

CUYSON

Guyson shot peening equipment



Shot peening benefits

Process monitoring and control



Digital Almen gauge



Gear with Almen strips



HMI visual control monitor



Non ferrous flow monitor



Cyclone sieve classifier



MagnaValve Controllers



Peening MagnaValves

Controlled shot peening is regularly specified by the aerospace, automotive and nuclear industries to enhance component service life. It is a cold working process in which the surface of the component is bombarded with small spherical blast media particles. Each piece of shot striking the surface of the component acts as a miniature peening hammer, deforming the component surface and causing a small indentation or dimple. The overlapping dimples develop a thin layer of metal in residual compressive stress at or near the surface. Since nearly all fatigue and stress corrosion failures start at the surface of a part, the compressive stresses induced by shot peening can considerably increase component service life.

The residual compressive stress cannot be measured except by destructive methods and hence a peening specification is given in terms of curvature of an Almen strip. The Almen strip is exposed to the shot stream and its curvature is used to validate whether the process is maintaining the desired peening intensity. Guyson can design and supply custom fabricated Almen strip holders (top left) to replicate the component geometry or can modify a component to accept the Almen holder positioned at critical positions and angles on the part, to reflect actual peening conditions.

The Guyson technique for shot peening uses compressed air as the shot propellant for precise treatment of components. Low intensity glass bead peening uses suction fed guns to meet specifications measured on the Almen 'N' strip. Higher intensity 'A' and 'C' strip specifications are met by pressure fed systems. For peening internal diameter surfaces Guyson utilises side exiting blast media lances to maintain an optimum impact angle relative to the component surface.

Process consistency in shot peening is vital and Guyson systems are custom designed to control all the critical variables to suit each application. The shot size is controlled with screen classifiers and its shape is controlled with roundness classifiers to meet ASM2430 requirements. Shot flow rate (kg/min) is monitored and close loop controlled using MagnaValves for ferrous shot and Guyson proprietary monitoring systems for non-ferrous shot.

Shot peening solutions

Automatic and robotic shot peening

Guyson automatic shot peening systems are designed to eliminate variations in manual blast processes. Depending on the geometry of the components, the cycle time available and the flow of work, a variety of different automated shot peening machines are available including tumble peen, conveyor peen, rotary table peen and spindle peen.

In Guyson's automated air blast peening machines, multiple nozzles, pre-set at the correct impact angle and stand off distance, are aimed at the target surfaces. With component rotation and the peening nozzle(s) vertically and horizontally traversing or oscillating, a greater surface coverage can be obtained with fewer nozzles and lower compressed air usage. The movements and blast pressures are all under PLC control, programmed as part of the operator selectable process recipe for each component to be peened.

Automated blast machines greatly improve on all those areas that are weak in manual blasting and bring key process parameters under control, providing a high degree of repeatability, so long as the geometry of the components is relatively simple. However, due to the linear nature (x-y axis) of traditional automated process control, when the shapes and contours of the components are complex, and the peening specification is extremely tight, a conventional automated blast system may not be able to meet all the precision component manufacturer's quality requirements. This is where robotic controlled peening is often the preferred solution. With a peening nozzle mounted on a 6-axis robot, the articulated robot arm manipulates the blast nozzle and provides a consistent, optimum impact angle to the surface, maintaining accurate stand off distance and surface speed. A 7th axis table or spindle coordinated with the robot allows extremely complex geometries to be peened in one system, where in the past multiple systems would have been required to target each zone of the component or different geometry components. Operator errors in blast nozzle and part manipulation are thus eliminated and set up times are also dramatically reduced.



Glass bead peening system



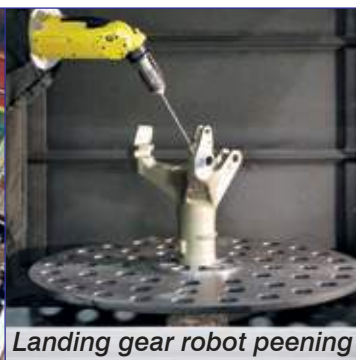
Batch spring peening



Aerospace gear peening



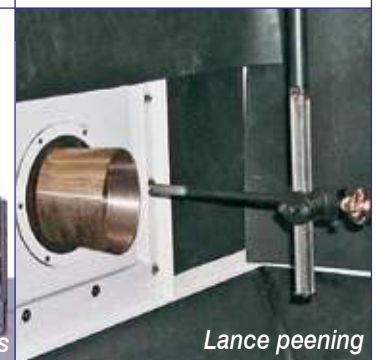
Robotic pick and place



Landing gear robot peening



Multiple helical classifiers



Lance peening



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Applications & testing



RB10 robot blaster - back



10 Reasons for robot blasting



RB10 robot blaster - front



Robot blasting brochure

Controlled shot peening is regularly specified by the aerospace, automotive and nuclear industries to enhance component service life and a number of Guyson shot peening systems have been installed around the world to undertake a varied range of applications. Listed below are just a few of them.

Shot Peening Applications	
Industry Sector	Component
Aerospace	Turbine blade root and aerofoil sections, rotating discs, stators and gears
	APU compressor wheels
	Drive shafts and miscellaneous fabrications
Medical	Orthopaedic hip stems and spinal rods
Oil & Gas	Drill rod connections
Automotive	Connecting rods
	Transmission helical and spur gears
	Turbocharger compressor wheels
	Helical springs

Guyson manufactures a range of automated, including robotically controlled, blast systems to undertake shot peening so if you would like to know more please contact your nearest Guyson location (see top of this page). Fuller product and application information for all equipment is available on the Guyson website at www.guyson.co.uk

Prospective users of Guyson manual or automated peening systems are encouraged to submit sample components for a free no obligation test and evaluation service in the company's extensive development workshop at Skipton. Guyson recognises that comprehensive testing of actual customer products is the only way to truly establish the correct peening parameters. This Guyson service then provides data to facilitate recommendations for the most cost effective equipment design and process for our customers.



Spindle gear peening



Multiblast RSB Peener



Peening turbine blades