



Abstract

Session 34: Fundamentals

Author

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Title

34-1: Taking the guesswork out of PTFE seals

Summary

Compressor sealing topics that were not previously fully understood include the formation or destruction of so-called transfer layers on the surface of sealing materials, problems of heavy wear following a change in gas composition, and polishing of piston rods through contact with the packing. The precise interaction between the sealing material, the metal counter face and the gas appeared to be an impenetrable secret.

As a first step toward solving this tribological mystery a unique test rig to reproduce accurately the conditions found in real compressors was used. The test conditions were varied with respect to composition of the sealing material, property of the counter face and gas composition, as well as temperature, stress, face speed and moisture level. The tested specimens of metal and sealing materials were carefully analysed to determine the tribological system.

Having established a reliable way to create wear and analyse the resulting physical and chemical changes the next step was to find out which materials perform best under different conditions. Looking at all the different fillers, both traditional and new, that can be used with PTFE, a test matrix covering possible combinations of sealing material, counter face, gas atmosphere and operating conditions was drawn up.

The results of this test matrix have led to new knowledge of the wear mechanisms in filled PTFE taking the guesswork out of PTFE seals.