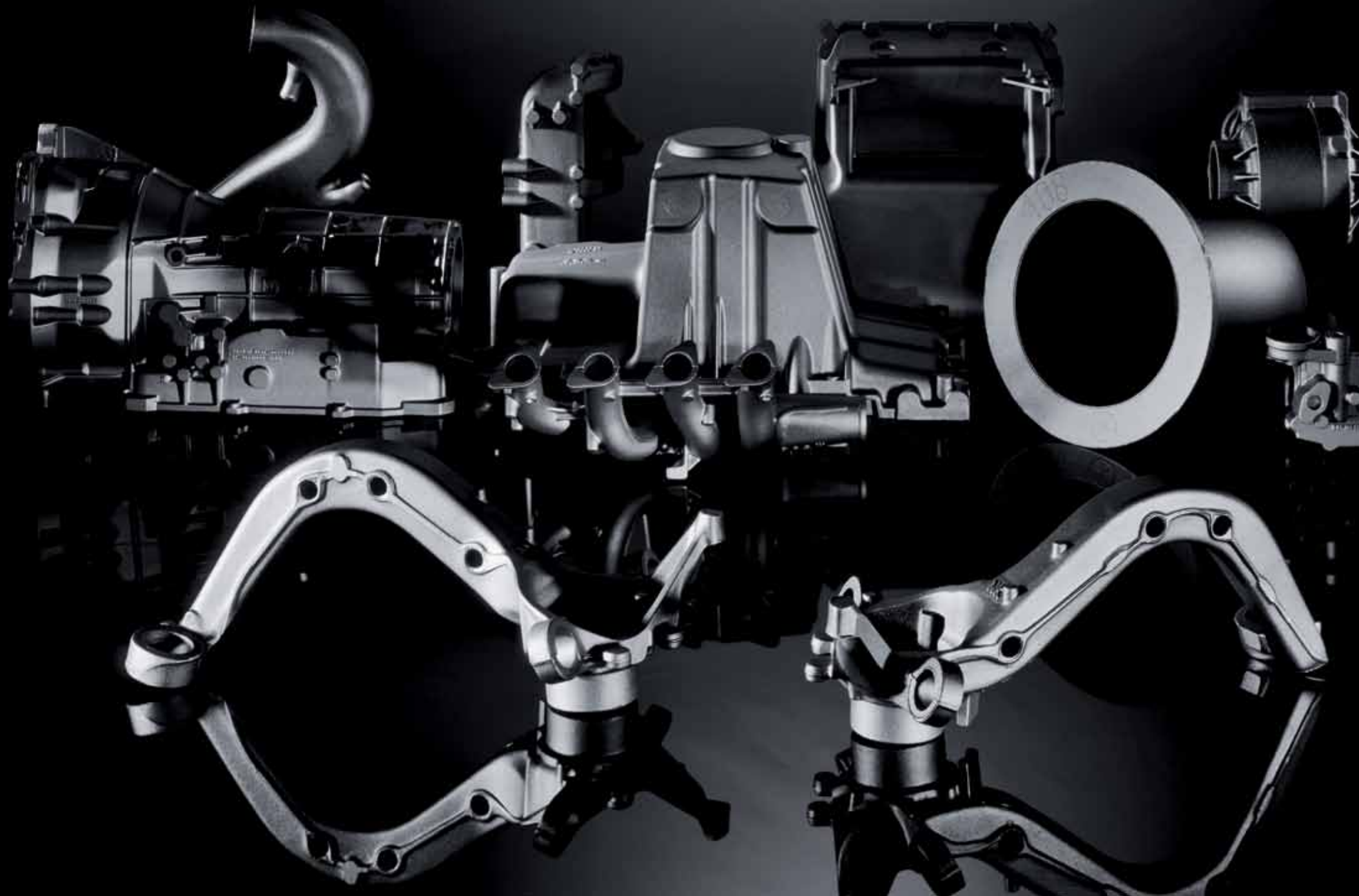




Surface preparation



wheelabrator
shaping industry

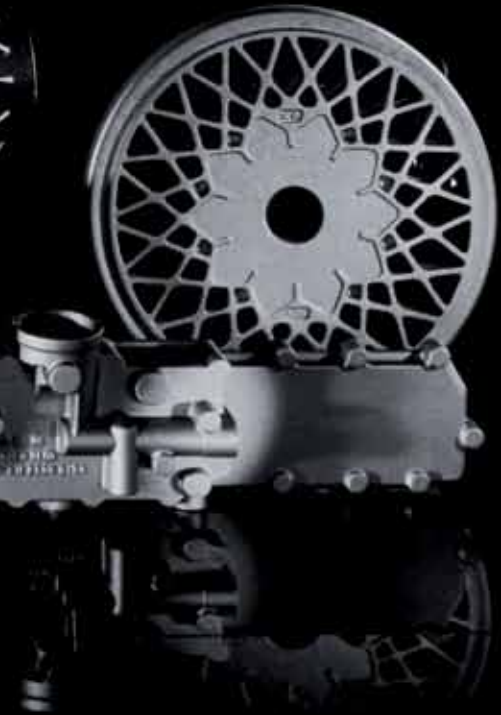


Surface technology for foundries and forges

Foundries and Forges must embrace new technology and production processes in order to meet today's ever stringent economical and ecological demands. Under the pressure of rising costs facilities are introducing automation; and ecological concerns, such as energy usage, raw material sourcing, waste disposal and environmental protection are becoming more important. Components must be lighter yet stronger, more precise yet less expensive, production processes must be traceable and reliable at all times.

Wheelabrator is your partner for change, and can help to introduce new equipment and processes, or upgrade existing plant to include the latest technological advances to optimise your operation. Wheelabrator puts ground-breaking solutions into practice for the treatment of metal surfaces in foundries and forges to offer long-term investment security.

This brochure focuses on surface preparation solutions. For other foundry equipment (moulding, sand and core technology) please contact our sister company DISA. Together, we can provide the complete foundry solution to lower your cost per casting.



Sustainability and Innovation



Wheelabrator is the world's leading supplier of solutions for cleaning, descaling and strengthening (shot peening) exterior and interior surfaces of workpieces by wheel or compressed air shot blasting in foundries and forges.

Our products range from standardised, stand-alone machines to fully automatic heavy-duty plant tailored to customer-specific applications.

Wheelabrator is committed to the reduction of production costs and to an environmentally responsible workplace by supplying systems covering a wide and comprehensive range of manufacturing processes to relieve physical strain on operators and reduce emissions (temperature and dust).

Individual processes (such as moulding or fettling) must be monitored, and the modern foundry will also measure how these processes interconnect with materials handling and storage to make cost savings.

To meet these needs Wheelabrator shot blast systems are designed to provide:

- Adequate linkage of process sequences and improved production consistency
- Reduction or elimination of manual workpiece handling
- Reduction or removal of part-on-part contact
- Short transport distances and the reduction of floor space
- Increased productivity and improved correlation between production cost and machine performance
- Consistent product quality

Prepared for innovation

New ideas and technological advances are essential to continued success. This was true more than 100 years ago when the first blast wheel was developed by Wheelabrator Group, and applies today more than ever.

Focused improvement constitutes the core of our efforts, and this is why Wheelabrator continues to lead the field in state-of-the-art shot blast technology.

With close cooperation between customer and supplier, and between Wheelabrator's five Technology Centres, our wealth of experience is exploited, concepts are optimised and developed into innovative approaches to provide the user with the best solution for his application, offering additional benefits and measurable advantages.



Globally present - locally anchored

Time is money and you expect Wheelabrator to be available at any time and place. Close customer relations are of great importance when it comes to realising projects and to providing services.

Our internationally-based Technology Centres and Manufacturing Centres design and manufacture machine solutions to suit local needs and budgets.

Our international network of offices and service partners on all five continents ensures faster communication, personal assistance and rapid and direct help in emergencies. We speak your language and are familiar with local situations.



Shot blast technology



The term 'shot blast technology' covers a process in which a focused stream of media (abrasive) is propelled onto the surface of a workpiece at high speed. It is the energy released in this process that achieves the desired cleaning effect.

Shot blast technology is used in almost every branch of metal-working, including the aerospace, automotive, construction, foundry, railway and shipbuilding industries amongst many others. In these fields, different shot blast technologies are applied using blast wheels and/or compressed air, individually or in combination. The treatment of engine castings is a classic example of a combined wheel and air blast application.

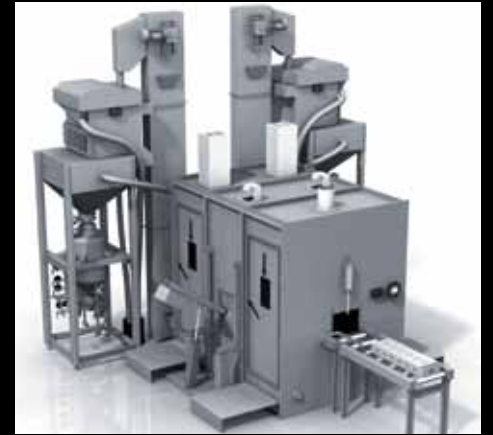
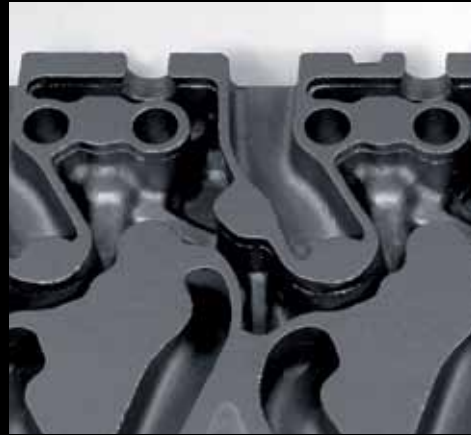
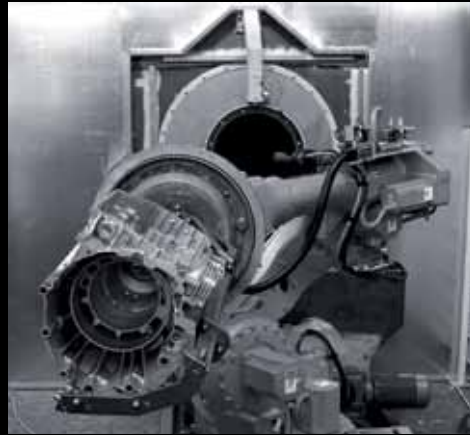
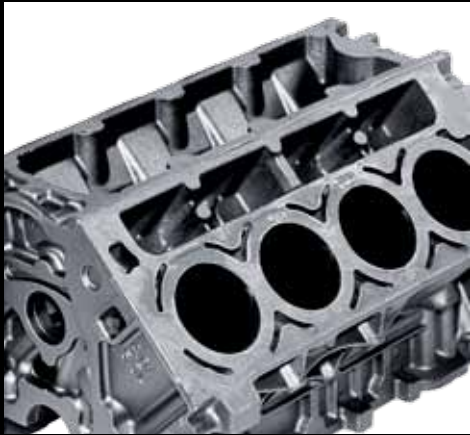
Wheel- or airless shot blasting

Wheelblasting directly converts electric motor energy into kinetic abrasive energy by rotating a turbine wheel. The capacity of each wheel ranges from approximately 60kg per minute up to 1200kg per minute. With these amounts of accelerated abrasive, wheelblast machines are used where big parts or large areas of parts require the removal of sand, scale, burrs or rust, or a different form of finishing.

Typical characteristics of wheel blast systems:

- High capacity, high shot blast efficiency
- Simple technology
- Moderate energy consumption



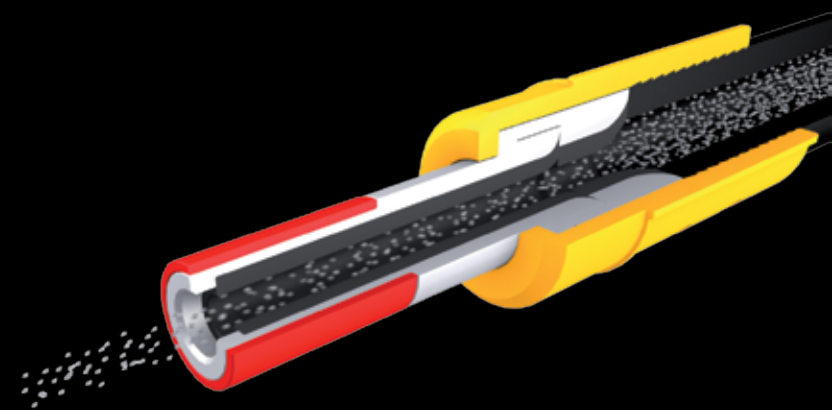


Compressed air shot blasting

Airblast machines take the form of a blastroom or a blast cabinet. The blast media is pneumatically accelerated by compressed air and projected by nozzles onto the component. In both air and wet blasting (a similar process but with the introduction of water into the blast stream) the blast nozzles can be installed in fixed positions or operated manually or by automatic nozzle manipulators or robots.

Among the essential characteristics are:

- Precise abrasive impingement
- Precise focusing of the shot blast stream on defined portions of the workpiece
- Treatment of workpiece sections and interiors that are difficult to reach
- Different shot blast intensities on the same workpiece
- Uniform shot blast intensities in different workpiece sections



Airblast nozzle

Delivering the right solution

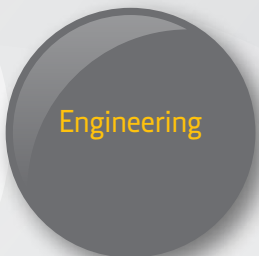


Wheelabrator offers a complete range of modern shot blast technology, from simple, table-type machines to integrated, continuous production lines and sophisticated concepts for the handling and transportation of workpieces. Also included are shot blast systems for descaling and surface hardening (shot peening). Together with application-oriented new developments, Wheelabrator Group offers a competitive range of systems for the treatment of castings or forgings of the most diverse sizes and designs.

Whatever your specific requirement, Wheelabrator has the competence and capability to offer and implement the right solution to deliver maximum benefit to you.

The range of products includes:

- Batch-type shot blast systems (table- and tumblast systems)
- Hanger-type shot blast systems
- Continuous throughfeed shot blast systems
- Robot/manipulator-type shot blast systems
- Air blast solutions
- Special machines
- Systems engineering, automation, dust collection
- Control system technology, state-of-the-art software, remote diagnostics



Engineering

- Concept (basic / detail concept)
- Feasibility / economy
- Blast trials / field tests
- Application engineering



Plant and automation technology

- Robotic
- Automatic handling
- Integrated systems



Process technology (Wheel / Air)

Batch-type shot blast machines	Hanger-type shot blast machines	Special machines
Continuous throughfeed shot blast machines	Robot-/ Manipulator-type shot blast machines	Air blast solutions



Control technology

- Design
- Realisation
- Integration in superior control systems
- Operation and maintenance training



Parts and services EMP projects

- Spare parts services / kits
- Service and maintenance contracts
- Equipment modernisation projects
- Plant optimisation, training (maintenance)



Remote support

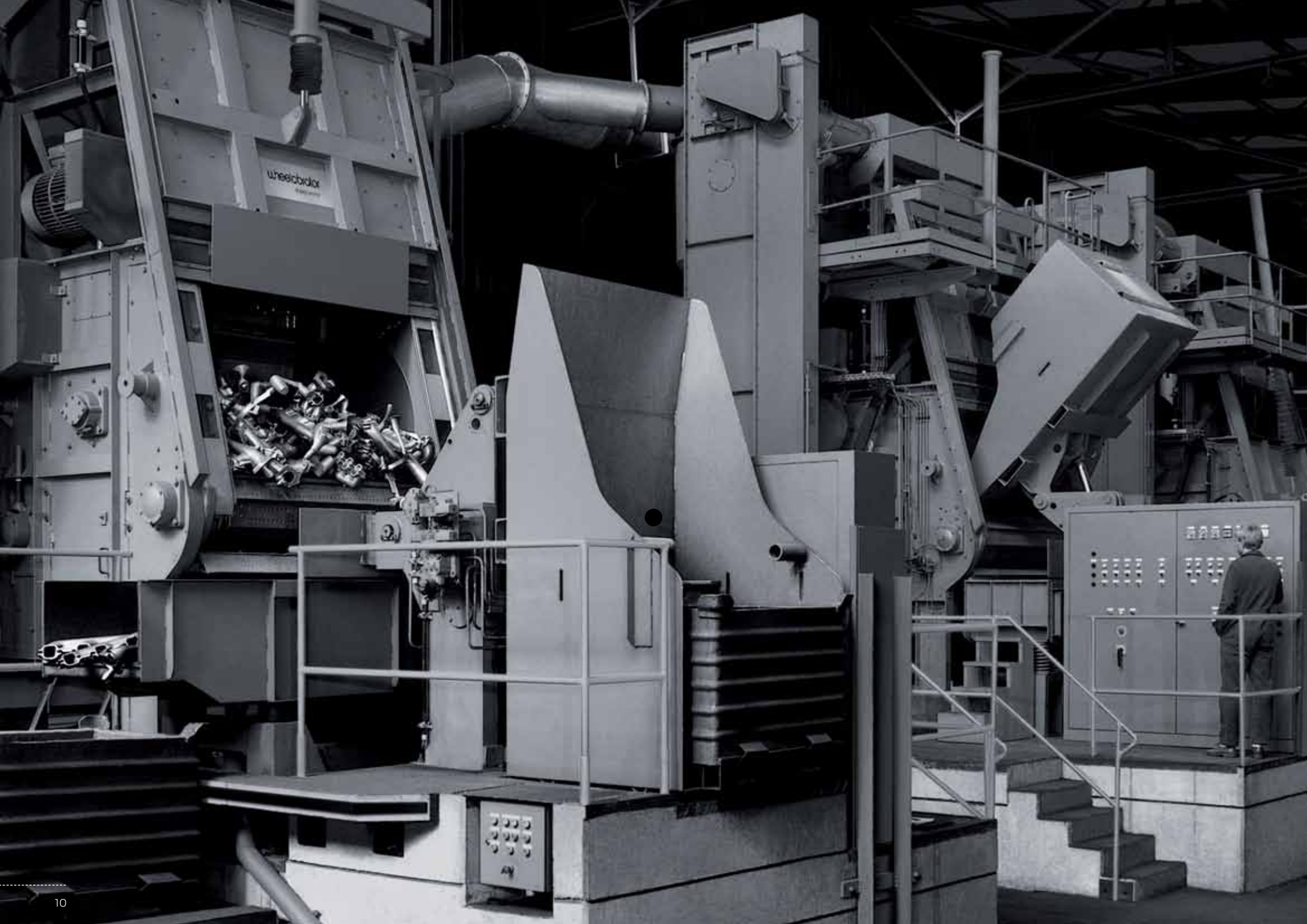
- 24 h Support
- Remote diagnostics
- Trouble shooting



Site assembly commissioning

- Planning, organisation
- Installation and installation supervision
- Commissioning
- Training





Batch-type shot blast machines



Rotary table machines: High flexibility, long proven technology

Turntable and satellite turntable shot blast machines are suitable for processing small and medium batches of workpieces including thin-walled and fragile parts. Wheelblast technology and compressed air shot blasting can be employed separately or in combination: even workpieces of complicated geometry and internal areas can be treated to a consistently high standard.

The wide range of equipment and the use of robots or handling units for the loading and unloading of workpieces facilitate integration of these machines into existing manual and automatic processes. With well known reliability, longevity and progressive engineering, Wheelabrator rotary tables represent unequalled quality and blasting efficiency.

Tumblast systems: the cost-effective solution for tumble-proof parts

Tumblast and polygon-drum systems are available with a range of shot blast and workpiece handling technologies. The compact design, the proven operating principle, high cleaning capacity and the gentle tumbling of parts are among the essential advantages of a tumblast system, as well as the complete exposure of all surfaces to the blasting stream. Solutions for desanding castings and for descaling forgings or heat-treated workpieces include machines for batch-weights of up to 5,500 kg, in various designs, with steel or rubber conveyors.

Polygon drum-type machines allow for intensive and gentle shot blasting at high capacity in a polygon-shaped trough rocking back and forth. Automatic loading and unloading provides an almost continuous process with consistent high performance.



Heavy duty installation with automatic loading / unloading system



Tumblast machine

Hanger-type shot blast systems



Accomplishing cleaning and transport tasks at the same time

Hanger-type shot blast machines (also known as overhead monorail shot blast machines) are very versatile and are therefore used in many different fields. Typical applications include the removal of sand and cores from safety parts (tracking), cleaning castings susceptible to impact damage, and descaling and reconditioning of workpieces in the metal-working industry.

Treatment of the workpiece can either be discontinuous in reverse operation or continuous in throughfeed operation.

The transportation of workpieces suspended on hangers offers many possibilities for optimum material flow, achieving shot blasting tasks smoothly in harmony with the overall system.

Spinner hanger shot blast machines: Universal applications

Spinner hanger blast cleaning machines with two or three chambers are applied for surface treatment and deburring of aluminum parts, descaling of forgings, and sand removal from castings, especially for those workpieces which are not suitable for tumbling because of their shape or size. Several models are available with load capacities of up to 600 kg per hook.

For automating operational sequences or integrating a shot blast machine in continuous production lines, loading and unloading can be performed without operator assistance. In this case, an industrial robot is used which also serves to link individual manufacturing cells.

Monorail shot blast systems: Numerous layout and output options

Wheelabrator overhead monorail blast cleaning systems include a number of heavy duty variations for different production areas, e.g. foundries and forging operations. Hanger-type blast cleaning machines offer ideal conditions for effective and economical blast cleaning of components, from small to large workpieces.

The basic series comprises machine modules of different sizes equipped with 2 to 24 blast wheels. Depending on the dimensions of the parts to be cleaned and the output required, it is possible to connect several machine modules in series. The concept covers machines for reversible or for through-feed operation. For processing large parts, inlet and outlet vestibules can be provided.

Individual solutions for handling the “Extraordinary”

Wheelabrator offers special custom-designed wheel and air blast solutions for desanding and descaling large and heavy workpieces.

Hanger variants include: manual, chain conveyor and motor-driven automatic hangers with a load capacity of 2,000 to 80,000 kg.

Bogie table machines use specially designed work cars with varying speed to transport heavy or large workpieces into the blast chamber.



Spinner hanger shot blast machine



Transport of workpieces on monorail



Blast house for a 80 tonne diesel engine block

Throughfeed systems



Continuous material flow with consistent blasting performance

With their clearly arranged and space-saving designs, throughfeed systems provide smooth work flow and short transport distances without intermediate storage of the parts or operator interaction, and can therefore offer the potential to reduce operating costs.

Throughfeed systems are designed to cope with product flows of changing volumes and automatically adapt to different throughputs. They are ideally suited to integration in fully automatic plants starting at the moulding line and culminating in the finished and clean castings.



Automatic production from moulding to blast cleaning



DT 20 throughfeed machine



Wire-mesh shot blast machine



Process-safe blasting of single parts



CT shot blast machine

Continuous, fully automatic throughfeed shot blast systems

CT Throughfeed tumblast systems are equipped with an endless apron conveyor and between 2 and 6 blast wheels.

DT Throughfeed rocker barrel machines use a polygonal drum to receive the workpieces, and have 4 to 10 blast wheels.

Both machine versions are used for continuous desanding and decoring of tumble proof castings and for descaling of cast or forged parts. The extensive machine range includes models for throughput capacities up to 30 t/h. They are ideally suited for automatic production from the moulding line to the finishing department, removing the need for operators to handle the workpieces. The installation can be run without operator attendance and only requires periodic inspection.

Wire-mesh shot blast machines: Continuous blasting of fragile parts

Process-safe shot blasting of thin-walled and fragile parts without any deformation is achievable in throughfeed operation with wire mesh shot blast machines. The blast wheels are arranged above and below the wire-mesh belt to clean the workpieces as they pass through. The machines are typically fitted with 4 to 8 blast wheels.

Inclined belt conveyor shot blast systems: No part on part contact

Process-safe, shock and impact-free blast cleaning of single, rotation-symmetric parts (brake discs and drums, rims, etc.) is easily achieved on the Wheelabrator Inclined Belt Conveyor (IBC) shot blast system. This machine ensures consistent and uniform exposure of the workpiece under the blast stream, and is ideal for high quality blasting of lighter parts that would be damaged in a tumblast system. This machine type employs 6 to 14 blast wheels, and is suitable for part weights from 5 to 75 kg.

The IBC machine has enabled many automotive parts producers to benefit from quality improvements and cost savings by protecting sensitive metallic parts while increasing productivity.



DS 1 Manipulator machine



Loading of cylinder heads on DS 5



Robot gripper machine

Manipulator-type shot blast systems



Automatic and flexible blast cleaning

Manipulator-type and robot blast systems are highly efficient and stand out for their excellent blast cleaning results. Even difficult to access interior surfaces are properly cleaned without the accumulation of abrasive. Often used in the production of vehicle and engine components, these highly flexible machines offer a wide range of programmable options to achieve different cleaning and shot peening applications.

Robot gripper machine

Robot gripper systems are suitable for wheel and compressed air shot blasting. The Robot gripper receives the workpiece and moves it into the blast chamber (in front of the blast wheels or blast nozzles). Loading and unloading are automatic.

Robot/manipulator machine

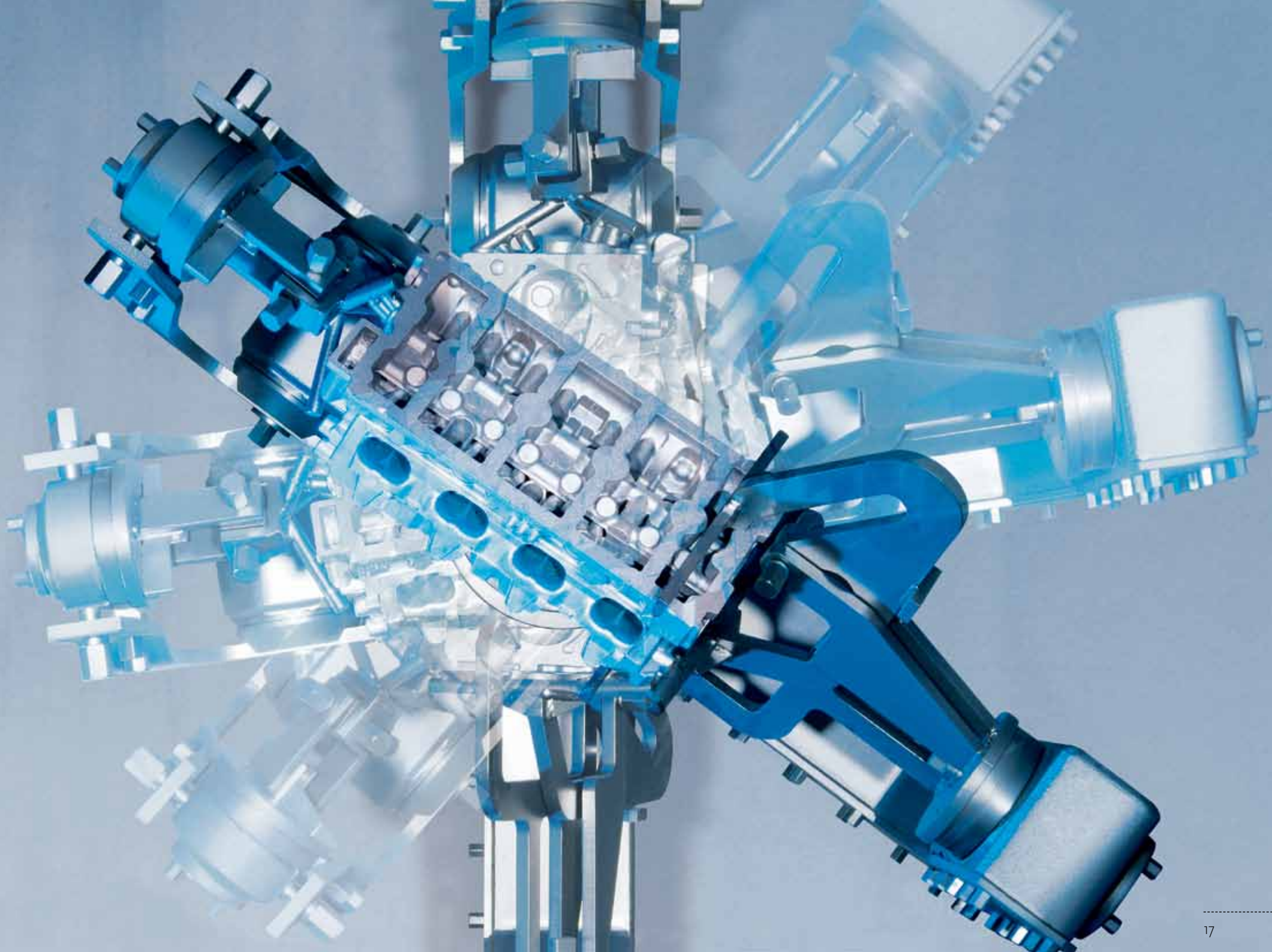
These machines work in combination with an industrial robot capable of operating one or two shot blast cells. They are especially suitable for shot blasting workpieces of light metal or magnesium alloys and have an internal manipulator to move the workpieces in the blast stream.

DS and DV Manipulator shot blast systems

Manipulator shot blast systems are capable of handling components of different shapes and sizes without the need for re-tooling. These systems deliver outstanding performance due to their high process capacity and excellent cleaning efficiency. The basic DS and DV machine models and modular design provide the flexibility necessary to cover a wide range of requirements regarding output, floor space and material handling arrangement.

Manipulator shot blast systems can be fitted with rotating support shafts or with flexible manipulator grippers to pick up the workpieces and transport them through the shot blast machine. The gripper tools automatically adapt to the shape of the workpiece and are able to accommodate one or more parts measuring between 80 and 650 mm in height.

A loading device or an industrial robot places the uncleaned workpieces on support shafts or in the manipulator where they are firmly held. Fully automatic shot blast systems can be equipped with sensors for part identification and workpiece-specific control of the blast parameters (blast time, shot quantity, throwing speed, workpiece movement during blasting, number of activated blast wheels, shot removal time, etc.). The selective placement of the workpieces ensures optimal and continuous exposure to the blast stream, whilst delivering the best shot energy efficiency and minimal wear of machine parts.

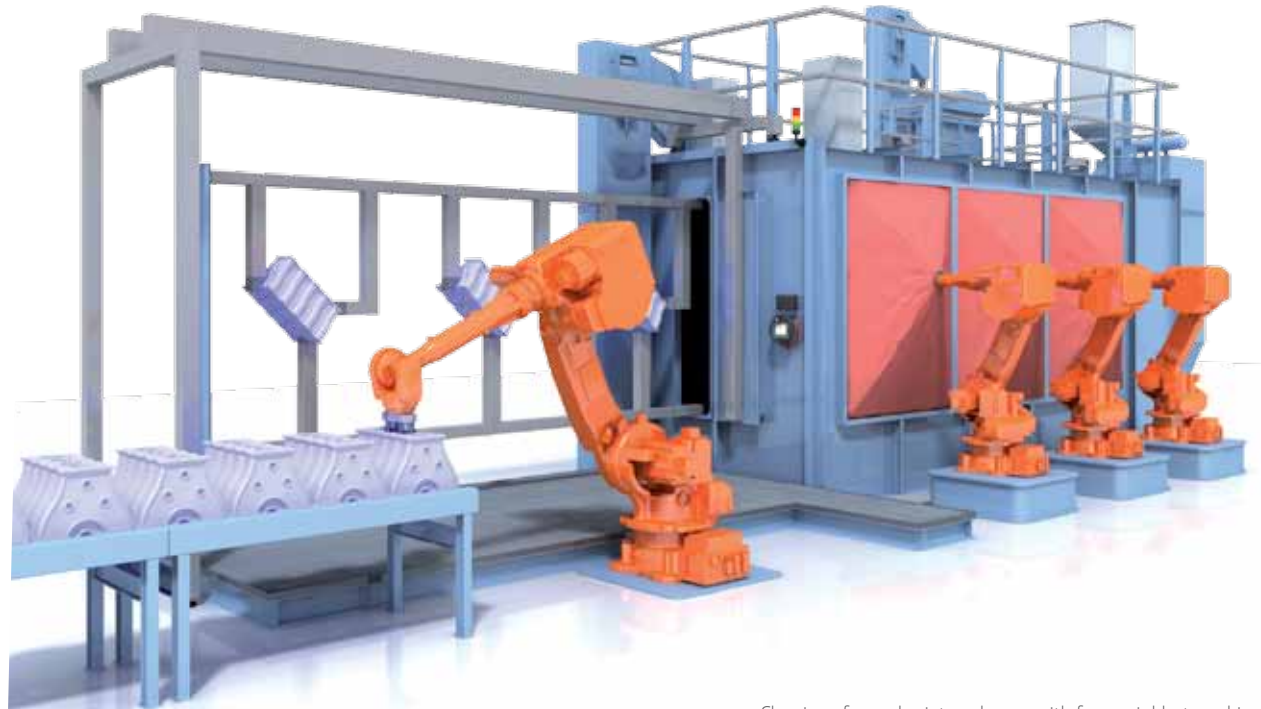


Compressed air shot blast systems



Flexible, focused and effective blast cleaning

Compressed-air shot blast systems are used for focused blast cleaning of defined surfaces or interior areas. In modern engine production, compressed-air systems are combined with wheel blast systems to economically meet complex parameters and precise requirements. The large variety of abrasives suitable for compressed-air shot blast systems ensures that each application can be treated in the best possible way. Targeted, process-safe blast cleaning increases product quality. Reduced process times improve efficiency, and individual requirements can be perfectly met by the modular construction concepts.



Cleaning of complex internal areas with frame air blast machine



Rotary table machine



Module8 Turntable machine



Finishing cell with Robot Gripper



Inside blasting of crankcases

Programme overview

The range of equipment offered extends from simple air blast cabinets to customised heavy duty systems capable of cleaning oil passages and water channels in engine blocks and cylinder heads. The comprehensive experience gathered from our global technology centres for air blast systems has created a pool of expertise in this field of application that is difficult to match. We are continually developing shot blast processes to bring you innovative plant concepts and improved machine performance to meet and exceed your expectations.

The following systems are designed for foundries or forges:

Table and satellite table machines

Table or satellite table air blast systems with one fixed table or several satellite tables are used for the most diverse workpieces. Systems with swing-in turntables placed at the front of the blast cabin are space-saving and allow for short process times. Load capacity up to 5,000 kg.

Frame machines

Frame systems are extremely flexible and ideal for complex parts on which specific areas - distributed over the whole workpiece - need to be treated. Robots manipulate the air blast nozzles, and the number and position of robots will depend on the production requirements. The size and number of

transport frames can be adapted to suit the type of workpiece to be treated and the throughput required to offer maximum flexibility. Exact positioning of the transport frames in the loading / unloading area allows for material handling by robots. The use of two transport frames will significantly reduce production times as one frame can be unloaded and re-loaded whilst the other frame is in the blast cabinet.

Advanced Internal Cleaning (AIC) systems

AIC systems are designed for shot blasting passages, oil chambers and cooling media channels of cylinder heads, crank cases and similarly complex parts. The number and position of the nozzles (fixed or adaptable) are set to individual production requirements (workpiece geometry, throughput, etc.).

After blast cleaning, compressed air or forced shake-out is used for complete removal of the abrasive from the workpieces.

High capacity solutions

Customised solutions are tailored to fit specific production requirements (workpiece complexity, process performance, time/energy efficiency) for the decoring of interiors of engine blocks or cylinder heads produced in large series. Robots take the components to the nozzle bars of the systems and position them for targeted blasting. Then the abrasive feed is interrupted to blow out the workpiece interior after treatment. Blasting pressure is automatically controlled following the programme. Workpiece handling can be integrated in plants in conjunction with wheel blast systems.

Special solutions

Wheelabrator is revered worldwide for its customised solutions for the surface treatment of workpieces.

Whatever solution is the perfect fit for your needs and will bring you the best return on investment, Wheelabrator has it or has the competence, know-how and skills to develop it. This makes Wheelabrator the reference point in the industry.

Five technology centres worldwide design and deliver solutions to the most diverse industry sectors. Each Technology Centre employs highly qualified engineers dedicated to specific areas of excellence. They work out concepts for systems tailored to the customer's needs. Wheelabrator has been implementing customised solutions for compressed air blasting and wheel blasting for more than 100 years. With its experience and knowledge, Wheelabrator is second to none in this field.

More than 15,000 active customers in nearly 100 countries, and a huge number of plants in operation attest to Wheelabrator's ability to meet any technological challenge.

Solutions go beyond blast technology and often include automatic material handling, loading and unloading, as well as planning smooth integration into existing production processes.

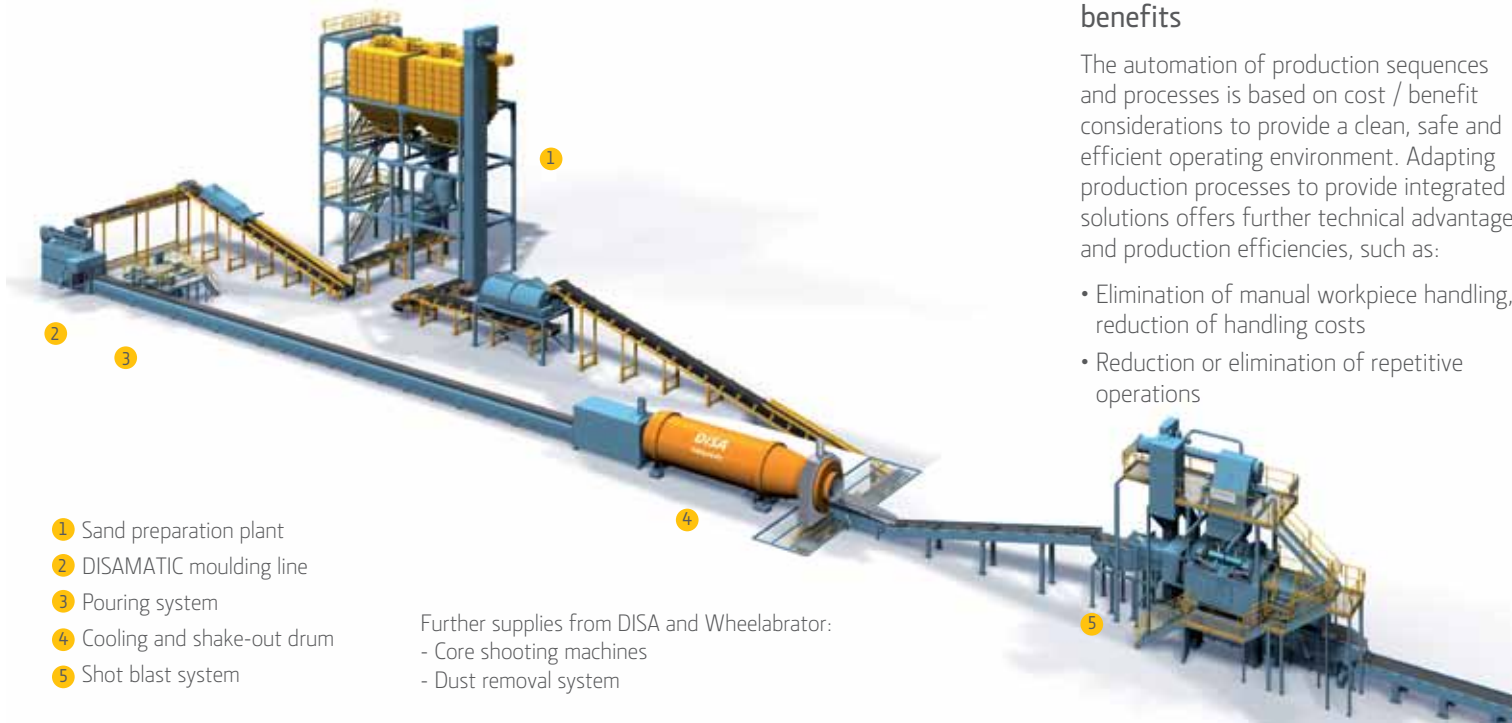


Blast cleaning (sand removal) of compressor housing



Fully automatic shot peening of more than 600 crank shafts / h on DS machine

Handling and automation



- 1 Sand preparation plant
- 2 DISAMATIC moulding line
- 3 Pouring system
- 4 Cooling and shake-out drum
- 5 Shot blast system

Further supplies from DISA and Wheelabrator:
- Core shooting machines
- Dust removal system

Integrated solutions create additional benefits

The automation of production sequences and processes is based on cost / benefit considerations to provide a clean, safe and efficient operating environment. Adapting production processes to provide integrated solutions offers further technical advantages and production efficiencies, such as:

- Elimination of manual workpiece handling, reduction of handling costs
- Reduction or elimination of repetitive operations

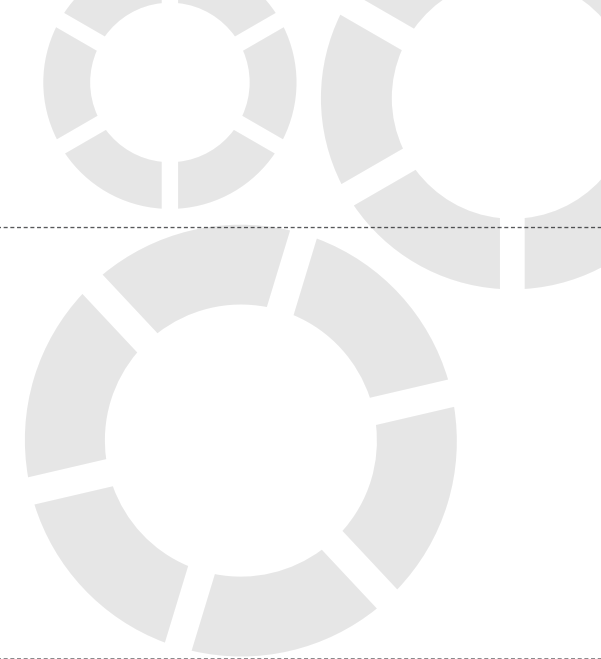
- Reduction of the risk of accidents, elimination of attendants' fluctuations (a robot is at its workplace every Monday without fail)
- Shorter amortisation periods, additional benefits thanks to reduced downtime and easier maintenance

Wheelabrator offers much more than the automation of processes. As a solutions-provider we can combine complementary manufacturing tasks (e.g. moulding/finishing) and realise complete foundry installations. Interface risks are eliminated, the customer can concentrate on the manufacture of his products.

The automation of operation sequences increases productivity and economic efficiency, emissions are prevented or reduced, and manufacturing and logistics sequences are improved. This produces a humane, safe and efficient workplace.



About Wheelabrator Plus



Wheelabrator Plus offers the largest aftermarket replacement parts supply, service and technical support for the surface preparation industry globally.

With the capability of maintaining and upgrading surface preparation equipment from both Wheelabrator and most other brands within the industry, Wheelabrator Plus continually strives to help you to profitably meet or even exceed your customer's requirements.

Focused entirely on providing a customer friendly solution that is affordable and profitable for you, the Wheelabrator Plus team offers a whole range of services for all users of surface preparation equipment, no matter how big or small.

Our extensive range of services includes:

Replacement wear parts

- We have the technical expertise and

knowledge to provide a wide range of replacement wear parts for Wheelabrator and non Wheelabrator blast equipment.

- We strive to deliver the highest quality of both replacement parts and service, in the shortest time frame at the most competitive prices.
- The ASTRAL collection is the range of replacement wear parts for non Wheelabrator blast equipment available from Wheelabrator Plus. Visit our website for a complete list of non-Wheelabrator technologies for which we supply parts: www.wheelabratorplus.com/astral

Maintenance and service

- Wheelabrator Plus provides equipment service and maintenance packages tailored to your specific needs to ensure you experience minimum downtime and maximum productivity.

Equipment modernisation and upgrades

- Our equipment modernisation programmes enable you to upgrade your current shot blast equipment, providing you with all the advantages of a new machine at a lower investment.
- By utilising the latest developments in technology we aim to improve your productivity and thereby reduce the cost of each part you produce.
- If you are planning to relocate equipment, Wheelabrator Plus can safely and quickly move, reassemble and recommission your shot blast surface preparation equipment to its new location, reducing your downtime and ensuring that you are back in production as quickly as possible.

Training

- Training can be provided for your convenience on-site or at one of our technology centres. Training programmes help participants understand the principles and interrelationships of blast surface preparation equipment components, how to apply appropriate preventative maintenance practices and learn how to increase productivity whilst controlling costs.
- Run by our technology specialists, training programmes allow Wheelabrator Plus to communicate our wealth of technical knowledge and experience to you and your staff.

For more information visit www.wheelabratorplus.com or contact us www.wheelabratorgroup.com/contact

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