

# Best Available Techniques

## What makes a good stuffing-box packing?

By Russ Pimblett, ESA Member

Made from relatively soft, pliant materials, compression or stuffing-box packings consist of a number of rings, usually of square or rectangular cross-section, of either braided or moulded material that are inserted into the space (stuffing-box) between the pump shaft or valve stem and the body of the pump or valve. By tightening a follower or packing gland against the outermost ring, pressure is transmitted to the packing set, thereby expanding the rings radially resulting in a seal. In today's tough industrial climate there are ever increasing economic and environmental demands on operators to minimize product leakage and emissions. Continued developments in valve packing design and materials have greatly improved the abilities of compression packings to provide long term reliable sealing performance in a wide range of applications. But, in order to answer the question, 'what makes a good stuffing-box packing?', the whole packed gland assembly must be considered and not just the packing itself. There are a whole host of variables that must be taken into account, many of which revolve around



Reputable packing manufacturers test products regularly to ensure highest performance standards are maintained.

the word 'quality'.

**Quality systems** are an important factor to consider. Has the packing been manufactured by a company with ISO 9001 approval specifically relating to the manufacture of packing? Whilst an ISO 9001 quality system by no means guarantees the performance of the finished product, it does give one an indication of the technical expertise relating to its manufacture.

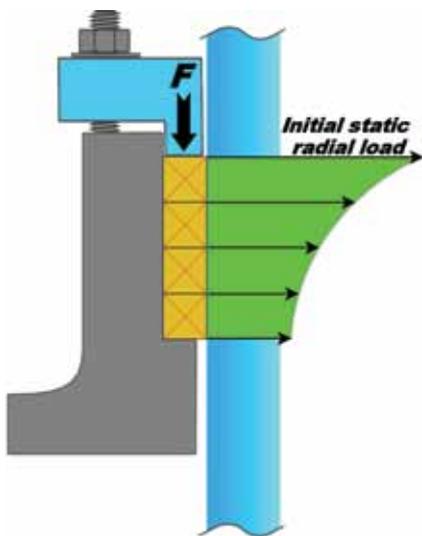
**Quality materials** that go into the packing. Can the supplier provide details and

evidence of the materials used with Certificates of Conformity and test data to prove the performance of the packing? Without this information, is your supplier actually capable of supporting and protecting your business against damages caused by packing failure?

**Quality of selection** of the appropriate packing for the application. Is the supplier asking too many questions about your application that you don't have the time or inclination to answer? Firstly, if the incorrect material is selected, what are you risking? Increased downtime, contamination of product, damage to equipment? What would be the consequences of an operator injury due to incorrect selection? Secondly, the total life-cycle cost is a major issue. A high coefficient of friction leads to high energy consumption. Loss of product through fugitive emissions can impact significantly on profit margins. If packing selection is based on price, how many additional re-packs and downtimes contribute to the real cost against a more expensive alternative.

### BAT guidelines

**Quality of installation** is another major consideration. The time and effort expended on the correct selection of product can be quickly compromised if



Interaction of the elements comprising a shaft or stem seal system (adapted from an original diagram of the FSA).



High quality compression packings have been developed for a huge range of applications.

the fitter does not follow Best Available Techniques (BAT) set out by the European Sealing Association. A number of publications are available to provide assistance here, including the extensive ESA Sealing Technology BAT Guidance Note and, more recently, the fully updated FSA+ESA Compression Packings Technical Manual (both available from the ESA website at [www.eurosealing.com](http://www.eurosealing.com)). When BAT guidelines are followed the packed gland has a significantly increased chance of a long and effective life.

**Quality of maintenance** is another important factor. This is very much in the realm of the plant operator cooperating with the supplier in formulating a suitable maintenance regime for the various pieces of equipment. A typical isolation valve, not subject to a single mechanical cycle and in a static thermal state, would probably need only one annual adjustment. The reverse would be a control valve, constantly cycling and subject to fluctuating temperatures. Several adjustments over a given period would possibly be necessary. Based on the operating conditions a technically competent supplier would

make specific recommendations on installation procedures, correct gland load figures and maintenance of these optimal settings. A car not maintained and regularly serviced would not give 5 years / 100,000 km trouble-free motoring. In the same way if packed glands are not properly maintained they will not provide optimum performance.

**Quality of plant:** As the saying goes, 'You can't make a silk purse from a sow's ear'. Stuffing-box packing is perhaps the most flexible, adaptable and forgiving sealing solution. It will accommodate old, slightly worn and damaged equipment where more rigid machined seals would fail. However, there are limits to how far you can push the boundaries of a packing solution. If a shaft, stem or stuffing box is badly scored or corroded, don't expect the packing to be a 100% leak-free solution or miracle cure. An overhaul or replacement would probably be the economical solution.

### Summary

So, "What does make a good stuffing-box packing?" In summary the packing is only one element of a sealing system and all

aspects of that system must be considered. Ensuring correct packing selection from a technically competent supplier, installed with care and diligence, into suitable equipment and plant that is well maintained, will go a long way to achieving this objective.

The European Sealing Association (ESA) has produced this article as a guide towards Best Available Techniques for sealing systems and devices. These articles are published on a regular basis, as part of their commitment to users, contractors and OEM's, to help to find the best solutions for sealing challenges and to achieve maximum, safe performance during the lifetime of the seal. The ESA is the voice of the fluid sealing industry in Europe, collaborating closely with the Fluid Sealing Association (FSA) of the USA. Together, they form a key source of technical information on sealing technology, which is the basis for these articles. For more information, please visit [www.eurosealing.com](http://www.eurosealing.com)