

Sage User Network BI Awareness Day

For our BI Awareness Day we were the guests of AESSEAL plc, Rotherham. To open the meeting we were treated to a tour of their manufacturing plant. AESSEAL are designers and manufacturers of mechanical seals, including cartridge and component seals, monolithic pumps, and metal bellows. Mechanical seals are used in pumps and rotating equipment to prevent liquids and gases from escaping into the environment.

I would like to thank all the staff at AESSEAL for their time and the extremely interesting tour; some delegates even suggested that we should close the meeting after the tour because it was so good!

Manufacturing at AESSEAL plc

Marketing

- AESSEAL produce around 200 different types of promotional literature and training courses in up to 10 different languages.
- The marketing department controls corporate advertising and newsletters, Installation Instructions, AESSEAL website, CD-ROMS, Videos.
- Other responsibilities include UK customer training, correspondence courses and internal 12 module training.

Commercial

- 70% + Export – 30% UK sales
- Approximately 150 distributors worldwide. 50+ in the USA.
- 66 branches / subsidiaries in 22 countries
- Supply approximately 85 countries
- Inter-branch computer system in all major currencies £ €, \$ updated every 15 minutes worldwide
- Real time order processing with 66% despatched same day.
- 7 foreign languages spoken for total focus on customer service.
- Electronic data capture for seamless integration into Purchasing and Technical.
- Approximately 4 hours between placement of order to packaging

Purchasing

- Loading of workshops for manufactured goods as well as bought in parts
- Sourced parts from over 17 different countries
- Annual spend of over £20m per annum
- 100,000 managed line items which are actively reviewed
- Typical reductions in costs in excess of £250,000 despite increasing energy and raw material costs
- Worldwide assistance to branches to manage and develop structured inventory programmes
- Supplier performance review every 6 months

OEM Projects

- Deal with OEM's
- Large project orders (£100,000+)
- Gas seals and new developments
- Key customers/Areas- North Seal Oil- Algeria

Work with share point and team centre to manage multiple projects

Bearing Protection Division



AESSEAL are a world leader in the provision of wholly-owned and extensively inventoried contacting and non-contacting bearing seal technology for rotating equipment applications.

They are also believed to be the producer of the world's first and only double face bearing protector, the Magtecta. This range is complemented by the non-contacting Labtecta, which means AESSEAL both enhance bearing life and provide a solution that is easier to repair and replace on a broad number of applications.

General view of the Bearing Protection Workshop, carousels in the background, MORI-SEIKI NL2500 CNC machine in the foreground (left). Bearing Protection Division design office (below).

- Manufacture patented bearing Isolators
- Separate entity within AES dealing with all supply process
- Lead time less than 48 hours
- 14" shaft diameter seals recently supplied 2 weeks ahead of expectations
- 9 CNC machines
- Admin, technical, design, manufacturing and assembly staff dedicated to bearing protection orders
- 22,000 Bearing Isolators sold in 2010
- Stock items despatched same day
- Products to suit applications such as electric motors, rotary valves, screw conveyors, plumbers blocks, steam turbines, pumps, fans, gearboxes and many more



Technical

- Selection of seals and system against customer requirements
- Analyse over 2000 enquiries for non-standard seals each year
- Provide on-site technical assistance and sealing advice to customers and AES Branches
- Produce the group technical publications including seal selection manuals and datasheets
- Provide technical and commercial guidance for non-standard seals
- Intimately involved in customer and internal training courses in line with the marketing 12 point training plan
- Involved in the continual development of the AESSEAL software suite including seal and system calculations

Design and build



AESSEAL use a unique, patented range of pre-engineered components enabling 10 million permutations to be configured so that they can rapidly assemble and dispatch solutions faster and more cost-effectively than anyone else. For this they use an industry-leading mechanical design system with exceptional tools for creating and managing 3D digital prototypes from single parts to assemblies containing thousands of components, Solid Edge 3D.

Carousel picking display (left). Demonstration of the Solid Edge 3D design system (below right). Solid Edge 3D workstation (below left).

- Product Development – develop new types of seals more recently Bellows and API on 3D Solid Edge Computer package. All new product drawings created through macro programming. Draw 1 size – programme completes size range. 3 – 4 new major product design ranges per year
- Special Orders – create non standard seal designs to suit customer specifications.
- Internet team – add as many designs as possible to the web for employees and customers to view.
- Process Engineering – create machining programmes for designs and decide which machine shop can produce them most efficiently. Use Unigraphics 3D verification package.
- Own network controlled through ADMIT with 15 seats of Solid Edge linked with Unigraphics.
- Product designs evaluated via FEA (Finite Element Analysis) – computer modelling of how different material and component will perform under different stresses and temperatures. Thereby reducing new product lead times.



- All mechanical seal systems are designed in the new department on 3D Solid Edge.
- Most recent developments include an API specific range of barrier fluid systems for the new CAPI seal range.
- Technical assistance and specification of support systems.
- Systems are then manufactured in at AESSEAL MCK in Ireland.

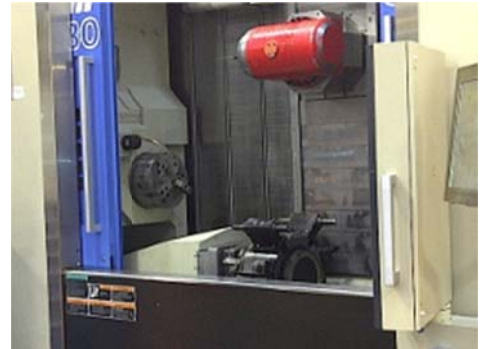
Special Products Division workshop

This NT4300 CNC machine can handle parts up to 24 inches diameter, raw materials include stainless steel and Phosphor Bronze.

- A minimum of 3 months stock of bar feedable 316 s/s tube is carried on site in pre cut 1m lengths.



- Additional sizes of 316 tube and exotic materials are provided from the Mangham Road site.
- AESSEAL plc are one of the biggest users of 316 s/s tube in England.
- Capacity of largest machine is 36" diameter and 1000kg weight



Left to right: craneage for loading CNC machines with raw material, stainless steel and Phosphor Bronze awaiting machining, the 'business end' of one of AES's MORI-SEIKI machines

Manufacturing Control Sheet

- Complete Batch traceability ISO 9001
One bar coded control sheet per batch of components, which is signed and dated after each operation, accompanies the components through the entire manufacturing process. This system gives complete traceability of batches.
- First off and ISO approved sampling regimes ensure top quality

Machinery

- 17 CNC machines at Mill Close and 12 CNC machines at Bradford are used for volume manufacturing.
- All the machines are linked to a central server for off line CAM generated programmes.
- Performance measurement is centrally controlled to feedback production improvement potential

Right: CNC machine control panel. Programs are loaded from the network and the jobs are started from this panel.



Capacity

- The plant operates 7 days per week manned for 363 days per year

Recent Developments

- SPC capability for the critical components backed up by in process probing linked to CMM.
- £1m investment in large machines cells



Left to right: Work in progress, monitoring the job, CNC machine tool turret

Inspection

- CNC CMM (Co-ordinate Measuring Machine) cost £50,000 and measures to within 0.5 micron resolution (1 micron = 1 millionth of a metre).

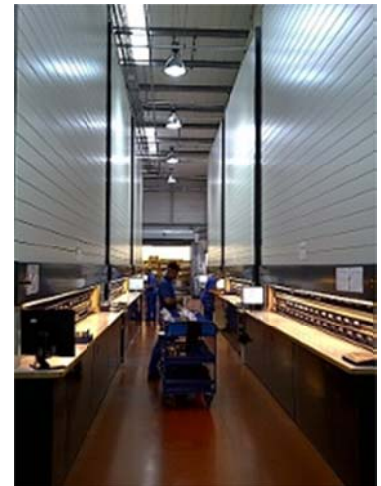
Assembly

- Every seal 40 individual checks signed and dated.
- Individual serial number etching – full traceability.
- Immediate response for standard – same day despatch available.
- 95% of seals built to customer order.
- Over 150 seals per day produced

Component stores

In AESSEAL's mechanical seal component stores there are 10 carousels holding around 1 million components, the carousels handle 1500 movements a day.

- Modular Design System – minimum stock for maximum seals. Around £12M stock worldwide, £5M in Mill Close stores. Keep 8 months predicted stock of all standard components. Full installation instructions in 12 European languages.



R&D Department

To deliver sustained reliability performance, AESSEAL test products to their limits. The test rigs can be programmed to validate seal designs against pre-determined criteria, including:

- shaft speeds (to 45,000rpm)
- challenging temperatures (280°C/536°F)
- high pressures (350 bar/5,000psi)

Testing

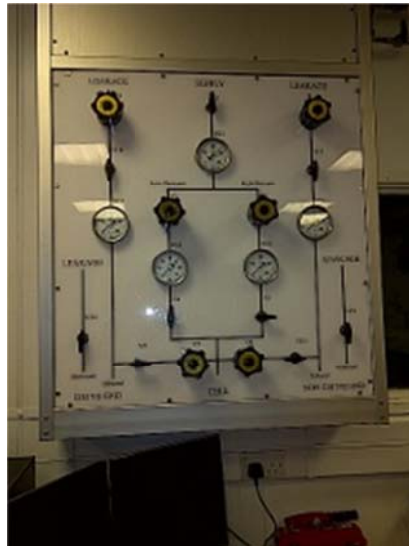
- Advanced testing facilities qualified to API 682 standard on hot water, propane, sodium hydroxide and hot oil (*below left*). Test runs may last several days.
- Full data logging / networking of test results. Proposed new building with state of the art test facilities and visitor reception.
- VOC (Volatile Organic Compounds) Testing
- Provide controlled environment for:

Seal design evaluation

Determination of performance levels

Establishing safe operating parameters

- Designed totally in house the test rig is designed to simulate the same conditions as the intended environment of the seal.
- Cover practical aspects of theoretical courses, barrier system, seal installation and split seal training.
- State of the art Gas seal test facility recently built at a cost of £2m (*below centre*)
- And yes AESSEAL also do plumbing! (*below right*)



Pressure Test

- 100% seals, kits are rigorously tested to higher standard than API682.
- If failure occurs, seal is stripped and re-worked until it passes
- 0.51% failure rate – analysed to pinpoint ongoing problems.
- APT Air Test used

Dispatch

- Daily UPS collections
- Majority shipped is UPS, but can use alternatives at customer request e.g. FedEx