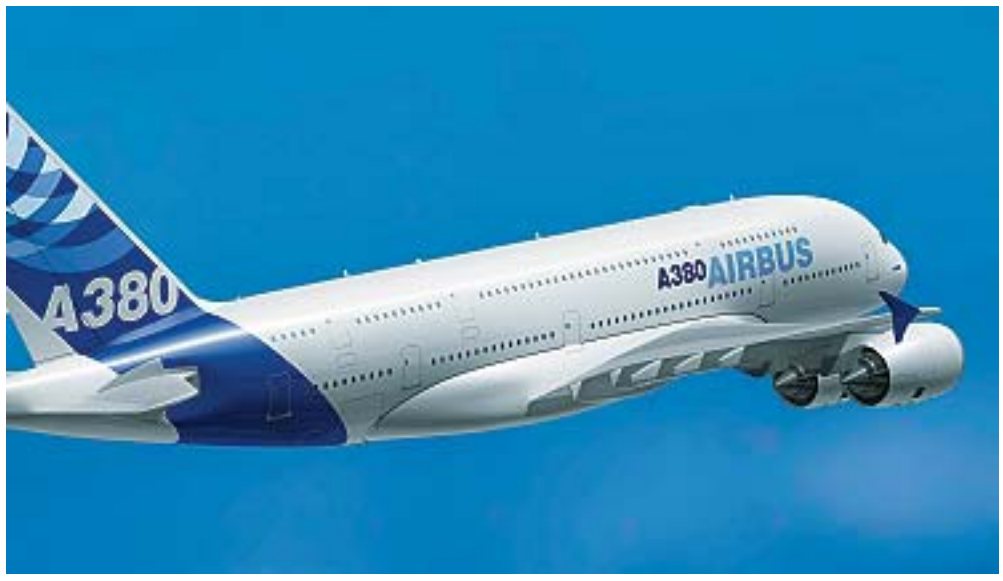
ON THE SURFACE
Aerospace Edition 2006
RÖSLER
finding a better way ...
Shotblasting · Shotpeening · High Pressure Waterjet · Wetblasting · Vibratory Finishing · Thermical Coating

Rösler Shotblasting technology for the Giant of the Skies

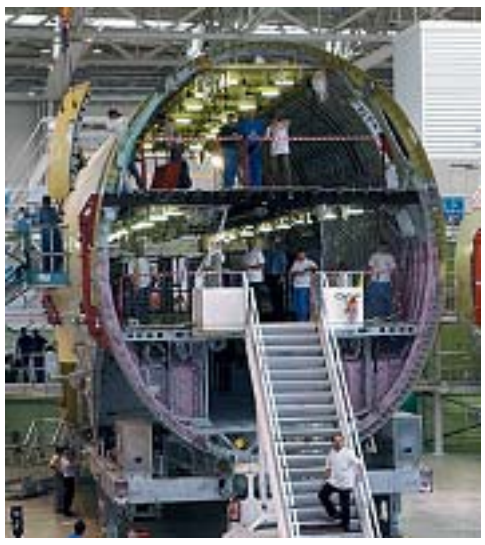
Airbus A380: A new dimension

Airbus didn't set out to break the world's record, nor are they trying to impress you with size, they'd rather you be impressed by economic advantages. The "Giant of the Skies" will require only 2.9 litres (.75 gallons) of fuel per passenger per 100 kilometers (62 miles) and would thus be the first "Three Litre Aircraft". The European aerospace company Airbus has achieved the primary technology goals for this through the use of innovative construction materials combined with better aerodynamics, system technologies and aviation electronics.

From a technology standpoint, the materials used in the construction of the Super Airbus are particularly innovative. About 25% of the A380 is made up of composites, 22% carbon fibre reinforced plastics (six times stronger and up to 60% lighter than steel) and 3% "Glare". Glare is a laminate of alternating layers of Aluminum and glass fibre reinforced plastic, that is being used in civilian aircraft for the first time. Glare is not only lighter than aluminium, but is also more fire proof and has higher fatigue strength. It also reduces the weight of the A 380 by 800 kg.



Airbus sets new standards for innovation and technology. The new aircraft can seat at least 555 passengers and will begin service in 2006.



The raw materials used in the new Super Airbus are of particular interest. The structural components of the fuselage are shot peened by Rösler shot blasting technology, making them distortion-proof and resistant to fatigue cracks.

In addition to composites, the A 380's construction includes a large percentage of high-tech metal construction materials, which also provide significant advantages in terms of weight reduction, operational reliability, ease of maintenance and repair. Aluminium alloys belong to this group, and various structural components of the Airbus airframe and floor plates are made of them.

Special shotblasting machine combined with two robots

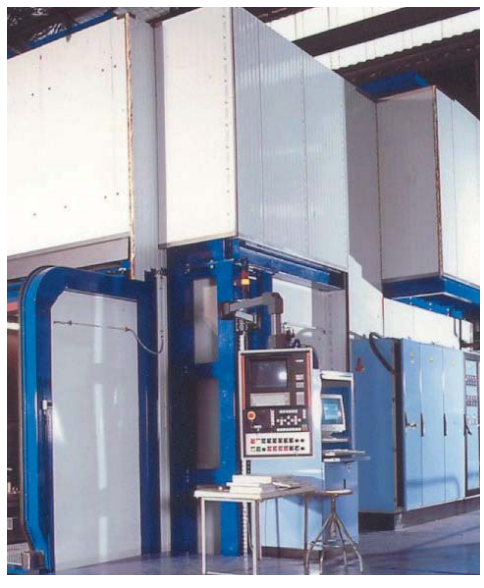
The structural components, which measure up to 10 metres by 3 metres, are partially shot peened in a special Rösler shot blasting system. A rail system transports the part into the shot blasting chamber, where it is shot blasted by the shot-blasting nozzles of two robots which have been programmed to only blast specifically targeted areas of the component. The internal compressive stress induced by shot peening the surface increases the distortion stiffness of the thin structural parts. Further advantages include higher resistance to corrosion and fatigue cracks.

An important aspect of shot peening is precise classification of the shot peening media. This picture shows the single spiral separator for removing unusable media.

Components of other Airbus models besides the A 380 are shotblasted in the shotblasting system which measures 50 metres long and 6 metres high. The system has been designed for flexibility. However, the peening process must always be repeatable and the individual processing steps must be replicated year after year, in order to meet strict aerospace specifications.

Multiple media classification and strict process controls

In view of the enormous static and dynamic loads that are exerted on the fuselage, which is 7 metres wide and 8.5 metres high and over 70 metres in length, the requirements for the exactness and repeatability of the shot peening process are extremely strict. Therefore, continual



10-axis CNC Shot Peening Machine

and precise media classification is very important. This is ensured by cyclone separation, screening and spiral separation. During the process, the media - steel shot or glass beads - passes through an integrated classification system in which it is continuously sorted for size and shape and then fed back into the cycle, in order to guarantee the maximum possible integrity of the shot peening process. The entire process is continuously monitored for possible deviations. Monitoring systems such as weighing cells and magnetic sensors, for measuring the flow rate of the shot peening media, or air pressure and air flow meters are used. The system is also connected to the Airbus Intranet. Rösler has utilized the results of many aviation projects in the design of this impressive shotblasting system.

Removing coatings from turbine components

High-Pressure Wet Blasting at 4000 Bar

Today's state-of-the-art technology in the field of turbine construction is the result of technical progress in the fields of material, manufacturing and surface finishing technology. For instance, the introduction of titanium alloys at the beginning

The Rösler high-pressure wet blast system cleans the component at a pressure of 4000 bar

of the sixties made possible the development of large fan blades. There is an equally close relationship between the power of a modern aeroplane engine and the quality of its individual component surfaces. In order to improve resistance against erosion and frictional wear and tear, highly used frames, cases, bearing housings or turbine blades are thermally coated with a layer of special plasma coating after the shot peening. As part of regular inspection and maintenance, this coating must be renewed regularly, requiring the removal of the old coating. As part of a capacity upgrade, the customer ordered a Rösler high-pressure wet blast system with integrated process water treatment. Not only is wet blasting environmentally friendly, but it also produces much faster results than the conventional chemical coating removal method.

The high pressure of 4,000 bar needed to remove the plasma coating is generated by means of a high-performance pump and is sprayed on the component by a high speed rotary nozzle, manipulated by a 6-axis robot, at a speed of 3,000 rpm. The effect achieved guarantees a quick, precise and at the same time gentle coating removal without causing deformations on the surface of the component.

Depending on the type and thickness of the coating, removal speeds of 4 mm (1/8 in) up to 75 mm (3 in) per second are achieved. A crane loads the components to be blasted directly onto a turntable in the stainless-steel blasting chamber. The pneumatically sealed door closes automatically prior to the start of the processing. The environmentally-friendly process water treatment system utilizes a proven system technology long used in vibratory finishing, which has been modified to suit high-pressure wet blasting applications.

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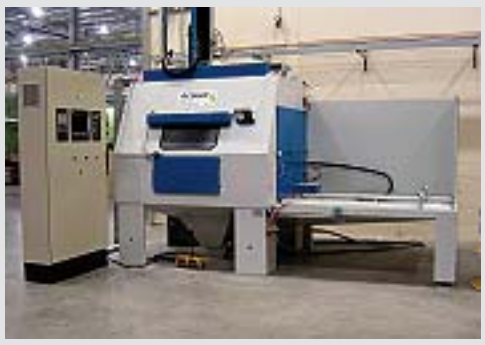
Rolls Royce invest in Rösler Range

Rolls-Royce have become the first UK Aerospace company to benefit from the addition of Vapor Blast to the Rösler Group in 2004.

When Aerospace specialist company Vapor Blast were acquired by Rösler, one of the world's largest suppliers of surface finishing equipment, it was obvious that the new alliance would be an attractive proposition for prospective customers. No one, however, could have predicted the impact that it would have on the Aerospace market.

The blasting, peening and finishing know-how of former Vapor Blast coupled with the global customer-base that Rösler enjoys has led to a huge order book that has forced an expansion of Rösler's Aerospace machine manufacturing facility in France, with work already underway.

The first machine to be delivered to the UK from the Rösler/Vapor Blast range has been to Rolls-



Royce at their impressive new facility in Hucknall, near Nottingham. The wet shot blasting machine has an automatic gantry system and turntable, PLC control and an external loading area.

A second machine, this time a high specification dry blast machine for plasma spray preparation, will be delivered to the same facility in February 2006.

Chris O'Brien, Rösler UK's aerospace manager, has been delighted with the reaction of customers in the UK: "The interest in the expansion of Rösler's range of capabilities now that we have Vapor Blast on board has been phenomenal" he said "and we are delighted that Rolls-Royce, one of Rösler UK's most important customers, are demonstrating their confidence in us by investing in these two machines. In addition, we have a number of enquiries for similar machines, and also for water jet stripping machines, another speciality that Vapor Blast brought to the group. It looks as though 2006 could be our busiest year for some time!"

Customer-specific finishing solutions

Superfinishing Delicate Components

Grinding and burnishing processes are very important steps in surface finishing components made of aluminium, magnesium, nickel, stainless steel or titanium. The high-quality materials, and the often highly sensitive areas of application are the products of specialized processes.

When finishing turbine blisks a one-hundred-percent even removal is guaranteed

Rotary vibratory bowl technology offers excellent properties for the processing of pump wheels

When selecting the surface finishing system, one critical aspect is that the components can not have any part-on-part contact during processing. Therefore, Rösler uses rotary and trough-style vibratory bowls, plunge grinding and drag finishing units, or Rotomatic continous flow systems for processing of such delicate work pieces. The media and compounds are matched to the individual processing requirements - high-performance abrasive media or polishing media, grinding media with microfine graining or grinding pastes, as well as specially- suited compounds are used. All of the media mentioned have been specially developed by Rösler in our laboratory. In some cases, chemically accelerated REM finishing (see page 4) or the patented Rösler Keramo-Finish® process is used. This is the processing method designed to meet the specification requirements of several of the worldwide largest aircraft manufacturers.

Special application: rotary vibratory bowl

In order to process oversized components gently and economically, it is not always necessary to utilize a drag finishing or continuous-flow system. Rotary vibratory bowl technology is more cost effective, while also offering excellent processing of large and delicate individual components with outer diameters of between 300 mm (12 in) and 1900 mm (75 in) and weighing up to 800 kg (1,764 lbs). Rotary vibratory bowls are sturdy, user-friendly, and economical in terms of media and compound consumption. They are also ideally suited for ball burnishing or deflashing, as well as Keramo-Finish® high-gloss polishing. With the addition of peripheral equipment, they can be configured as fully automated processing cells.

Special Keramo-Finish Polishing Media-RP®

For Keramo-Finish® processing, the Rösler laboratory has developed special porcelain polishing media. The Keramo-Finish® RP media is identifiable by a micro-crystalline binding structure with a specific weight of 2.91 g/cm³.

Keramo-Finish® Surface Finishing

Keramo-Finish® is a finishing method. In the preceding processing step, the turbine blades are, for example, shot blasted and their surface is peened.

The surfaces of bearing rollers are polished in a rotary vibratory bowl by the Keramo-Finish® process

This precision process was developed by Rösler to achieve micro-fine surfaces for the aviation industry, in particular for processing turbine blades and rotors of all kinds. For this specialized process, a rotary vibratory bowl is most commonly used. Keramo-Finish® processing involves a combination of high-density, low-abrasive special media, grinding paste and polishing compound. The surface of the component is polished by special "RP" media coated with abrasive paste that exert slight pressures during a precisely defined processing period. Due to the very slow movement of the mass within the bowl, it is possible to polish several components at the same time without the risk of damage.

SMEA Malaysia choose Rösler

This year SMEA were selected by Airbus as part of the huge European aircraft manufacturer's overseas offset programme to supply A320 aircraft wing components.

SMEA were to waist no time at all selecting Rösler to manufacture a 6- axis robotic peening machine to perform all the steel shot peening requirements on over 40 wing components.

The machine is scheduled to help produce new parts in March 2006 when the supply of wing components from Malaysia to Airbus begins.

Rösler Aerospace and Jebsen and Jessen in South East Asia

Rösler are renowned as a worldwide supplier of many types of high quality surface finishing and surface preparation equipment and consumables. To better support customers and develop business in Asia, Peter Kendall, Rösler aerospace projects manager for the past five years, formerly with Rolls-Royce, GE and Honeywell, has taken an overseas secondment to relocate in the Asia Pacific region. Peter reports to Rösler UK who have the responsibility not only for customers in the UK and Ireland but for aerospace in the whole of the Asia Pacific region, with the exception of China.

Michael Chang, Jeremy Chee, Philip Lee, Yong Siew Kit, Esther Chiong, S L Wuu, Paul Rawlinson (Rösler UK), Jean-Jacques Andreu (Rösler France), Peter Kendall (Rösler UK Aerospace Project Manager- Asia), Jerard Lim, Joseph Choo & Gan Wan Kit

Rösler UK has much first hand experience within the aerospace industry having delivered successful project solutions to customers such as Rolls-Royce, GE, Airbus, ATI, Lufthansa Ireland, Centrax and P&W Ireland. Rösler UK is headed by Paul Rawlinson the UK branch manager who has been with the company for over 25 years, the past 15 of which as branch manager.

Jebsen and Jessen technology in South East Asia are an experienced and very well established engineering company with head offices in Singapore. Jebsen and Jessen represent a wide range of high tech equipment manufacturing companies. Included in this representation portfolio are Finnsonic, Galvatek, ALD, Systherm, Ionbond, Hermle, TTL, Toshulin, Luburdi. Jebsen and Jessen technology also provide technical support, after sales service and tools and consumable sales to the aerospace and other industries within South East Asia.

Rösler Aerospace are the latest to join this highly esteemed family of companies and a very informative launch training seminar for aerospace customers was held at the Changi Village Hotel, Singapore in September 2005.

A cooperative partnership in aerospace between Rösler the manufacturer of vibratory finishing machines, cleaning machines, drying machines, waste water systems, wet and dry blasting machines, peening machines and high pressure water jet stripping and preparation machines, and Jebsen and Jessen an engineering solutions technology company has been forged for Indonesia, Singapore, Thailand and Malaysia.

The main purpose of the new cooperation is to provide sales and after sales support to customers in this important region. Together, Peter Kendall and Paul Rawlinson soon realised to be successful in the region takes more than just knowing the industry thoroughly, good product knowledge and providing high quality equipment. Customers require complete satisfaction plus 100% support and back up in their home country which together the Rösler and Jebsen and Jessen bond will provide.

Jebsen and Jessen know just how well this solution works providing the sole turnkey package for the automated cleaning cell and compressor cell within SAESL in Singapore.

Rösler will be part of the Jebsen and Jessen team stand, Hall C, Asian Aerospace 2006, Singapore.

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