remains steady at the highest level are of the greatest importance to our customers. It gives them a good feeling in iffy situations.

The foundry

Technology is a means to an end. The stricter the requirements are, the more accurately it needs to work. Equipped with the latest technology, our melting shop produces materials that are tailored to the needs of our customers. Next to plain grades that conform to DIN EN 1561, our standard portfolio includes about 30 different alloys that exactly meet the requirements specified. The key terms that describe all castings produced by us are quality and durability.

Outstanding results

It’s the matrix that does it!

Basically, the material properties of cast iron with lamellar graphite can be changed in many ways by diverse alloying techniques that are applied under close control during manufacture. The matrix of each casting-alloy variety has its own heat-conductivity properties which critically influence the mechanical properties of the material as well as its tensile, heat, and creep resistance. Moreover, the matrix also has a crucial influence on wear resistance. In practice, each product has its own load profile which determines the weight that is accorded to each specific characteristic. However, the result is always a material that is tailored to fit a customer’s requirements exactly.

The melting shop

The raw materials on which our alloys are based include pig iron, steel scrap, foundry scrap, and recycled material. Coke is used both as a carbon source for the material and as a source of energy for the melting process.

Cupola furnace (Küttner)
- Hot-blast shuttle cupola furnace with oxygen injection (Linde HIGHJET® TDI process)
- Output: 28 t/h

Holding furnaces (ABB)
- Capacity: 1 x 60 t and 1 x 100 t

Electric furnaces
- 2 mains-frequency crucible furnaces, 6 t each (ABB)
- 1 medium-frequency furnace, 8.4 t (ABB)
The Core shop

Cores such as those used in the manufacture of internally-ventilated brake disks are made by the PUR (polyurethane) cold-box process in which a two-component compound (phenol resin and polyisocyanate) is hardened into a rigid polyurethane resin by a gaseous catalyst, DMEA (dimethyl ethylamine).

4 Hottingers
- Total output per shift: c. 2,000 cores
- Core weight: c. 5 – 60 kg

1 Vogel & Schemmann
- Total output per shift: 120 cores
- Core weight: c. 5 – 30 kg

The Moulding shop

The sand we use in making our moulds is a bondable mixture of quartz sand, clay binder (bentonite), coal/graphite dust, and water.

HWS EFA
- Cycle time: 30 s = 120 boxes/h
- Optimum casting weight: 170 kg
- Maximum casting weight: c. 220 kg, with extended pouring time

HWS ACE
- Cycle time: 12 s = 300 boxes/h
- Optimum casting weight: 50 kg
- Maximum casting weight: c. 90 kg

1 Otto Junker pouring furnace
- Capacity: 8 t
- Usable capacity: 6 t
**MACHINING**

Systems of **substance**

**Machining**

To turn our castings into products that are ready for installation, we use modern, fully-automated production lines. Flexible concepts enable us to respond to our customers’ wishes. To us, meeting the most stringent quality demands comes naturally.

- **Brake disks**
  - Chained pick-up CNC units complete all machining operations on brake disks for commercial vehicles.

- **Brake drums**
  - Vertical CNC machines for turning commercial-vehicle brake drums.
  - Maximum pitch: 630 mm

- **Flywheels**
  - Production lines to complete all machining operations on flywheels.
  - Maximum pitch: 570 mm

**How to do better**

**The journey is the reward**

The outstanding quality of our components helps us to pass even difficult routes and stony paths with splendid success. Wherever there is a need to adapt to changing requirements, we act as competent consultants to our customers, supporting the development of a product with our knowhow from its conception. Flexibility and innovative strength guarantee our joint success.

**Tough under stress**

To the economy at large, a great deal depends on transport vehicles reaching their destination safely and on time. Our components greatly help to make sure that this is so. Thoroughly planned workflows on automated systems ensure top precision, maximum stability, and optimum functionality.

**Quality**

Our quality management consistently ensures that our customers receive the top-quality products to which they are entitled. The system’s toolkit includes internal audits, machine capability studies, and process analyses by FMEA and other methods. Continuous workflow optimisation is assured by regular evaluations of statistical data. Effectiveness is documented by the positive results of recertification and monitoring audits that have been conducted continuously since 1992 by the Lloyd’s Register Quality Assurance (LRQA) as well as by our customers.

Quality management certifications:
- DIN EN ISO 9001
- ISO/TS 16949

**Development**

Frequently, advanced production processes developed in-house go beyond the state of the art, enabling us to meet our customers’ individual requirements exactly. Potential approaches emerge from our continuous dialogue with research institutes and users of our products. As braking is a ‘hot affair’, the most important matter is to qualify cast iron with lamellar graphite for high-temperature applications. Flywheels are another matter altogether, for in this case the focus is on high mechanical strength.
Responsibility for man and nature

Change requires action

No company is an island. In the long run, it can be successful only if its actions are based on a consensus with society, its goals, and its interests. Given that change is continuous, this is a challenge we are convinced we should meet. In concrete terms, this means that Busch invests not only in quality assurance and product development but also, and just as zealously, in the development of human resources and measures to secure jobs and protect the environment.

Energy recovery

Our CO₂ emissions shrank markedly when we applied modern technical methods. Thus, we use the waste heat generated by our cupola furnaces to supply heat for foundry processes, our buildings, and even our industrial water. To further optimise heat utilisation we employ oxygen injection (TDI method). In this way, we were able to markedly reduce the specific amount of coke consumed in the production of liquid iron.

Corporate IT from a single mould

For an innovative enterprise like Busch it is almost natural that leading-edge information technologies should be used and all corporate divisions should be networked. Our flexible EP/PPS system covers all relevant departments. Developed in cooperation with a software manufacturer to meet our needs, a special foundry module has been integrated to ensure that processes and inventories are monitored one hundred per cent at each production stage.

Process transparence

Everything safely in place

In the long history of our company, we find numerous instances of innovative development opportunities being identified early and used consistently. One of the most recent cases in point is a project entitled ‘RFID for small and medium-sized enterprises’, which is part of the electronic business network initiative of the Federal Ministry of Economics. Busch was one of the first companies in Germany to introduce the progressive RFID technology in order to optimise its warehousing system, sustainably improving the storage and management of goods.

Automating the storage and retrieval process keeps goods from being misplaced and ensures that work within the plant can proceed smoothly. As all goods are always stored where they are supposed to be, warehouse operations take considerably less time. Moreover, an automated online booking system and user interfaces in the fork-lift trucks improve coordination within the warehouse. This holds true even if goods are parked under the open sky, exposed to the elements. Even in such cases, warehouse data remain 100 per cent readable.

In harmony with the environment

We at Busch think that the first thing in environmental protection is to protect people living in the vicinity of our production facilities from noise and exhaust gases. This works because we take environmental aspects into consideration in the planning stage, ensure conformance with emission standards for residential areas close to our foundry, and keep optimising our noise abatement methods. We also comply with internal and external obligations by efficiently using energy and raw materials and avoiding waste as far as possible. Needless to say, we submit our results to objective and expert inspection by neutral institutions. This certificate, too, is provided by the LRQA.

ISO 14001 Certificate

The river Ruhr – right next to our Wehrstapel plant