Blasting Processes for Mass-Produced Components

Drum Blasting Machines Produce a Better Surface Quality

In applications where belt blasting machines are pushed to their limits, drum blasting machines are the ideal solution. By changing to a drum blasting machine, users can maintain high quality standards when processing small complex components of the same type.

Many parts, such as chain links, components for automatic gearboxes, clutch springs or small sheet metal items, have to be subjected to consistent shot blasting processes often using identical or reproducible parameters. This is not easy, in particular in the case of complex parts.

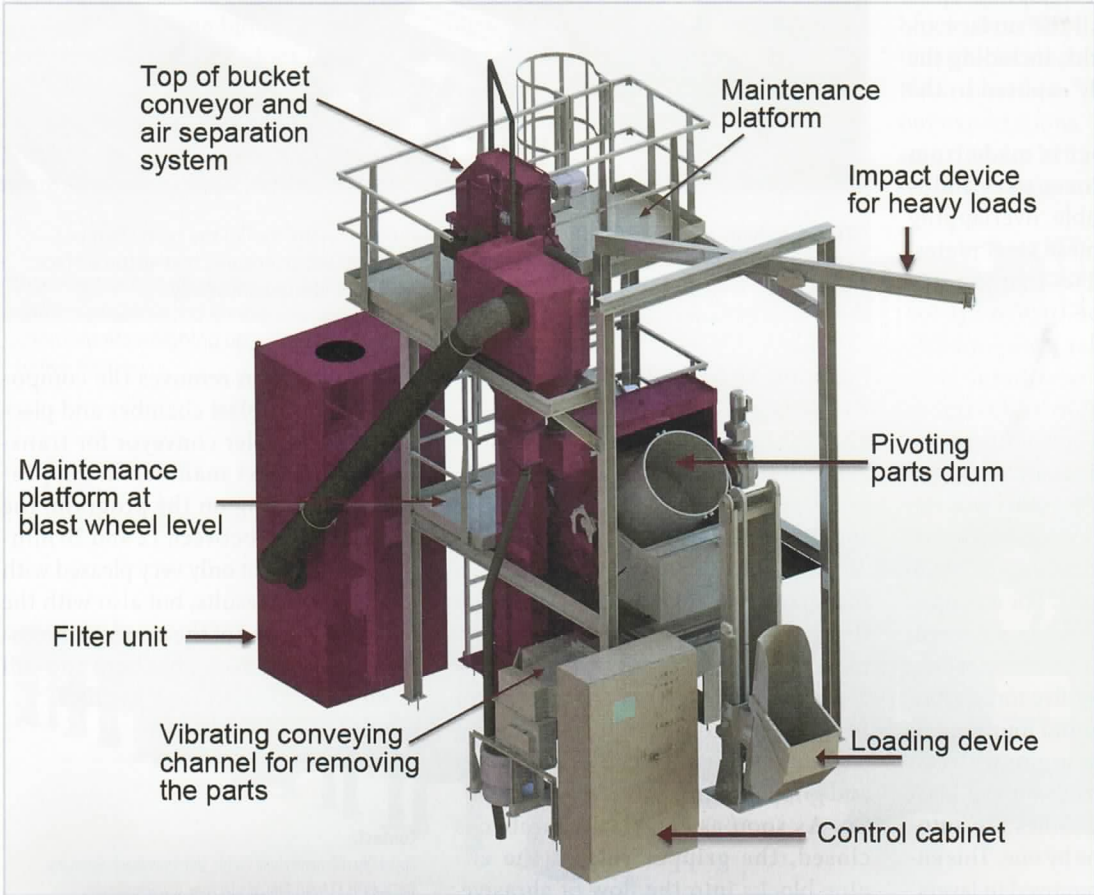
Drum blasting machines from Agtos are designed to meet precisely these requirements. The main benefit of this type of machine is that the workpieces are effectively circulated. Furthermore they will not be displaced or damaged. Undefined blasting results and cost causing stops in the production process will be avoided.

The drum is one single component and, for reasons of wear resistance, it is made from perforated manganese steel. The size of the perforations depends on the dimensions of the parts being blasted and the grain size and quantity of the blasting abrasive. Special devices are used to mix the parts so that the shot is applied evenly to all the surfaces.

Tandem operation allows for high availability

For companies that operate three shifts, it pays to install two drum blasting machines in parallel, which results in a continuous process. If there is a fault with one machine, the reliability of the process is not affected, because the other machine is always available.

Process reliability is crucial in ensuring the consistently high quality of the end products. The latest drum blasting machines have features relat-



Structure of a drum blasting machine

ing to process reliability that are not found on conventional systems. Electronic functions for displaying and modifying process parameters allow users to access information about the blasting process at any time, including details of the blasting time, the speed of the blasting wheels and the drum or the throughput quantity of shot.

In addition, detailed error messages are displayed that make troubleshooting quicker and easier. If a programmed sequence of movements is not completed, the machine goes into fault mode and the blasting process is interrupted. The source of the fault is displayed and this allows the problem to be rectified quickly. One important consideration for users is ensuring that no parts remain in the machine at the end of the blasting process. Drum blasting machines are designed to prevent this from happening.

Another aspect of process reliability is the fact that the batch of parts being processed is fully circulated, which ensures the consistent surface quality of all the parts. This has been achieved by further developing a number of mechanical devices.

Example of a possible operating procedure

Before the parts are blasted, they are stored in a conventional container. This is placed in a loading device or emptied manually. The loading device is lifted over the open drum. When it reaches the correct height, it pivots and loads the components into the drum. Depending on the fragility of the parts, this process can be carried out with great care.

The machine is controlled by a PLC, but manual operation is also possible in order to prevent damage from being caused. At this point, the drum is in the loading position. Before the blasting process starts, the machine closes and the drum pivots into the ideal blasting position in front of the high-performance blast wheel. At the same time, it rotates around its own axis.

The blasting process starts and continues until all the parts have been thoroughly mixed and blasted from every side. The blasting chamber is lined with material which is highly resistant to the effects of the blasting abrasive. The main lining in the area directly blasted by the wheels is made of high strength steel panels that can be replaced if required.

During the blasting process, the door remains sealed and can only be opened when the dust has been removed from the blasting chamber, which takes 10 to 15 seconds. The dust generated is extracted during the blasting process by a low-pressure system and separated out in a filter unit.

After the blasting process, the drum pivots into the unloading position. Depending on the type and quantity of parts, the speed and intensity of the unloading process can be controlled. The blasted parts are transferred to a mesh conveying channel where any remaining shot is removed. They are then moved to parts containers.

Fully emptying the drum

The manoeuvrability of the drum is a unique feature of drum blasting machines which prevents the components from being damaged, in contrast to older blasting systems. It also guarantees that the drum is fully emptied, even in the case of small parts which would often become stuck in the machine. Another benefit is that the controlled emptying process allows parts to be transferred to containers of different sizes, if this is necessary for the next stage of the production process.

The high-performance wheels blast the parts with shot at speeds of more than 100 m/sec, depending on the required results. The wheels supplied by Agtos are single-disc systems.

Low maintenance, environmentally friendly cartridge filter system

The machine's filter system also sets new standards and makes an important contribution to the reliability of the blasting process. The air from the blasting chamber, which is laden with dust, is extracted and flows through an impact separator that removes the largest dust particles. After this, it passes into the lower filter chamber and through the filter cartridges where the remaining dust is separated out. Subsequently, the cleaned air flows upwards into the clean gas chamber.

The filter cartridges are cleaned using pulses of compressed air on the basis of differential pressure. The dust particles are fed into hoppers below the filter cartridges and collected in metal or paper containers. The cleaned air is discharged from the upper filter housing into the outside air or is returned to the inside of the building. If a filter cartridge is damaged, additional filter inserts remove the majority of the dust.

The filter cartridges are conical in shape, because this design allows the pulses of compressed air to be applied more directly to the inside of the side walls that are covered in dust. The filter surface area is smaller than that of other cartridges, but the special design of the filter medium means that more dust is extracted per square metre. In addition, the larger folds improve the adhesion of the dust and the efficiency of the cleaning process, because the dust falls off more easily when the pulses of compressed air are applied to the filter.

Improved results from cleaning with compressed air

The conical shape of the filter cartridges leads to more dust being removed by the pulses of compressed air, when compared with conventional cylindrical filter cartridges. The cartridges have another advantage when it comes to disposal. The metal frame can be reused and only the filter medium is discarded. Depending on the type of dust, it can be disposed of with normal commercial waste and no additional disposal costs are incurred. Slide-in inserts make the process of replacing cartridges simpler. The cartridges are pulled out of the filter unit and can be replaced outside in a clean environment. Nevertheless, the cartridges are precisely positioned and always installed with the correct contact pressure. ▮

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