

THE CHARACTERISTICS

The single sealing ring, developed and patented by STASSKOL, is a revolutionary sealing design.

The combination of sealing and covering elements in a unique system provides the following characteristics:

- » **homogeneous pressure distribution** within the piston rod packing
- » **lower friction** between the sealing elements and the piston rod as a result of the homogeneous pressure distribution
- » **reduction of frictional heat** as a result of lower frictional forces
- » **longer service life** due to less friction and lower frictional heat
- » **shortening of the length** of the piston rod packing through the compact design which combines the sealing ring and cover ring

REFERENCES

STASSKOL has been using the single sealing ring in a great variety of applications and with the most diverse gases since March 2006. Here are some examples:

- » Nitrogen application, 3 stage compressor
suction pressure in the 1st stage: 7.3 bar(a)
final pressure in the 3rd stage: 59.8 bar(a)
mean piston velocity: 2.9 m/sec
- » Hydrogen application, 2 stage compressor
suction pressure in the 1st stage: 23.5 bar(a)
final pressure in the 2nd stage: 121.5 bar(a)
mean piston velocity: 4.0 m/sec
- » Natural gas application, 3 stage compressor
suction pressure in the 1st stage: 4.5 bar(a)
final pressure in the 3rd stage: 305 bar(a)
mean piston velocity: 5.6 m/sec
- » Oxygen application, 3 stage compressor
suction pressure in the 1st stage: 1.4 bar(a)
final pressure 3rd stage: 33.3 bar(a)
mean piston velocity: 3.1 m/sec



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THE SINGLE SEALING RING
A revolution in sealing technology

HIGH DURABILITY
HIGH SEALING EFFICIENCY OVER ENTIRE SERVICE LIFE
LOW TEMPERATURES DUE TO REDUCED FRICTION

The STASSKOL single sealing ring, which represents a revolution in sealing design, was developed and patented by STASSKOL. The novelty of the single sealing ring is that it allows the pressure load to be spread homogeneously over the entire piston rod packing. This preserves the materials and maximizes the operational service life.

SINGLE SEALING RING DESIGN

A revolution of sealing technology

THE CHALLENGE

The piston rod seal is a vital component in a piston compressor. To ensure that the compressor functions optimally, the sealing elements must possess the following characteristics:

- » a long service life
- » high gas tightness over the entire lifetime
- » low frictional forces

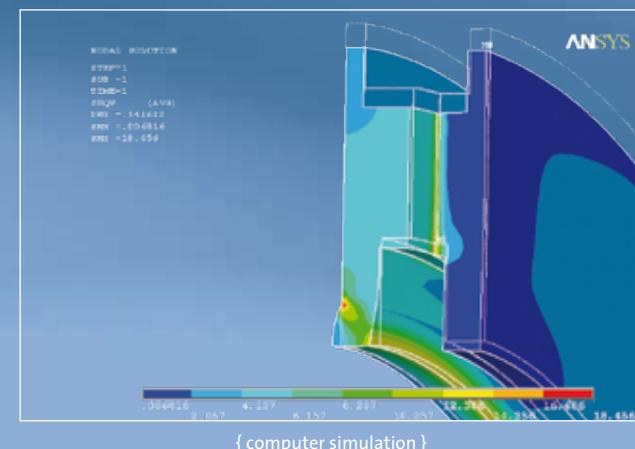
Conventional seal designs rely on a combination of a sealing ring and a cover ring, to form a sealing ring pair in each chamber. In this arrangement, only the first and the final sealing ring pair in the piston rod seal are carrying the entire pressure load between the cylinder and the atmosphere.

This situation leads to strong local contact forces between the seal elements and the piston rod, which can result in high levels of friction and increased wearing.

Our most important task, therefore, was to develop an optimized sealing ring design that combines all of the positive characteristics within a single system.

THE METHOD

To develop new products, STASSKOL combines cutting-edge techniques, such as computer aided pressure, temperature and flow simulations, with experiments carried out on an in-house test compressor under field conditions.



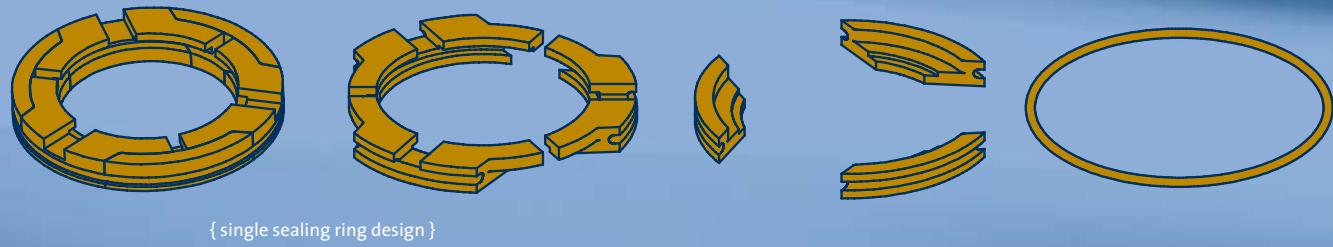
The STASSKOL test compressor is able to digitally measure the pressures and temperatures in every chamber, as well record any leakage, from 2 piston rod packings positioned both horizontally and vertically. Analysis of the data allows the operational principles of different sealing ring designs to be examined and proven.

THE SOLUTION

The single sealing ring combines the traditional sealing ring and cover ring to form a single unique sealing ring - a compact design which enables the length of the piston rod packing to be shortened.

The optimized design of the single sealing ring allows the pressure load between the cylinder and atmosphere to be spread consistently over the entire piston rod packing, which enables the local contact forces between the sealing elements and piston rod to be greatly reduced.

The groove along the inner diameter of the single sealing ring also leads to a reduction of the pressure load, which in turn reduces frictional heat and increases the lifetime.



THE DATA

The advantage of the single sealing ring, when compared to conventional sealing designs, is its ability to distribute the pressure load between cylinder and atmosphere over the entire piston rod packing. The pressure spread measured on the test compressor can be seen in the following diagram.

