
STASSKOL
MATERIALS THAT MAKE A DIFFERENCE
STASSKOL

102 Years of Experience
in Sealing Technologies and Applications

1920	Founded as “Deventer“ - Manufacturer of machine parts and sealing elements
1945	Restart after WWII as “Dichtungswerk Stassfurt“
1990	Part of the “Kombinat Pumpen und Verdichter“ - Manufacturer of sealing systems for diesels and compressors
1991	Renaming company into “STASSKOL“
2001	Major shares are taken over by “Neuman & Esser“ - NEA
Oct. 2001	Start of construction of the new facilities
Jul. 2002	Start of production at the new facilities
Feb. 2005	First run of the TEST-COMPRESSOR
Jul. 2008	Initial operation of the NEW OSCILLATING TRIBOMETER
Jul. 2010	Initial operation of the NEW MATERIAL CENTER
Nov. 2011	Initial operation of our additional NEW FACILITY
Jul. 2015	Foundation of STASSKOL Inc. in Katy (Houston – USA)
Sept. 2019	Start of production at the new Machine shop
Oct. 2019	Start of production at the new Material centre
Oct. 2019	STASSKOL office in Pune
Feb. 2021	Distributor and Consultant in Japan
April 2021	STASSKOL Kunshan Ltd. in China

100 Years of Experience
in Sealing Technologies and Applications

STASSKOL

STASSKOL facility expansion – 2002 to 2021

Material center since 2019
(Bushing production, cold
& hot compression molding)

Test facility – 2005
(test compressor,
rotating test equipment,
tribological test equipment)

Machining facility – 2019
(Machining production,
from bushing to final product)

Material center – 2009 till 2019 – now Powder center
(Powder storage and mixing)

100 Years of Experience
in Sealing Technologies and Applications

STASSKOL

100 Years of Experience
in Sealing Technologies and Applications

STASSKOL

100 Years of Experience
in Sealing Technologies and Applications

STASSKOL GmbH
in Stassfurt (Germany)

90 employees
10 Mio € turnover

STASSKOL Inc.
in Katy (USA)

13 employees
4.0 Mio € turnover

Sales and engineering office
in Pune, India

3 employees
1,1 Mio € turnover

Sales and engineering partner
in Japan

WORLD VALVE CO., LTD.
Imagination&Creativity

100 Years of Experience
in Sealing Technologies and Applications

RECIP SYSTEMS

The name STASSKOL stands for piston rod and oil wiper seals, quality products made in Staßfurt.

ROTATING SYSTEMS

Vacuum, cell, screw, fluid ring, and turbo compressors, all require a diverse range of sealing elements, in order to seal off the compressed medium from the surrounding atmosphere.

MATERIALS

STASSKOL has been creating its own materials for several years with the help of research and development methods, which set new standards in sealing technology.

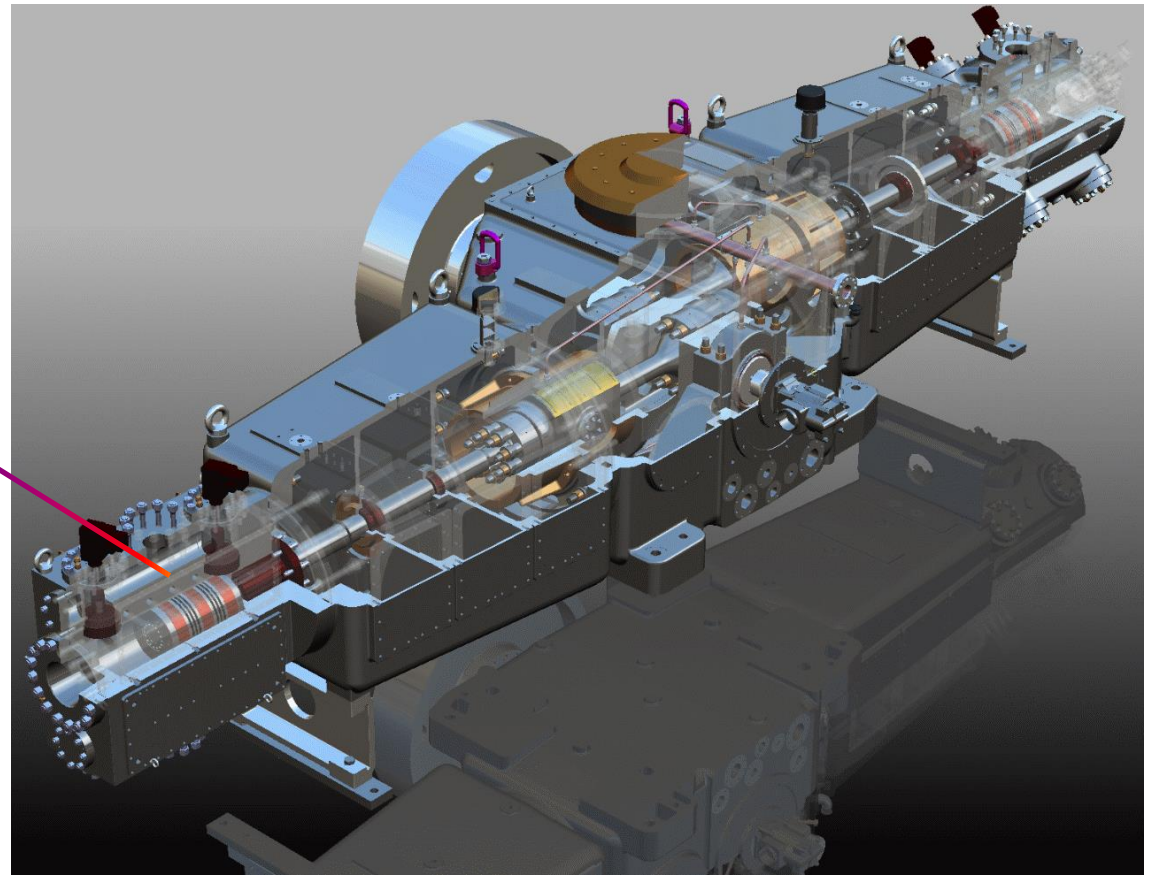
Main customers in the field of API618/PET/CNG that we are working with:

- Siemens Dresser Rand
- Leobersdorfer Maschinenfabrik (LMF)
- Borsig ZM
- Köhler & Hörter (KOHO)
- ARIEL
- SIAD
- Atlas Copco (AC)
- Neuman & Esser (NEA)
- Howden (Thomassen)
- Mehrer Compression
- Sauer
- Corken
- Clean Energy
- FornovoGas (FG)
- Kirloskar (KPCL)
- Burckhardt Compression (BC)
- Safe
- KwangShin
- and other OEMs

Products for Recips

STASSKOL

Piston and guide rings



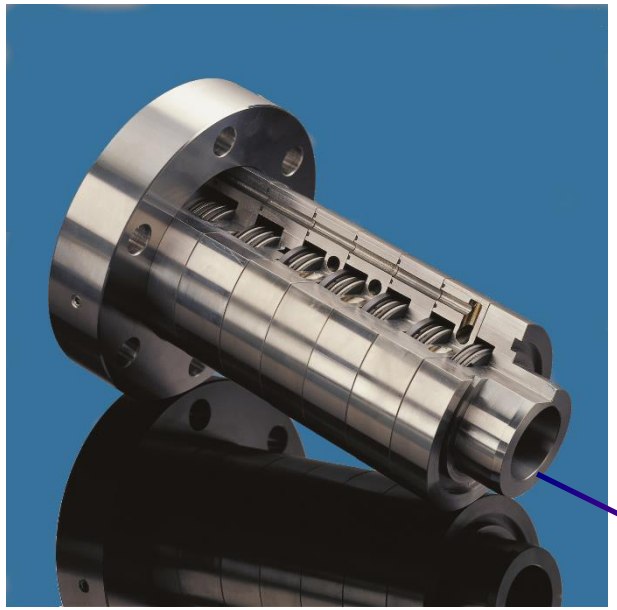
- **STASSKOL rings are applied:**

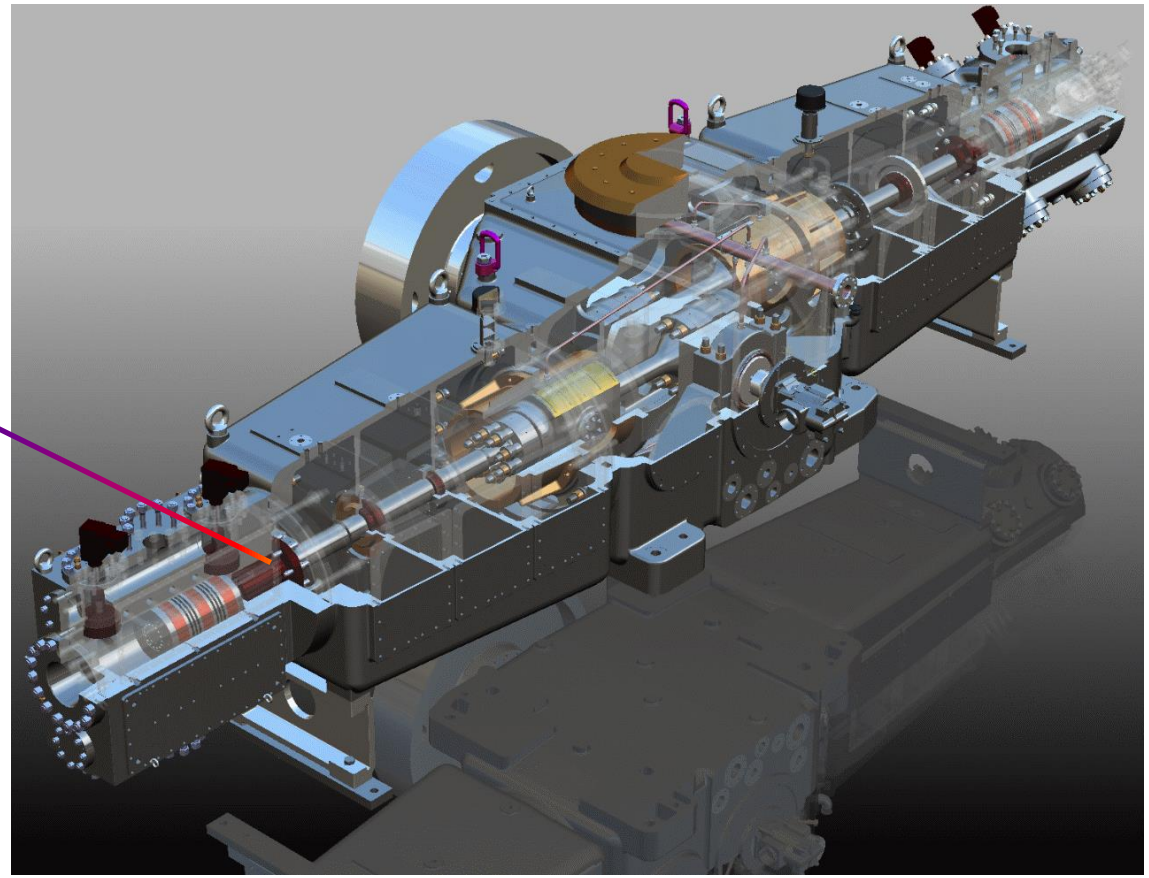
- for any technical gas
- for bone dry gases
- for Oxygen, including BAM-certificate
- up to 700 bar final pressure
- for lube and non lube service
- PEEK materials, PTFE-Compounds

- for any design:
  - rectangular rings with/without springs
  - angular rings
  - labyrinth type ring
  - one piece and multiple piece design rings

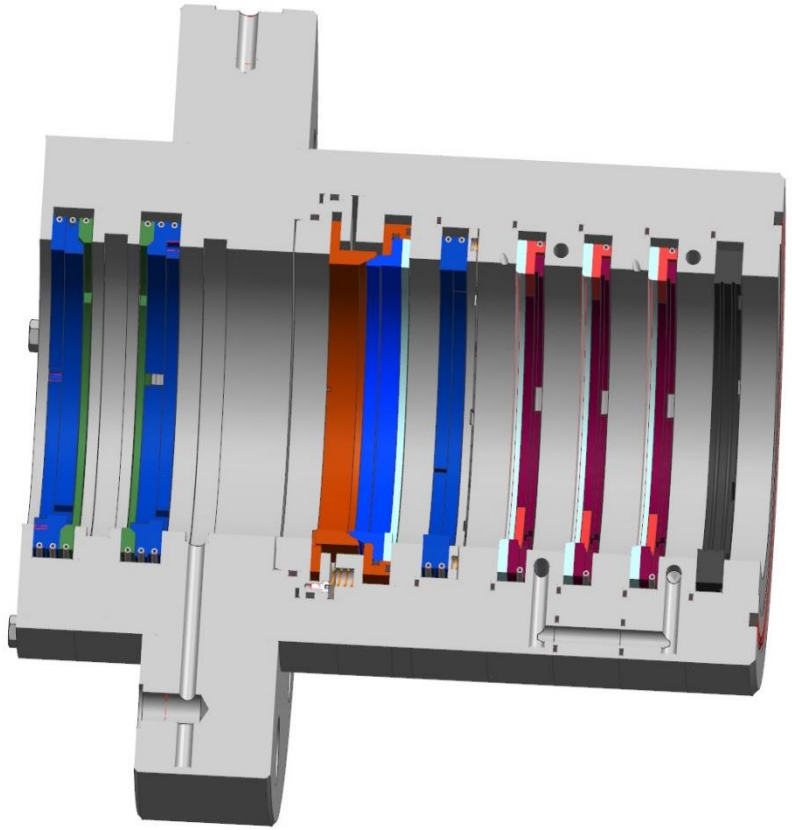
STASSKOL

Piston rod packings



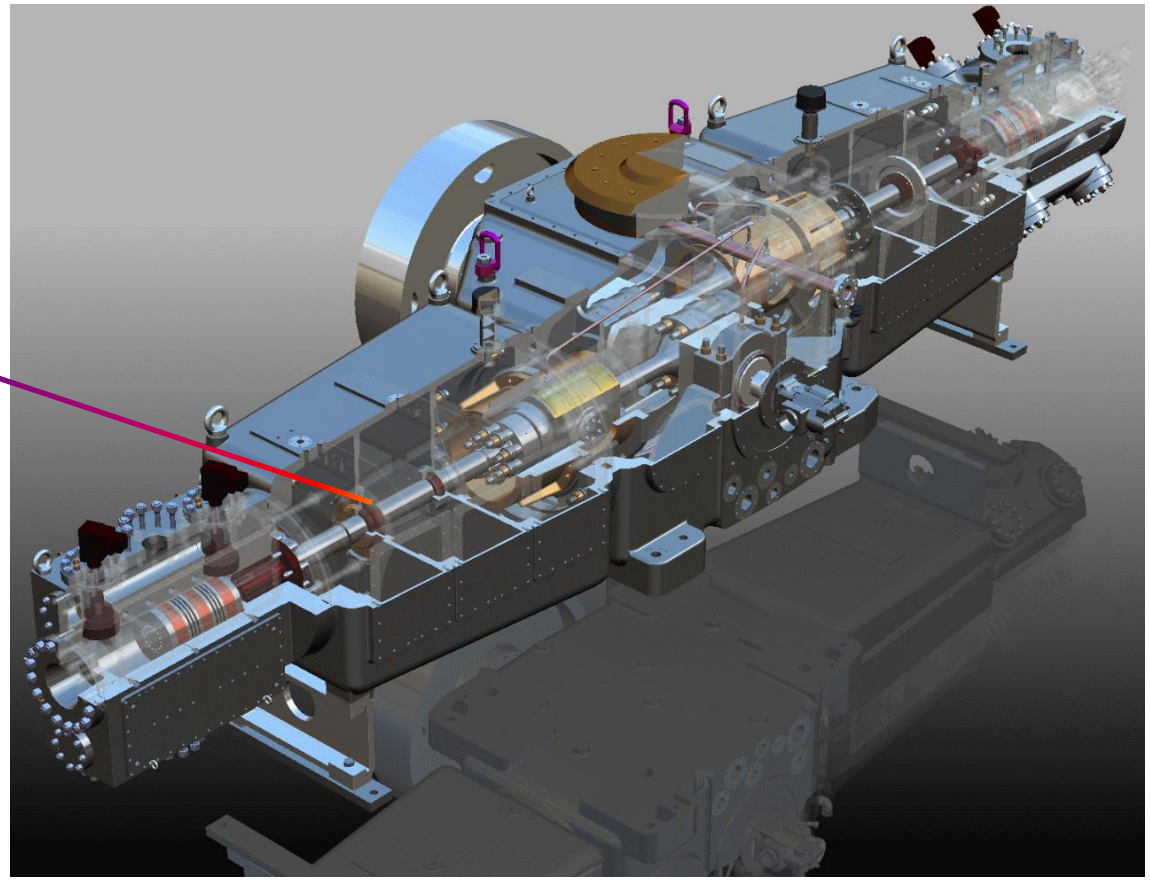


Piston rod packings



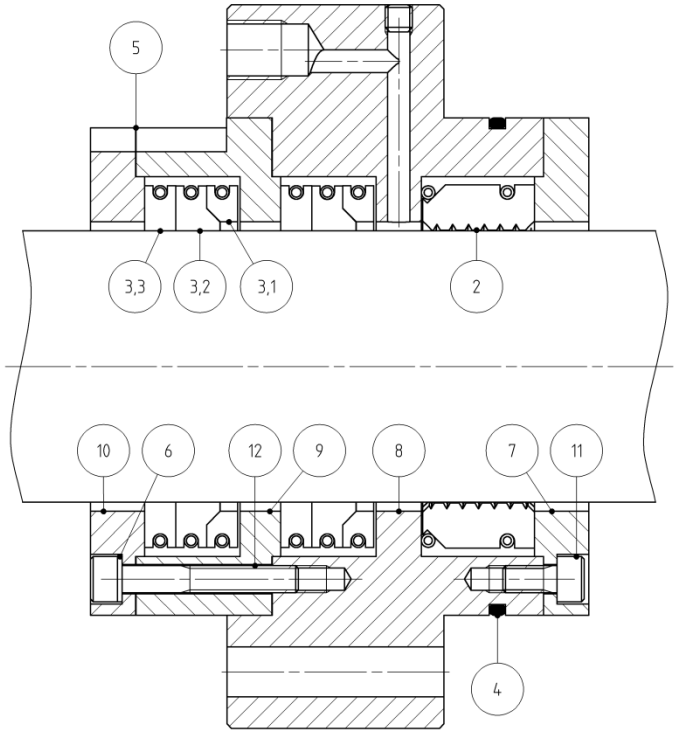
- Piston rod packings for lubricated or non-lubricated piston compressors (cooled and non-cooled version with connections for leakage gas, buffer gas,purge gas and with static pack)

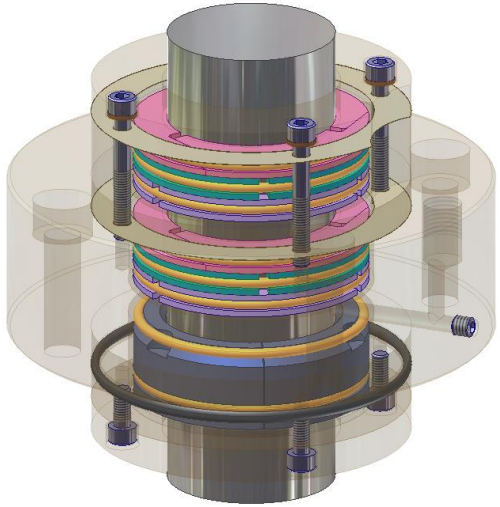
Intermediate packings



Intermediate packings

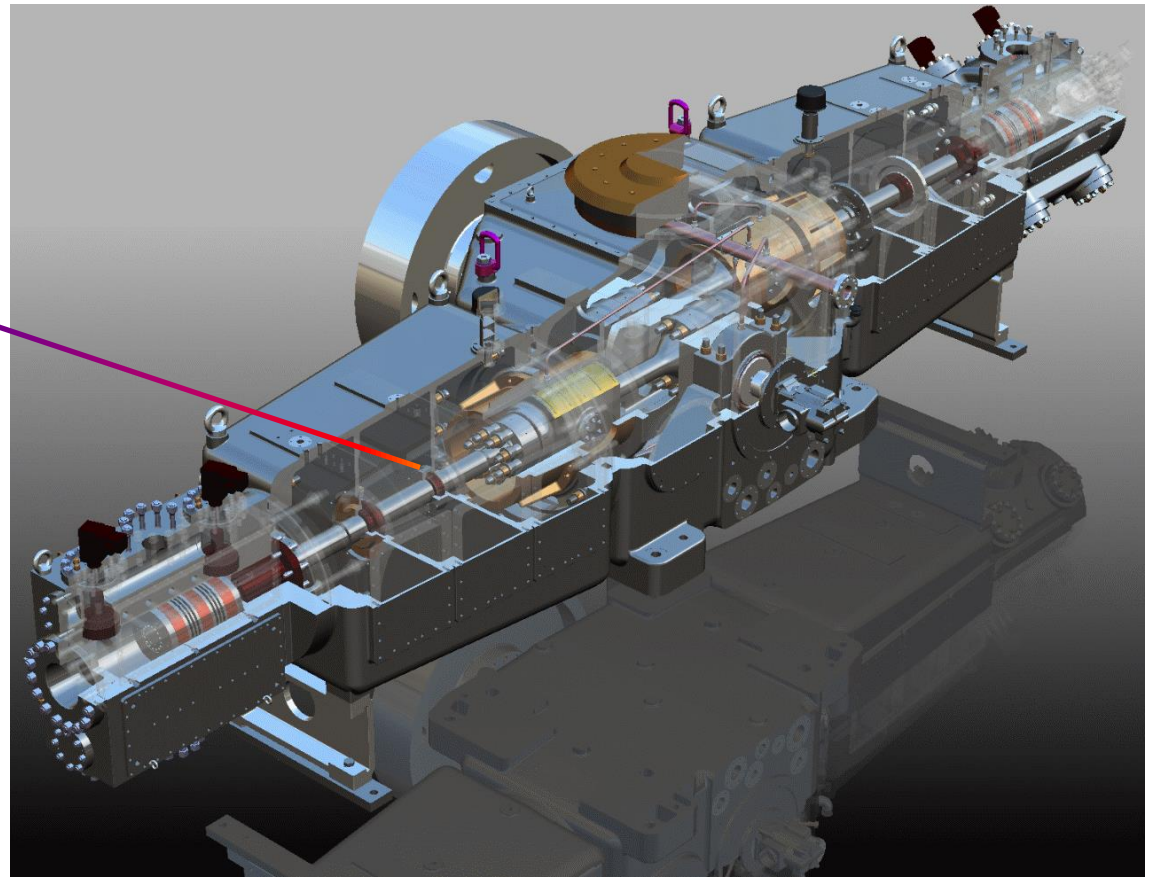
Instead of pressurizing the crank case, is necessary to fit a double distance piece, which is separated from each other by the use of an intermediate packing.





Intermediate packings are applied especially when it comes to the compression of toxic and highly combustible gases. Since these packings are purged they contribute to the safety of the plant.

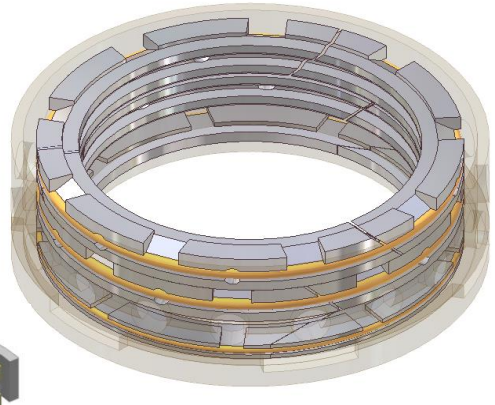
Oil wiper packings

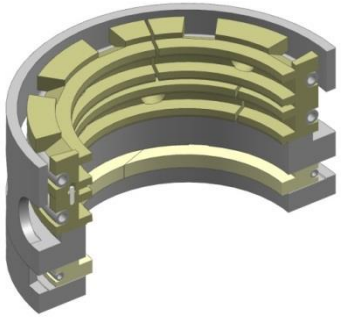


OS – Oil wiper packings

for piston diameter 50 mm

for piston diameter 140mm





Material that used for oil wiper rings:

- White bronze
- Grey cast iron
- Bronze
- White metal
- PTFE

This has helped us to achieve:

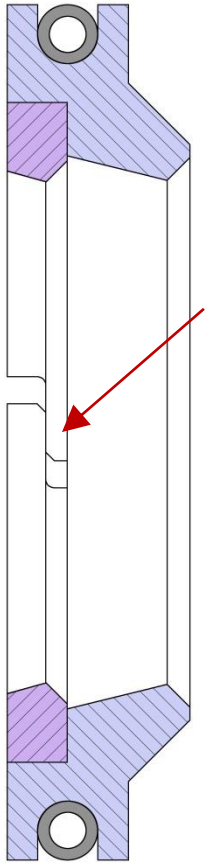
- almost 100 percent oil removal
- additional cost saving by reducing oil consumption
- increase in operating hours of piston compressors
- use with piston compressors of most different makes and models
- assembly-friendly handling
- flexible use, also with existing cases

OS – Oil wiper packings

patent (applied): Oil wiper sealing design

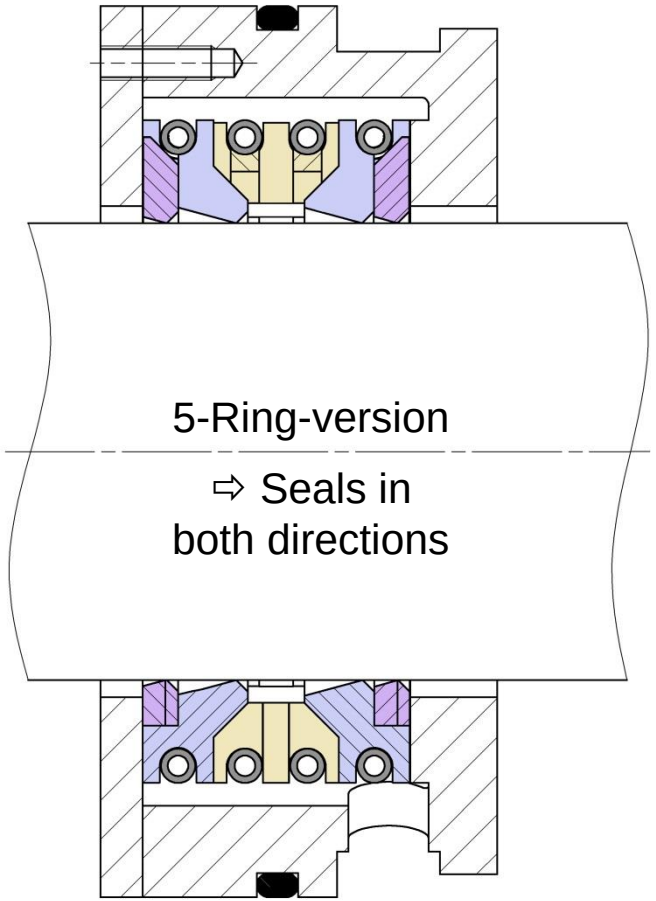
BOSS (Balanced Oil Sealing Solution)

New oil wiper sealing design out of PTFE/PEEK



2nd Scraper ring in overlapped version

- ⇨ Oil- and gastight
- ⇨ Replacement for gastight oil wiper systems

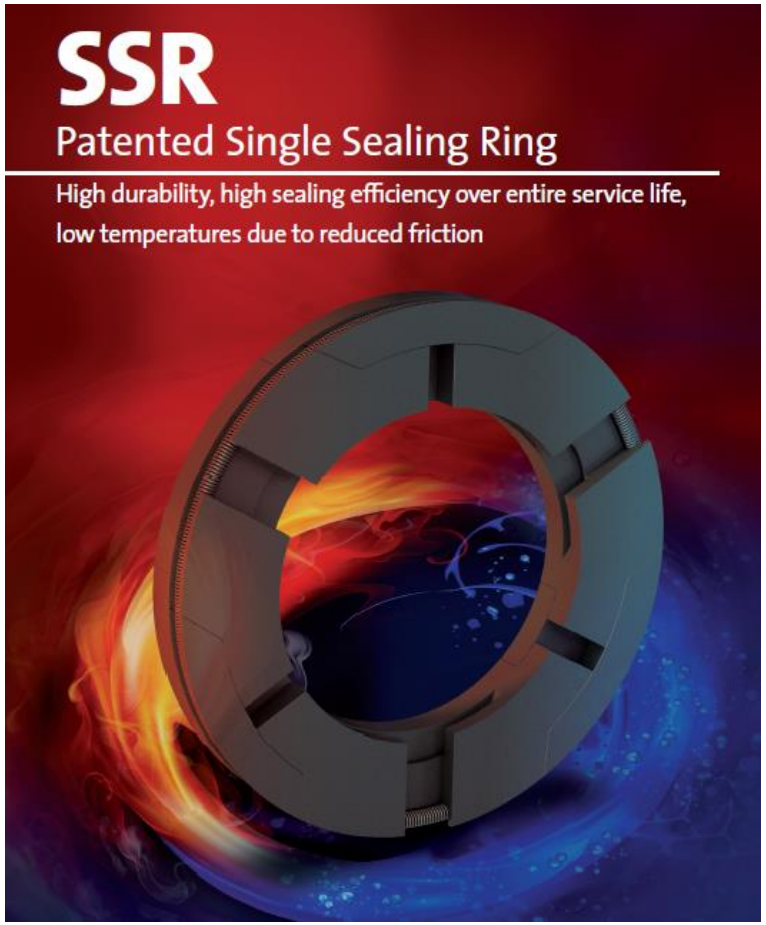


Actual: Construction of the gas tight version for compressor testing

⇒ Zero Leakage after 100 running hours

⇒ Field result: Positive Feedback by LMF and Dresser:
70 % Leakage reduction

Products for Recips



STASSKOL

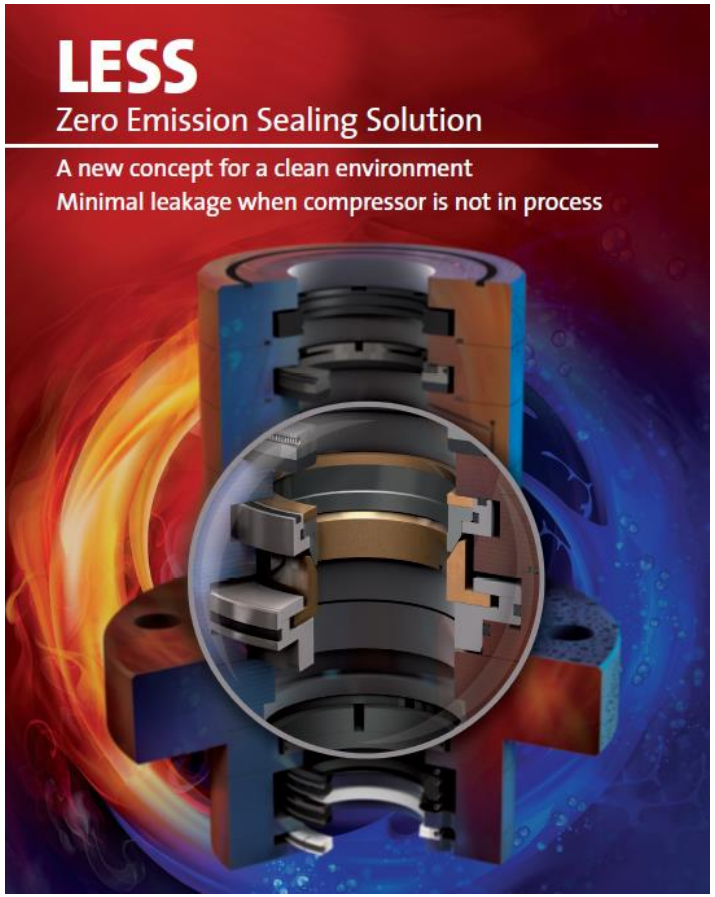
DEVELOPMENT

SINGLE SEALING RING SSR

STASSKOL

DEVELOPMENT

GAS TIGHT RING SOLUTION
GTRS



STASSKOL

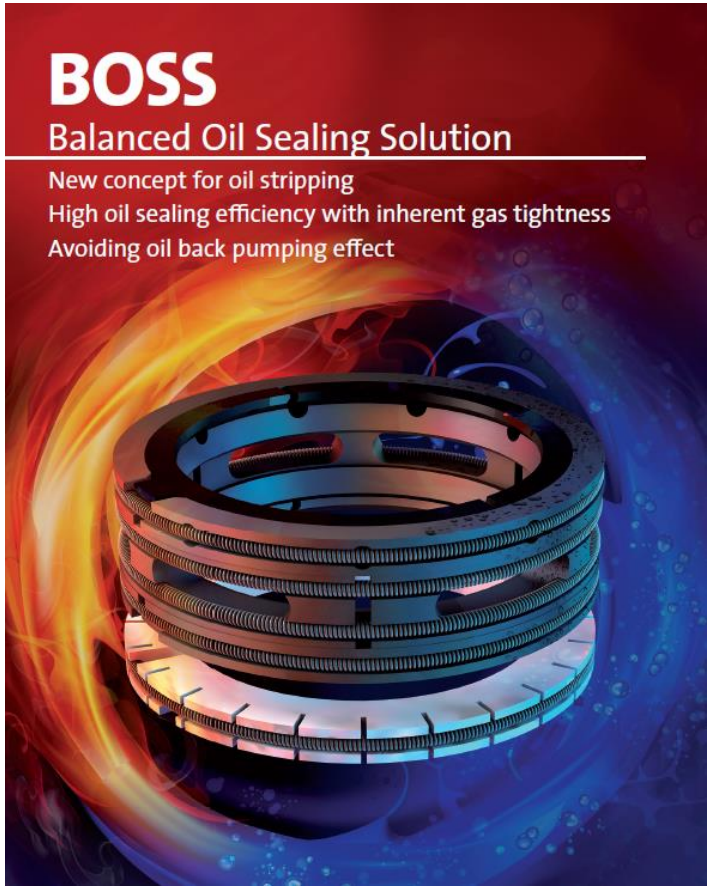
DEVELOPMENT

LOW EMISSION SEALING SOLUTION LESS

STASSKOL

DEVELOPMENT

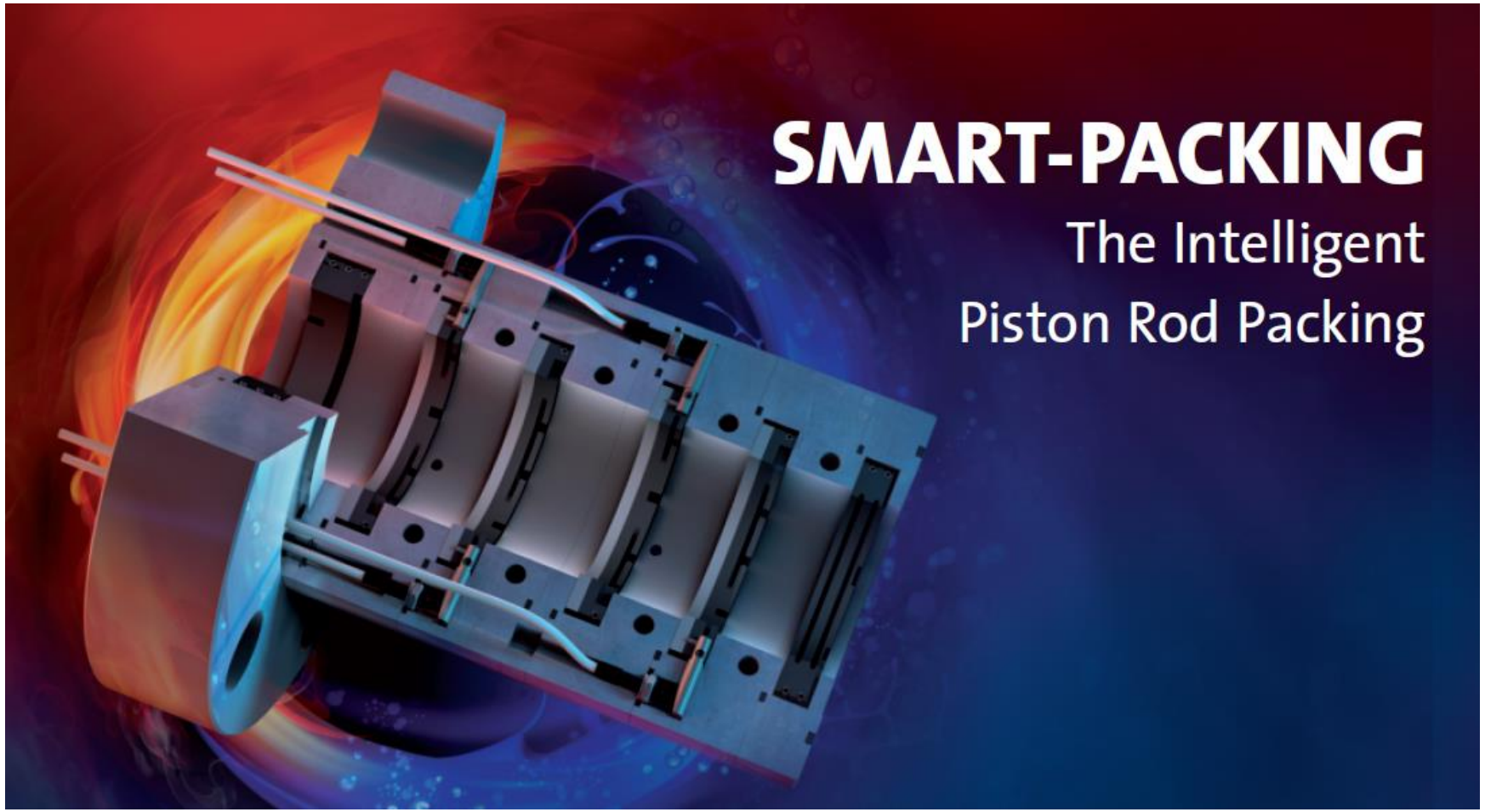
COMPRESSED NATURAL GAS SOLUTION CNGS



STASSKOL

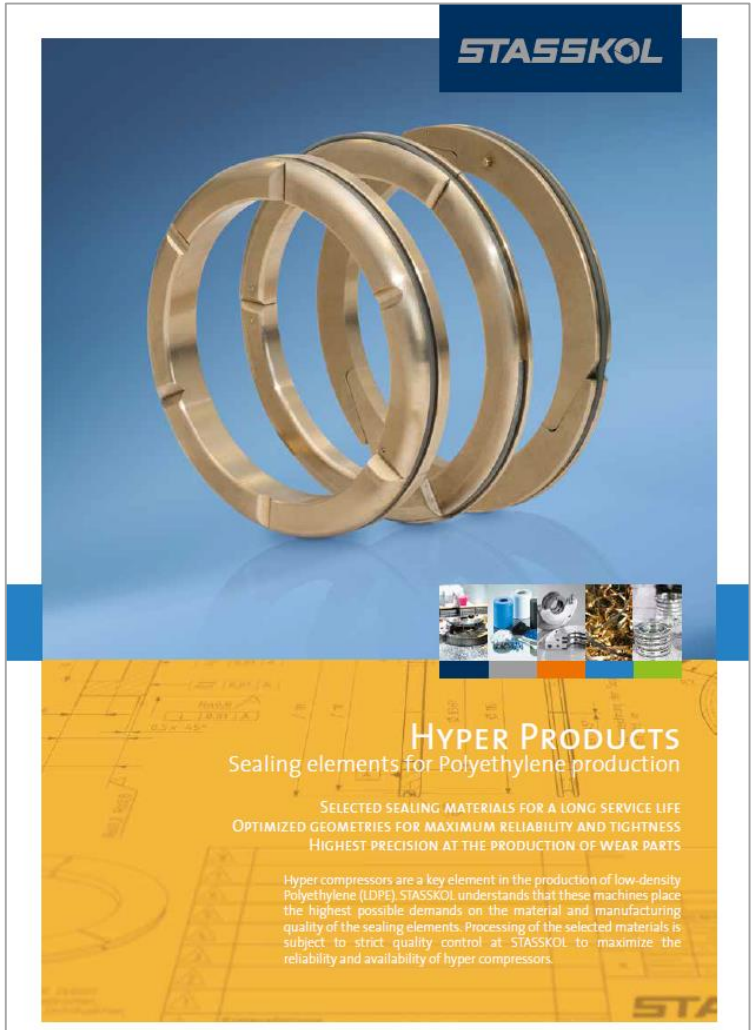
DEVELOPMENT

BALANCED OIL SEALING SOLUTION BOSS


SMART-PACKING
The Intelligent
Piston Rod Packing

Products for Recips

STASSKOL



Material & Product Development

Material Development

- Development of a new materials **PTFE basis**:
  - SK202 – for dry & lube gases, e.g. Hydrogen, Natural gas, Carbondioxid …
  - SK306 – for lube service, e.g. Hydrogen
  - SK302 – for dry gases e.g. Air, Nitrogen ...
  - SK313 – for dry gases, high pressure (PET) e.g. Air, Nitrogen ...
  - SK401 – for dry gases e.g. Hydrogen, Natural gas …
  - SK406 – for dry gases e.g. Hydrogen, Polysilicon applications …
  - SK701 – for dry gases, e.g. Nitrogen …
  - SK801 – for bone dry gases e.g. Hydrogen, Natural gas, LNG, BOG Nitrogen ...

- Development of a new materials **PEEK basis**:
  - SK901 – for lube gases, e.g. Hydrogen, Natural gas …
  - SK904 – for lube gases, high pressure e.g. Hydrogen, Natural gas …
  - SK907 – for lube gases, high pressure e.g. Air …

- Development of a new materials **PI basis**:
  - SK921 – for lube gases, e.g. Hydrogen, Natural gas, LNG …

Material Development

2. Material choice

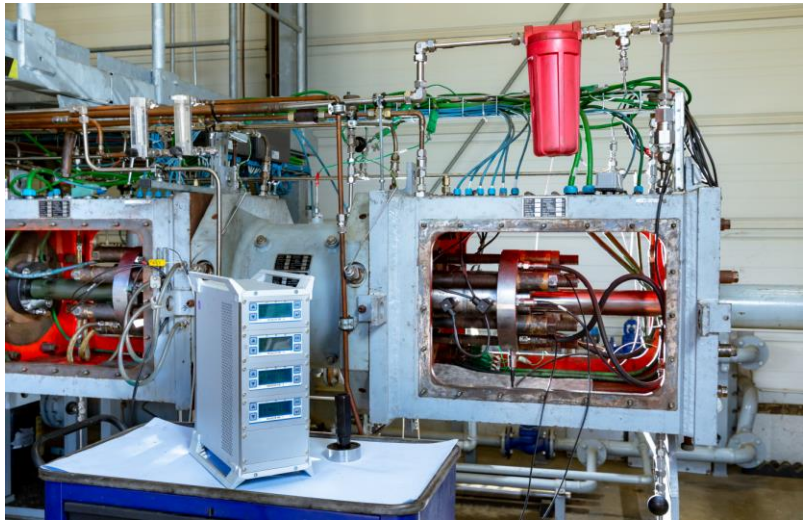
The following table is a guideline for choosing the right sealing material according to gas composition, dew point and lubrication.

Gas	Lubricated Service	Dry-running service	
		$t_d \geq -50$ °C	$t_d < -50$ °C
Air	SK202[1]	SK313	SK302[5]
Ammonia (NH_3)	SK202[1]	SK202	SK202
Carbon monoxide (CO)	SK202[1]	SK202	SK803
Carbon dioxide (CO_2)	SK202[1]	SK202[4]	SK803[4]
Oxogas (H_2/CO)	-	SK406	SK406
Chlorides (Cl_2, HCl, etc.)	SK202[1]	SK406	SK801
Flare gas	SK202[1]	SK406	SK801
Fluorinated gas (TFE, FCKW, etc.)	SK901	SK901	SK901
Hydrogen	SK306[2,3]	SK406	SK801
Hydrocarbons (Ethylene, Propane, etc.)	SK202[1]	SK406	SK801
Hydrogen sulfide (H_2S)	SK202[1]	SK406	SK801
Inert gas (N_2, He, etc.)	SK202[1]	SK703	SK703
Methane (CH_4, Biogas, LNG, BOG)	SK202[1]	SK202	SK803
Oxygen (w/ BAM certificate)	n/a	SK305	SK305
Polysilicon application	n/a	SK406	SK406
Sulfur dioxide (SO_2)	SK202[1]	SK406	SK801

[1] For standard pistons rings above 100 bar (Δp) or gas tight rings above 80 bar (Δp) use SK901/SK904
[2] SK306 for new machines // Replacement of SK301 with SK202 at repeating orders
[3] For piston and guide rings above 80 bar (Δp) use SK901
[4] For tobacco applications: PTFE-free carbon material SK602
[5] For dry Air applications up to 20 bar(g) SK202 can be used

Material Development

Testbed for Material and Product Development



Rotating Systems

Sealing Experts for Special Applications In Rotation Equipment

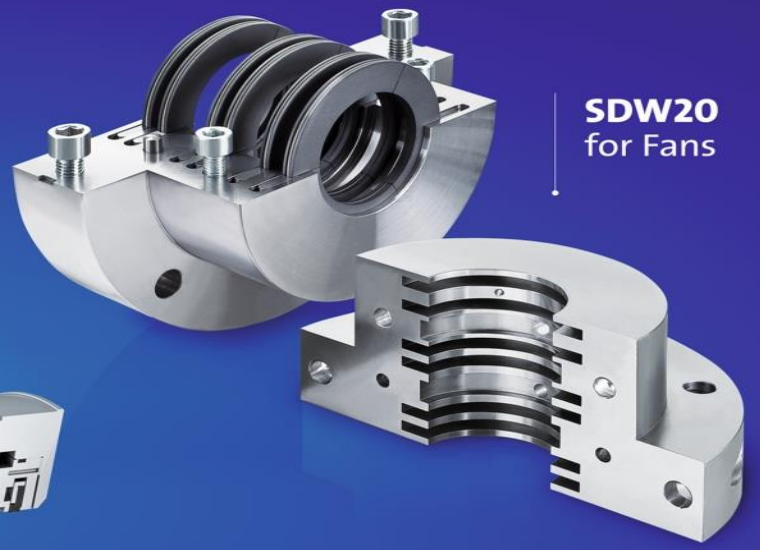
STASSKOL

- In-house material development
- In-house material production
- State-of-the-art test bed

SDG102
for Pumps

SDR300
for Blender

SDK80
for Turbines



SDW20
for Fans

SDS100
for Turbo Compressors

SDP500
for Agitators

STASSFURT **GERMANY** | HOUSTON **USA**

www.stasskol.de

100 Years of Experience
in Sealing Technologies and Applications

Main customers in the field of Rotating Equipment's that we are working with:

- Siemens
- Borsig ZM
- Atlas Copco
- Neuman & Esser
- Howden
- Kirloskar
- Piller
- FIMA
- Reitz
- TLT
- Bühler
- LTG
- ANOD
- Flottweg
- Team Turbo
- Mixaco
- and other OEMs

Carbon Ring Seal – Split Housing Designs

Radially cut ring seal SDW20

Features
- Low friction
- Low heat generation
- Long service intervals
- Small self-adjusting sealing gap
- Customized purge gas or grease connection

Materials
- Sealing rings made of carbon or PTFE
- Housings made of 1.4021, 1.4571 or others

Applications
- Blowers, Turbo-Compressors, Steam Turbines, Mixers
- Vacuum up to 25 bar

Carbon Ring Seal – Split Housing Designs

Overlapped sealing ring seal SDW50

Features
- Gastight overlapped gaps
- High sealing efficiency
- Compensation of axial and radial shaft movement

Materials
- Sealing rings made of carbon or PTFE
- Housings made of 1.4021, 1.4571 or others

Applications
- Blowers, Mixers
- Vacuum up to 3 bar

Carbon Ring Seal – Cup Designs

Radially cut ring seal SDK30

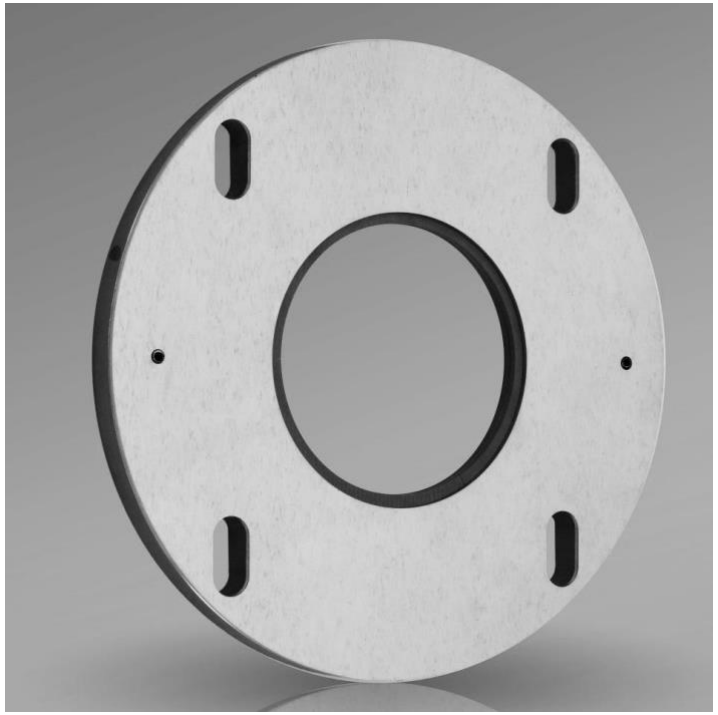
Features
- Low friction
- Low heat generation
- Long service intervals
- Small self-adjusting sealing gap
- Customized purge gas or grease connection

Materials
- Sealing rings made of carbon or PTFE
- Housings made of 1.4021, 1.4571 or others

Applications
- Blowers, Ventilators, Mixers
- Vacuum up to 3 bar

Carbon Ring Seal – Cup Designs

Radially cut ring seal SDK31



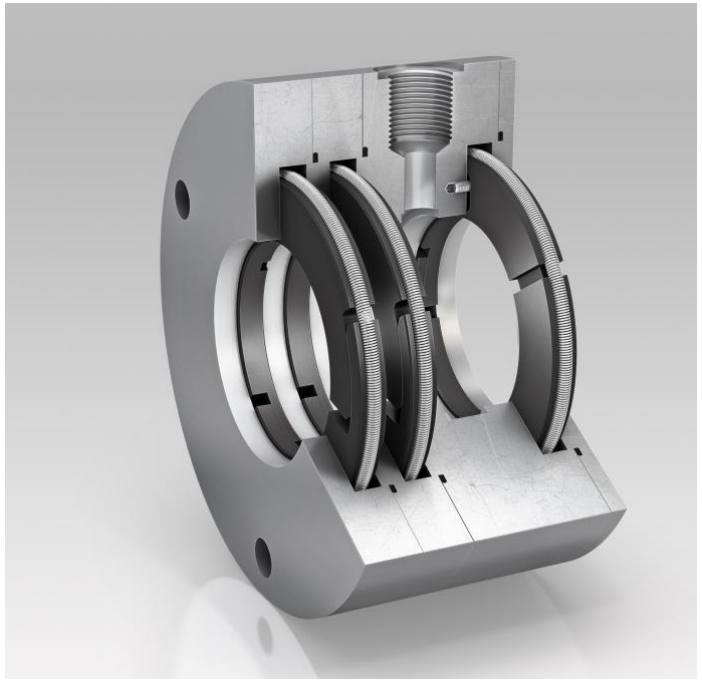
Features
- Low friction
- Low heat generation
- Long service intervals
- Small self-adjusting sealing gap
- Inexpensive
- Short term delivery as parts are on stock

Materials
- Sealing rings made of carbon or PTFE
- Housings made of 1.4571 or others

Applications
- Blowers, Ventilators, Mixers
- Vacuum up to 1,5 bar

Carbon Ring Seal – Cup Designs

Overlapped ring seal SDK60



Features
- Gastight overlapped gaps
- High sealing efficiency
- Compensation of axial and radial shaft movement

Materials
- Sealing rings made of carbon or PTFE
- Housings made of 1.4021, 1.4571 or others

Applications
- Blowers, Ventilators, Mixers
- Vacuum up to 3 bar

Carbon Ring Seal – Cup Designs

Radially cut ring seal SDK40

Features
- Low friction
- Low heat generation
- Long service intervals
- Small self-adjusting sealing gap

Materials
- Sealing rings made of carbon
  Housings made of 1.4021,
  1.4571 or others

Applications
- Gas- and Steam Turbines, Turbo compressors, Mixers, Blowers
- Vacuum up to 50 bar

Carbon Ring Seal – Cup Designs

Solid ring seal SDK80

Features
- Contactless, no friction
- No heat generation
- Long service intervals
- Small sealing gap
- Solid rings, bandaging depends on specific application

Materials
- Sealing rings made of carbon Housings made of 1.4021, 1.4571 or others
- Bandages made of Titanium

Applications
- Gas- and Steam Turbines, Turbo compressors
- Vacuum up to 100 bar

Carbon Ring Seal – Cup Designs

Solid ring seal SDS100

Features
- Contactless, no friction
- No heat generation
- Long service intervals
- Small sealing gap
- Solid rings, bandaging depends on specific application
- High sealing efficiency and compact design

Materials
- Sealing rings made of carbon Housings made of 1.4021, 1.4571 or others
- Bandages made of Titanium

Applications
- Gas- and Steam Turbines, Turbo compressors
- Vacuum up to 150 bar

Labyrinth Seals

Labyrinth Seal SDL90

Features
- Contactless, no friction
- No heat generation
- Long service intervals
- Internal bandage made of carbon allowing small sealing gap

Materials
- Shaft and sleeve and housing made of 1.4301, 1.4021, 1.4571 or others
- Bandages made of carbon

Applications
- Gas- and Steam Turbines, Blowers
- Vacuum up to 100 bar

Labyrinth Seals – Split Housing Designs

Labyrinth Seal SDL90

Features
- Contactless, no friction
- No heat generation
- Long service intervals
- Internal bandage made of carbon allowing small sealing gap

Materials
- All in one made of PEEK or PTFE

Applications
- Blowers, Mixers

Mechanical Seals SDG 100 Series

Single-acting seal SDG100 E

Features
- Cartridge design for easy installation
- Available with customized connections for flush
- Quench version SDG200 Q also available
- Shaft diameter 25mm…100mm

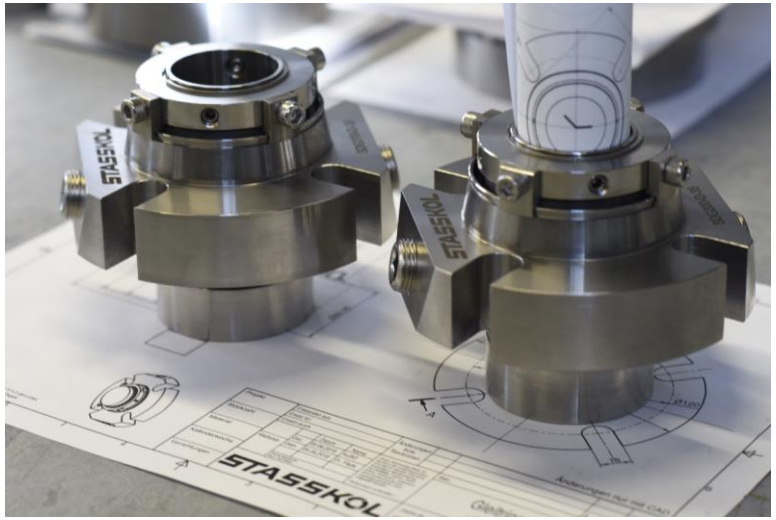
Materials

Face ring:	Carbon, SiC, WC
Mating ring:	SiC, WC
Secondary seals:	NBR, EPDM, Viton, Kalrez etc.
Metal parts, springs:	1.4401 (SS316), Hastelloy C

Applications
- Pumps
- Up to 25 bar
- -40°C …220°C

Mechanical Seals SDG 100 Series

Double-acting seal SDG100 D



Features

- Cartridge design for easy installation
- Available with customized connections for flush and buffer liquid
- Shaft diameter 25mm…100mm

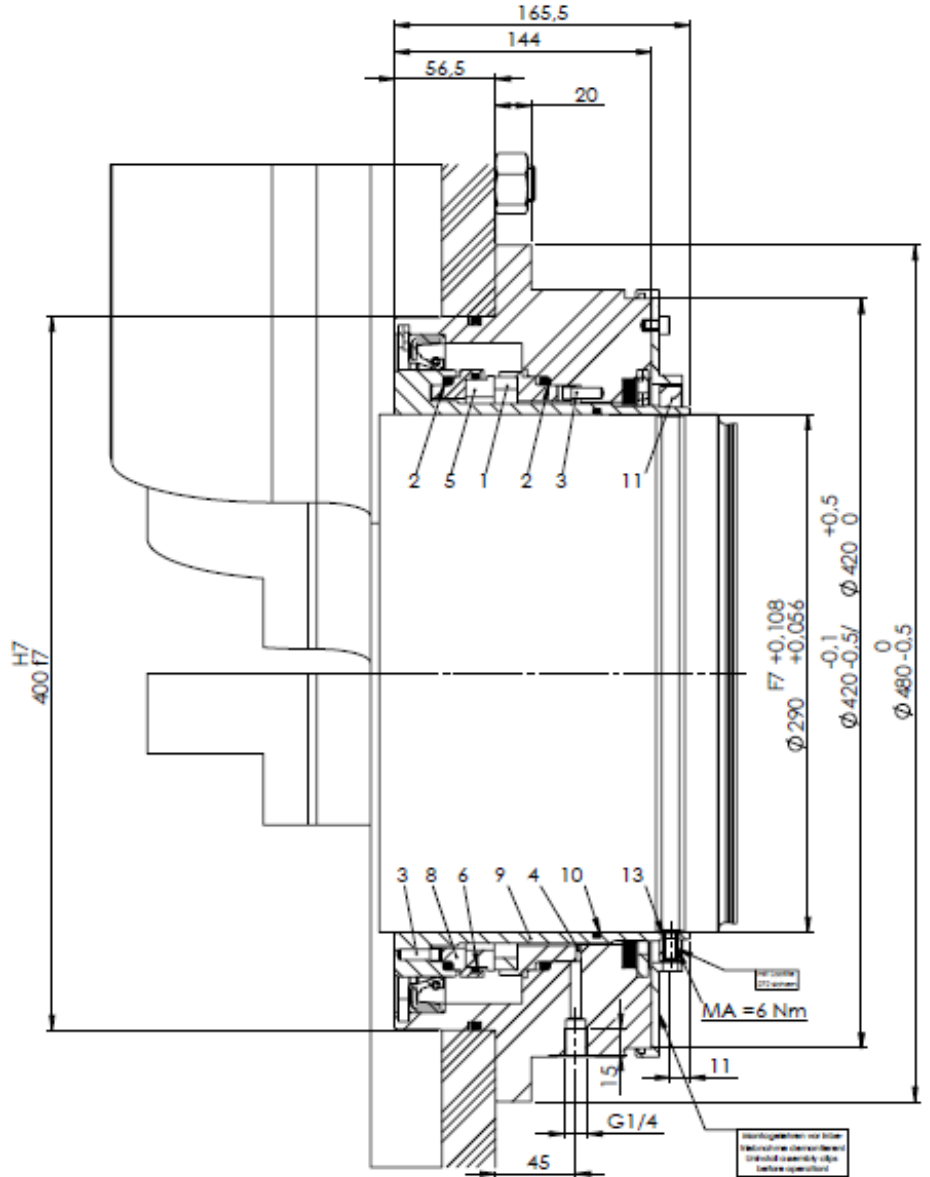
Materials

Face ring:	Carbon, SiC, WC
Mating ring:	SiC, WC
Secondary seals:	NBR, EPDM, Viton, Kalrez etc.
Metal parts, springs:	1.4401 (SS316), Hastelloy C

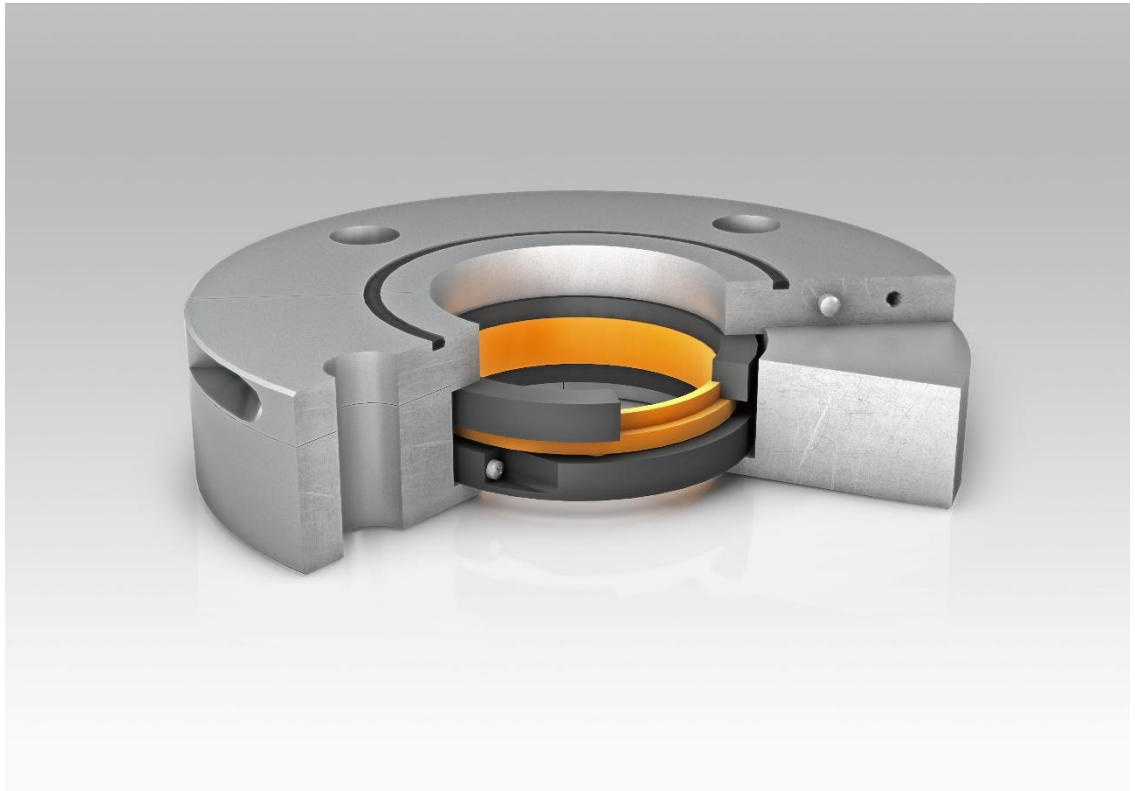
Applications

- Pumps
- Up to 25 bar
- -40°C …220°C

Mechanical Seals
SDG 100 Series



Roto Cup
SDR 300 Series



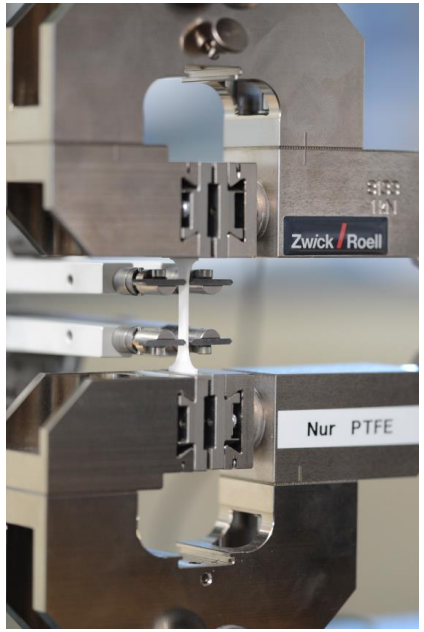
Mixer Seal
SDP 500 Series

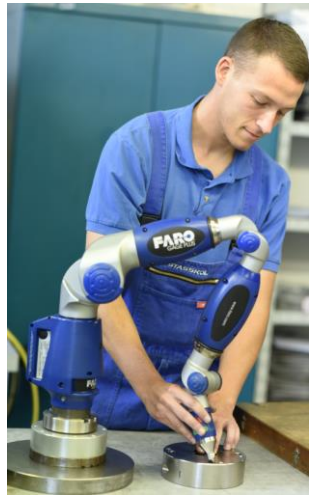
Conclusion and Forecast

Own Production and Quality Assurance

Machine Shop

Material and Dimensional Tests





Brand names & Patents

Patents

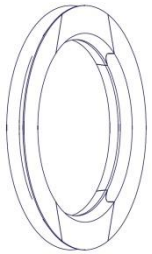
2006

DE: Patent issued
EP: not applied

2006

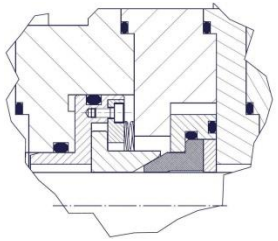
DE: Patent issued
EP: not applied

2008



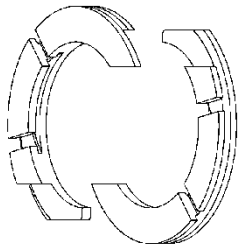
DE: Application pending
EP: not applied

2010



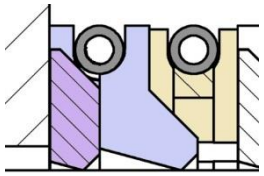
DE: Application pending
EP: not applied

2012



DE: Patent issued
EP: not applied

2015

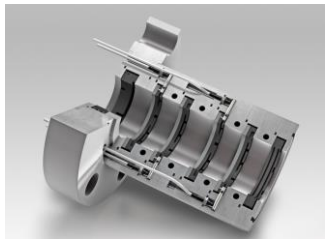


DE: Application pending
EP: Application pending

2017

DE: Application pending
EP: not applied

2018



DE: Application pending
WO: Application pending

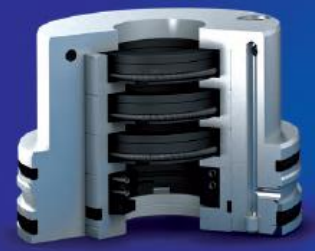
Conclusion and forecast

- STASSKOL is providing spare parts for nearly **every piston compressor application.**
- The **RELIABILITY** (→ life-time) is the most important feature.
- STASSKOL is developing its own **Materials** with improved wear resistance.
- **PTFE and PEEK grades** will be constantly optimized for future challenges.
- **Pure wear resistance** is not the only criterion for high service-life-times.
- **Balance of Mechanical and Material properties** are important for a long service-life-time.
- **Future experiments** have to be performed to identify these interrelations.
- By knowing the target properties and their weighting we can calculate the best mix for the **“Real Application”.**

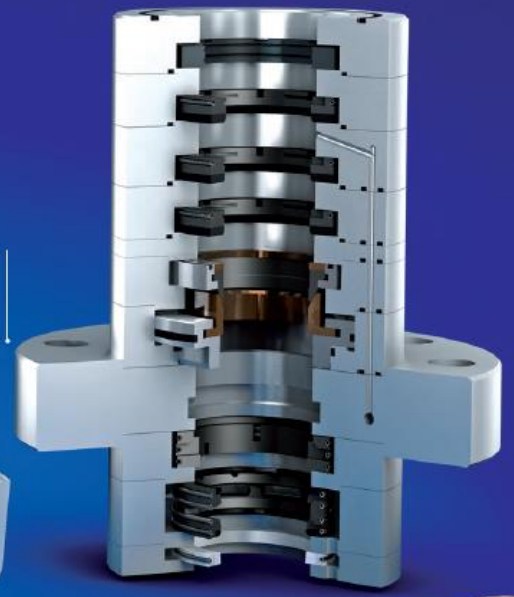
Conclusion and forecast

Sealing Experts for Special Applications

- In-house material development
- In-house material production
- State-of-the-art test bed


PET


CNG


API


Blender for Solids


Turbo Compressors


Hyper