Contact

China
Wheelabrator Group Ltd.
Room A901-903, Far East International Plaza
No.319 Xian Xia Road
Shanghai 200051 – PR China
T: +86 21 6113 1777
F: +86 21 6113 1788
E: info-china@noricangroup.com

Wheelabrator Group Ltd.
Unit 03, 11th Floor., Futura Plaza,
111-113 How Ming Street,
Kwun Tong, Kowloon, Hong Kong SAR
T: +852 2827 1927
F: +852 2877 6839
E: info-china@noricangroup.com

Canada
Wheelabrator Group (Technology Centre)
1219 Corporate Drive
Burlington, Ontario L7L 5V5
T: +1 (800) 845 8508 • T: +1 (905) 319 7930
F: +1 (905) 319 7561
E: info@wheelabratorgroup.com

Czech Republic & Slovakia
Wheelabrator Czech s.r.o.
Za Balonkou 269
CZ-260 01 Příbram 1
T: +420 318 479 111
F: +420 318 479 333
E: pribram@wheelabratorgroup.com

France
Wheelabrator Group
28-30 Rue de Tournenfils, BP 19
91541 Mennecy-Cedex
T: +33 (0) 1 64 57 21 21
F: +33 (0) 1 64 57 05 59
E: contact.fr@wheelabratorgroup.com

Wheelabrator Group (Technology Centre)
24, Rue Camille Didier BP 39
F-08001 Charleville-Mézières Cédex
T: +33 (0) 324 33 63 21
F: +33 (0) 324 37 39 37
E: sav@noricangroup.com

Germany
Wheelabrator Group GmbH
Ferdinand-Porsche Str. 23
D- 51149 Köln
T: +49(0) 2203 297 51 0
F: +49(0) 2203 297 51 60
E: service&teile@wheelabratorgroup.de

Wheelabrator Group GmbH
(Technology Centre)
Heinrich-Schlick-Strasse 2
D-48629 Metelen
T: +49(0) 25 5688 0
F: +49(0) 25 5688 150
E: kontakt@wheelabratorgroup.de

India
DISA India Ltd.
5TH Floor, Kushal Garden Arcade
1A Peenya Industrial Area
Peenya 2nd Phase, Bangalore 560058
T: +91 80 4020 1400 (01/02/03/04)
F: +91 80 2839 1661
E: bangalore@noricangroup.com

Japan
Wheelabrator Group c/o DISA K.K.
4F Sumitomo Shoji Nagoya
Marumochi Bldg
3-5-10 Marunouchi Naka-ku
Nagoya 460-0002 Japan
T: +81 52 950 7260
F: +81 52 971 9450

Mexico
WG Plus de México S. de R.L. de C.V.
(Wheelabrator)
Rectángulos No. 214
Parque Industrial Arco Vial
Garcia N.L.
C.P. 66000 México
T: +52 (81) 1946-1000
E: servicioaclientes@noricangroup.com

Poland
Wheelabrator Schlick Sp. Z.o.o.
Biuro Handlowe, ul. Rzymowskiego 30
lok. 318,
PL-02-697 Warszawa
T: +48 22 651 70 91
F: +48 22 651 70 92
E: info@wheelabratorgroup.pl

Russia
Wheelabrator Group
Ul. Malakhitovaya 27, Building B
129128 Moscow
T: +7 495 1815548
F: +7 495 1815571
E: info@wheelabratorgroup.ru

Spain
Wheelabrator Group S.L.U.
Gran Via de les Corts Catalanes, 133 - 8º B
E-08014 Barcelona
T: + 34 93 421 1266
F: + 34 93 422 3137
E: contact@wheelabratorgroup.es

Switzerland
DISA Industrie AG (Technology Centre)
Kasernenstrasse 1
CH-8184 Bachenbülach
T: +41 44 815 40 00
F: +41 44 815 40 01
E: zurich@wheelabratorgroup.com

United Kingdom
Wheelabrator Group Ltd.
41 Craven Road
Altrincham, UK
WA14 5HJ
T: +44 (0) 161 928 6388
F: +44 (0) 161 929 0381
E: uk-info@wheelabratorgroup.co.uk

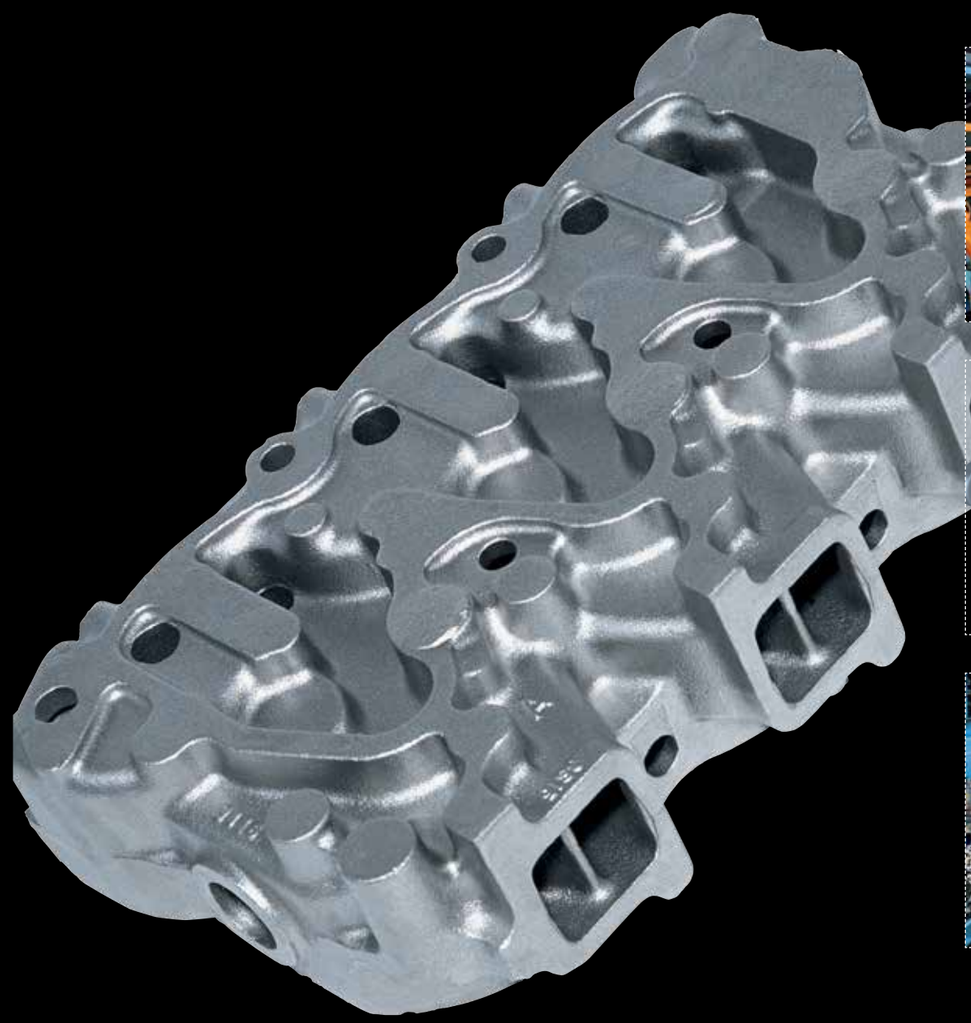
USA
Wheelabrator Group
1606 Executive Drive
LaGrange, GA 30240
T: +1 (800) 544 4144 • T: +1 (706) 884 6884
F: +1 (706) 884 0568
E: info@wheelabratorgroup.com

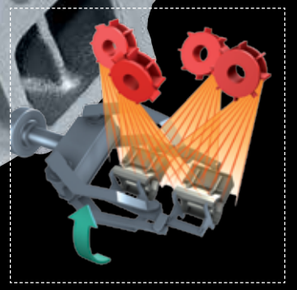
DISA Industrie AG
Kasernenstrasse 1
CH-8184 Bachenbülach
Schweiz
T: +41 44 815 40 00
F: +41 44 815 40 01
E: zurich@wheelabratorgroup.com
www.wheelabratorgroup.com

Norican Group is the Holding of DISA and Wheelabrator.

wheelabrator
shaping industry

Manipulator shot blast systems DS / DV





wheelabrator
shaping industry

Manipulator shot blast systems DS / DV

Flexible processing capacity

Wheelabrator's flexible and high performance manipulator shot blast systems are capable of handling components of different shapes and sizes without the need for re-tooling.

These systems have high process capacities and deliver excellent cleaning efficiency. Even intricate workpieces with internal bores can be meticulously cleaned, without any shot accumulation.

A variety of basic machine models are available to suit specific applications.

- Systems with manipulator grippers for desanding, descaling and surface finishing of gearboxes, crankcases, cylinder heads, and other cast iron and light metal components (green sand, gravity and pressure die castings)
- Systems fitted with rotating support shafts for desanding, descaling and shot peening of crankshafts, and other rotational parts

Major advantages

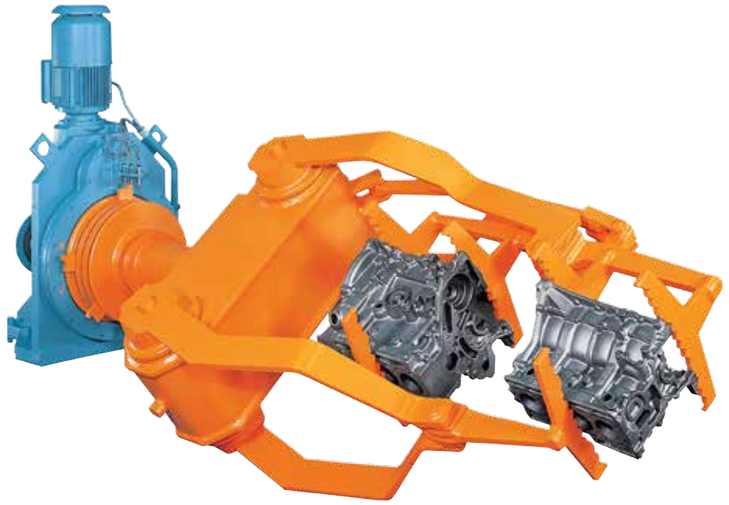
- Fully automatic sequence of operations, including loading and unloading of workpieces
- Automatic blast cleaning of castings of different shapes and sizes without the need for re-tooling
- Optimized abrasive energy efficiency minimizes wear of machine parts
- Programmable manipulator motions (rotating, swinging, stopping) for targeted cleaning of critical surfaces and internal passages
- Shot removal inside the machine and during the operating cycle. No abrasive is discharged with clean workpieces

Versatile systems cope with different needs

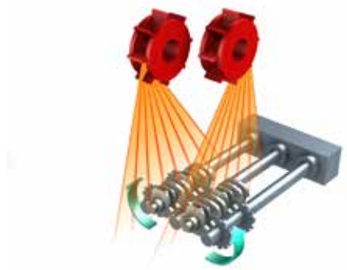
Six basic models and its modular design, provide the flexibility necessary to cover a wide spectrum of requirements with regard to output, floor space, and material handling arrangements. Manipulator shot blast systems can be combined with air blast stations and are suitable for integration into automatic fettling lines.

These shot blast systems are either 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 a particular workpiece and are able to accommodate one or more parts.

Automatic and flexible blast cleaning of complicated parts



High flexibility allows crankcases, cylinder heads,and many other castings to be held by manipulator grippers



Crankshafts are transported through the machine on rotating support shafts

Inside the shot blast cabin, the manipulators with the workpieces rotate in front of the blast wheels for full exposure of all surfaces

A loading device or an industrial robot places the uncleaned workpieces on support shafts or in the manipulator where they are firmly held. A spring-loaded mechanism serves to maintain the holding power of the grippers. Fully automatic shot blast systems can be equipped with sensors for part identification and workpiece-specific control of 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, best shot energy efficiency, and minimal wear of machine parts. After blast cleaning, the manipulators (and workpieces) perform various rotational, oscillating and stopping movements for removal of residual shot. All machine parts within the working range of the manipulator and the blast area are of high-quality manganese steel. Doors and transfer points are securely and tightly sealed with multiple labyrinth packings or magnetic strips.

Available machine versions

Application	Light metal	Cast iron	Rotational parts	Page
DS 1	●	●	●	6 / 7
DV 2 / DV 4		●	●	8 / 9
DS 4	●		●	10 - 13
DS 5		●	●	10 - 13
DS 6		●	●	10 - 13
DS 8		●	●	10 - 13

Clever Workpiece Handling

DV 4-1250 for shot blasting crankcases

Simultaneous loading and unloading of a DS 8 via twin handling device

Smart loading / unloading techniques

Fully automated production systems call for intelligent materials handling solutions to deliver:

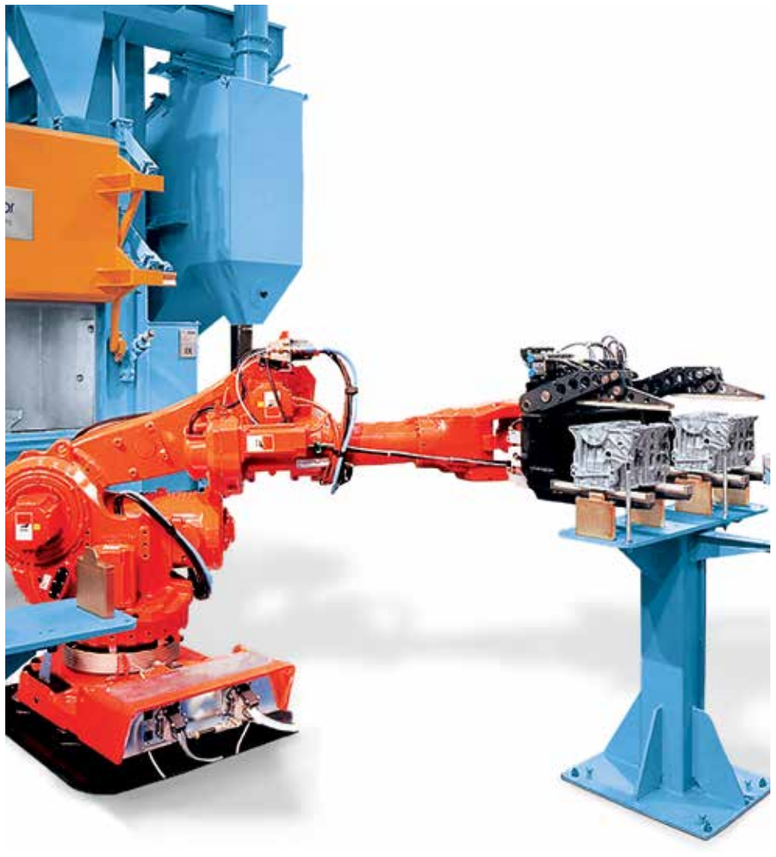
- Logically coordinated production sequences without the need for multiple handling and buffer storage space
- Close monitoring of all successive operations
- Elimination of manual operations at delivery, loading, unloading, transfer points and interfaces between machines

Robots and mechanical devices are available to accomplish these tasks. However, the choice of the appropriate equipment must primarily be based on cost/benefit considerations, infrastructure and customer individual preferences.

Mechanical loading / unloading devices

These devices offer practical and cost-saving solutions for machines in factories with restricted floor space. Continuous throughput machines for workpieces weighing more than 250 kg each, or machines loaded on the front side and unloaded from the rear side, are typical applications for such devices. Their ability to handle different workpieces of diverse shapes is an added advantage.

Optimisation of workflow



DS1-338 shot blast machine with robot handling workpieces

Industrial robots

Industrial robots are generally used in combination with machines operating with short cycle times to process workpieces weighing up to 250 kg. The robots can be programmed to carry the workpieces reliably along complex pre-defined paths and to move them into the required positions. High precision and motion repeatability, and flexibility when changing from one task to the next, are important advantages of industrial robots. They can also be used for shot evacuation outside the machine. For systems comprising autonomous cells for blast cleaning, deburring, trimming, and grinding of workpieces, robots can serve to link these individual process stages, helping to reduce unproductive downtime and operating cost.

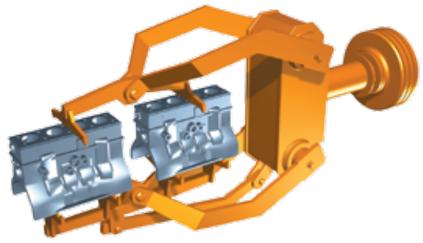
DS 1 shot blast systems: Compact and versatile

DS 1-338 shot blast system with fully automatic front loading and unloading device

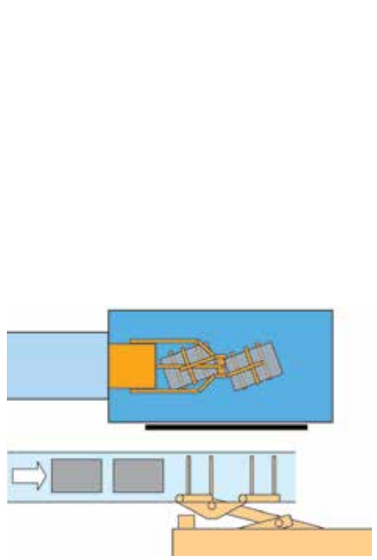
DS 1 shot blast systems for light metal, cast iron and forged parts

The shot blast machines of the DS 1 series are designed for the treatment of cast iron, light metal and forged workpieces. The machines feature a combined shot blast and shot removal chamber. Depending on the particular application, they can be fitted with a manipulator gripper or with rotational support shafts to receive rotating parts, such as crankshafts, etc. In accordance with the workflow, the machines can be loaded and unloaded at the front or, alternatively be loaded at the front and unloaded from the rear with the help of a robot or a loading device. In most cases the machines can process the workpieces in pairs to increase production output. Programmable motion sequences of the manipulators (rotating, swinging, stopping) ascertain precisely targeted shot impingement on even the most critical workpiece surfaces. Sensors can be installed to ensure that parts are processed according to preset parameters, such as blast time, shot quantity, throwing speed, number of activated blast wheels, shot removal time, etc.

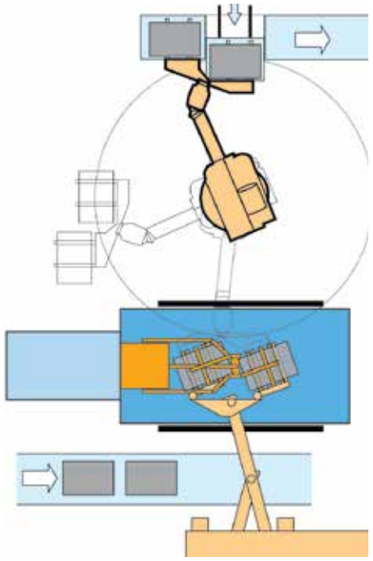
The compact design of the machines offers ample flexibility with regard to layout and production flow to the user. Moreover, the machines can easily be integrated in existing installations.



For light metal, cast iron, and forged workpieces



Variant 1:
Front loading and unloading



Variant 2:
Front loading and rear unloading via robot

Application		DS 1-338 Surface finishing (light metal)	DS 1-438 Surface finishing (light metal)	DS 1-450 Descaling Shot Peening	DS 1-450 Desanding (iron castings)	DS 1-650 Desanding (iron castings)
Manipulators		1	1		1	1
Load capacity / manipulator*	max. kg	150	150	100	700	700
Support shafts (alternatively)**				2 or 3		
Workpiece dimensions						
Length	max. mm	1400	1400	1400	1400	1400
Height	max. mm	440	440		650	650
Diameter**	max. mm			200		
Output capacity	cycles / h	20 - 45	20 - 45	45 - 90	50 - 70	50 - 70
Workpieces / h***		40 - 90	40 - 90	90 - 180	100 - 140	100 - 140
Blast wheels		3	4	4	4	6
Blast wheel diameter	mm	380	380	500	500	500
Capacity per blast wheel	kW	22/30	22/30	45	45	45

* Load capacity of the manipulator is determined by user requirements.
** Machines with support shafts for crankshafts and similar parts.
*** Each manipulator loaded with two workpieces, performance depending on the type of parts and required shot blast effect.

Other models available on request.

DV Series: Simultaneous shot blasting

DV2 with loading and unloading device

DV shot blast systems are exclusively used for the treatment of cast or forged iron components. They are equipped with 4, 8 or 12 blast wheels and 2 or 4 manipulator grippers or the corresponding number of support shafts. These systems can run between 20 and 80 operating cycles to process up to 160 parts per hour. The size and load capacity of the grippers or shafts is chosen according to workpiece type.

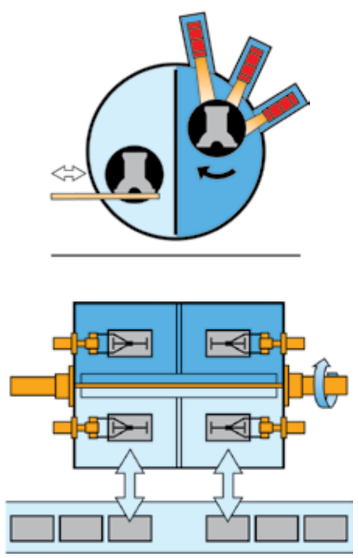
In DV shot blast systems, loading / unloading and shot blasting are performed simultaneously. The complete shot blasting of complex workpiece interiors occurs in one operating cycle inside the machine.

A robot or loading device loads and unloads the workpieces at the front of the machine. The system offers the possibility of processing parts in pairs. Programmable manipulator gripper motions (rotating, swinging, stopping) allow for targeted treatment of critical surfaces.

The space-saving design of the system facilitates its integration into existing plants. It's design concept allows users to coordinate the shot blasting machine with existing peripheral equipment and handling facilities enabling a high degree of automation to be achieved.

and loading / unloading

DV 4 for the surface treatment of motor blocks for trucks



DV 4 shot blast system with 4 chambers

Application		DV 2-450 Desanding of iron castings	DV 4/2-850 Descaling shot peening	DV 4-1250 Desanding of iron castings
Manipulators		2		4
Support shafts			4	
Load capacity / manipulator*	max. kg	700	160	700
Loading / unloading compartment		1	2	2
Blast compartment		1	2	2
Workpiece dimensions				
Length	max. mm	1400	1000	1400
Height / Ø	max. mm	650	Ø 220	650
Output capacity	cycles / h	20 - 80	60	60 - 80
Parts / h **		20 - 160	up to 360	up to 160
Blast wheels		4	8	12
Blast wheel diameter	mm	500	500	500
Capacity blast wheel	kW	45	37	45

* Load capacity of the manipulator is determined by users' requirements.
** Each manipulator loaded with two workpieces, performance depending on the type of parts and required shot blast effect.

Other models available on request.

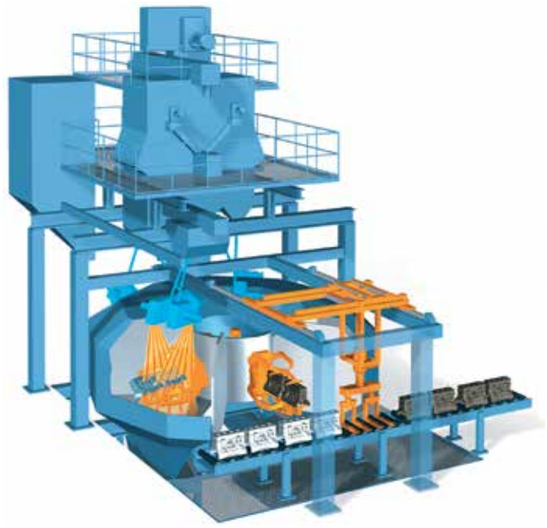
DS 4 / DS 5 / DS 6 / DS 8 shot blast systems

Aluminium gear boxes being blast cleaned and deburred in a DS 8 system

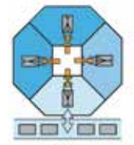
The DS 4-,-5, -6, and DS 8 series offer a wide range of concept options and meet a variety of output and quality expectations. They allow workpieces to be processed in several compartments at the same time. Among the typical treatment applications of these high capacity systems are components for the automotive industry, including desanding, descaling and shot peening of rotational parts.

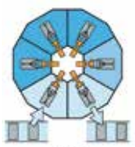
DS 4 machines with 4 compartments are designed for the surface treatment of light metal parts and rotational parts.
DS 5, -6, and -8 systems are equipped with 5, 6, and 8 compartments, and are used for the treatment of iron components. Loading and unloading are carried out during the operation of the shot blast machines, by robots or mechanical loading and unloading devices. This enables users to minimise downtime and increase production output. It is also possible to treat the workpieces in pairs. These machines have between 4 and 12 blast wheels and 4, 5, 6 or 8 manipulator grippers. Size and load capacity of the grippers will be selected based on individual requirements.

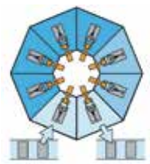
Powerful and effective



DS 5 shot blast system with 5 manipulators and mechanical loading / unloading







Application		DS 4-438	DS 4-638	DS 5-650	DS 5-850	DS 6-850	DS 6-1050	DS 8-1050	DS 8-1250
		Surface finishing (light metal)		Desanding, descaling, shot peening (cast or forged iron castings)					
Manipulators		4	4	5	5	6	6	8	8
Support shafts (alternatively)**		-	-	5 x 3	5 x 3	6 x 3	6 x 3	8 x 3	8 x 3
Load capacity / manipulator	max. kg	150	150	700	700	700	700	700	700
Loading / unloading compartment		1	1	1	1	each 1	each 1	each 1	each 1
Blast compartment		2	2	3	3	3	3	4	4
Shot and dust removal chamber		1	1	1	1	1	1	2	2
Workpiece dimensions:									
Length	max. mm	1400	1400	1400	1400	1400	1400	1400	1400
Height / Ø	max. mm	440	440	650 / 200	650 / 200	650 / 200	650 / 200	650 / 200	650 / 200
Output capacity	cycles / h	100	100	100	120	120	150	150	160
Parts / h***		200	200	200	240	240	300	300	320
Blast wheels		4	6	6	8	8	10	10	12
Blast wheel diameter	mm	380	380	500	500	500	500	500	500
Capacity blast wheel	kW	22/37	22/37	45	45	45	45	45	45

* Load capacity of the manipulator is determined by users' requirements.
** Machines with support shafts for crankshafts and similar parts.
*** Each manipulator loaded with two workpieces, performance depending on the type of parts and required shot blast effect.

Other models available on request.

Typical examples

DS 5 shot blast machine

System for workpiece handling

Typical examples of DS plant layouts

The workpieces progress through the shot blast and shot removal "satellite" zones (see the diagrams on the opposite page). At the same time the manipulator grippers perform programmed motion sequences (rotating, swinging, stopping) for optimal exposure to the shot blast stream and targeted cleaning. The manipulator movements cause the shot to be continuously removed from the workpiece interiors, ensuring excellent cleaning results.

Special shot removal compartments prevent the risk of shot leaving the machine.

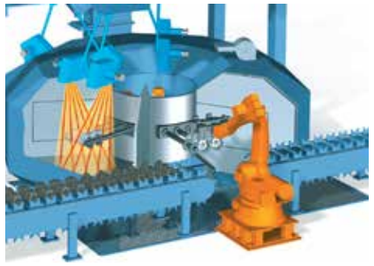
Low-emission motors - complex castings

The reduction of emissions from vehicles requires ever more complex castings. Demands on cleanliness of the parts after shot blasting increase in the same measure. Conventional shot blasting with blast wheel systems reaches its limits here as it does not allow to perfectly clean complex workpiece interiors. This is the point where air blasting is introduced.

After wheel blasting, blast nozzles are used for focused removal of sand and slag residues or burrs from workpiece interiors. Depending on the number and variety of workpieces, different systems can be employed. The simplest method is to hold the nozzles against the outside of the workpiece to clean the channels. Interior blast nozzles entering the channels deliver more focused blast cleaning. Pivotable nozzles facilitate still easier access.

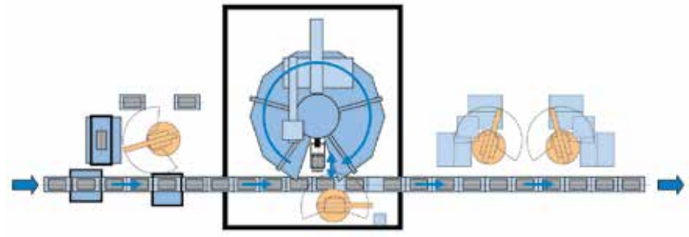
To handle large quantities of workpieces, these nozzles are combined on bars to blast clean several channels simultaneously. Either the nozzle bars move towards the workpiece or the workpiece moves towards the bars - with the help of a robot in most cases. In this case, the workpiece is cleaned inside a shot blast cabin sealed by a flexible vestibule. This provides a maximum range of movement for the robot situated outside the shot blast cabin and thus protected against the shot blast effect. Depending on the task to be accomplished, the workpiece is held in place during shot blasting or is moved by the robot.

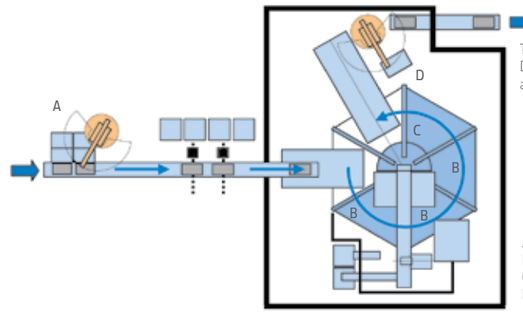
High performance and versatile applications



Easy access to the manipulator drive station

Most of these systems are custom-designed to suit the user's requirements as production volumes or workpiece geometries vary considerably. Our ample experience and the wide range of Wheelabrator products allow you to take advantage of our vast engineering expertise.



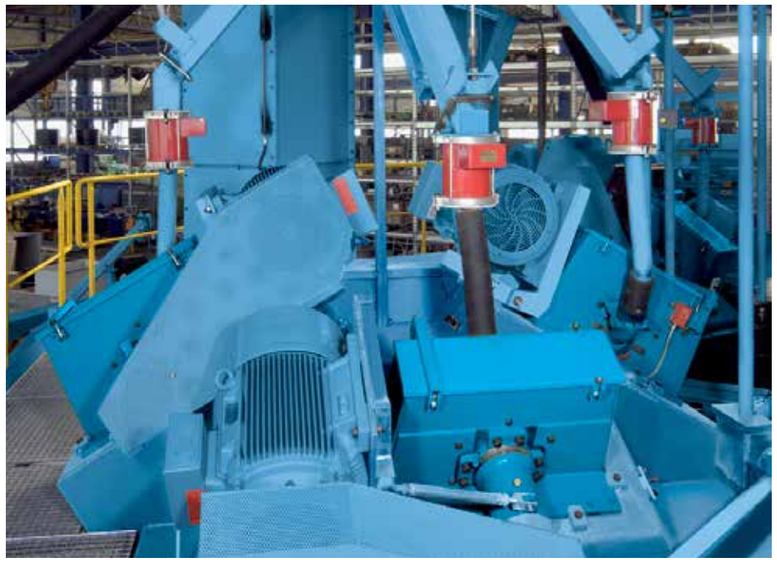


Typical examples of a DS 5 (above) and a DS 6 (left) shot blast system integrated in a fully automatic fettling line

A Loading
B Shot blasting
C Shot removal
D Unloading

The blast wheels: Highly efficient and precise

1 Blade
2 Opening
3 Control cage
4 Impeller



Fully automatic control of shot volume via magnetic valves

Wheelabrator blast wheels are known for high capacity and maximum energy efficiency. They are available in different sizes to meet individual requirements. Due to the reversibility of the blast wheel rotation, the range of applications can be considerably extended.

The throwing power of the wheels and shot impact are fine-tuned to suit specific applications and to ensure optimal energy efficiency. The amount of abrasive can be adjusted from the operator's panel. The abrasive is mechanically pre-accelerated and delivered to the blast wheel in a continuous stream, fully utilising the drive power of the motors to achieve the best blast cleaning effect. The careful arrangement of the blast wheels plus the ability to adjust the throwing angle of the abrasive, assure that workpieces are always blast cleaned in the hot spot. Machine components within the throwing range of the blast wheels are made of highly wear-resistant material to avoid excessive wear.

Advanced ecology, easy maintenance

All blast wheels are conveniently accessible and coordinated for optimal shot blast results

Shot reconditioning for re-use includes meticulous separation of metal splinters, sand, scale, and other impurities by pneumatic or combined magnetic and air-wash separators, depending on the specific application.

With the shot blast systems integrated in fully automatic production lines, operators will have little or no contact with uncleaned workpieces. Except for occasional inspection rounds, the shot blast systems can be run without operator attendance. Simple but effective sealing elements prevent leakage of shot. An effective dust collector and a closed-loop abrasive transport system within the machine ensure environmentally responsible operation. The unique machine structure and easily accessible service platforms facilitate periodic visual inspections and routine maintenance work. Components with close tolerances permit fast removal and installation. Original spare and wear parts of selected materials and painstaking workmanship are, of course, best suited to keep the blast cleaning system in perfect operating condition. Our well equipped test centre is available for blast trials in order to define blast parameters and optimum machine configuration.