SEALING TECHNOLOGY

CHETRA®

# MECHANICAL SEALS

CHEMISTRY
ENERGY & WATER
FOOD
OIL & GAS
PAPER
PHARMA
REFINERIES & PETROCHEMISTRY

„Quality –
**Made in Germany“**
At CHETRA
**individuality,**
**complexity** and
**standardization**
combine to form a
composition that hits
all the right notes
for your application.


211
212

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**Dichtungstechnik AG**

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01. Page 6
CHETRA Dichtungstechnik AG

02. Page 8
Mechanical seals

03. Page 148
Supply Systems / API Plans

# 01.

# CHETRA DICHTUNGSTECHNIK AG

**„QUALITY – MADE IN GERMANY“**

- **Specialists for sophisticated mechanical seals**
- **Safety, competence, and individuality**
- **Maintenance and repair**

CHETRA is one of the technically leading international specialists for sophisticated mechanical seals and equipment for complex applications.

Mechanical seals are machine elements used to seal pumps, mixers, agitators and other rotating units.
CHETRA mechanical seals are used in diverse industry sectors such as chemicals, energy, food processing, paper, pharmaceuticals, refineries/petrochemicals and others.
We have been manufacturing, in Garching since 1979 and at the Kirchheim-Heimstetten site (near Munich) since 2012, with exports to some 50 countries. Sales and service partners are our subsidiaries and authorized distributors and representatives.

Various CHETRA locations offer repair service and overhaul of mechanical seals, including products from other manufacturers. Since 1996 we have been certified according to DIN EN ISO 9001 (DQS; IQ-Net). Shown below are examples of CHETRA mechanical seals and accessories from a wide range of designs.

Locations and updates can be found on our website at www.chetra.de. We look forward to hearing your inquiries.

# 02.
# MECHANICAL SEALS

Standard series according to DIN 12756, ANSI, API 682

**Special seals adapted to the equipment**
- Single-acting
- Double-acting
- Unbalanced design
- Balanced design

| | |
|---|---|
| pmax | up to 200 bar |
| t-range | -120°C to +400°C |
| vmax | 35 m/s |
| ds | 10 – 650 mm |

**Consultation, design, service life extension**

**Mechanical seal accessories, thermosiphon / flush tanks**

**Installation – support, service**

**Spare parts kits, exchange program, repair service**

# Components
# Single mechanical seals according to DIN EN 12756

## DESCRIPTION

Balanced, short design (L1kU), independent of direction of rotation, protected springs, STATIONARY arrangement – for use in pumps.

## TYPICAL USES

- Wastewater applications
- Standard chemical pumps
- All pump applications, such as centrifugal, stage and progressive cavity pumps
- For abrasive, high-viscosity media
- Paper and pulp, up to 3.5% OD
- Hot water applications with special circulation design

| | |
|---|---|
| pmax | 50 bar (208 N) 18 bar (210 N) |
| t-range | -80°C to +260°C |
| Vmax | 35 m/s (208 N) 25 m/s (210 N) |
| Seal sizes | 25 - 100 mm, also in inch sizes |

Technical data sheets on request.

# 201/ 207 / 209 Cartridge Single seal

## DESCRIPTION

Pre-assembled unit ready for service, fits into the gland space, balanced, short design, independent of direction of rotation, protected springs, STATIONARY arrangement.

## TYPICAL USES

- Universal mechanical seal
- In pipeline refinery pumps, according to API
- In media loaded with solids
- In sterile applications

| | |
|---|---|
| pmax | 125 bar (201) 25 bar (209D) |
| t-range | -80°C to +260°C |
| Vmax | 35 m/s (201) 25 m/s (209D N) |
| Seal sizes | 25 - 100 mm, also in inch sizes |

Technical data sheets on request.

# 807AS Cartridge Double seal

## DESCRIPTION

High-quality, standard double cartridge seal using high tech design features for demanding applications.

## TYPICAL USES

- In pipeline refinery pumps according to API
- Refinery finished products

| | |
|---|---|
| pmax | 35 bar |
| t-range | -80°C to +260°C |
| Vmax | 25 m/s |
| Seal sizes | 25 - 100 mm, also in inch sizes |

Technical data sheets on request.

# 821 Cartridge Double seal

## DESCRIPTION

Pre-assembled unit ready for service, for pumps, especially for difficult requirements.
Seal adapted to the respective equipment.

## TYPICAL USES

- Polyester melt
- Phenolic resin
- Latex
- For abrasive, high-viscosity media, and similar

| | |
|---|---|
| pmax | 12 bar |
| tmax | -120° C to +260° C |
| Vmax | 25 m/s |
| Seal sizes | 20 - 200 mm, also in inch sizes |

Technical data sheets on request.

# 881 Multiple seal according to API 682

## DESCRIPTION

Double balanced seal; operation according to API plan 52 or 53.
Seal adapted to the respective equipment.

## TYPICAL USES

- Pumps in refineries
- In the petrochemicals sector for demanding applications, such as Lean Amine, main quench oil pumps, hydrogenation processes, media with high solids content and frequently changing operating conditions.

| | |
|---|---|
| pmax | 80 bar |
| tmax | -120° C to +260° C |
| Vmax | 25 m/s |
| Seal sizes | 20 - 200 mm, also in inch sizes |

Technical data sheets on request.

# 521 Multiple seal sterile design

## DESCRIPTION

Seal with integrated bearing. Specially designed for low speed equipment (with gas phase of the medium to be sealed e.g. DM-water) using sliding/stationary rings with lubricating pads (DGM 202.11805.3). Seal adapted to the equipment.

## TYPICAL USES

- With low-speed equipment and with Aktiv-LUB seal face lubricating system
- For mixers, agitators, driers, and similar
- In pharmaceutical, diagnostic, fine chemicals and similar applications.

| | |
|---|---|
| pmax | Vacuum up to 10 bar |
| tmax | Up to +150°C (dependent on secondary seal) |
| Vmax | 7 - 150 1/m |
| Seal sizes | 35, 60, 80, 100 mm, also in inch sizes |

Technical data sheets on request.

# 299 Split Mechanical seal

## DESCRIPTION

Single seal, stationary design especially for equipment with inaccessible location and/or large shaft diameter range with the associated high cost of installation/dismantling. Economically interesting alternative to conventional closed seal designs.

## TYPICAL USES

- In tubular casing pumps
- In Kaplan and Frances turbines and similar equipment
- In power plants including the nuclear power area (licensing according to KTA 1401; QSP in conjunction with pump OEM)

| | |
|---|---|
| pmax | Vacuum 0.5 bar (absolute) up to max. 25 bar |
| tmax | max. +120° C |
| Vmax | 10 m/s |
| Seal sizes | 50 - 400 (650) mm, also in inch sizes |

Technical data sheets on request.

# CHETRA REPAIRS | SERVICE QUALITY AWARENESS

- Experience, expertise and problem-solving
- Quality of Repairs
- Testing of mechanical seals

When CHETRA receives a mechanical seal for repair, we bring experience, expertise and solutions to the table. At CHETRA we don't just clean, rework and replace. We also provide support with problem solving.

## EXPERIENCE, EXPERTISE AND SOLUTIONS

Our service department gathers experience at the customer's site and passes it on to our repair department; specific expertise is strengthened through good internal communication.

The goal at CHETRA is not just to repair - we want to understand why a GLRD has failed. If we find that you have a very high downtime with a mechanical seal, we examine your processes, and the application, to see what we can improve. Our service department will be happy to come to you and check the set-up around the mechanical seal.

Trouble-free operation of a mechanical seal is naturally dependent on holding to the correct normal operating conditions.

## QUALITY REPAIRS

A mechanical seal repaired by us can be considered to be as good as new. We clean all parts of a mechanical seal, paying special attention to sensitive materials that may need to be reworked. We replace O-rings with every repair (it would be technically senseless and uneconomical to completely inspect O-rings for cracks, elastomer behavior, or material shrinkage). We check all tolerances on a mechanical seal and rework all major surfaces according to specification.

All repairs are tagged at our facility to ensure traceability and enable us to provide full information about the repair in the event of queries.

Every mechanical seal, old or new, is tested on our leak test bench prior to shipment.

**Repair of other brands**
We will gladly repair your mechanical seals from other manufacturers. Our design and engineering departments work closely together to quickly determine all relevant dimensions and check your application, ensuring a high-quality repair.

## TESTING OF MECHANICAL SEALS

CHETRA has the capability to test mechanical seals on a rotating test rig or statically on our API leak test rig.

- **Rotating test bench**
  Here we have the possibility to test new developments and application-oriented operating modes on mechanical seals in our test room. We have the most advanced tools available, which can also be used on site by our service personnel.

- **Static test bench**
  Every mechanical seal is tested for tightness prior to shipment. (This includes non-standard single mechanical seals). Every mechanical seal test that we perform includes a leakage report.

## CHETRA SERVICE

CHETRA is always ready to provide you with professional support. Especially on site, it is clear how important it is to work together. Each of our service staff has the expertise to help you at your location.

In some cases, repairs to our mechanical seals can also be carried out on site.

# 02.
# CHETRA Mechanical seals


**Single seals** 17

**Cartridge seals**
Liquid single acting 42
Liquid double acting 60
Gas 88
Steril 98

**Agitator seals**
General 102
Sterile 116

**API seals**
including engineered seals 124

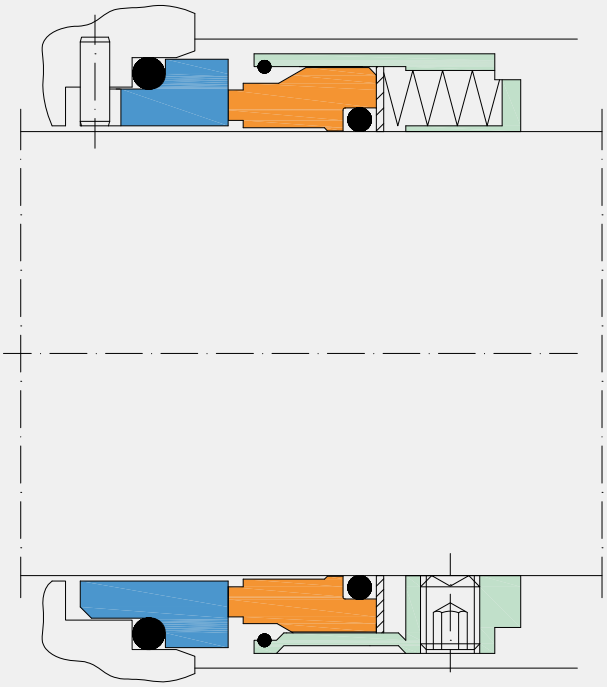
**Stationeries**
General 144

# COMPONENT MECHANICAL SEALS


| | |
|---|---|
| SEAL Type 111 | 17 |
| SEAL Type 112/113 | 18 |
| SEAL Type 114S R/L | 19 |
| SEAL Type 117 | 20 |
| SEAL Type 118 | 21 |
| SEAL Type 151 | 22 |
| SEAL Type 152/153 | 23 |
| SEAL Type 208N | 24 |
| SEAL Type 210N | 26 |
| SEAL Type 249 | 28 |
| SEAL Type 292 | 29 |
| SEAL Type 431K | 30 |
| SEAL Type 488 / 488S | 32 |
| SEAL Type 600 | 34 |
| SEAL Type 700 | 36 |
| SEAL Type 900 / 990 | 38 |
| SEAL Type 958 | 41 |


# CHETRA
# SEAL Type 111

CHEMISTRY | ENERGY & WATER



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 12 bar |
| pmax (static) | 35 bar |
| tmax | -80° C to +220° C |
| vmax | 25 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

› Water, wastewater, lubricating oil, standard chemical pumps, media with low solids content, etc.

## DESCRIPTION

› Single-acting
› Short design
› Unbalanced
› Independent of direction of rotation
› Multiple springs
› Anti rotation pin

## STANDARD

› Standard seal according to DIN EN 12756

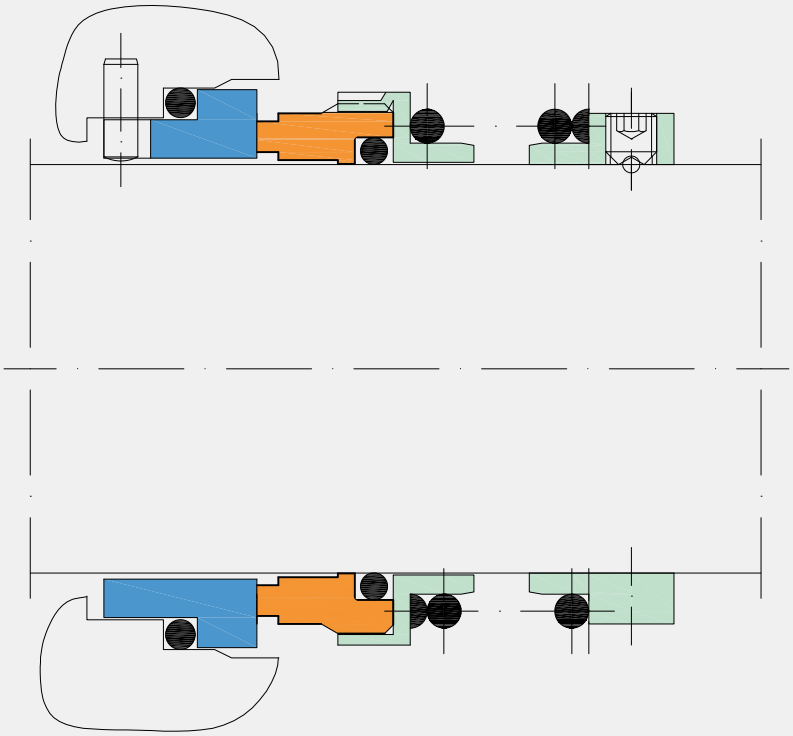
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / chrome casting, hard carbon / silicon carbide, silicon carbide / silicon carbide | A, $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, FFKM | V, E n.a. |
| Metal parts | 1.4571, 1.4404 | $G_1$, $G_8$ etc. |
| Springs | 1.4571, Hastelloy C | $G_1$, $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 112 / 113

CHEMISTRY | ENERGY & WATER



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 12 bar |
| pmax (static) | 35 bar |
| tmax | -80° C to +220° C |
| vmax | 15 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

› Water, wastewater, lubricating oil, standard chemical pumps, media with low solids content etc.

## DESCRIPTION

› Single-acting
› Standard design
› Unbalanced
› Independent of direction of rotation
› Single spring

## STANDARD

› Standard seal according to DIN EN 12756

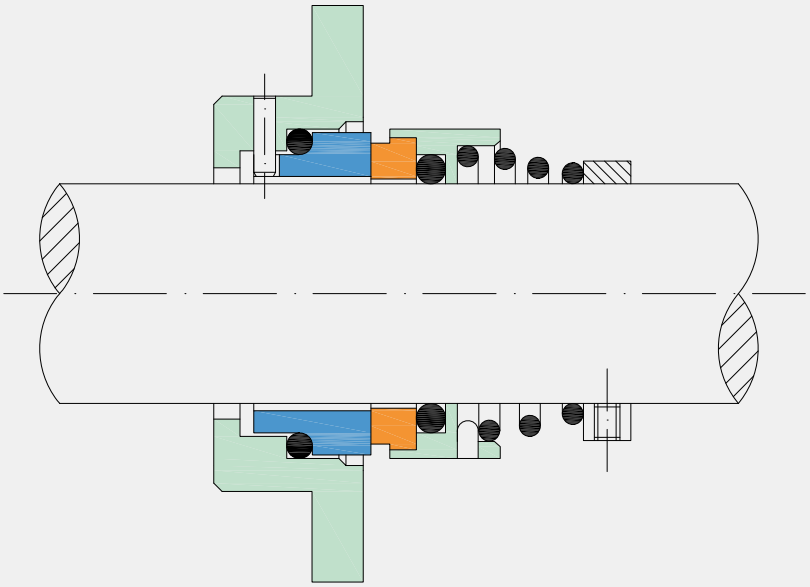
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / chrome casting, hard carbon / silicon carbide, silicon carbide / silicon carbide | A, $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, FFKM | V, E n.a. |
| Metal parts | 1.4571 (316 Ti), 1.4404 | $G_1$, $G_8$ etc. |
| Springs | 1.4571 (316 Ti), Hastelloy C | $G_1$, $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 114S R/L

CHEMISTRY | ENERGY & WATER



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 10 bar |
| tmax | -30° C to +185° C |
| vmax | 10 m/s |
| Seal sizes | 16 - 65 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

› Water, wastewater, building technology, standard chemical pumps, uncomplicated areas of application

## DESCRIPTION

› Single-acting
› Short design
› Unbalanced
› Independent of direction of rotation
› Conical spring

## STANDARD

› Standard seal according to DIN EN 12756

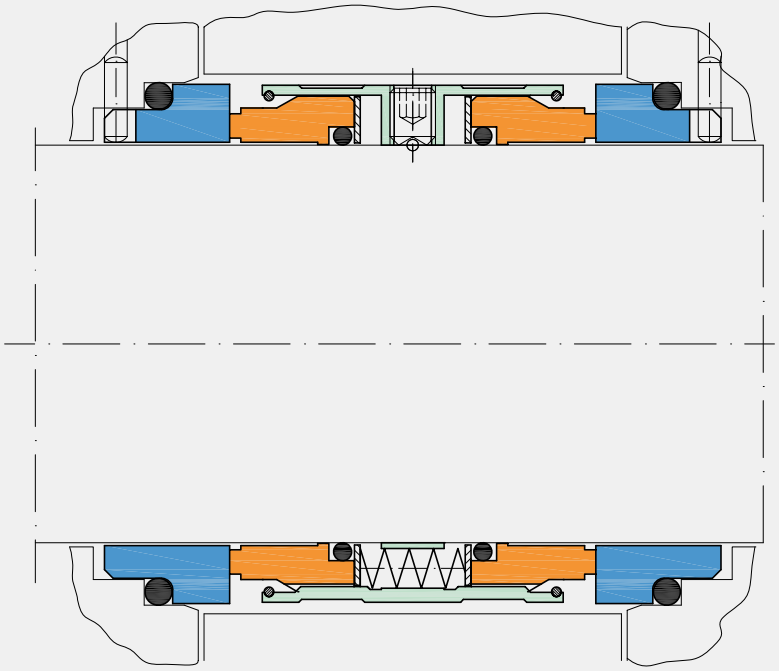
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / chrome casting<br>hard carbon / silicon carbide | |
| Secondary seals | FKM, EPDM, NBR etc. | \| V, E, P |
| Metal parts | 1.4401 etc. | \| G |
| Springs | 1.4571 (316 Ti) | \| $G_1$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 117

CHEMISTRY | ENERGY & WATER



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 12 bar |
| pmax (static) | 35 bar |
| tmax | -80° C to +250° C |
| vmax | 25 m/s |
| Seal sizes | 18 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

- Chemical industry, process industry, standard chemical pumps, loading pumps

## DESCRIPTION

- Double-acting
- Short design (common carrier)
- Unbalanced
- Independent of direction of rotation
- Multiple springs

## STANDARD

- Standard seal according to DIN EN 12756

## OTHER DESIGNS

- **Type 117S** with special torque transfer ("snapper") for screw spindle pumps
- **Type 157S** balanced design

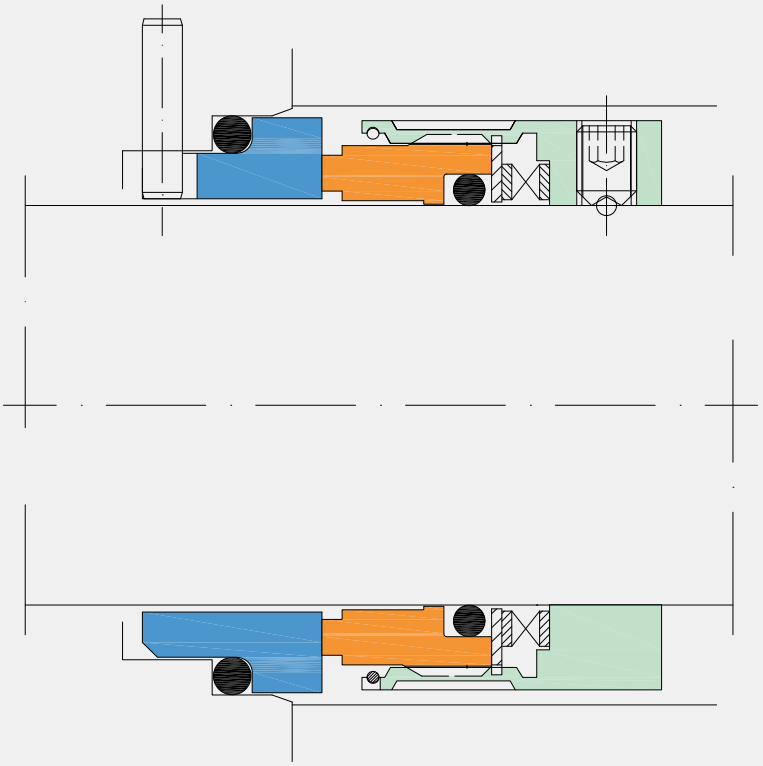
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | $A_1$, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE | V, E, $T_1$/$T_2$ |
| Metal parts | 1.4571(316 Ti) etc. | $G_1$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 118

CHEMISTRY | ENERGY & WATER



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 12 bar |
| pmax (static) | 35 bar |
| tmax | -80° C to +315° C |
| vmax | 25 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

› Water, wastewater, lubricating oil, standard chemical pumps, media with low solids content, etc.

## DESCRIPTION

› Single-acting
› Short design
› Unbalanced
› Independent of direction of rotation
› Sinus spring

## STANDARD

› Standard seal according to DIN EN 12756

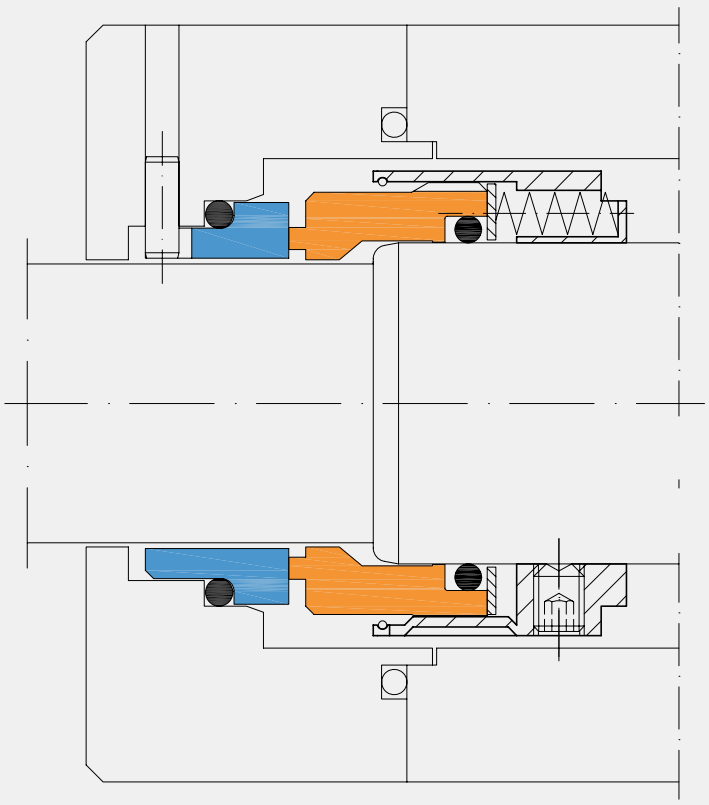
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / chrome casting, hard carbon / silicon carbide, silicon carbide / silicon carbide | A, $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, FFKM | V, E n.a. |
| Metal parts | 1.4571, 1.4404 | $G_1$, $G_8$ etc. |
| Springs | 1.4571, Hastelloy C | $G_1$, $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 151

CHEMISTRY | ENERGY & WATER | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 50 bar |
| pmax (static) | 100 bar |
| tmax | -80° C to +250° C |
| vmax | 25 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

- Process industry, oil & gas, refineries, chemical industry, hot water, media near the boiling point, low temperature ranges, light hydrocarbons

## DESCRIPTION

- Single-acting
- Short design (L1K)
- Balanced
- Independent of direction of rotation
- Multiple springs

## STANDARD

- Standard seal according to DIN EN 12756

## OTHER DESIGNS

- Cartridge: Type 151CA + 151CAF (according to API 682)

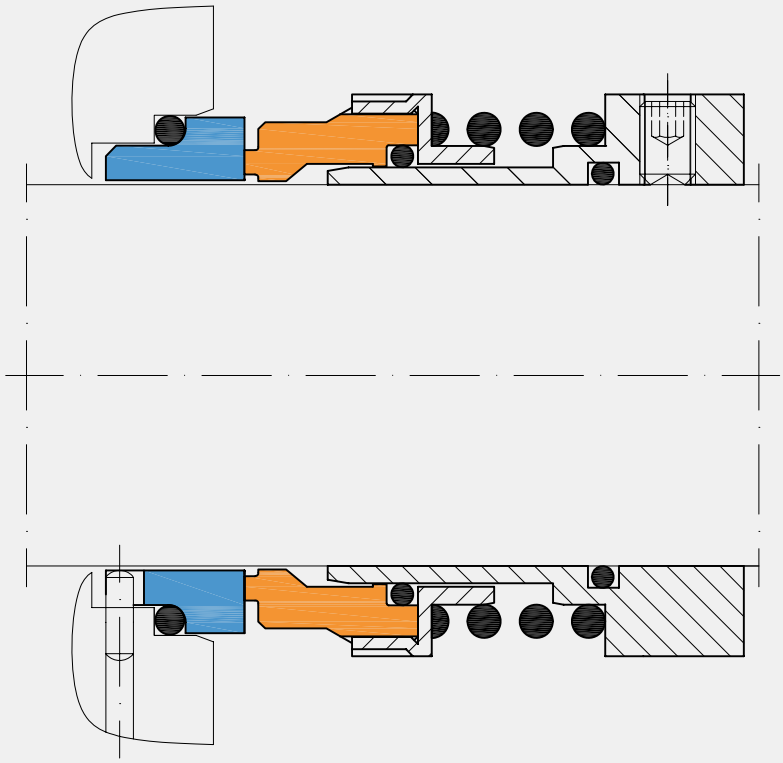
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, F, $T_1$/$T_2$, K |
| Metal parts | 1.4571(316 Ti), 1.4404 etc. | $G_1$ ,$G_8$ etc. |
| Springs | 1.4571(316 Ti), Hastelloy C | $G_1$ ,$M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 152/153

CHEMISTRY | ENERGY & WATER | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 50 bar |
| pmax (static) | 100 bar |
| tmax | -80° C to +250° C |
| vmax | 15 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

- Process industry, oil & gas, refineries, chemical industry, hot water, media near the boiling point, low temperature ranges, light hydrocarbons

## DESCRIPTION

- Single-acting
- Standard design
- Balanced
- Independent of direction of rotation
- Single spring

## STANDARD

- Standard seal according to DIN EN 12756

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / chrome casting, hard carbon / silicon carbide, silicon carbide / silicon carbide | A, $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, FFKM | V, E n.a. |
| Metal parts | 1.4571, 1.4404 | $G_1$, $G_8$ etc. |
| Springs | 1.4571, Hastelloy C | $G_1$, $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 208N

## CHETRA TYPE 208N Standard mechanical seal

**Seal in stationary design**
- Significantly greater efficiency due to improved service life, stationary arrangement of dynamic O-ring
- Dynamic O-ring on hard metal (SSiC)
- As a result no more attrition of the O-ring on the shaft
- Springs outside the medium, therefore no clogging of the springs, less radial/axial movement

› No need for a shaft sleeve in the area of the O-ring or hard coating
› Universally applicable

Suitable for universal use and for sealing of media loaded with solids, for abrasive and high-viscosity media and other difficult applications.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | $A_1$, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1/T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

› Standard seal, according to DIN EN 12756, short design

## DESCRIPTION

High tech short design
Standard mechanical seal (short L1),
Components seal
Stationary design

› Single-acting
› Balanced
› Independent of direction of rotation
› Multiple springs (protected)

## SUBSTITUTE FOR

› Packing in the gland area
› All rotating DIN mechanical seals

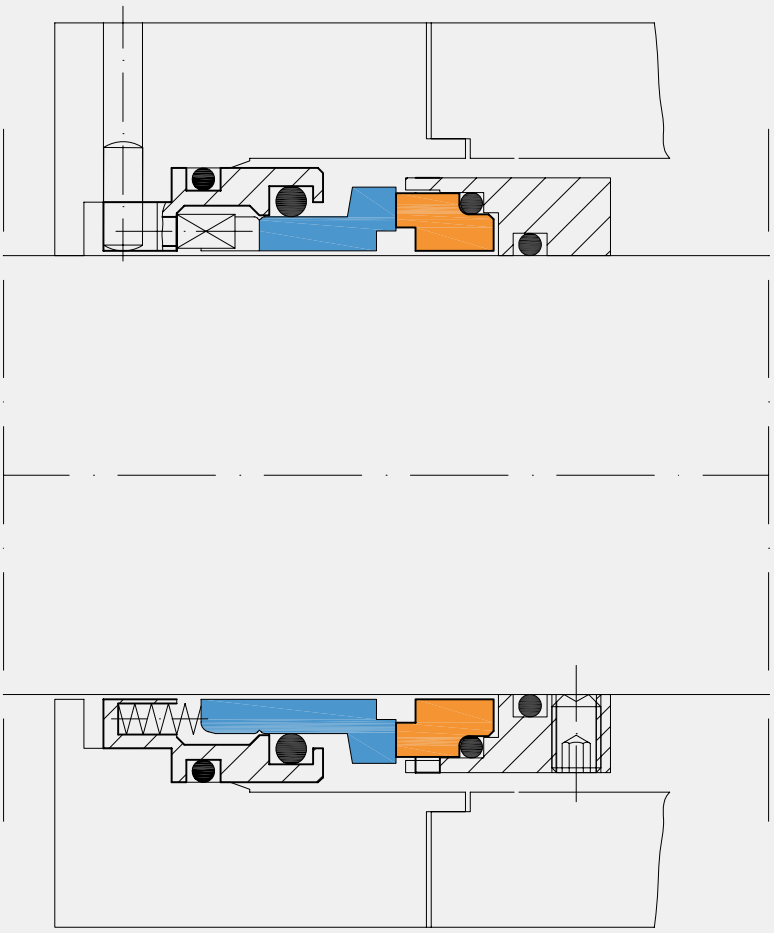
## TYPICAL USES

› In wastewater applications
› In standard chemical pumps
› In all pump applications, such as centrifugal, stage and progressing cavity pumps
› For abrasive, high-viscosity media (dyestuffs)
› Paper and pulp up to max. 3.5% OD (paper stock pump, deckle stirrer, deflaker)
› Hot water applications with special circulation control (type 208S)

## OPERATION

› Medium-lubricated
› According to API plan 01 / 11 / 31 or other

## TYPE 208N



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 50 bar |
| pmax (static) | 100 bar |
| tmax | -80° C to +260° C |
| vmax | 35 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 210N

## CHETRA TYPE 210N Standard Mechanical seal

**Seal in stationary design**
- Significantly greater efficiency due to improved service life, stationary arrangement of dynamic O-ring
- Dynamic O-ring on hard metal (SSiC)
- As a result no more attrition of the O-ring on the shaft
- Springs outside the medium, therefore no clogging of the springs, less radial/axial movement

› No need for a shaft sleeve in the area of the O-ring or hard coating
› Universally applicable

Suitable for universal use and for sealing of solids-laden media, for abrasive and high-viscosity media.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | $A_1$, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE | V, E, $T_1/T_2$ |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

› Standard seal, according to DIN EN 12756, kU design

## DESCRIPTION

Single mechanical seal
for universal application

› Balanced
› Single-acting
› Short design
› Independent of direction of rotation
› Multiple springs in stationary arrangement and outside the conveyed product

## SUBSTITUTE FOR

› Packings in stuffing box
› All rotating DIN mechanical seals

## TYPICAL USES

› In wastewater applications
› In standard chemical pumps
› In all pump applications, such as centrifugal, stage, and progressive cavity pumps
› For abrasive, high-viscosity media (dyestuffs)
› Paper and pulp up to max. 3.5% OD (stock pump, chest agitator, deflaker)
› Hot water applications with special circulation control (type 208S)

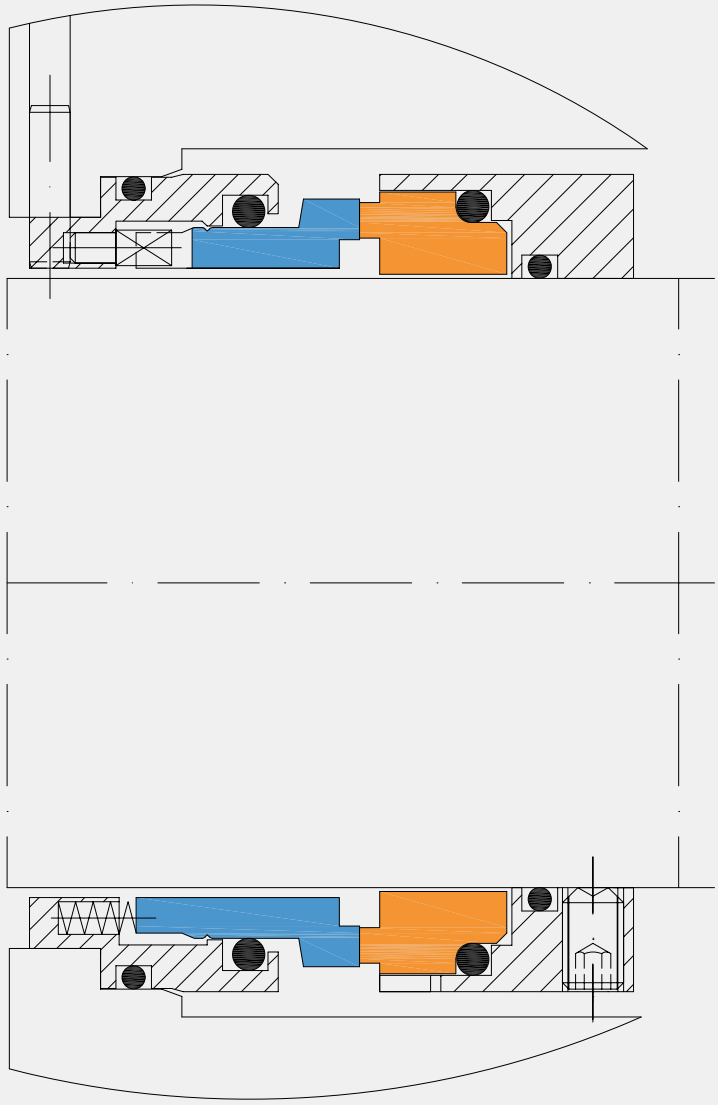
## OPERATION

› Medium-lubricated
› According to API plan 01 / 11 / 31 or other

CHEMISTRY | ENERGY & WATER | PAPER



## TYPE 210N



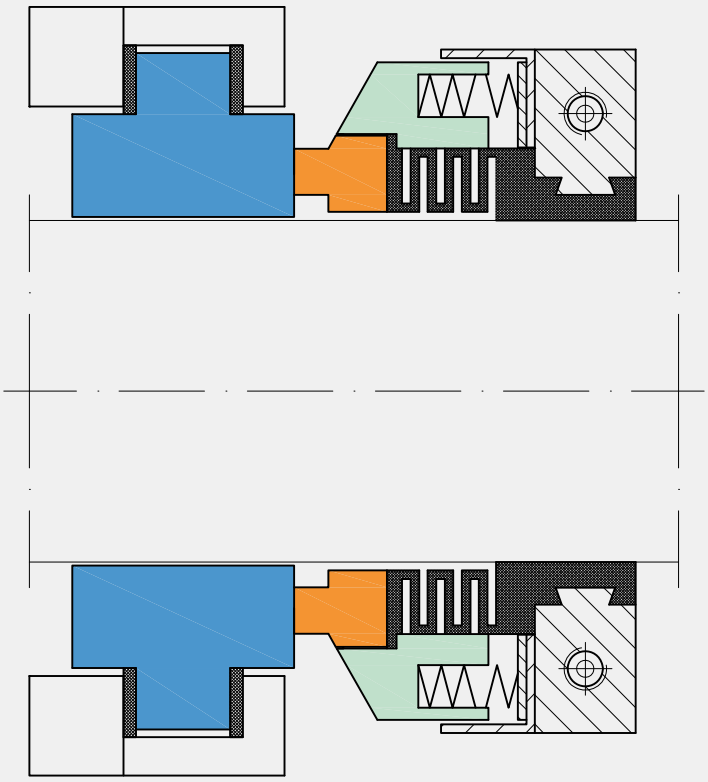
## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 28 bar |
| pmax (static) | 50 bar |
| tmax | -80° C to +260° C |
| vmax | 25 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 249

CHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax | 8 bar |
| tmax | -40° C to +125° C |
| vmax | 10 m/s |
| Seal sizes | 16 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## DESCRIPTION

**Single-acting PTFE bellows seal**
Preferred for corrosive media – alternative to CHETRA seal Type 600

- Unbalanced
- Single-acting
- Short design
- Independent of direction of rotation

## STANDARD

- Work standard

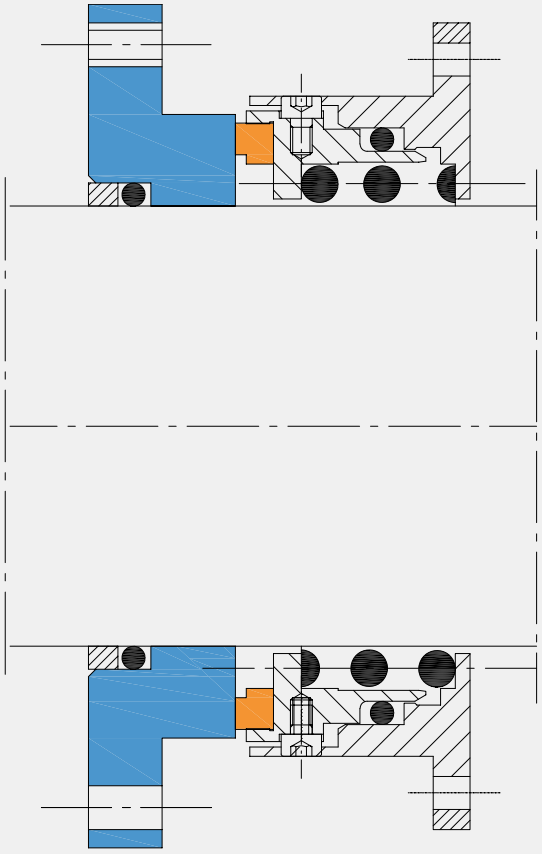
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Silicon carbide | $Q_1$ |
| Secondary seals | PTFE | T |
| Metal parts | 1.4401 (316 SS) | G |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 292

CHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax (before the seal) | full vaccum to 25 bar |
| pmax (rear side) | full vaccum to 25 bar |
| tmax | -30° C to +160° C |
| vmax | 25 m/s |
| Seal sizes | 35, 60, 80, 100, 140 mm |

Larger dimensions on request.

## DESCRIPTION

**Single-acting seal** for abrasive and high-viscosity media

The seal is independent of the direction of rotation and pre-assembled. The stationary unit is mounted on the pump case, while the rotary ring is bolted to the pump shaft.

## STANDARD

› Work standard

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, impregnated with synthetic resin | $B_1$ |
| Stationary ring | chrome casting | S |
| O-ring | FEP with FKM core | $M_2$ |
| Springs | 1.4571 (316 Ti) | $G_1$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 431K

## Elastomer Bellow Mechanical seal Type 431K

SEAL Type 431 is a simple, robust seal with freely flushable spring for a great many uses, such as water, wastewater, oils, and chemicals.

Stationary ring in block format with collar (Type BM) or optionally with DIN stationary ring (DIN-KL Type) without rotation lock.

## STANDARD

- Standard seal, according to DIN EN 12756 *

## DESCRIPTION

- Single-acting
- Short design (L1k)
- Unbalanced
- Independent of direction of rotation
- Elastomer bellow seal
- Single spring

## TYPICAL USES

- In all pump applications suitable for undemanding media
- Suitable for the low temperature and speed range

## OTHER DESIGNS

- **Type 431**, with longer bellow, corresponds to DIN "L1K"
- **Type 431N**, with longer bellow, corresponds to DIN "L1N"

## OPERATION

- API plan 01, 02, 11, 13

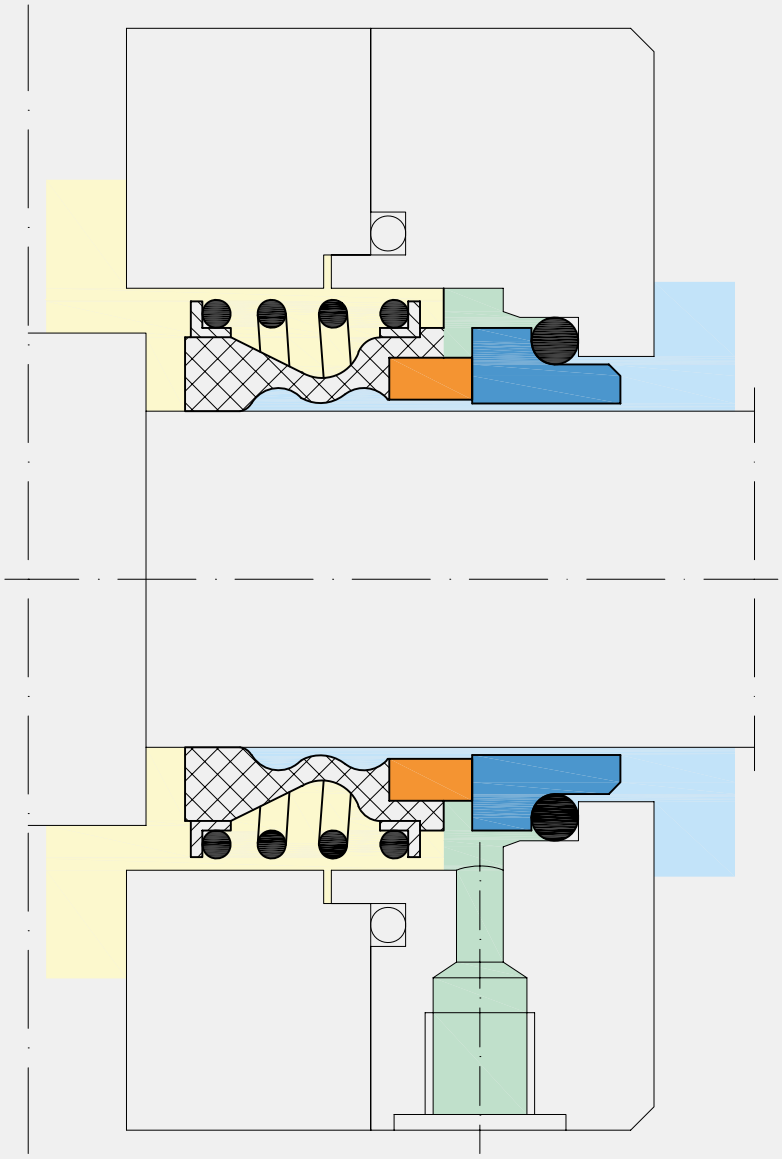
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | $B_1$, $Q_2$ |
| Elastomer materials | NBR, FKM, EPDM | P, V, E |
| Springs | 1.4401 (316 SS) | G |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

* Diameter range deviates from DIN EN 12756 (DIN 24960)

## TYPE 431K



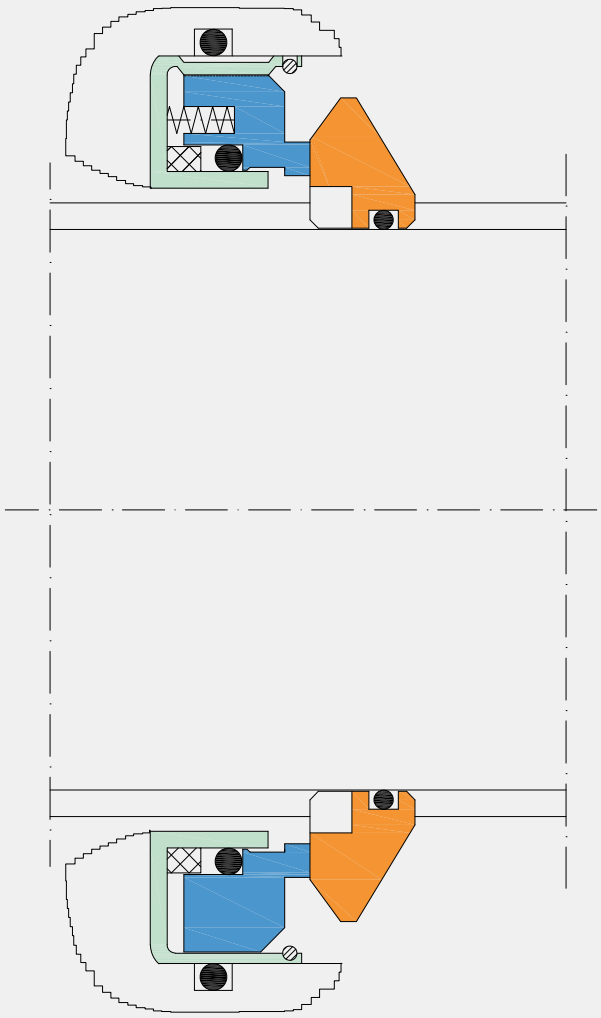
## TECHNICAL DATA

| | |
|---|---|
| pmax | 12 bar |
| tmax | -20° C to +100 / 200° C |
| vmax | 10 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 488 / 488S

## TYPE 488



## STANDARD

› Work standard

## DESCRIPTION

› Balanced
› Single-acting
› Stationary design
› Short design
› Axial installation
› Multiple springs
› Independent of direction of rotation

## TYPICAL USES

› Process industry
› oils
› in roots blowers and similar

## OTHER DESIGNS

› **Type 488 / 488S**

## Single-acting Short Design Stationary Cartridge seal

SEAL Type 488 / 488S is available in different versions, adapted for the respective equipment.

## MATERIAL

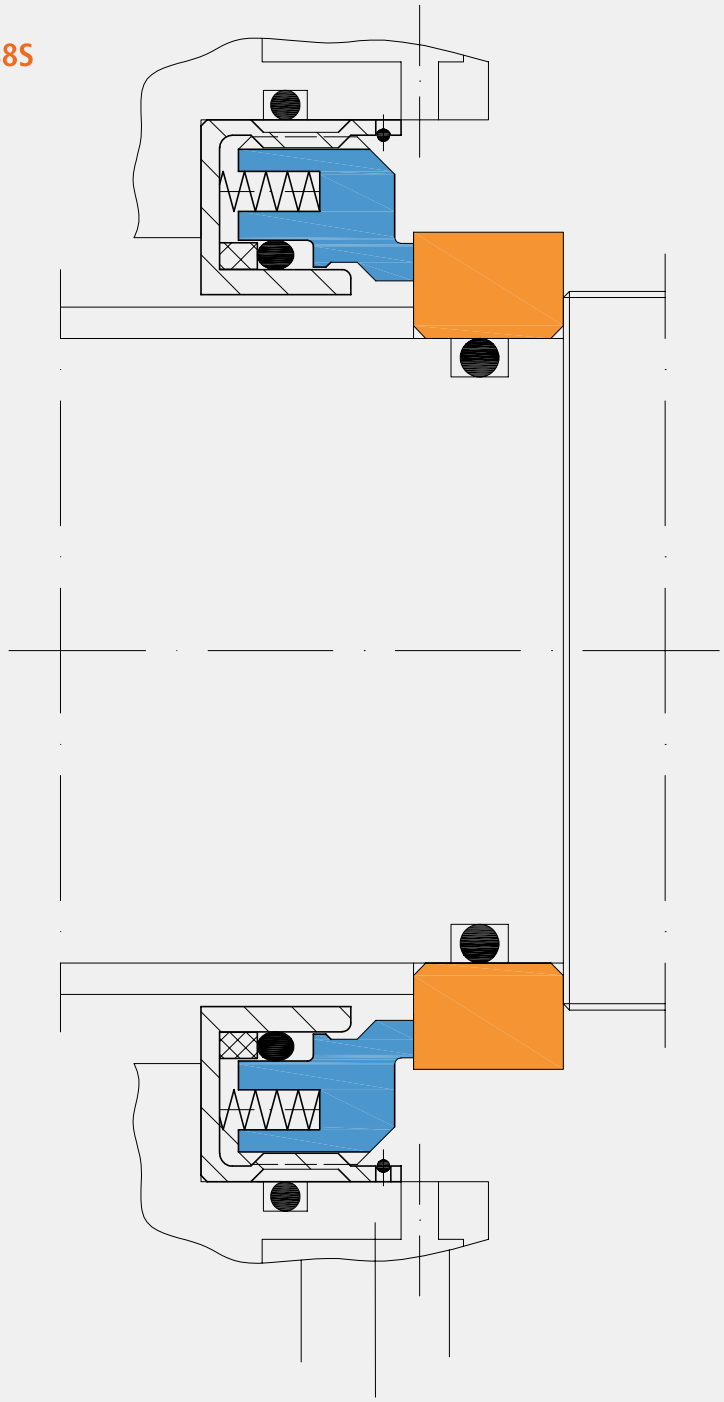
| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / silicon carbide<br>silicon carbide / silicon carbide | \| $B_1$, $Q_2$<br>\| $Q_1$, $Q_2$ |
| Secondary seals (O-ring) | FKM | \| V |
| Metal parts | 1.4571 | \| $G_1$ |
| Springs | 1.4571 | \| $G_1$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | REFINERIES & PETROCHEMISTRY



## TYPE 488S



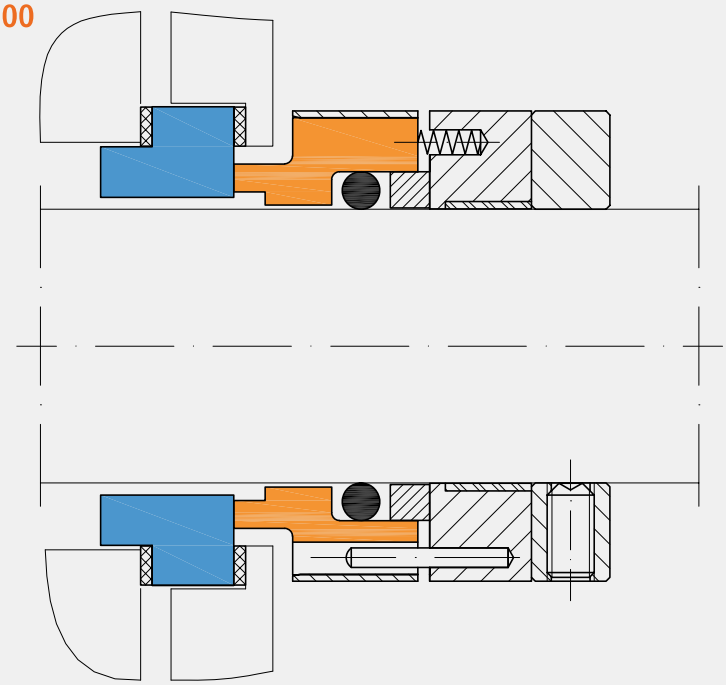
## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | -40°C to +200°C |
| vmax | 35 m/s |
| Seal sizes | 16 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 600

TYPE 600



## CHETRA Type 600

**Single-acting Mechanical seal, external**

External seal especially for corrosive media, chemicals, and similar – no metal parts in contact with the media. Therefore, economical alternative to seal made of materials such as titanium, tantalum, and similar.
As this is an external single seal the safety aspect must be considered, depending on the medium!

Construction with clamping ring fastening, positive torque transfer, for use on plastic, carbon, rubberized, enameled, or PTFE-coated pump shafts.
Also well suited for installation in double-bearing pumps.
Easy function check and cleaning possible due to easy accessibility

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE | V, E, $T_1$/$T_2$ |
| Metal parts | 1.4571(316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- SEAL according to work standard with ISO stationary, etc.

## DESCRIPTION

- Single-acting
- Balanced
- Independent of direction of rotation
- External arrangement
- Multiple springs protected

## TYPICAL USES

- In pumps and agitator applications with corrosive media
- In pumps and agitator applications with metal-free product area (coated)
- Use on plastic, PTFE, rubberized, and similar shafts (clamping ring fastening)
- Also suitable as dry-running agitator seal in top installation

Stationary ring L-shape according to ISO 3067 and others

## OTHER DESIGNS

- **Type 600L**, attached agitator mechanical seal with quench
- **Type 600LL**, attached agitator mechanical seal with quench and bearing
- **Type 600MD**, attached agitator mechanical seal dry-running, product-side metal-free version
- **Type 600MDS / 600MDA**, dry-running; ATEX-compliant

## FAHRWEISE

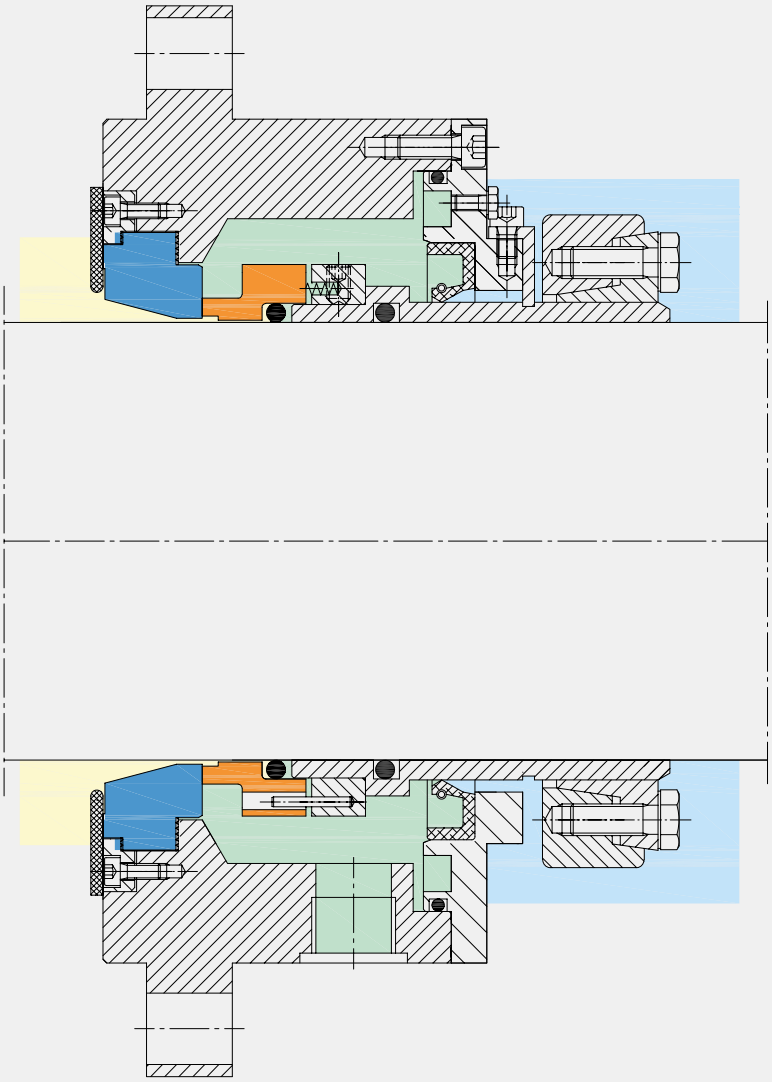
- Quench-lubricated, media-lubricated, or dry-running..

CHEMISTRY



## TYPE 600L

› SEAL for enameled containers



## TECHNICAL DATA

| | |
|---|---|
| pmax | 10 bar |
| tmax | -80° C to +220° C |
| vmax | 20 m/s |
| Seal sizes | 24 - 110 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› For information on dry-running series: 600MD, 600MDS, and 600MDA, please submit request.

# CHETRA
# SEAL Type 700

## CHETRA Type 700

**Standard Mechanical seal, Series 700**

Metal bellows seal, flexible, high leak tightness also in the vacuum range, achieve a long service life, for example in applications with several million load cycles.

Coordinated design and materials ensure flawless function in the high temperature range.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE, graphite | V, E, $T_1$/$T_2$, G |
| Metal parts | 1.4571(316 Ti) | $G_1$ |
| Bellows | Inconel 718(2.4668)<br>AM 350 (AISI 633) | $M_6$<br>$E_4$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Metal bellows seal, according to DIN EN 12756

## DESCRIPTION

- Single-acting
- Short design (L1k)
- Balanced
- Independent of direction of rotation
- Metal folding bellows
- Vibration-damping

## TYPICAL USES

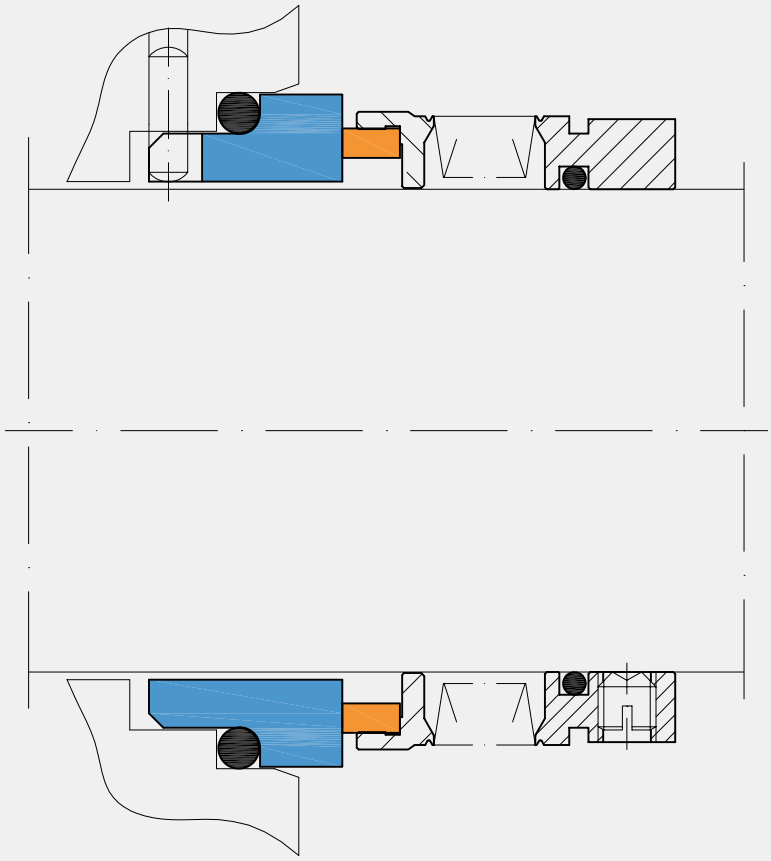
- In applications with solids-laden media, such as sludge, dyestuffs, paper, and pulp/wood pulp (up to 2% OD without flushing)
- Suitable for hot media
- Petrochemical and refinery applications
- In API applications in the high temperature range, in which single-acting seal are used

## OTHER DESIGNS

- **Type 270** Single-acting metal bellows seal as cartridge unit
- **Type 700A** Version according to API 682
- **Type 700H** High-temperature version up to 400°C (components seal)
- **Type 700S** High-temperature version, cartridge also quenchable
- **Type 700SA** High-temperature version, cartridge, quenchable, design according to API 682 C1
- **Type 770 / 711** Tandem double seal (see special seals / pumps / heat exchangers)
- **Type 790/791/792** Special versions for twin-screw extruders
- **Type 875A** Double-acting high-temperature version, cartridge unit, design according to API 682

## TYPE 700

› Standard metal bellows seal



## TECHNICAL DATA

| | |
|---|---|
| pmax (outer) | 25 bar |
| pmax (inner) | 10 bar |
| tmax | -80° C to +315° C, 400° C (dep. on the secondary seal) |
| vmax | 25 m/s |
| Seal sizes | 20 - 100 mm also in inch sizes, see dimension sheet |

Larger dimensions on request.

## OPERATION

› According to API plan 11 / 23 / 31 / 62

# CHETRA
# SEAL Type 900 / 990

## CHETRA Type 900 / 990

**Rotationally arranged seal**

The seal is balanced by means of an integrated protective sleeve and therefore designed for installation on a smooth, continuous shaft or on a shaft sleeve.

The cross-sections of the seal 900/990 are designed to fit **without** change into the packing gland area; i.e., **simple conversion** from packing to seal.

All stationary rings are used DIN according to EN 12756, L-shape according to ISO 3039, and DIN/SEG (combined DIN stationary with ISO connection dimensions) are used as stationary rings.
Suitable as replacement for packing in the stuffing box.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571(316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Single-acting
- Balanced
- Independent of direction of rotation
- Multiple springs (protected)

## TYPICAL USES

- In pump applications
- Suitable for paste-like media
- Use in sterile areas possible (900S)
- Packing replacement

## OTHER DESIGNS

- **Type 900**, for use in pumps and diverse other applications
- **Type 900S**, for use in sterile areas, such as food processing, pharmaceutical applications, with gap-free elastomer seal, based on DIN 11864 (pipe connection); based on EHEDG design
- **Type 990**, designed with solid ring, for use in pumps and other applications

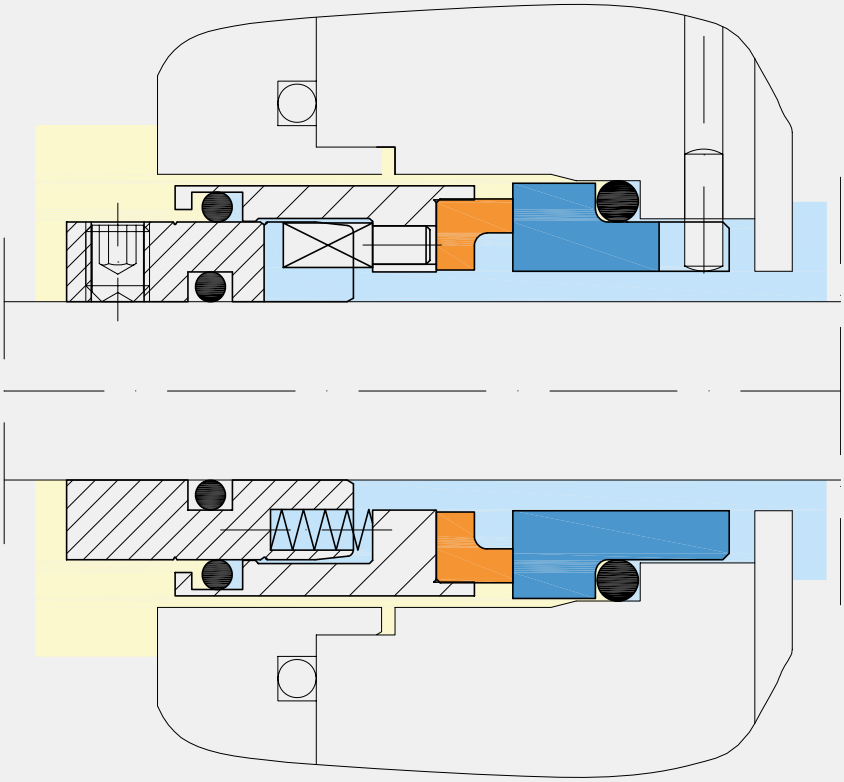
## OPERATION

- For example, according to API plan 11 / 31, medium-lubricated

CHEMISTRY | ENERGY & WATER | FOOD



## TYPE 900



## TECHNICAL DATA

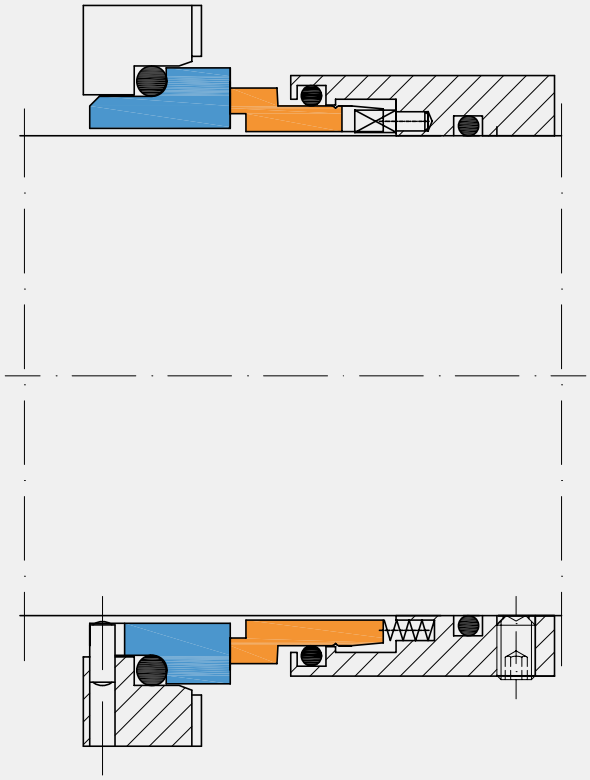
| | |
|---|---|
| pmax | 28 bar |
| tmax | -25° C to +205° C,<br>(dep. on the secondary seal) |
| vmax | 15 m/s |
| Seal sizes | 18 - 150 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Single-acting pump seal with DIN or ISO stationary

# CHETRA
# SEAL Type 900 / 990

## TYPE 990



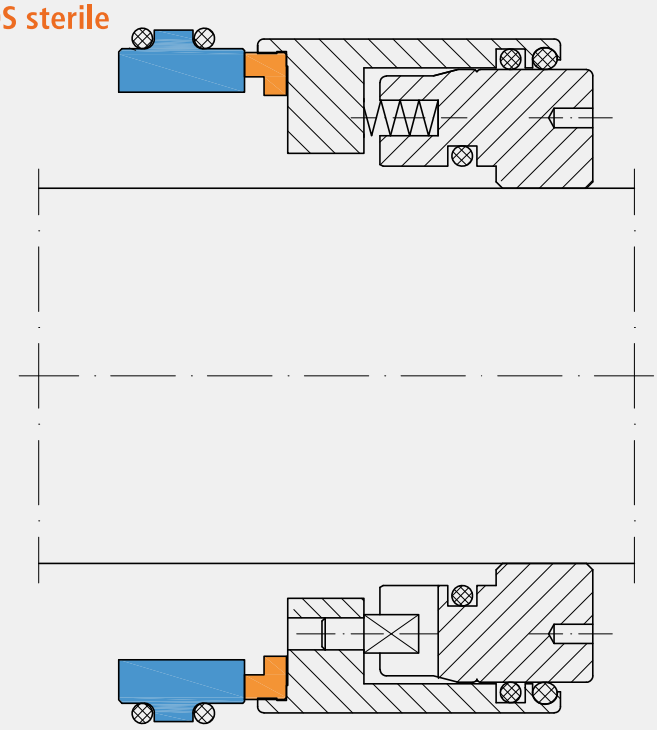
## TECHNICAL DATA

| | |
|---|---|
| pmax | 30 bar |
| tmax | -25° C to +205° C,<br>(dep. on the secondary seal) |
| vmax | 15 m/s |
| Seal sizes | 18 - 150 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Single-acting pump seal with combination stationary DIN SEG (=DIN in L-shape, ISO seat)

## SPECIAL DESIGN
## TYPE 900S sterile



## TECHNICAL DATA

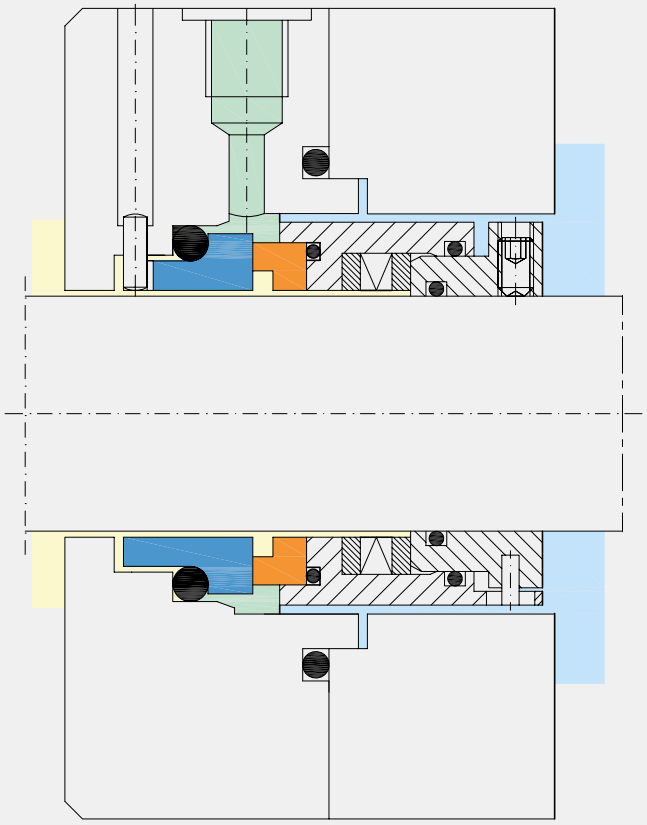
| | |
|---|---|
| pmax | 28 bar |
| tmax | -25° C bis +205° C,<br>(dep. on the secondary seal) |
| vmax | 15 m/s |
| Seal sizes | 18 - 150 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Single-acting seal specially for food processing / pharmaceutical applications

# CHETRA
# SEAL Type 958

CHEMISTRY | ENERGY & WATER | FOOD



## TECHNICAL DATA

| | |
|---|---|
| pmax | 30 bar |
| tmax | -80° C to +220° C |
| vmax | 10 m/s |
| Seal sizes | 18 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## DESCRIPTION

- Balanced
- Single-acting
- Short design
- Independent of direction of rotation
- Sinusoidal spring (wave spring) arranged outside of the product to be conveyed

## STANDARD

- Work standard, according to DIN EN 12756

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Tungsten carbide / silicon carbide | $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM etc. | V etc. |
| Metal parts | 1.4571(316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CARTRIDGE MECHANICAL SEALS
## LIQUID / SINGLE-ACTING


| | |
|---|---|
| SEAL Type 201S | 44 |
| SEAL Type 201A | 46 |
| SEAL Type 207 | 48 |
| SEAL Type 207A | 50 |
| SEAL Type 208S | 52 |
| SEAL Type 209D | 54 |
| SEAL Type 299 | 56 |
| SEAL Type 301S | 58 |

# CHETRA
# SEAL Type 201S

## CHETRA Type 201S Cartridge single mechanical seal

Suitable for all seals where dead spot, CIP / SIP-capable sterile sealing is required.

All secondary seals are completely chambered on the product side, according to DIN 11864, or the metallic surfaces are processed with Ra 0.4, acc. to the recommendation of EHEDG. The components used can be supplied with 3.1 certificate, the materials
FDA-compliant. On the atmosphere side sealing via throttle/lip seal, for liquid quench.

Rotary surface design for a high PV factor and other design measures result in a reliable, robust seal with a long service life (MTBR) in these applications.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / silicon carbide | $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_2/T_1$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Single-acting
- Pre-assembled ready for service cartridge seal
- Balanced
- Independent of direction of rotation
- Multiple springs (protected)
- Stationary design
- Sterile design
- Low dead space, based on EHEDG
- Parts in contact with the product are polished

## TYPICAL USES

- In vacuum or unpressurized operation with top mounting
- In operation under pressure
- For media with lubrication properties
- For bottom mounting
- Use as CIP / SIP-capable sealing of process equipment
- Use as agitator seal in pharmaceuticals and food processing

## DESIGNS

- **Type 201**, as two-part design; i.e., as component mechanical seal for pump applications
- **Type 201L**, with bearing for pump and agitator applications
- **Type 201S**, in sterile design, low dead space, quenchable, CIP-capable, based on EHEDG.
- **Type 201SL**, in sterile design as above, with bearing

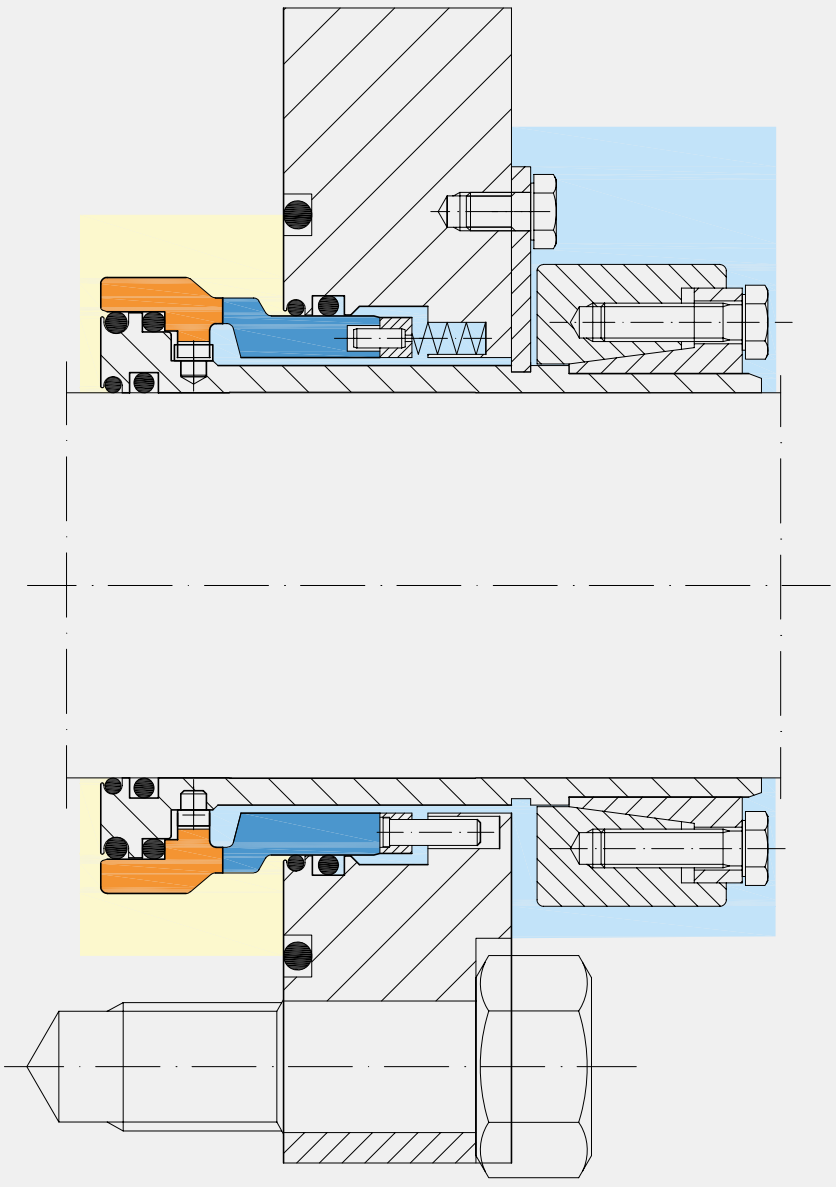
## OPERATION

- According to API plan 01 / 11 / 61 / 62

CHEMISTRY | FOOD | PHARMA



## TYPE 201S



## TECHNISCHE DATEN

| | |
|---|---|
| pmax | Vacuum to 20 bar |
| tmax | to +140° C (sterilization) or depending on the secondary seal |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm also in inch sizes, see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 201A

## CHETRA Type 201A Cartridge single mechanical seal

In pipeline pumps, both crude oil products and finished products are transported. Due to the pressure conditions as well as in connection with dimension and speed (PV factor), the seal must have a design that is appropriately robust and insensitive to solids.

Multipoint injection, rotary surface design for a high PV factor and other design measures result in a reliable, robust seal with a long service life (MTBR) in these applications.

## STANDARD

- According to API 682, ES – Engineered seal

## DESCRIPTION

- Single-acting (SEAL according to API)
- Pre-assembled, ready for service, cartridge seal
- Balanced
- Independent of direction of rotation
- Multiple springs (protected)
- Stationary design

## TYPICAL USES

- Pipeline pumps
- Water injection pumps
- High pressure range
- High solids content

## DESIGNS

- **Type 201/201A**
  - With flushing connection, quenchable
- **Type 201AHD – Heavy Duty**

## OPERATION

- According to API plan 01 / 11 / 31 / 61 / 62

## MATERIAL

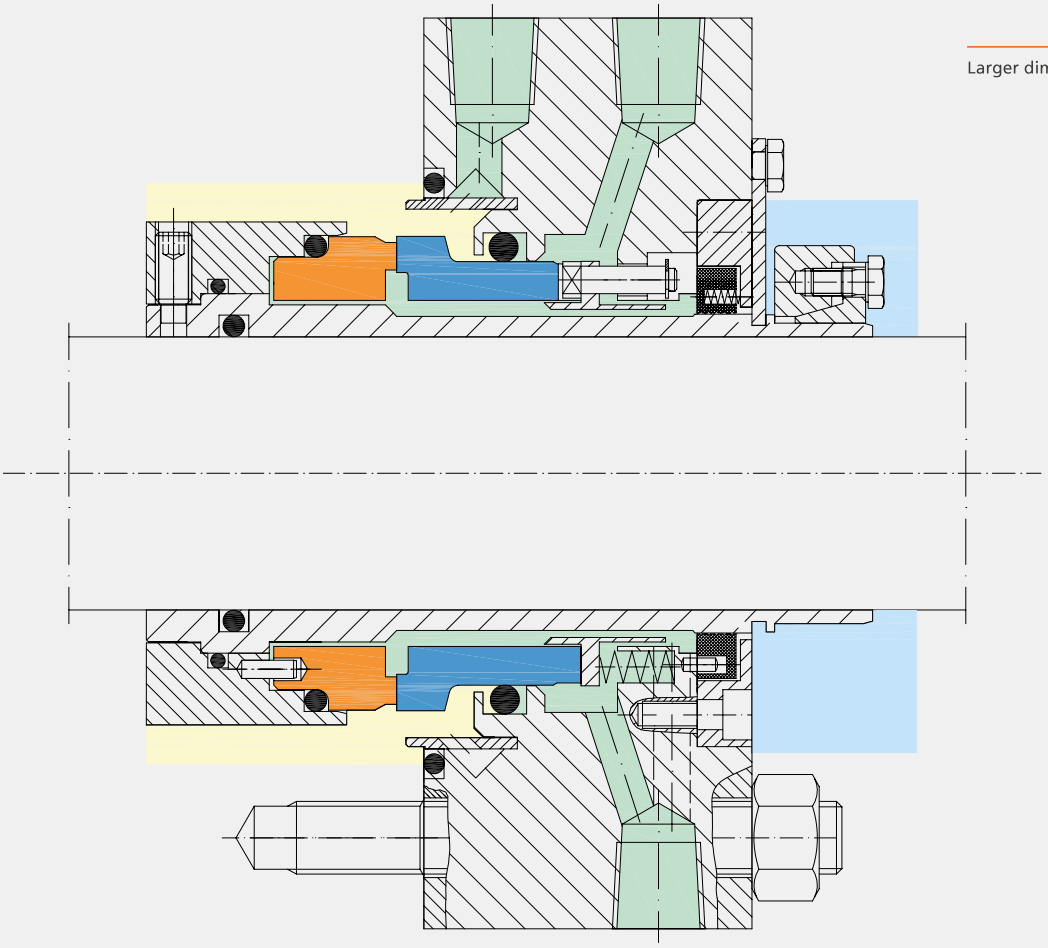
| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / silicon carbide | $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_2/T_1$, K |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | PAPER | REFINERIES & PETROCHEMISTRY



## TYPE 201A



## TECHNICAL DATA

| | |
|---|---|
| pmax | 100 bar |
| pmax (Typ 201AHD) | 150 bar |
| tmax | -80° C to +220° C |
| vmax | 35 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 207

## CHETRA Type 207 Cartridge single mechanical seal

Seal type 207 meets the requirements for a technically demanding and economically interesting solution when using a mechanical seal.

Complete sealing system, consisting of: seal with cartridge case (cartridge) and clamping device for shaft or shaft sleeve, solid case cover with flush circulation connections.

- Single-acting
- Balanced
- Independent of direction of rotation
- Stationary design

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / silicon carbide | A, B1, B2, Q1, Q2 |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_2/T_1$ |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## SPECIAL ADVANTAGES AND USER BENEFIT

- **Simplified pump maintenance**
- Pre-assembled ready for use
- Simplified installation and removal
- Subsequent impeller adjustment
- Universal slotted hole attachment and installation aids
- Stationary design = protected springs outside of the medium (no clogging)
  - Compensation for unavoidable mechanical tolerances such as angular offset, misalignments, etc.
- Optimum heat dissipation through circulation control or quench option
- Only solid rotary and stationary rings (no shrinkage), therefore reliable operation in higher temperature range
- No scoring or shrinking of the shaft or shaft sleeve
- **Significant cost savings**
  - Due to **no** shaft sleeve wear
  - No shaft sleeve required
- High capability for conveying media loaded with solids due to structural design

## TYPICAL USES

- For abrasive, high-viscosity media (dyestuffs)
- Paper and pulp up to max. 3.5% OD (paper stock pump, deckle stirrer, deflaker)
- Hot water applications with special circulation control
- For standardization

## OPERATION

- According to API plan 02 / 11 / 21 / 31 and others

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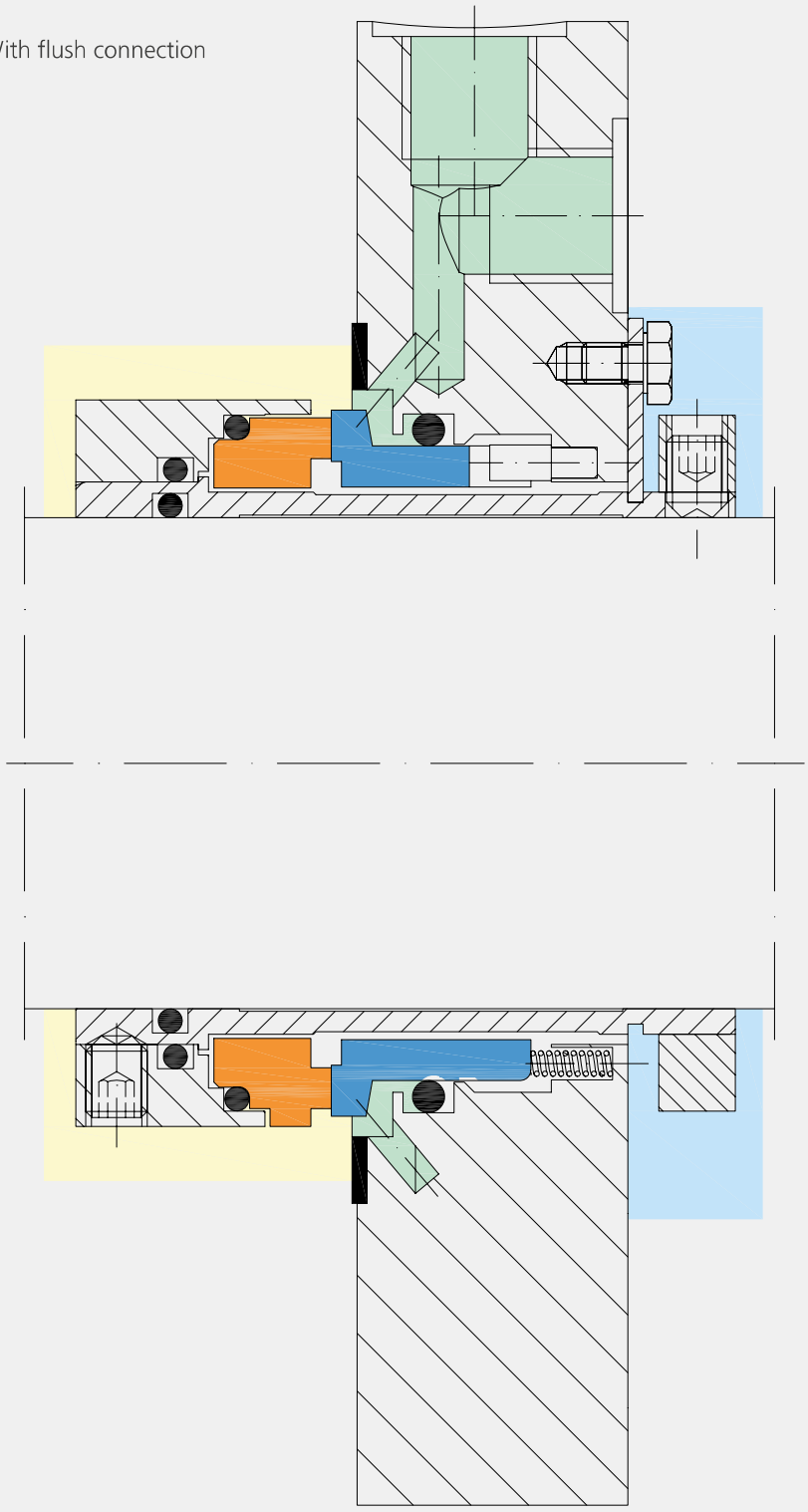
## TYPE 207

› With flush connection



## TECHNICAL DATA

| | |
|---|---|
| pmax | 50 bar |
| tmax | +220° C (sterilization) or depending on the secondary seal |
| vmax | 35 m/s |
| Seal sizes | 25 - 130 mm also in inch sizes, see dimension sheet |

Larger dimensions on request.

## OTHER DESIGNS

› **Type 207AS**, API 682 4th Ed. (incl. ES), special design adapted to the respective equipment; please request information.

# CHETRA
# SEAL Type 207A

## CHETRA Type 207A Cartridge single mechanical seal

Seal Type 207A meets the requirements for a technically demanding and economically interesting solution when using a mechanical seal.

Complete sealing system, consisting of: seal with cartridge case (cartridge) and clamping device for shaft or protective sleeve, solid case cover with flushing and circulation connections.

- Single-acting
- Stationary arrangement
- Balanced
- Independent of direction of rotation
- Springs outside the conveyed medium

## MATERIAL

| | |
|---|---|
| Rotary / stationary rings | Carbon / silicon carbide; silicon carbide / silicon carbide |
| Secondary seals | FKM etc. |
| Metal parts | 1.4571 (316 Ti), other |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## SPECIAL ADVANTAGES AND USER BENEFIT

- **Simplified pump maintenance**
- Simplified installation and removal
- Subsequent impeller adjustment
- Universal spotted hole fixture and installation aids
- Stationary design = protected springs outside of the medium (no clogging)
  - Compensation for unavoidable mechanical tolerances such as angular offset, misalignments, etc.
- Optimum heat dissipation through circulation control or quench option
- Only solid rotary and stationary (no shrinkage), therefore reliable operation in higher temperature range
- No scoring or shrinking of the shaft or shaft sleeve
- **Significant cost savings**
  - **No** sleeve required and therefore no shaft sleeve wear
- High capability for conveying media loaded with solids due to structural design

## TYPICAL USES

- For abrasive, high-viscosity media (dyestuffs)
- Paper and pulp up to max. 3.5% OD (paper stock pump, deckle stirrer, deflaker)
- Hot water applications with special circulation control
- For standardization

## OPERATION

- According to API plan 02 / 11 / 21 / 31 and others

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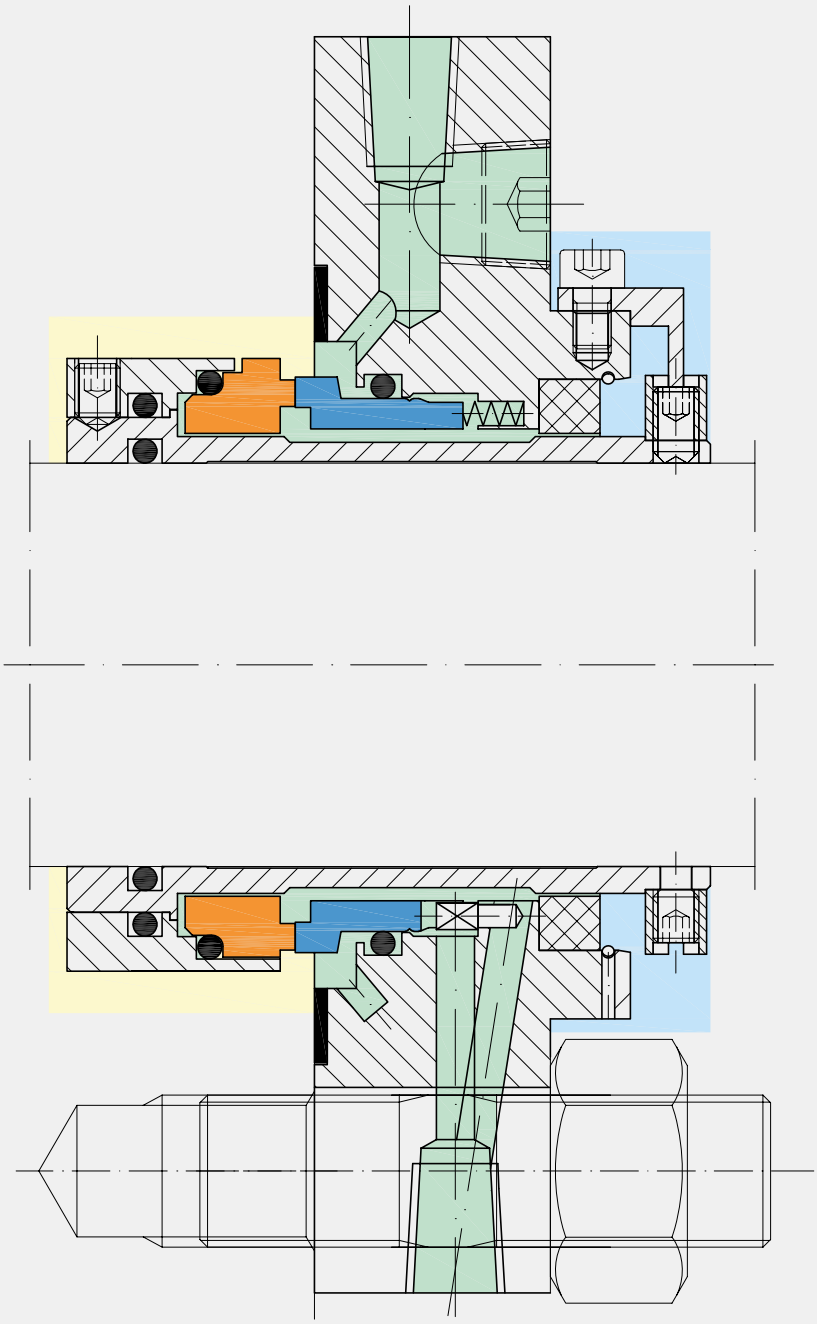
## TYPE 207A

- With flush connection
- Additionally with quench option (throttle bushing or shaft seal)



## TECHNICAL DATA

| | |
|---|---|
| pmax | 50 bar |
| tmax | -25° C to + 220° C |
| vmax | 35 m/s |
| Seal sizes | 25 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## OTHER DESIGNS

- **Type 207AS**, API 682 4th Ed. (incl. ES), special design adapted to the respective equipment; please request information.

# CHETRA
# SEAL Type 208S

## CHETRA Type 208S for hot water

High-tech mechanical seal, for single stage pumps with overhung impeller. Our concept for sealing hot water up to a maximum of +180°C calls for working without external cooling, with the help of a single acting seal in stationary design, rotating throttle bushing (thermostop), and use of quench/thermosiphon vessels (as coolers).

The elimination of external cooling alone, which is also often susceptible (e.g., to calcification of the cooling chamber), makes this concept very economical. Furthermore, the service life is typically much longer than with the conventional method of sealing.

Successful solutions are also available for hot water applications with multi-stage, double-bearing pumps. Please ask us.

## STANDARD

- Work standard

## DESCRIPTION

- Single acting
- Pre-assembled ready for use cartridge seal
- Balanced
- Independent of direction of rotation
- Multiple springs (protected)
- Stationary design

- Solid case with ½" connections (ZE/ZA)
- Seal complete with rotating throttle bushing (thermostop)
- Solid rotary/stationary rings
- Self-adjusting arrangement

## ACCESSORIES

- Thermosiphon vessels type 8L / 12L

## OPERATION

- Circulation by means of separate thermosiphon vessels, closed circulation, no additional cooling required

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | $A_1$, $Q_1$, $Q_2$ |
| Secondary seals | EPDM | E |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

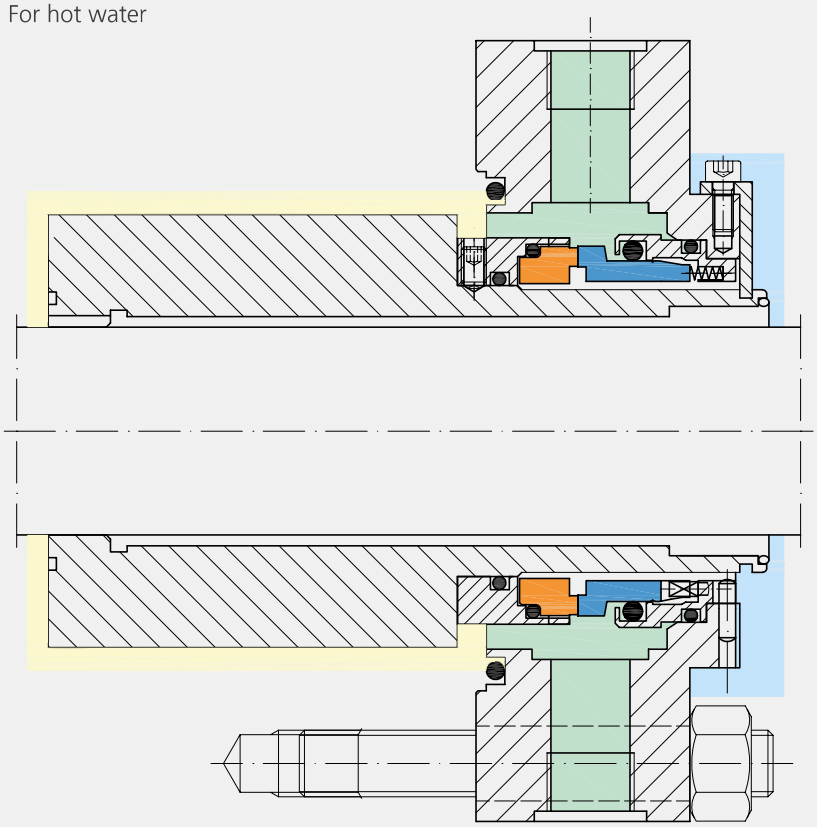
Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

ENERGY & WATER



## TYPE 208S

› For hot water



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | +200° C |
| vmax | 25 m/s |
| Seal sizes | 28 - 75 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 209D

## CHETRA Type 209D Cartridge seal, ready for use

- Single acting
- Balanced
- Stationary design
- Independent of direction of rotation

## Advantages and Benefits

- **Simplified pump maintenance**
- **Fits in packing stuffing box**

Type 209D for a technically demanding and economically interesting solution when using a mechanical seal.
Complete sealing system, consisting of: seal with cartridge case and clamping device for shaft or shaft sleeve, solid housing cover with flushing and circulation connections.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## SPECIAL ADVANTAGES AND USER BENEFIT

- Pre-assembled ready for use
- Simplified installation and removal
- Also for conversion from packing to seal (see technical data)
- Subsequent impeller adjustment
- Universal slotted hole attachment and installation aids
- Stationary design =
  - springs outside the medium (no clogging),
  - Compensation for unavoidable mechanical tolerances such as angular offset, misalignments, etc.
- Optimum heat dissipation through circulation control
- Only solid, loose rotary and stationaries (no shrinkage), therefore reliable operation in higher temperature range
- No scoring or shrinking of the shaft or shaft sleeve.
- **Significant cost savings**
  - no sleeve required and therefore no shaft sleeve wear
- High capability for conveying media loaded with solids due to structural design

## FOR PACKING CONVERSION

- Only low gland depth of 30 mm required
- Packing cross section 10 mm for shaft ø 25 – 65 mm
- Packing cross section 12 mm for shaft ø 70 – 100 mm
- Savings, as shaft sleeve does not need to be replaced

## OPERATION

- According to API plan 02 / 11 / 21 / 31 and others

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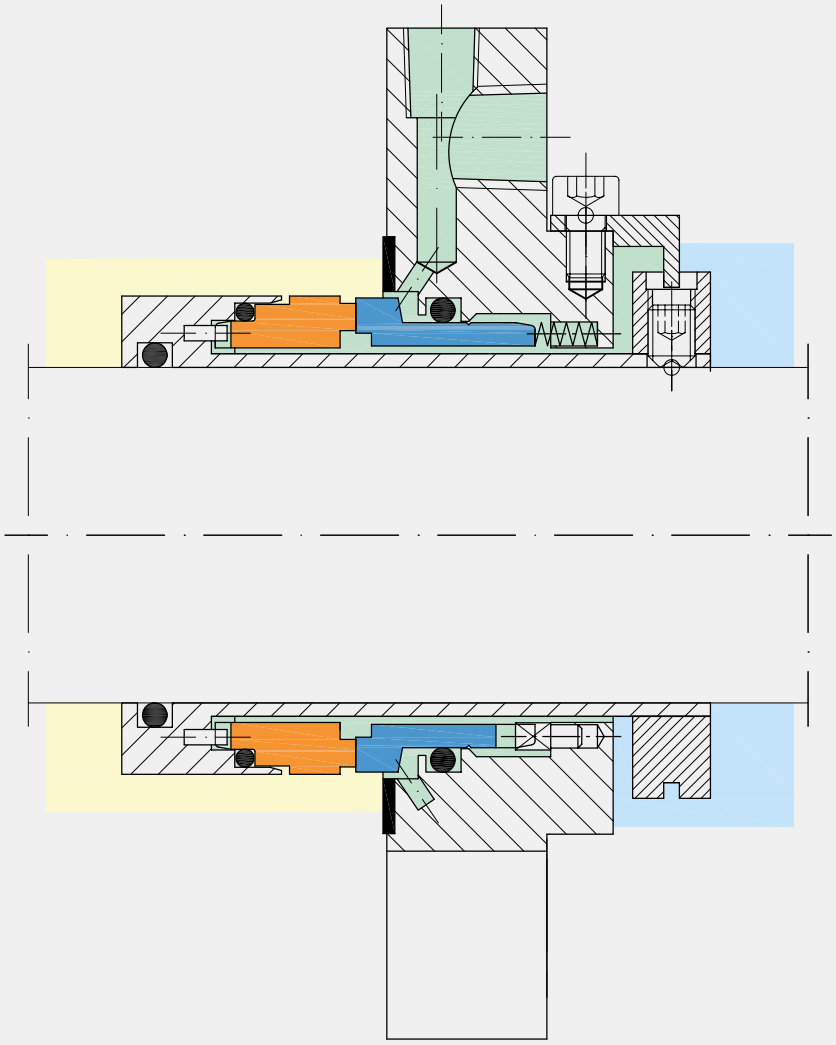
## TYPE 209D



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | -40° C to +220° C |
| vmax | 25 m/s |
| Seal sizes | 25 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## OTHER DESIGNS

- **Type 209** with quench (throttle bushing/shaft seal)
- **Type 209DS** adapted to the respective equipment
- **Type 209DC** with standard dimensions (see dimension sheet)

# CHETRA
# SEAL Type 299

## SPLIT, stationary, balanced, single-acting seal; Independent of direction of rotation, semi-cartridge

### Advantages and Benefits

- For locations difficult to reach
- High dismantling/assembly cost
- Larger diameter range of the shaft to be sealed

CHETRA split seal Type 299 is an economically interesting alternative to conventional closed seal designs, especially in case of the above-named conditions.

## STANDARD

- Work standard

## TYPICAL USES

- Operate successfully in pumps, such as in the larger diameter range in Kaplan and Francis turbines and similar units
- Successfully used in cooling water pumps of nuclear power plants

## SPECIAL ADVANTAGES AND USER BENEFITS

- Rotary ring is installed first = easier assembly
- Flat seal for the case has adhesive backs = easier assembly
- Large O-ring cross-section = easier handling and better sealing
- Stationary design = springs are outside the medium to be sealed (no clogging) and compensate for unavoidable mechanical tolerances, such as angular offset, misalignments, etc.
- Stationary ring always moves towards the "clean" side, less sensitive to solids

## OPERATION

- For example, according to API plan 11 / 31

## MATERIAL

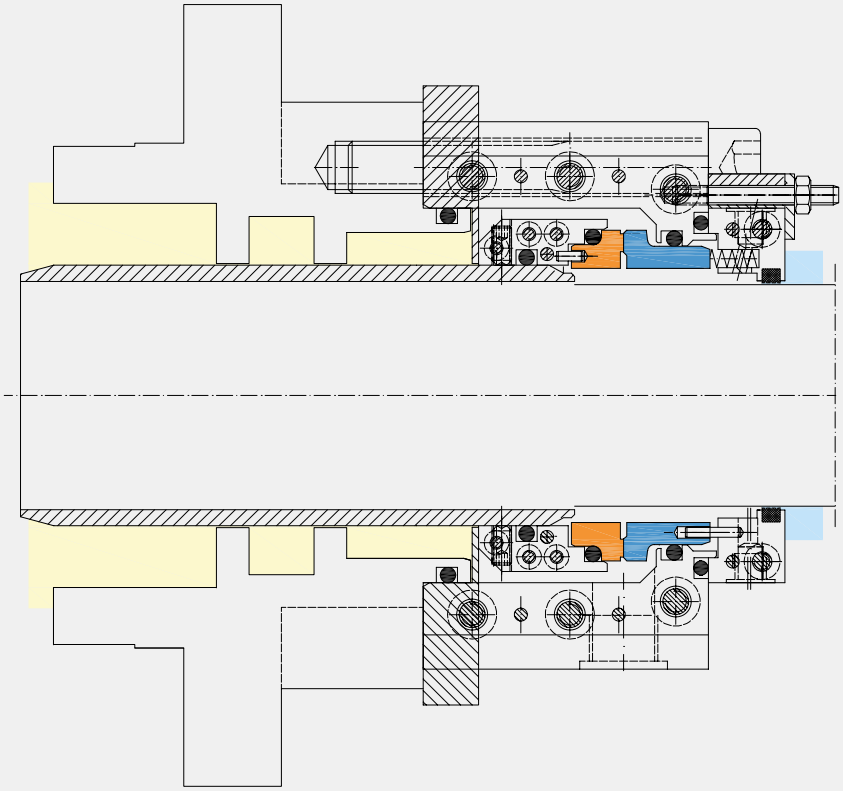
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | $B_1$, $B_2$, $Q_1$, $Q_2$, $Q_5$ |
| Secondary seals | FKM, EPDM, FFKM | V, E, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

ENERGY & WATER



## TYPE 299



## TECHNICAL DATA

| | |
|---|---|
| pmax | Vacuum 0,5 bar (absolute) to max. 25 bar |
| tmax | +120° C |
| vmax | 10 m/s |
| Seal sizes | 50 - 400 mm (650 mm) also in inch sizes, see dimension sheet |

Larger dimensions on request.

› Example of a split seal Type 299, use in cooling water pump (power plant)

## REMARKS

**Independent of the manufacturer**, conventional split seals demonstrate some basic special characteristics, compared to a closed seal:

› Installation requires a certain level of skill and experience
› Split seal are limited in the area of application (pressure, stability, etc.)

Due to these characteristics of the split seal

› we incorporated special advantages in the concept of type 299
› Type 299 are adapted to the respective equipment to be sealed (“customized”)

# CHETRA
# SEAL Type 301S

## CHETRA Type 301, HIGH PERFORMANCE mechanical seal

**Completely pre-assembled single seal, balanced, cartridge unit**

## STANDARD

- Work standard

## DESCRIPTION

- Clamp ring with clamping screws or shrink disc
- Fixed throttle
- Quench and drainage connections in the case
- Multiple springs – stationary design
- Pumping ring – independent of direction of rotation
- Flush IN/OUT in the case
- Flush IN with distributor ring
- Thermostop

## TYPICAL USES

- Hot water, boiler feed water

## OPERATION

- According to API plan 21, 22, 23

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | A, $Q_1$, $Q_2$, $Q_6$ |
| Secondary seals | EPDM, FKM, FFKM | E, V, K |
| Metal parts | 1.4571, 1.4404, 1.4501 | $G_1$, $G_8$, $G_{12}$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

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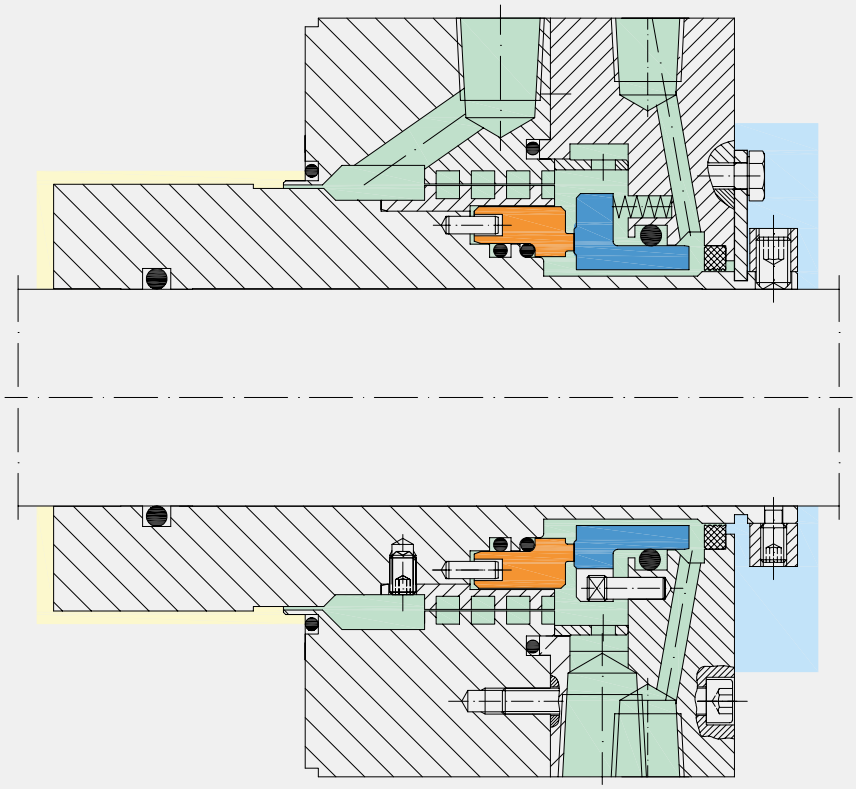
## TYPE 301S



## TECHNICAL DATA

| | |
|---|---|
| pmax | 100 bar |
| tmax | -10°C to +330°C<br>(observe operating mode) |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CARTRIDGE MECHANICAL SEALS
## LIQUID / DOUBLE-ACTING


| | |
|---|---|
| SEAL Type 351F | 62 |
| SEAL Type 371 | 64 |
| SEAL Type 741 / 741S | 66 |
| SEAL Type 770 | 67 |
| SEAL Type 790 | 68 |
| SEAL Type 807 | 70 |
| SEAL Type 808 | 72 |
| SEAL Type 809DC | 73 |
| SEAL Type 821 | 74 |
| SEAL Type 851 | 76 |
| SEAL Type 857 / 857S | 79 |
| SEAL Type 861AS | 80 |
| SEAL Type 875AS / A | 82 |
| SEAL Type 877 | 84 |
| SEAL Type 881 | 86 |

# CHETRA
# SEAL Type 351F

## CHETRA Type 351F, short design

**Face-to-Face, specially for compressors**

Robust seal in stationary design with solid rotary and stationary rings for sealing of compressors and other equipment with limited installation space.

This seal has a compact "face-to-face" design to fit into the available short installation space.

Structural measures were also taken to virtually exclude distortion of the rotary surfaces.
To this effect a solid, central rotary ring is configured to which two stationary rings are positioned in a stationary arrangement with multiple springs. This conception is also referred to sometimes as rotating stationary with stationary rotary rings.
Use of the compressor's own oil supply as sealing medium for the seal.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | Chloroprene / neoprene, FKM, EPDM, PTFE | N, V, E, $T_2/T_1$ |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Pre-assembled ready for service cartridge seal
- Double-balanced
- Independent of direction of rotation
- Multiple springs, protected
- Compact / stationary design

## TYPICAL USES

- In compressors
- In other equipment with limited, short installation space

## VERSIONS

- **Type 351F**
  without feed screw
- **Type 351FH**
  with integrated feed screw
- **Type 351FHD**
  with integrated double feed screw

## OPERATION

- According to API plan 53, with overpressure.
  Supply with compressor's own sealing medium.

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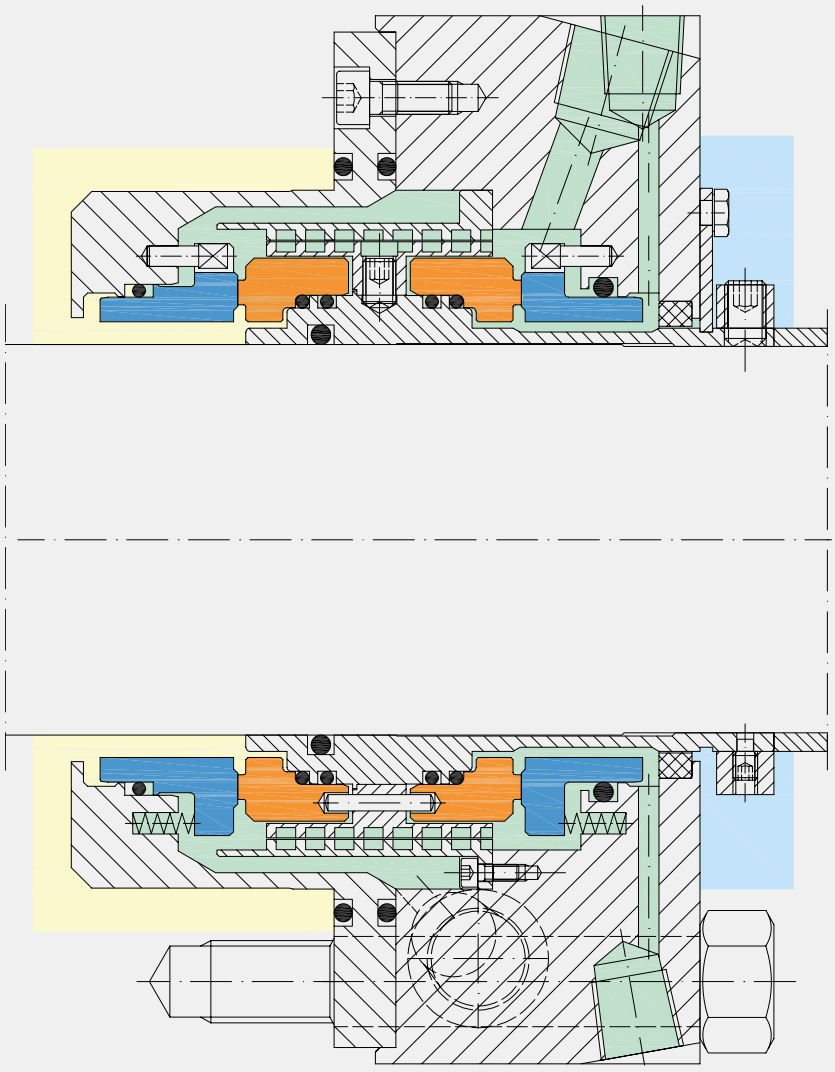
## TYPE 351FHD



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar (stat. 50 bar) |
| tmax | 200° C |
| vmax | 25 m/s |
| Seal sizes | 40 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 371

## CHETRA Type 371 mechanical seal, liquid-lubricated, short design face-to-face

**Specially for standard chemical pumps/centrifugal pumps**

Rugged seal in stationary design with solid rotary and stationaries for sealing of pumps with limited installation space.

This seal has a compact face-to-face design to fit into existing tight installation spaces. Structural measures were also taken to virtually exclude distortion of the rotary surfaces. To this end, a very soft bellow was developed that practically eliminates such distortion and better compensates for vibrations in the pump.
Use of this seal in chemical plants and refineries.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / silicon carbide | B, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE , FFKM, chloroprene / neoprene | V, E, $T_2$/$T_1$, K, N |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Bellows | Inconel | $M_6$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Pre-assembled ready for service cartridge seal
- Soft bellows to compensate for vibrations
- Independent of direction of rotation
- Double protection in case of aggressive media through upstream shaft seal
- ATEX-compliant
- Compact, stationary design

## TYPICAL USES

- In pumps
- In other equipment with limited installation space

## OTHER VERSIONS

- **Type 370G**
  gas-lubricated seal design

## OPERATION

- According to API plan 52 / 53, unpressurized or with overpressure.

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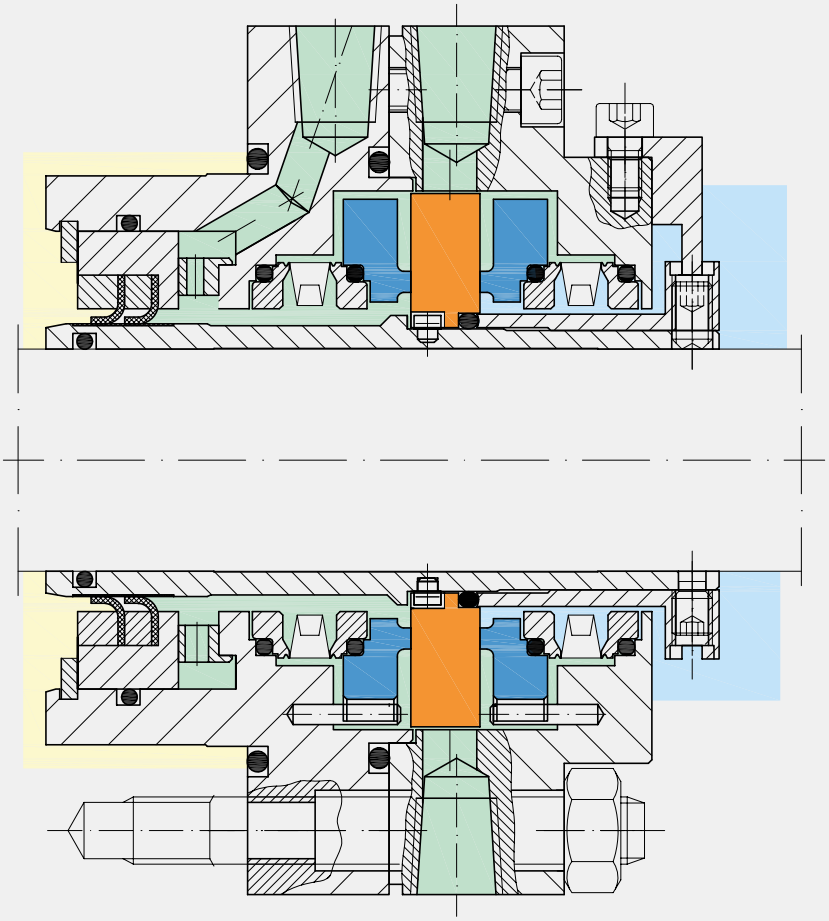
## TYPE 371



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | 250°C |
| vmax | 18 m/s |
| Seal sizes | 30 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 741 / 741S

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## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | -40° C to +250° C |
| vmax | 25 m/s |
| Seal sizes | 30, 40, 50, 60 mm, see dimension sheet |

## CHETRA mechanical seal Type 741 / 741S

**Short design, double-acting**

This seal is a combination-type design.
Media-side metal bellows, atmosphere-side in stationary O-ring design.
In this way, applications in the higher temperature range can be combined with an appropriate level of corrosion resistance.

## STANDARD

- Double seal, according to DIN 24960C

## DESCRIPTION

- Pre-assembled ready-for-service cartridge seal
- Short design/compact
- Fits into DIN 24960C installation spaces
- With feed screw and guide sleeve for optimized heat dissipation
- Can be used as improvement to replace other bellows seals
- ATEX-compliant

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Bellows | Inconel 718 (2.4668) / AM 350 (AISI 633) | $E_4$ / $M_6$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## TYPICAL USES

- Sealing of fatty acids, caustic soda (low concentration), tensides, glycerin, esters, dextrose, etc.
- In petrochemicals and refineries

## OPERATION

- Higher sealing pressure / API plan 53A and others

# CHETRA
# SEAL Type 770

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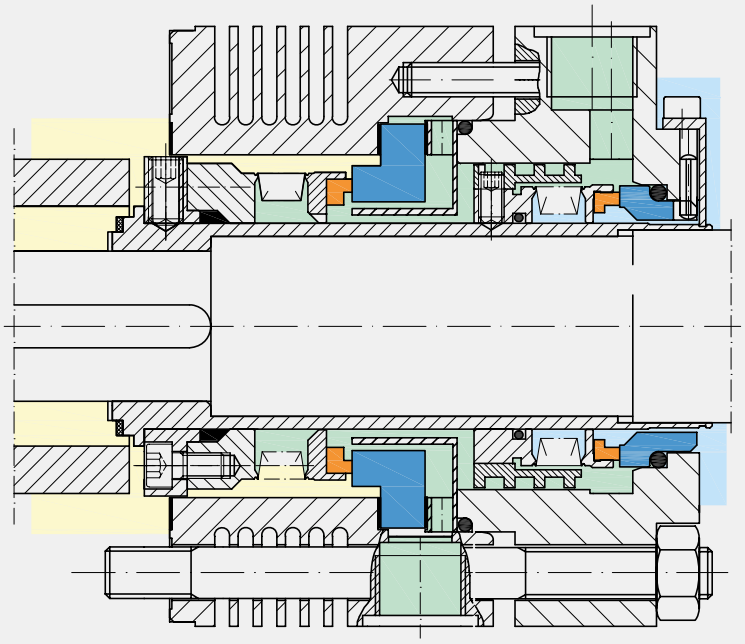


## TECHNICAL DATA

| | |
|---|---|
| pmax | 16 (30) bar |
| tmax | -100° C to +400° C |
| vmax | 25 m/s |
| Seal sizes | 30 - 115 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## CHETRA mechanical seal Type 770

**Double-acting metal bellows Cartridge seal in Tandem Arrangement**

Cooling fins housing, heat barrier, thermosiphon configuarion (quench vessel), external cooling usually not required.

## STANDARD

- Work standard

## DESCRIPTION

- Cooling ribs
- Housing
- Feed screw

## TYPICAL USES

- Heat transfer oils

## OPERATION

- Unpressurized / tandem, API plan 52

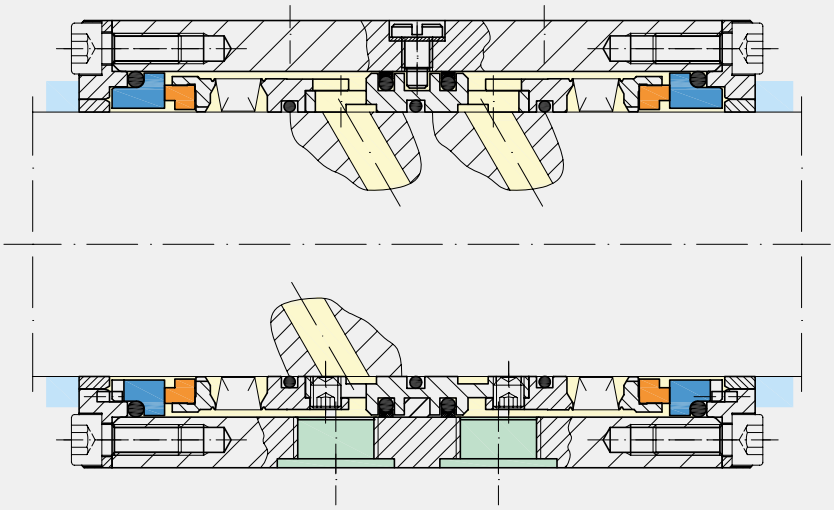
## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $Q_2$ |
| Secondary seals | Graphite | G |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Bellows | Inconel 718 (2.4668) / AM 350 (AISI 633) | $E_4$ / $M_4$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 790

CHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | -40° C to +180° C |
| vmax | 8 m/s |
| Seal sizes | 25 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## CHETRA mechanical seal Type 790

**Double-acting bellows seal in semi-Cartridge Design, balanced**

Used in the processing of granules in plastic extruders e.g. heat transfer oils. This media is sealed through the specially designed double-acting bellows of the seal.

## STANDARD

› Work standard

## TYPICAL USES

› For plastic extruders (heat transfer oil)

## OTHER VERSIONS

› **Type 791**
› **Type 792**

## OPERATION

› API plan 53A

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon / chrome casting | A, S |
| Secondary seals | FKM, FFKM | V, K |
| Metal parts | 1.4571 (316Ti) | $G_1$ |
| Bellows | AM 350 (AISI 633) | $E_4$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 807

## CHETRA Type 807, standardized mechanical seal

**Cartridge mechanical seal, double-acting**

High-quality, standard double cartridge seal with High-Tech design features for demanding applications

Exclusive use of robust solid rotary/stationary rings in "self-adjusting" configuration and stationary design, therefore minimal seal face distortion from pressure and thermal load.
Guided circulation flow for optimum heat dissipation and to achieve maximum service life.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard API 682 (incl. ES)

## DESCRIPTION

- Double-acting
- Pre-assembled, ready-for-service cartridge seal
- Double-balanced
- Independent of direction of rotation
- Multiple springs (protected)
- Stationary design

## TYPICAL USES

- In pump applications with clean media
- Suitable for media near the boiling point
- Light hydrocarbons
- Use in the low-temperature range

## OTHER VERSIONS

- **Type 807S** in special designs
- **Type 807AS** in design according to API 682
  - For petrochemical and refinery applications
  - For pipeline pumps
- **Type 806; 809; 808** and **808S** and others, specially for the paper industry
- **Type 809DC** for general, universal applications

## OPERATION

- API plan 52 or 53 (i.e., as tandem seal with unpressurized supply or as double seal with higher sealing pressure)

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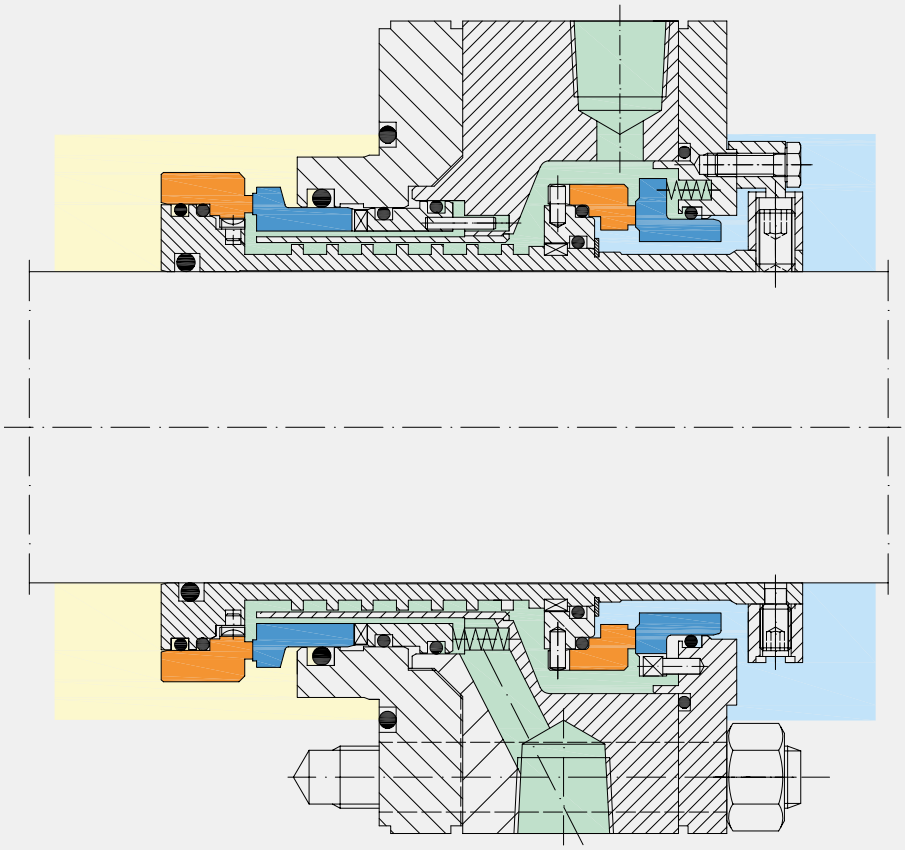
## TYPE 807



## TECHNICAL DATA

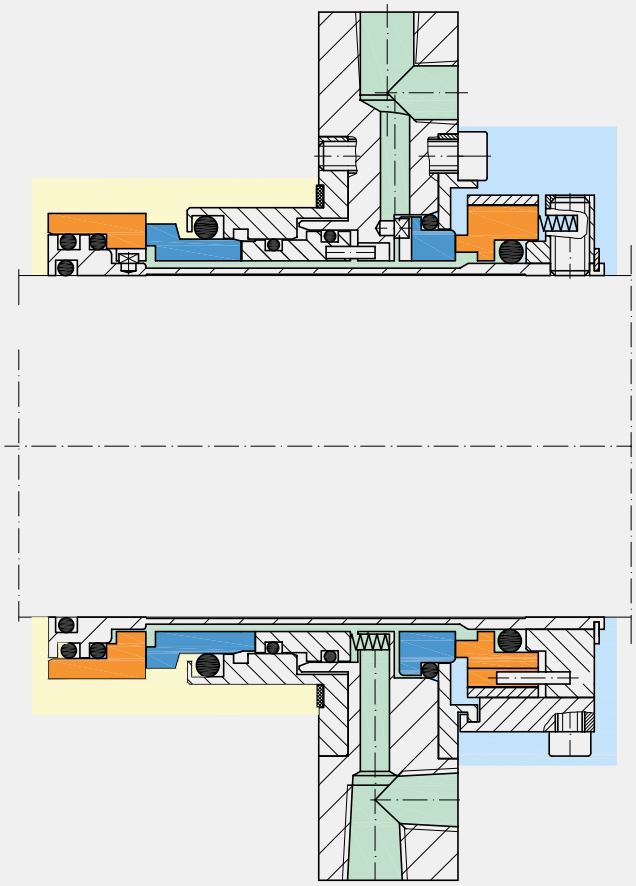
| | |
|---|---|
| pmax | Full vaccum to 35 bar |
| tmax | -80° C to +260° C<br>(dep. on the secondary seal) |
| vmax | 25 m/s |
| Seal sizes | 25 - 100 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Standard double seal
for demanding applications

# CHETRA
# SEAL Type 808

CHEMISTRY | ENERGY & WATER | PAPER



## TECHNICAL DATA

| | |
|---|---|
| pmax | Vacuum to 30 bar |
| pmax (static) | 35 bar |
| tmax | -25° C to +200° C |
| vmax | 25 m/s |
| Seal sizes | 45 - 90 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## CHETRA Type 808 for paper industry

## DESCRIPTION

- Pre-assembled
- Cartridge-type unit
- Balanced
- Double-acting
- Independent of direction of rotation

## STANDARD

- Work standard

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | $B_1$, $B_2$, $Q_1$ |
| Secondary seals | FKM etc. | V etc. |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 809DC

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## TECHNICAL DATA

| | |
|---|---|
| pmax | 23/25 bar |
| tmax | -40° C to +220° C |
| vmax | 18 m/s |
| Seal sizes | 25 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## CHETRA Type 809DC, universal double seal

## DESCRIPTION

- Single-acting
- Stationary arrangement
- Double-balanced
- Independent of direction of rotation
- 809DC is a standard fixed design; with adaptions "809S"

## STANDARD

- Work standard

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, B, Q, $U_2$ |
| Secondary seals | FKM etc. | V etc. |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 821

## STANDARD

- Factory standard

## DESCRIPTION

- Double-acting
- Independent of direction of rotation
- Stationary design
- Sensitive components are protected
- Suitable for low-speed equipment

## TYPICAL USES

- For abrasive, high-viscosity media (dyestuffs)
- Latex applications
- Kaolin
- Abrasive coatings
- Polyester melts

## OPERATION

- Higher sealing pressure according to API plan 11 / 53

## CHETRA Type 821, double mechanical seal

High-tech cartridge mechanical seal in back-to-back design for sealing of solids-laden media with a tendency to stick. For abrasive media, and other difficult applications.
As double seal with higher sealing pressure.
Completely pre-assembled, ready-for-service cartridge unit with cover, shaft sleeve, feed screw, and throttle bushing.

The bottom seal of Type 821 contains a special circulation guide for cooling / heating, optionally with conveyor.
Parts in contact with the product can be coated with nonstick coating or polished.
The seal also features appropriately selected cross-sections due to its robust, solid construction.
The seal can be adapted to the equipment to be sealed.

## MATERIAL

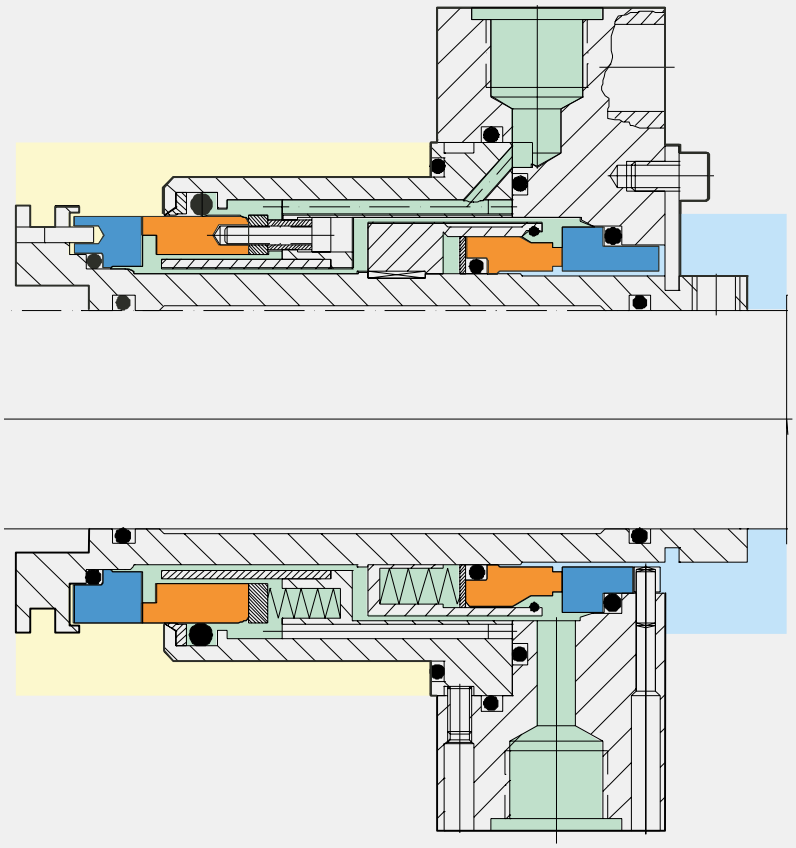
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_5$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY



## TYPE 821



## TECHNICAL DATA

| | |
|---|---|
| pmax | 12 bar |
| tmax | -100° C to +260° C |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Double seal;
typical applications: latex,
polyester melts, phenolic resin, etc.

# CHETRA
# SEAL Type 851

## CHETRA mechanical seal Type 851

Double seal back-to-back, as well as Tandem seal and face-to-back version, incl. API 682.

## STANDARD

- Work standard, API 682 (incl. ES)

## DESCRIPTION

- In various versions:
  as back-to-back and tandem version

## TYPICAL USES

- Sealing of toxic and explosive media, such as aromatics, as well as highly flammable and self-igniting media, LPG, solvents, etc.

## OTHER VERSIONS

- **Type 851B** back-to-back
- **Type 851B/T** double-balanced
- **Type 851T-A**
- **Type 851T** Tandem version according to API 682
- **Type 851TB** Tandem face-to-back version / API 682

## OPERATION

- API plan 53A / 53B,
  as well as API Plan 52

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, FFKM | V, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

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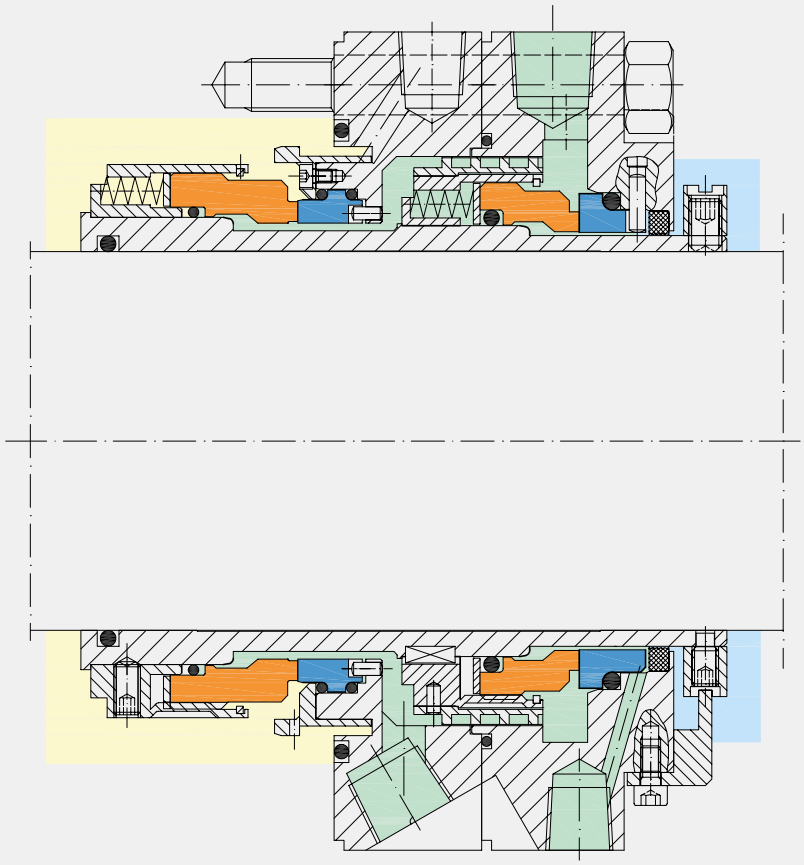
## TYPE 851TB



## TECHNICAL DATA

| | |
|---|---|
| pmax | 50 bar |
| tmax | -50° C to +260° C<br>(in API +176° C) |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

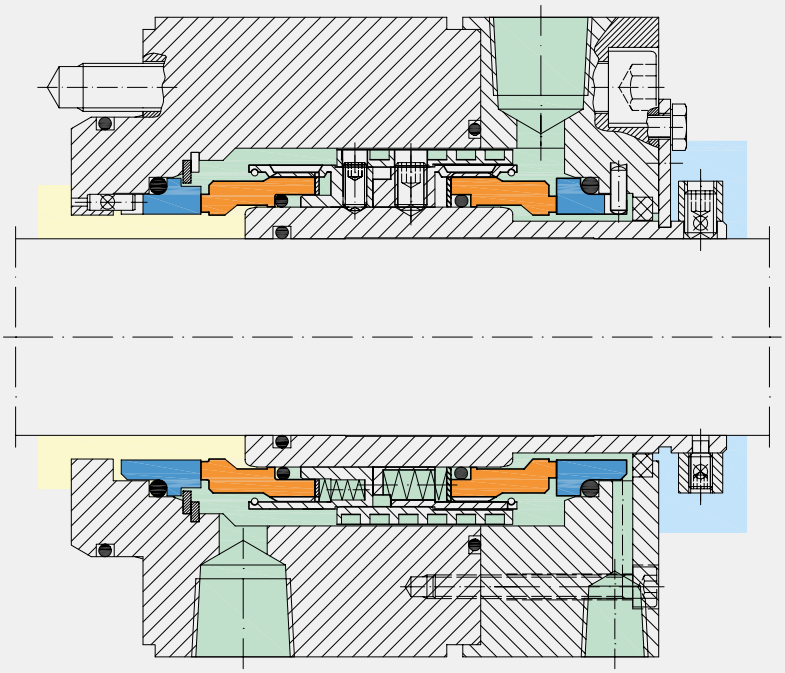
Larger dimensions on request.

## TYPICAL USES

› Sealing of toxic and highly explosive media, such as aromatics like benzene, toluene, xylene, etc.

# CHETRA
# SEAL Type 851 alternative version

## TYPE 851B/T



## TECHNICAL DATA

| | |
|---|---|
| pmax | 50 bar |
| tmax | -120° C to +260° C (in API-applications, max. 176° C) |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm (API to max. 110 mm) also in inch sizes, see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

- For sealing of highly flammable and self-igniting media
- Light hydrocarbons
- LPG/liquid gas
- Solvents and similar in connection with flare connection
- For low temperature use

# CHETRA
# SEAL Type 857/857S

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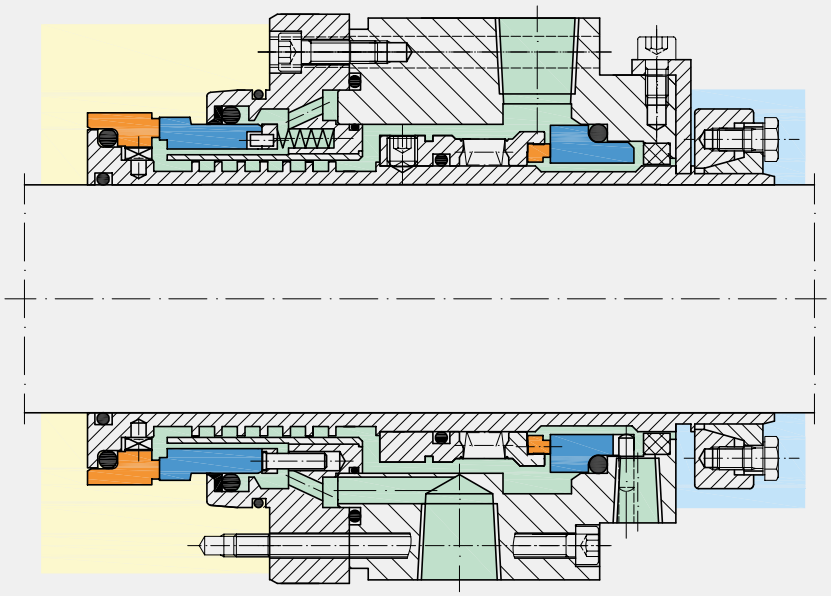

## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | +250° C |
| vmax | 25 m/s |
| Seal sizes | 30 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

- Ship loading pumps
- Bitumen
- Asphalt
- Screw spindle and centrifugal pumps
- Hydrocarbon condensate
- Heavy fuel oil
- Liquid sulphur etc.

## CHETRA Mechanical seal Type 857/957S

**Double-acting, hybrid cartridge seal**

stationary O-ring seal on the product side,
metal bellows seal the atmosphere side

## STANDARD

- Work standard, based on API

## DESCRIPTION

- Double-acting
- Feed screw
- Guidance sleeve for optimized circulation
- Throttle bushing

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, PTFE, FFKM e.g. | V, T, K etc. |
| Metal parts | 1.4571 (316 Ti), 1.4404 | $G_1$, $G_8$ |
| Springs | Hastelloy C | $M_2$ |
| Bellows | Inconel 718 / AM 350 | $E_4$, $M_4$ |

## OPERATION

- API plan 53A, 54

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 861AS

## CHETRA Type 861AS, double mechanical seal, back-to-back

**Specially for demanding applications in refineries, dependent of direction of rotation**

With the 861AS, CHETRA offers a sophisticated seal that has been specially developed with double-threaded feed screws eliminating the need for an additional circulation pump in the sealing system. Successfully used by well-known refineries and in the petrochemical industry.

This seal has a compact back-to-back design.
With this series, CHETRA replaces an additional circulation pump in the sealing system, as high-volume flows are achieved with the integrated double-threaded feed screw in the seal. This seal can be operated with air or water coolers without any loss of performance.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | $B_1$, A, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, FFKM, PTFE, chloroprene / neoprene | V, E, $T_2$/$T_1$, N, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard, based on API 682

## DESCRIPTION

- Pre-assembled ready-for-service cartridge seal
- Liquid-lubricated
- Double-threaded feed screw
- Stationary design towards product side
- Back-to-back
- ATEX-compliant
- Modern refinery seal, adapted to the respective operating standard

## TYPICAL USES

- In centrifugal pumps in demanding refinery applications

## OTHER VERSIONS

- **Type 875AS**
  Similar design, but with metal folding bellows version for high temperatures

## OPERATION

- According to API plan 53B, with overpressure, and others

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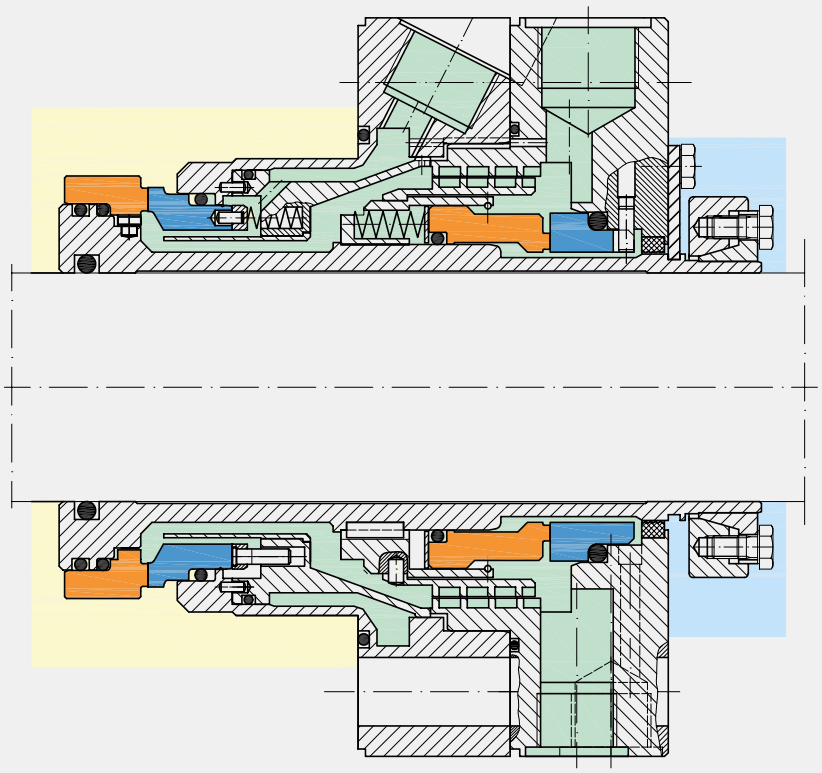
## TYPE 861AS



## TECHNICAL DATA

| | |
|---|---|
| pmax | 30 bar |
| tmax | -40° C to +250° C |
| vmax | 15 m/s |
| Seal sizes | 30 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Differential pressure min. 3 bar

# CHETRA
# SEAL Type 875AS / A

## CHETRA Type 875AS

**For demanding applications in refineries, dependent of direction of rotation**

With the 875AS, CHETRA offers a sophisticated seal that has been specially developed with feed screws eliminating the need for an additional circulation pump in the sealing system. Successfully used by well-known refineries and in the petrochemical industry.

This seal is a compact design. The design was developed for high temperatures with respect to construction and materials.
High volume flows are achieved in the seal with the integrated feed screw.
This seal can be operated with air or water coolers without any loss of performance.

## STANDARD

- Work standard, API 682 (875A) based on API 682 (875A)

## DESCRIPTION

- Pre-assembled ready-for-service cartridge seal
- Liquid-lubricated
- Feed screw
- No O-ring friction due to the use of graphite elements
- ATEX-compliant
- Modern refinery seal for high temperatures
- Version based on API and according to operator standard

## TYPICAL USES

- In centrifugal pumps, in the chemical industry, petrochemical industry, refineries

## OTHER VERSIONS

- **Type 861AS**
  Similar design, but back-to-back without bellows, with multiple springs

## OPERATION

- According to API plan 53B, 53C, with overpressure

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide etc. | A, $Q_2$ etc. |
| Secondary seals | FKM, EPDM, FFKM, graphite, PTFE | V, E, K, G, $T_1$/ $T_2$ |
| Metal bellows | Inconel 718, AM 350 etc. | $M_4$, $E_4$ |
| Metal parts | 1.4571 (316 Ti) | $G_1$ etc. |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

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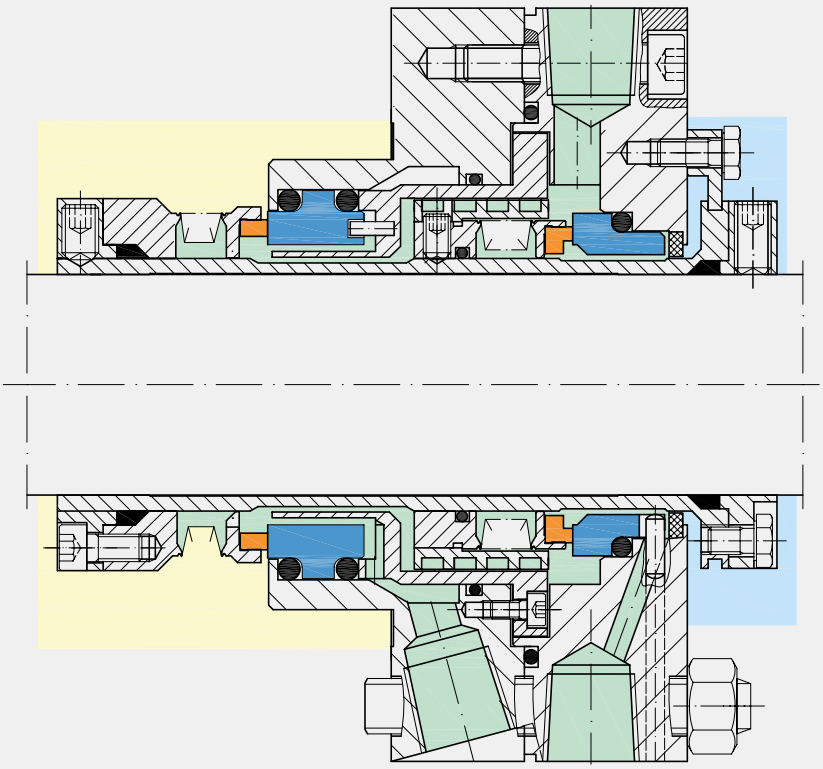
## TYPE 875A



## TECHNICAL DATA

| | |
|---|---|
| pmax | 28 bar |
| tmax | -40° C to +400° C |
| vmax | 25 m/s |
| Seal sizes | 30 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 877

## CHETRA Type 877 double mechanical seal

A widely used standard chemical pump is the CPK series from KSB. In order to realize the advantages of a seal version with robust cross-sections and other high-quality design elements, the pre-assembled seal 877X is arranged directly on the pump shaft. Impeller tensioning through the seal shaft protective sleeve.

The double seal 877X is designed for more demanding applications, such as the sealing of melts, resins, and similar substances, compliant with the German Clean Air Act (TA-Luft).

However, the economical design of the seal allows universal use whenever a double seal is required.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard, ATEX

## DESCRIPTION

- Double-acting
- Cartridge seal with impeller tensioning
- Double-balanced
- Independent of direction of rotation
- Multiple springs (protected)
- Stationary design

**This concept also includes:**

- Seal shaft protective sleeve as pump protective sleeve, i.e., associated savings
- Identical-design elements rotary/ stationary rings internal/external simplify stocking of spare parts and ensure interchangeability
- Integrated conveying system (DGM 202 12 246.8) seal is double balanced by means of an integrated protective sleeve and therefore designed for installation on a smooth, continuous shaft or on the shaft protective sleeve

## TYPICAL USES

- In standard chemical pump applications
- Suitable for media ranging from media containing suspended solids to paste-like media

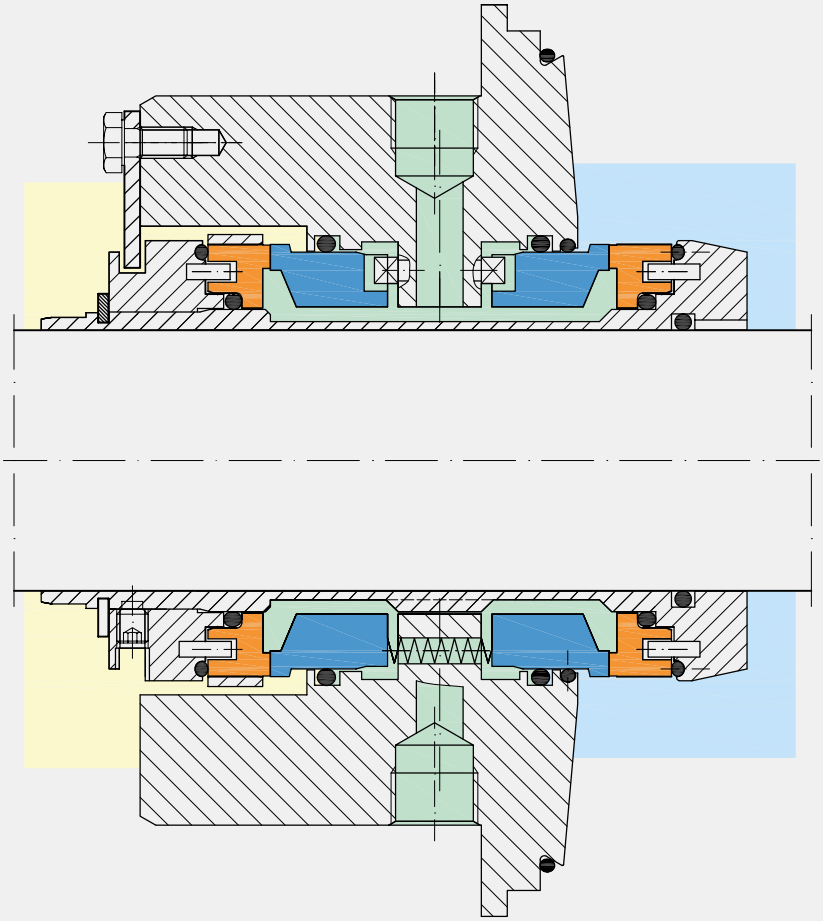
## OTHER VERSIONS

- **Type 877X**, aseptic / sterile
- **Type 877XC**, with bearing for pump and agitator applications
- **Type 877S**, adapted to the equipment - for confined installation spaces
- **Type 877GS**, gas-lubricated

CHEMISTRY



## TYPE 877



## TECHNICAL DATA

| | |
|---|---|
| pmax | 20 bar |
| tmax | -40° C to +220° C<br>(dep. on the secondary seal) |
| vmax | 25 m/s |
| Seal sizes | 25 - 80 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## OPERATION

› API plan 52 when appropriate together with API 11 or API 53, with overpressure

The structural design includes, among other things, the design with double balancing; i.e., in the absence or reversal of sealing pressure the seal remains closed. Alternatively, the seal can be operated as a tandem seal (with unpressurized supply) or as double seal with higher sealing pressure.

Stationary design ensures optimum running due to plane-parallel rotary surface guidance (see “The stationary sealing concept”).

The seal offers high operating reliability and the potential for achieving a long service life.

# CHETRA
# SEAL Type 881

## CHETRA Type 881

## DESCRIPTION

› Double-acting cartridge seal for especially demanding applications, stationary design, integrated feed screw, double balanced

## STANDARD

› Work standard, API 682 (incl. ES), ATEX

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $Q_1$, $Q_2$ etc. |
| Secondary seals | FKM etc. | V etc. |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

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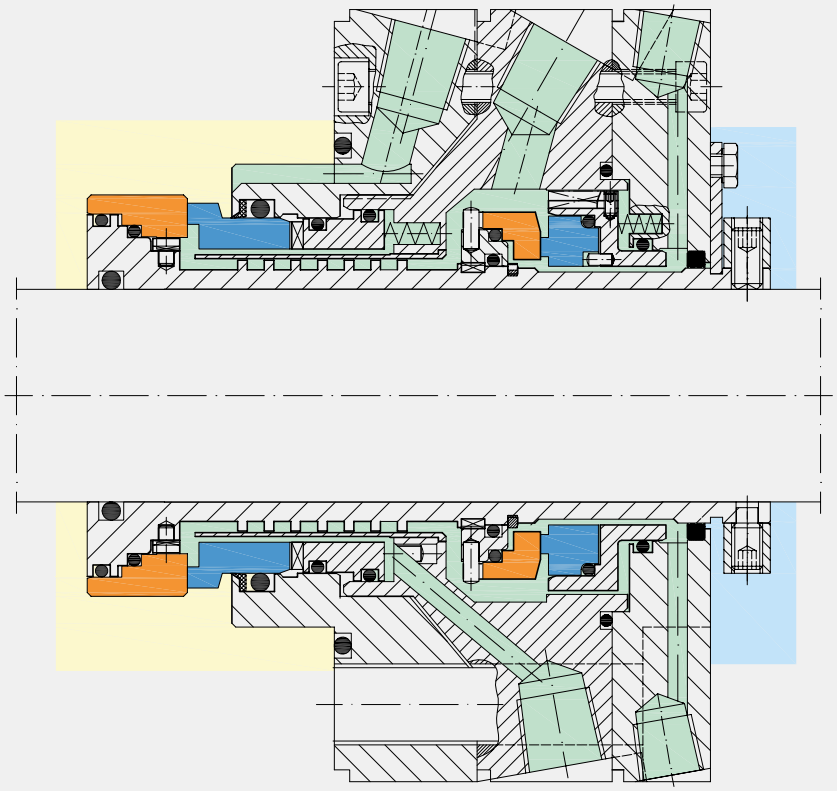
## TYPE 881D



## TECHNICAL DATA

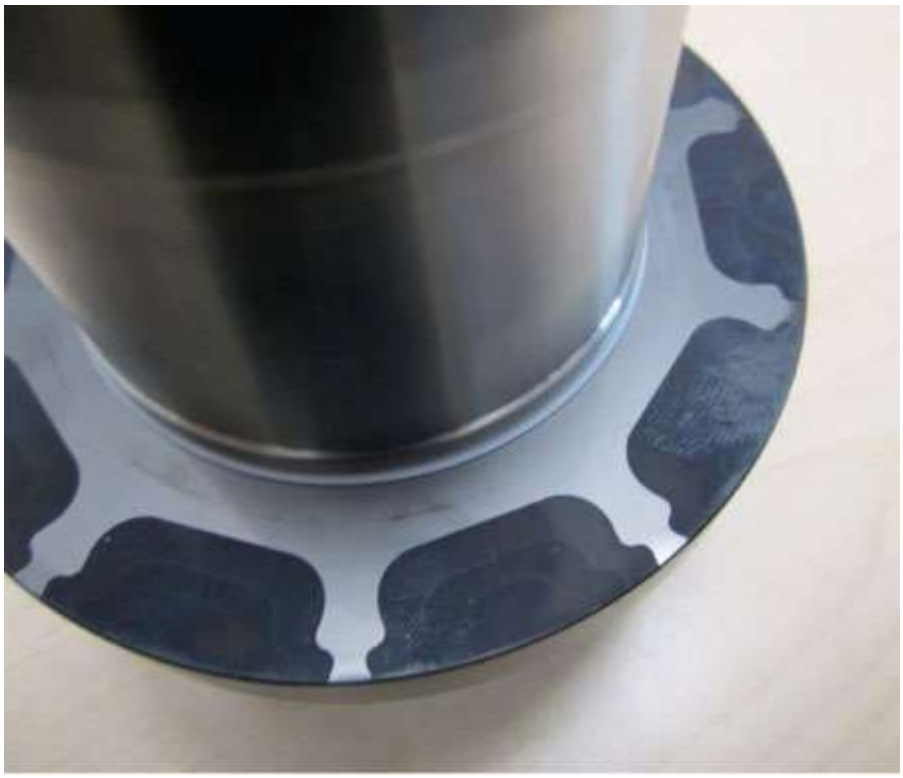
| | |
|---|---|
| pmax | 80 bar |
| tmax | -120° C to +260° C |
| vmax | 35 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CARTRIDGE MECHANICAL SEALS
## GAS-LUBRICATED


| | |
|---|---|
| SEAL Type 370G | 90 |
| SEAL Type 801TAD | 92 |
| SEAL Type 825TAG | 94 |
| SEAL Type 877GS | 96 |

# CHETRA
# SEAL Type 370G



## CHETRA Type 370G, short design, face-to-face

**Specially for short installation spaces, gas-lubricated, independent of direction of rotation**

With the 370G, CHETRA offers a short-design gas-lubricated seal that is designed for applications in the chemical industry and refineries, among other uses.
This seal has a compact face-to-face design for existing tight installation spaces and provides the advantages of a gas-lubricated pump seal that is independent of the direction of rotation. The lasered gas groove is designed to detach from the spring-loaded ring in the event of slight incidence of liquids.
All components are delivered in high quality, exceeding the specifications of the API. All mechanical seals, whether gas or liquid lubricated, are tested in-house prior to delivery.
This type of design is used in chemical plants and refineries.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | B, Q |
| Secondary seals | FKM, EPDM, PTFE, FFKM, chloroprene / neoprene | V, E, $T_1/T_2$, K, N |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Bellows | Inconel | $M_6$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Pre-assembled ready for service cartridge seal
- Gas-lubricated
- Independent of direction of rotation
- Soft bellows to compensate for vibrations
- Minimum gas leakage
- Double protection through upstream shaft seal
- ATEX-compliant
- Compact, stationary design
- For ISO and ASME pumps with standard bores

## TYPICAL USES

- In standard chemical pumps/centrifugal pumps
- Discharge pumps, usually vertical

## OTHER VERSIONS

- **Type 371**
  same design – liquid-lubricated

## OPERATION

- According to API plan 74, with overpressure.
- Supply with N2, use of a gas control panel.

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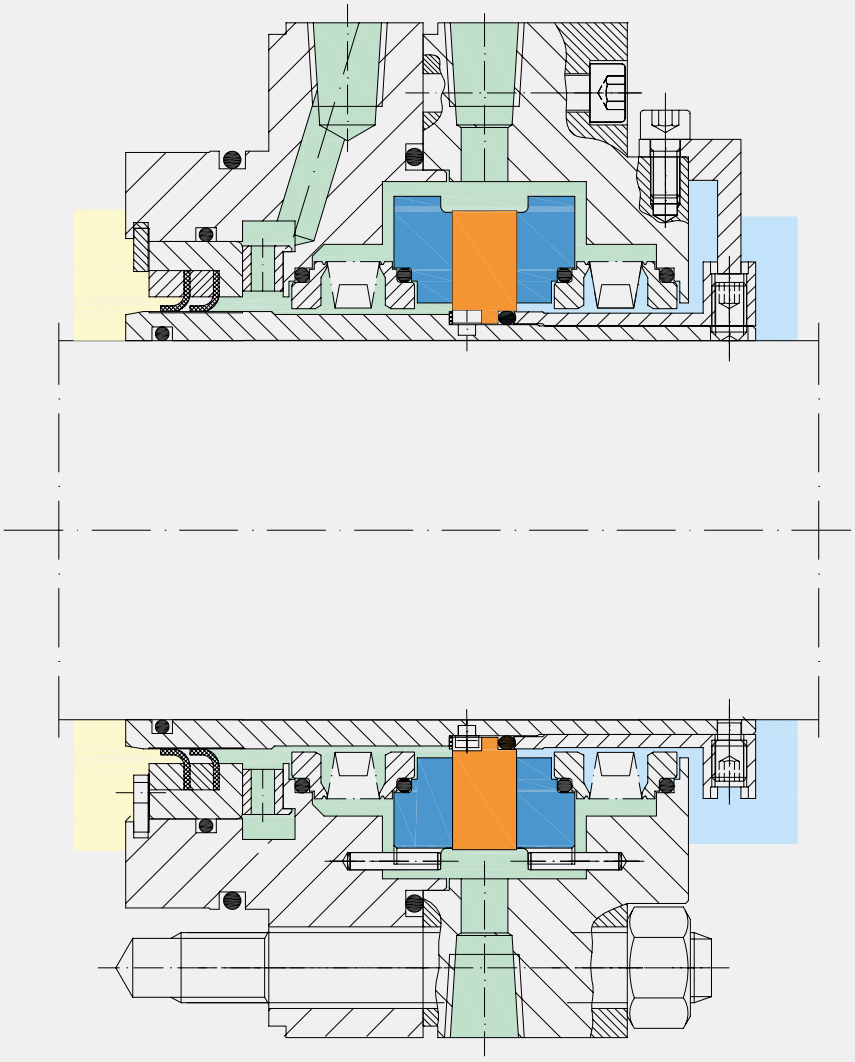
## TYPE 370G



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | 250°C |
| vmax | 18 m/s |
| Seal sizes | 10 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## Omega Plus Gas Grooves

› Offer the advantage that the seal can be operated independently of the direction of rotation; at the same time minimum gas leakage

# CHETRA
# SEAL Type 801TAD

## CHETRA Type 801TAD

**Cartridge seal, double-acting**

Back-up seal, dry running seal on atmospheric side. Collecting leakage in a cup with indicator, possibility of alarm display by API plan 75 system. For vertical and horizontal use.

## STANDARD

- API 682 and work standard

## DESCRIPTION

- Double-acting
- Liquid seal
- Dry running on atmospheric side
- Stationary design on product side

## TYPICAL USES

- Loading pumps
- Tank farms
- Ammonia
- Crude oil
- Fuels

## OPERATION

- API plan 11, 13, 75, 61 (62)

## MATERIAL

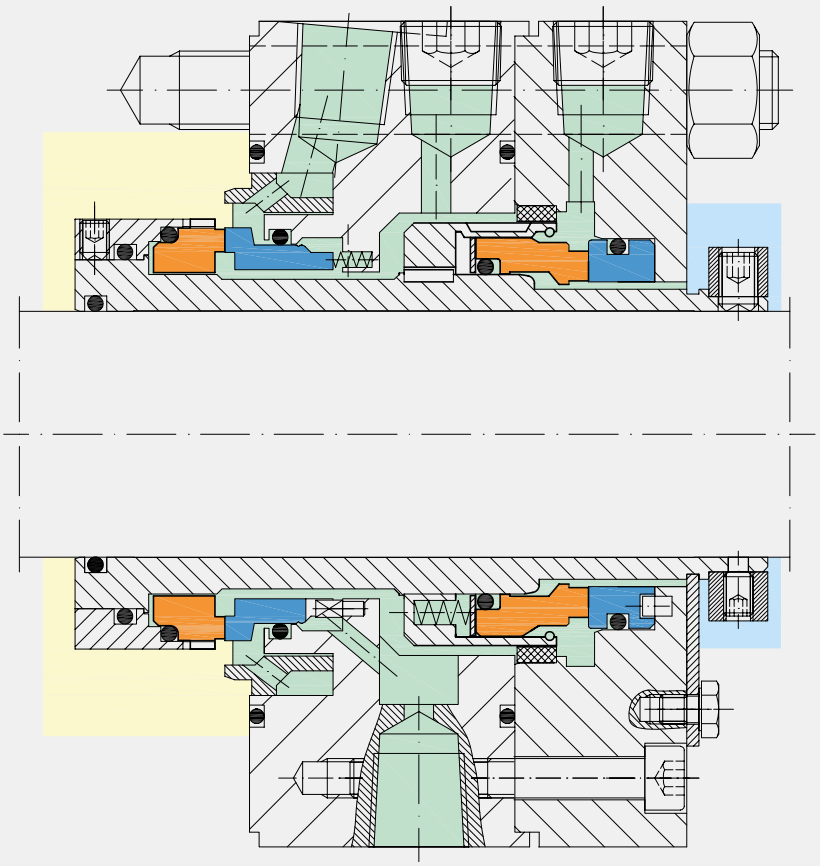
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $Q_2$ |
| Secondary seals | EPDM, FKM, FFKM | E, V, K |
| Metal parts | 1.4571 (316 Ti), 1.4404 etc. | $G_1$, $G_8$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 801TAD



## TECHNICAL DATA

| | |
|---|---|
| pmax | 35 bar |
| tmax | -40° C to +260° C<br>(dep. on the secondary seal<br>API max. 176° C) |
| vmax | 25 m/s |
| Seal sizes | 30 - 110 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 825TAG

## CHETRA Type 825TAG
**Cartridge seal, double-acting**

Back-up (containment-)seal, atmospheric side under N2-pressure > than pressure to be sealed.
For vertical and horizontal use.

## STANDARD

- API 682 and work standard

## DESCRIPTION

- Double-acting
- outer seal as back-up with $N_2$
- Rotary design on product side
- Liquid seal

## TYPICAL USES

- Crude oil
- Diesel
- Fuels
- Unstabilized petrol

## OPERATION

- API plan 11, 13, 72, 61 (62)

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, FFKM etc. | V, K etc. |
| Metal parts | 1.4571 (316 Ti), 1.4404 etc. | $G_1$, $G_8$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

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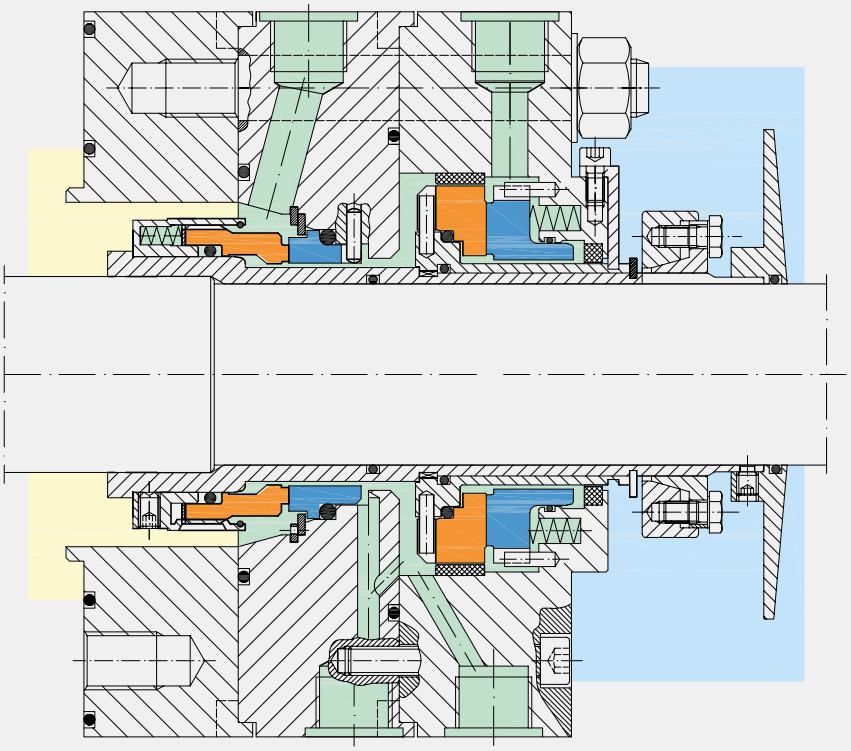
## TYPE 825TAG



## TECHNICAL DATA

| | |
|---|---|
| pmax | 35 bar |
| tmax | -40° C to +260° C<br>(dep. on the secondary seal<br>API max. 176° C) |
| vmax | 25 m/s |
| Seal sizes | 30 - 110 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 877GS

## CHETRA Type 877GS, back-to-back

**For demanding applications, gas-lubricated, independent of direction of rotation**

The 877GS is a high-quality, gas-lubricated seal used in the chemical industry and in refineries, among other areas.

This seal is a compact back-to-back design and offers the advantages of a gas-lubricated pump seal that is independent of rotation.
A number of double-stage circulation pumps have already been equipped with this gas seal.
The lasered gas groove manages to detach from the spring-loaded ring in the event of slight incidence of liquids.
All components are delivered in high quality.
This design is used in chemical plants and refineries.

## STANDARD

- Work standard

## DESCRIPTION

- Pre-assembled ready-for-service cartridge seal
- Gas-lubricated
- Independent of direction of rotation
- Soft spiral springs
- Minimum gas leakage
- Double protection through shaft seal
- ATEX-compliant
- For pumps with extended gland area

## TYPICAL USES

- Double-stage circulation pumps/centrifugal pumps, etc.

## OTHER VERSIONS

- **Type 877S**
  Similar design, liquid-lubricated

## OPERATION

- According to API plan 74, with overpressure.
- Supply with N2, use of a gas control panel

## MATERIAL

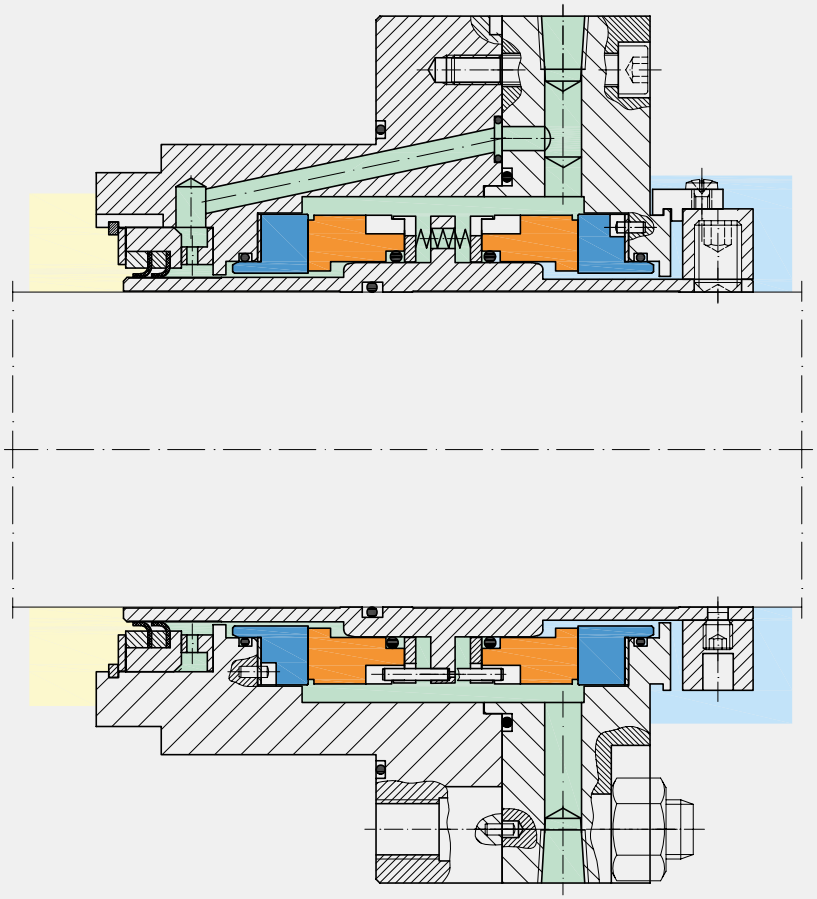
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, FFKM, PTFE ($T_2$/$T_1$), chloroprene / neoprene | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY



## TYPE 877GS



## TECHNICAL DATA

| | |
|---|---|
| pmax | 25 bar |
| tmax | +250° C |
| vmax | 18 m/s |
| Seal sizes | 30 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Differential pressure min. 3 bar

# CARTRIDGE MECHANICAL SEALS
STERILE

SEAL Type 201S sterile 100

# CHETRA
# SEAL Type 201S sterile

## CHETRA Type 201S sterile Cartridge single mechanical seal

Suitable for all seals where low dead space, CIP / SIP-capable sterile sealing is required.

All secondary seals are completely chambered on the product side, according to DIN 11864, or the metallic surfaces are processed with Ra 0.4, (as EHEDG recommended).
The components used can be supplied with a 3.1 certificate, the materials FDA-compliant. On the atmosphere side sealing via throttle/lip seal, for liquid quench.

Rotary surface design for a high PV factor and other design measures result in a reliable, robust seal with a long service life (MTBR) in these applications.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon, silicon carbide | $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_2/T_1$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Single-acting
- Pre-assembled ready for service cartridge seal
- Balanced
- Independent of direction of rotation
- Multiple springs, protected
- Stationary design
- Sterile design
- Low dead space, based on EHEDG
- Parts in contact with the product are polished

## TYPICAL USES

- In vacuum or unpressurized operation with top mounting
- In operation under pressure
- For media with lubrication properties
- For bottom mounting
- Use as CIP / SIP-capable sealing of process equipment
- Use as agitator seal in pharmaceuticals and food processing

## DESIGNS

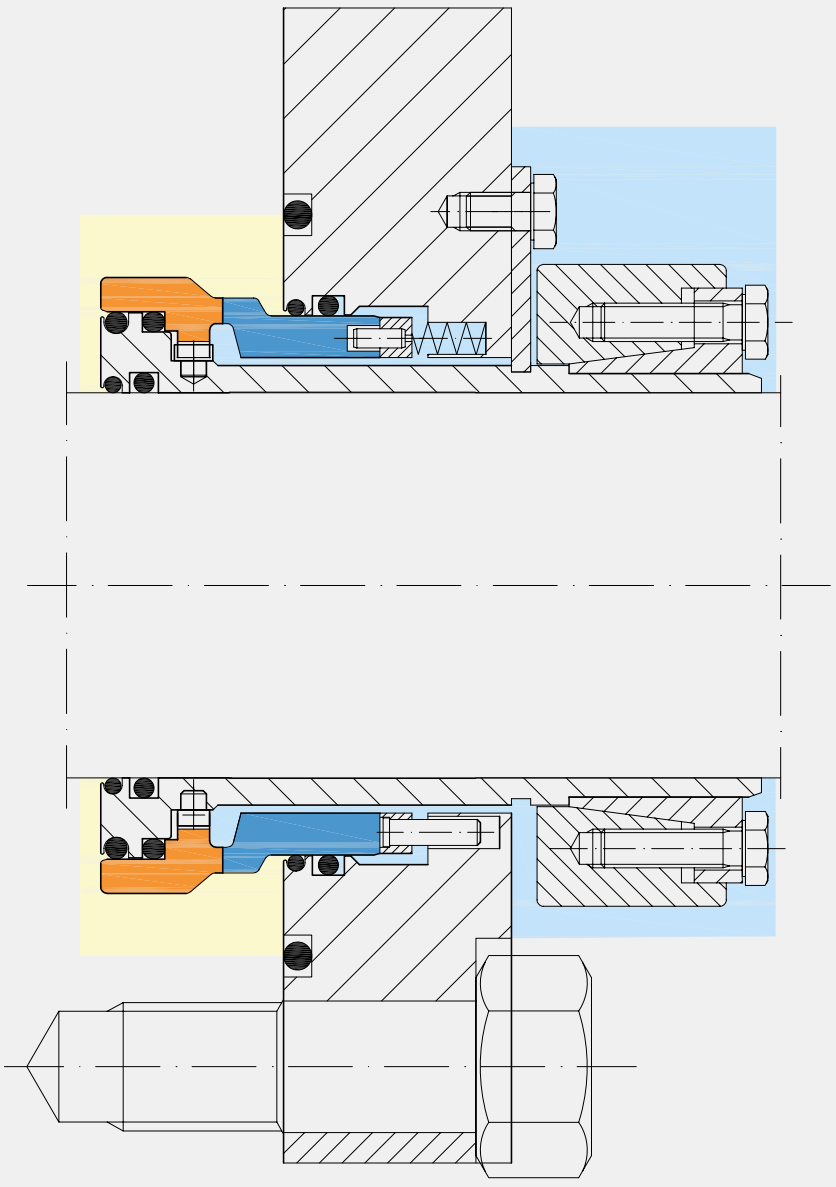
- **Type 201**, as two-part design; i.e., as component mechanical seal for pump applications
- **Type 201L**, with bearing for pump and agitator applications
- **Type 201S**, in sterile design, low dead space, quenchable, CIP-capable, based on EHEDG.
- **Type 201SL**, in sterile design as above, with bearing

## OPERATION

- According to API plan 01 / 11 / 61 / 62

FOOD PHARMA

## TYPE 201S



## TECHNISCHE DATEN

| | |
|---|---|
| pmax | Vacuum to 20 bar |
| tmax | to +140° C (sterilization) or dep. on the secondary seal |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm also in inch sizes, see dimension sheet |

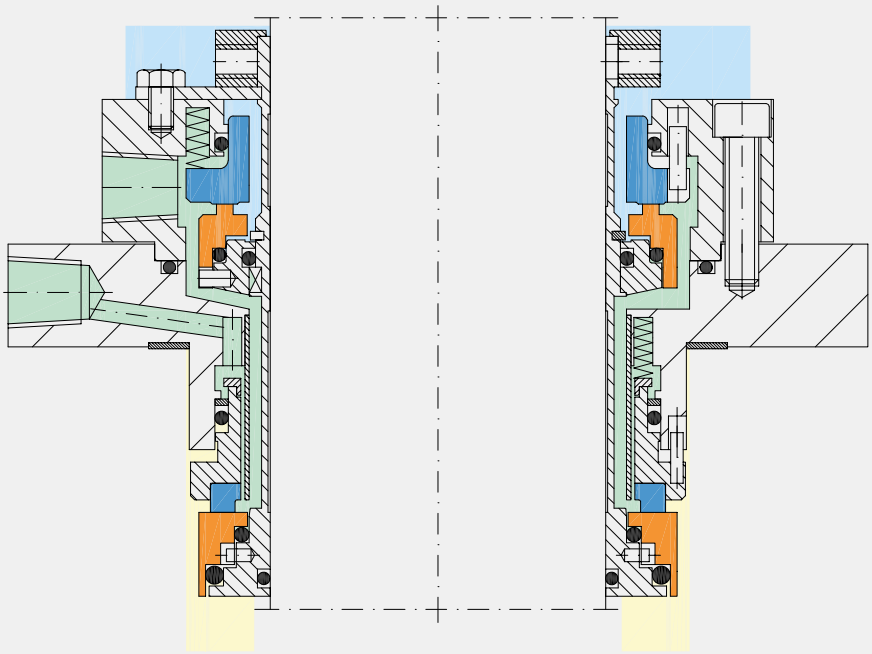
Larger dimensions on request.

# MECHANICAL SEALS
## FOR AGITATORS GENERAL


| | |
|---|---|
| SEAL Type 509 | 103 |
| SEAL Type 517 | 104 |
| SEAL Type 541 | 106 |
| SEAL Type 557 | 108 |
| SEAL Type 577 | 110 |
| SEAL Type 597 | 112 |


# CHETRA
# SEAL Type 509

CHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax | Vacuum to 30 bar |
| tmax | -25° C to +205° C |
| vmax | 25 m/s |
| Seal sizes | 70 - 120 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## CHETRA Type 509

**Cartridge Mechanical seal:**
Agitator design

## DESCRIPTION

- Balanced
- Double-acting
- Independent of direction of rotation
- Permissible axial play ± 1.5 mm
- Permissible radial play ± 2.5 mm

## STANDARD

- Work standard

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Tungsten carbide, hard carbon | $U_2$ / $B_1$ |
| Secondary seals | FKM etc. | V etc. |
| Metal parts | 1.4571 (316 Ti) etc.. | $G_1$ etc. |
| Springs | 1.4571 (316 Ti) / Hastelloy C | $G_1$ / $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Typ 517

## CHETRA Type 517, double-acting, mechanical seal

Standard agitator seal for top drives with smooth shaft, with shrink-plate coupling. Also into the high pressure range. Optimized design, therefore long service life possible.

Construction with positive torque transfer, for use on smooth agitator shafts.
Inner stationary axially secured.
Optional: media-side leak container to protect the seal ring pair in case of crystallizing media or temperature effects.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_1$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFUM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Standard seal, according to DIN 28136 / 28138

## DESCRIPTION

- Double-acting cartridge seal
- Unbalanced
- Independent of direction of rotation
- Multiple springs
- With or without integrated bearing

## TYPICAL USES

- In agitator applications with foaming or polymerizing media
- For liquid or paste-like media
- In agitator applications with smooth agitator shaft

## OTHER VERSIONS

- **Type 517BC**
  design without bearing
- **Type 517BCL**
  design with bearing
  - also available with leak container
- **Type 557**
  balanced

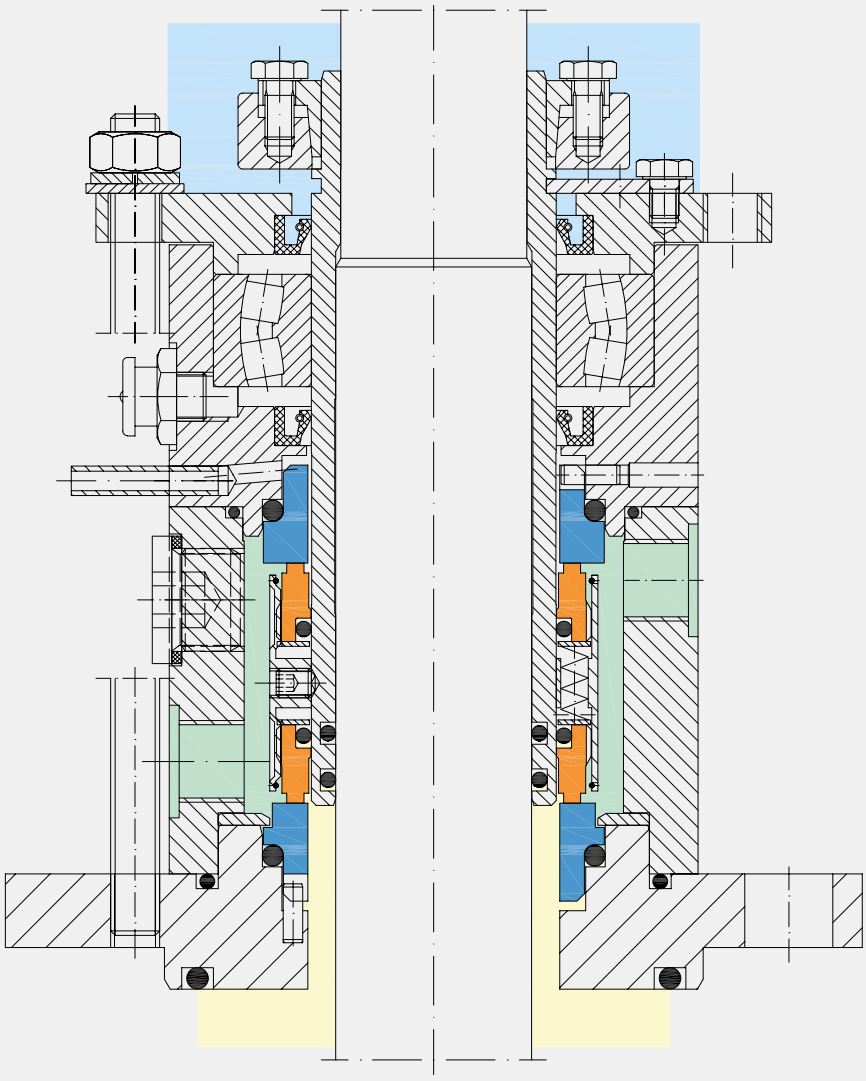
## OPERATION

- With unpressurized quench
- With barrier fluid circulation, according to API plan 52
- With sealing pressure, according to API plan 53

CHEMISTRY



## TYPE 517BCL



## TECHNICAL DATA

| | |
|---|---|
| pmax | full vaccum to 16 bar |
| tmax | -80° C to +200° C |
| vmax | 10 m/s |
| Seal sizes | 40 - 220 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Double-acting, unbalanced standard seal for agitators (top drive / smooth shaft)

# CHETRA
# SEAL Type 541

## CHETRA Type 541

**For Mixers / Agitators, also Pharmaceuticals, sterile applications**
**Bottom Drives**

Liquid-lubricated double seal designed for use with bottom drive equipment.
The type 541 rotary/stationary rings are specially designed for these requirements.

**Special version for: butadiene / bottom-entry agitators**

Butadiene is permanently elastic after hardening - this means very high costs in case of sealing problems just from cleaning the system (often with water under 400 bar pressure). Structural design: „self-adjusting" stationary design, guided barrier fluid flow, protection of sensitive components, metered external flushing. seal adapted to the equipment.
Preferred materials: $U_2$ $U_2$ V $G_1$ $G_1$ + $U_2$ $Q_2$ V
Service life of the seal in these applications: >4 years

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | $A_1$, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_1$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Double-acting
- Pre-assembled ready for service Cartridge GLD
- Integrated bearing
- Double balanced
- Independent of direction of rotation
- Multiple springs protected
- Stationary design

## TYPICAL USES

- Suitable for top or bottom installation
- For high-speed equipment
- Suitable for paste-like media, for bottom installation with overpressure
- In sterile version for pharmaceuticals and food processing applications

## OTHER VERSIONS

- **Type 541L**, with / without bearing

## OPERATION

- With higher sealing pressure, according to API plan 53, metered external flushing

CHEMISTRY | FOOD | PHARMA | REFINERIES & PETROCHEMISTRY

## TYPE 541L

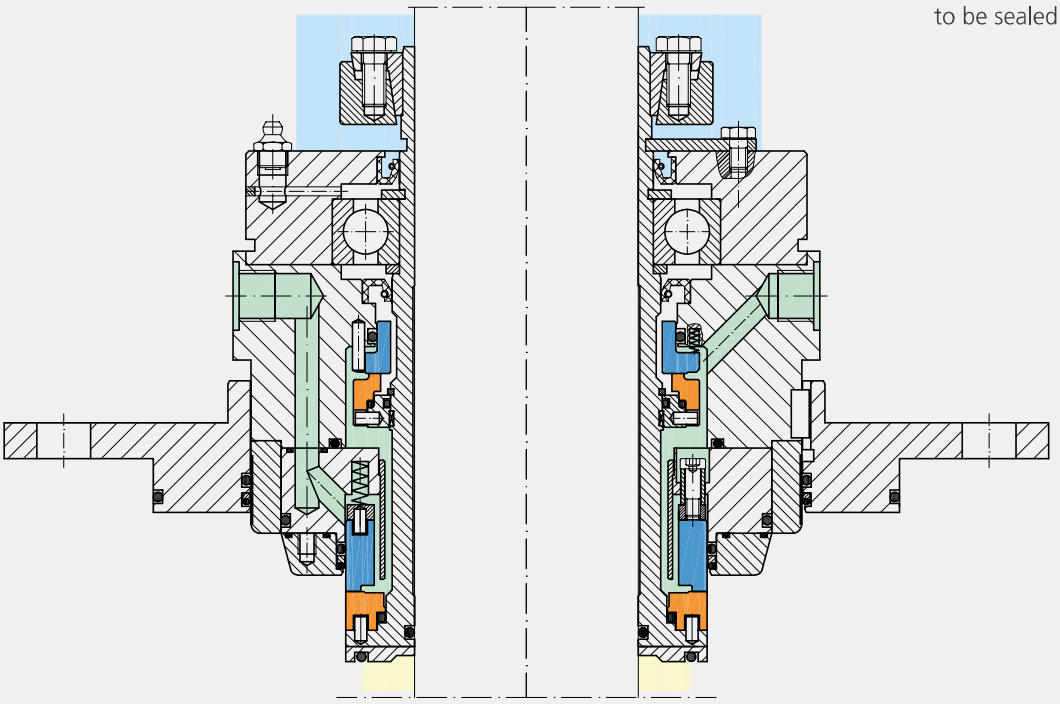
› Double seal, designed especially for polymeric solutions (butadiene)

## TECHNICAL DATA

| | |
|---|---|
| pmax | to 20 bar |
| tmax | to +220° C (dep. on the secondary seal) |
| vmax | 10 m/ s |
| Seal sizes | 30 - 200 mm, also in inch sizes, see dimension sheet |

Larger dimensions on request.

SEAL adapted for the equipment to be sealed.



# CHETRA
# SEAL Type 557

## CHETRA Type 557, double-acting, mechanical seal

Standard agitator seal for top drives with smooth shaft, with shrink disk coupling. Also in the high pressure range. Optimized design for long service life.

Construction with positive torque transfer, for use on smooth agitator shafts.
Inner stationary ring axially secured.
Optional: media-side leak container to protect the seal ring pair in case of crystallizing media or temperature effects.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_1$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFUM | V, E, $T_1/T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Standard seal, according to DIN 28136 / 28138

## DESCRIPTION

- Double-acting cartridge seal
- Unbalanced
- Independent of direction of rotation
- Multiple springs
- With or without integrated bearing
- Connection dimensions according to DIN 28136 / 28138

## TYPICAL USES

- In agitator applications with foaming or polymerizing media
- For liquid or paste-like media
- In agitator applications with smooth agitator shaft
- In high pressure range

## OTHER VERSIONS

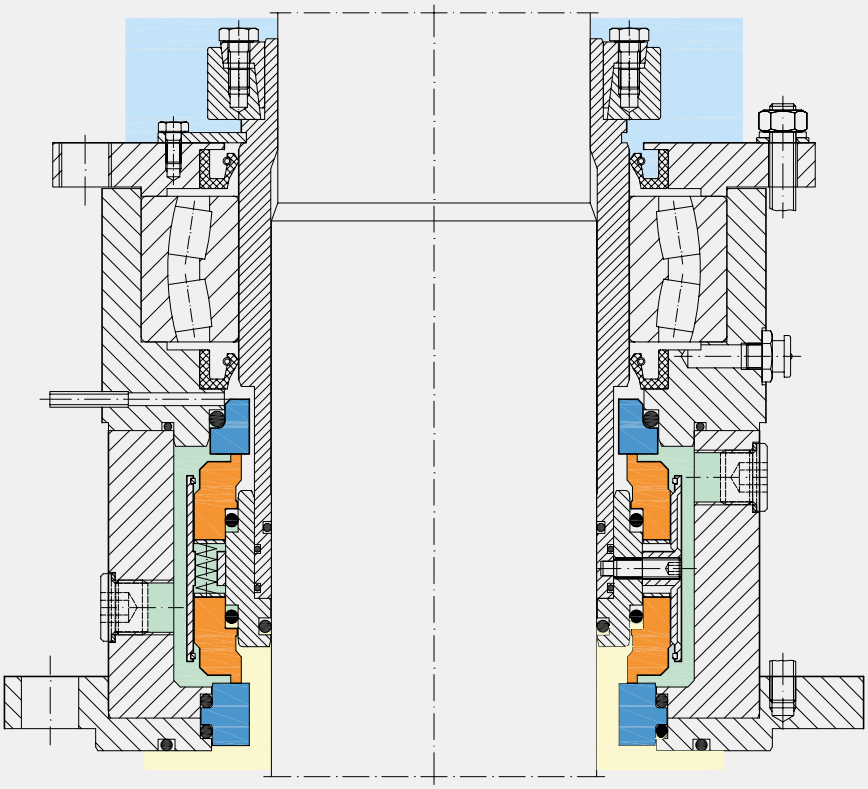
- **Type 557BC** design without bearing
- **Type 557BCL** design with bearing
  - also available with leak container
  - balanced version
- **Type 517** unbalanced

## OPERATION

- With unpressurized quench
- With barrier fluid circulation, according to API plan 52
- With sealing pressure, according to API plan 53

CHEMISTRY

## TYPE 557



## TECHNICAL DATA

| | |
|---|---|
| pmax | full vaccum to 50 bar |
| tmax | -80° C to +250° C |
| vmax | 10 m/s |
| Seal sizes | 40 - 220 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 577

## CHETRA Type 577

**Short-design Agitator seal for use in: Pharmaceuticals, Food Processing, Rotary Filters, Mixers, Reactors, Vacuum Filter Dryers, Bead Mills or similar**

This seal has been used successfully for years in the above-mentioned applications. The seal design with a media-side rotating stationary, together with the mode of operation, results in a versatile seal. With appropriate material or surface selection and as a result of the design, options such as CIP capability, a sterile version, and FDA-approved materials can be integrated into this sealing concept on request.

The seal can be designed as a complete unit with double seal, integrated bearing, cartridge sleeve, housing cover, and lifting bellow and directly adapted to the equipment.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_1$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Double-acting cartridge seal
- Stationary design
- Pre-assembled ready-for-service cartridge seal
- Integrated bearing possible
- Double-balanced
- Independent of direction of rotation
- Multiple springs (protected)
- Guided barrier fluid circulation

## TYPICAL USES

- For abrasive products
- Suitable for paste-like or dry media
- Chocolate
- Coatings
- Rotary filters

## VERSIONS

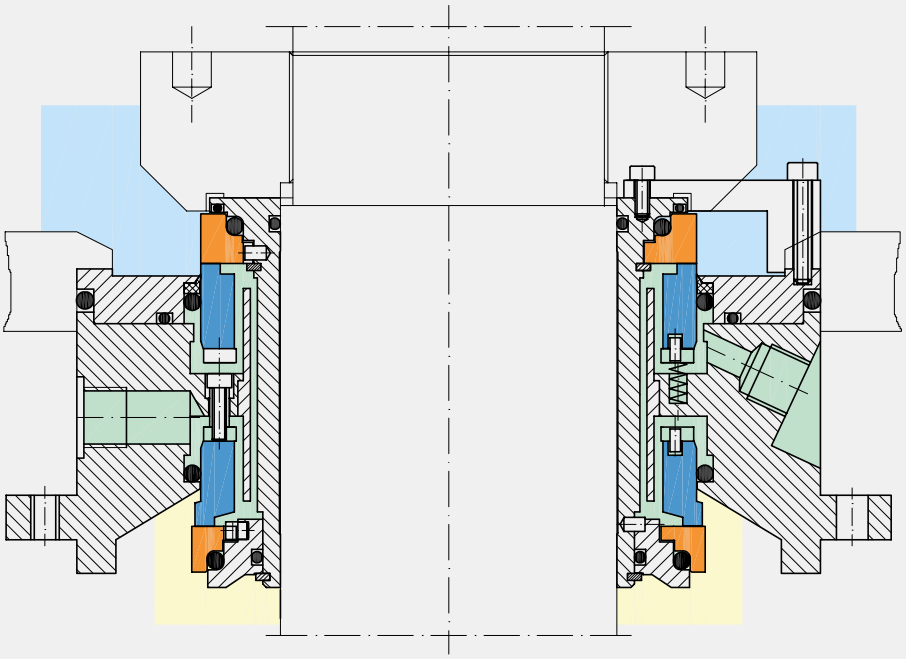
- **Type 577**, without bearing
  **Type 577BCL**, with bearing
  **Type 577G**, with lifting bellows for absorption of axial movement
- Suitable for top and bottom as well as lateral installation
- FDA-approved materials if required

## OPERATION

- With higher sealing pressure according to API Plan 53 or API Plan 52

CHEMISTRY FOOD

## TYPE 577



## TECHNICAL DATA

| | |
|---|---|
| pmax | Vacuum, to 20 bar |
| tmax | to +280° C<br>(dep. on the secondary seal) |
| n | 20 – 30 / 3000 1/min |
| Seal sizes | 30 - 200 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 597

## CHETRA Type 597, double-acting, mechanical seal

**For steel and enameled containers**

The standard seal for enameled containers/autoclaves, completely pre-assembled, tested, ready-to-install cartridge unit, exclusive use of solid rotary/stationary rings, no metal parts in contact with the media. Optimized design for long service life.

Construction with positive torque transfer, for use on plastic, carbon, rubberized, enameled, or PTFE agitator shafts.
Easy function check and cleaning option of the seal due to easy accessibility.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | $A_1$, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_1$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE | V, E, $T_1$/$T_2$ |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Standard seal, according to DIN 28136 / 28138 and work standard

## DESCRIPTION

- Double-acting cartridge seal
- Balanced
- Independent of direction of rotation
- Multiple springs
- No metal parts in contact with media
- With or without integrated bearing
- Connection dimensions according to DIN 28136 / 28138 and equipment-specific design possible

## TYPICAL USES

- In agitator applications with corrosive media
- In agitator applications with metal-free product area (coated)
- When contact of metals with the media must be excluded

## OTHER VERSIONS

- Version without bearing also available
- Single-acting version Type 600L

## OPERATION

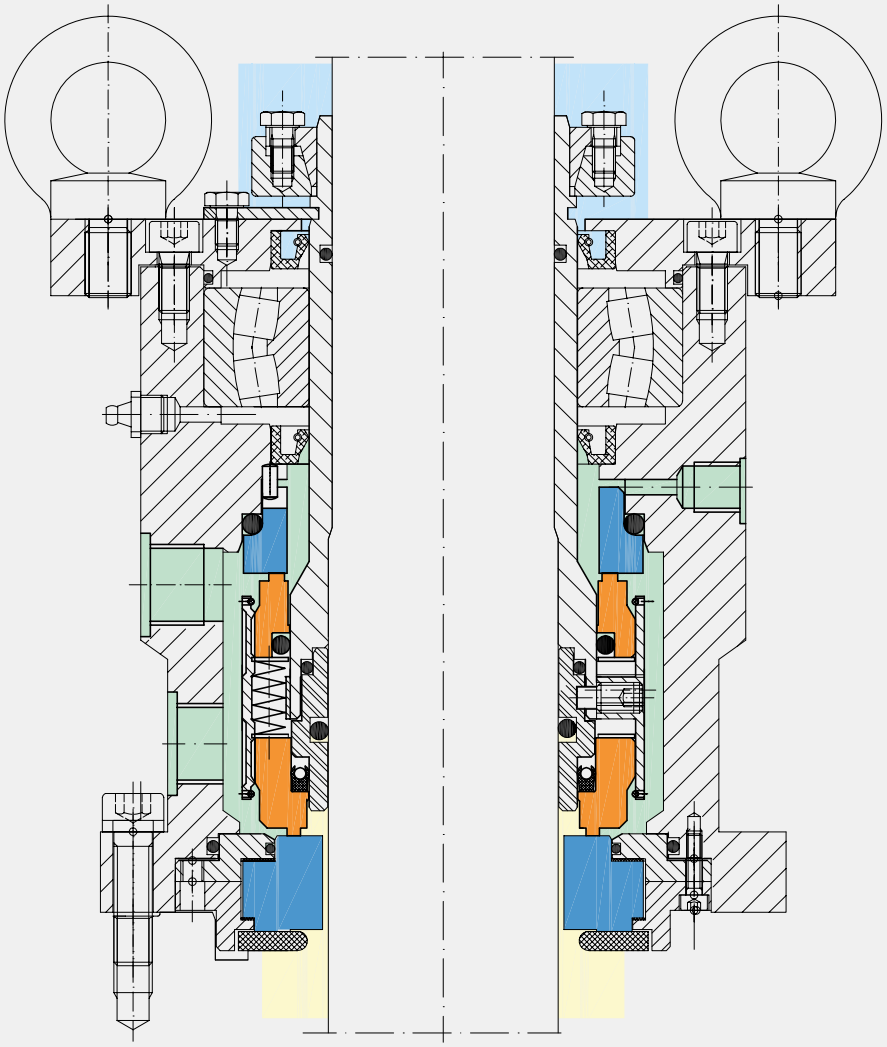
- API plan 52 and others

CHEMISTRY | REFINERIES & PETROCHEMISTRY



## TYPE 597

› Double seal for steel and enameled containers / reactors



## TECHNICAL DATA

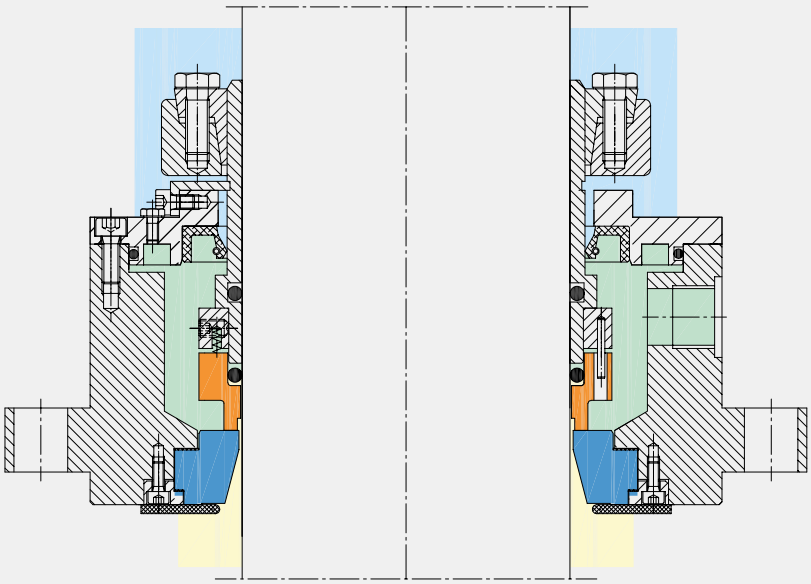
| | |
|---|---|
| pmax | full vaccum to 10 bar |
| tmax | -80° C to +125° C |
| vmax | 20 m/s |
| Seal sizes | 40 - 125 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

CHEMISTRY | ENERGY & WATER | FOOD | PAPER | PHARMA

## TYPE 600L

› Seal designed for use with enameled vessels



## TECHNICAL DATA

| | |
|---|---|
| pmax | 10 bar |
| tmax | -80° C to +220° C |
| vmax | 20 m/s |
| Seal sizes | 24 - 110 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Please inquire about our series of dry-running seals: 600MD, 600MDS, 600MDA, 600MDA-C

# MECHANICAL SEALS
## FOR AGITATORS


| | |
|---|---|
| SHAFT SEAL CARTRIDGE SEAL Type 500 | 118 |
| SEAL Type 521 | 120 |
| SEAL Type 541 | 122 |

# CHETRA
# SEAL Type 500

## CHETRA Type 500, rotary shaft seal (short-design)

Compact-design shaft seal cartridge for agitators and mixer applications (based on the German Clean Air Act (TA-Luft), for ATEX applications, FDA).

With Type 500, CHETRA offers a shaft seal that is widely used in the chemical, pharmaceutical, and food processing industries.

CHETRA Type 500 is a compact, robust design developed to accommodate axial and radial shaft deflections and to protect the shaft seal rings.
Certain media do not allow the proper use of a seal – the CHETRA Type 500 offers an alternative.
All high-quality components, including FDA compliance.

## STANDARD

- Work standard

## DESCRIPTION

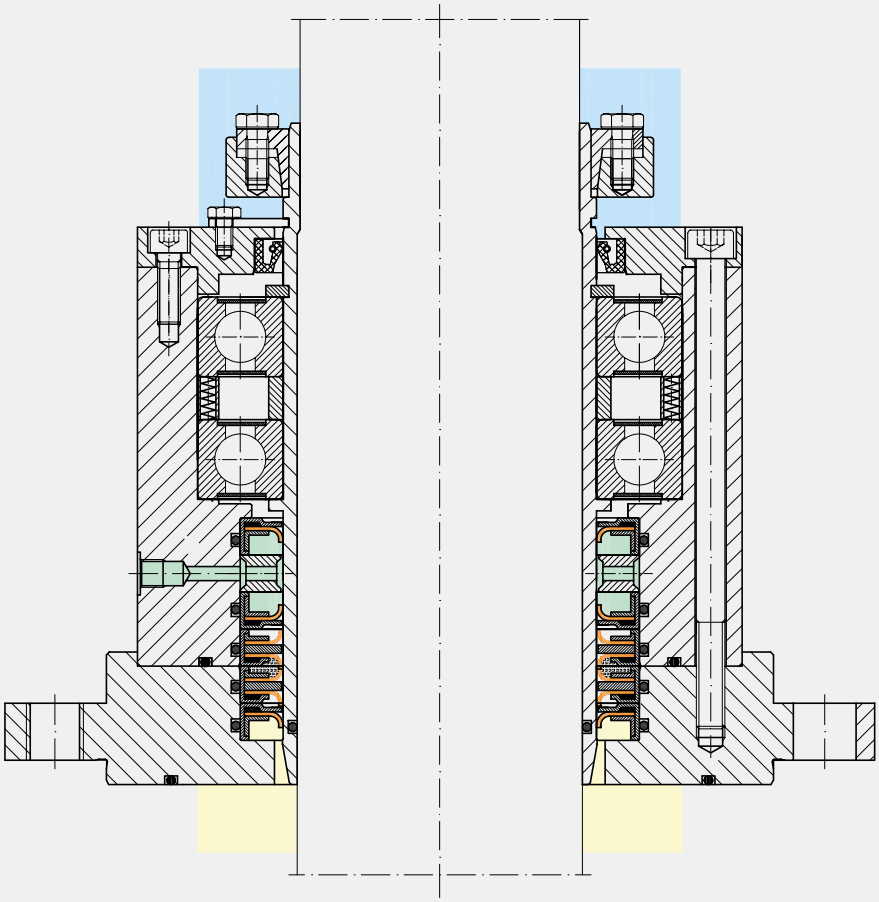
- Pre-assembled, ready-for-service cartridge seal
- Dry-running, except shaft seals in contact with product
- High-quality seal replacement
- Therefore elimination of sealing/supply media
- Elimination of supply systems (tanks / similar)
- Multiple protection through shaft seal
- ATEX for certain applications
- "Customized," adapted to the equipment and application
- Independent of direction of rotation
- Leak monitoring
- With and without integrated bearing

## OTHER VERSIONS

- Rotary shaft seal for pumps

CHEMISTRY | FOOD | PHARMA

## TYPE 500



## TECHNICAL DATA

| | |
|---|---|
| pmax | Vacuum to 10 bar |
| Reference-p | min. 3 bar |
| tmax (operation) | application-specific |
| tmax (design / system) | 200°C |
| vmax | 1 m/s |
| Seal sizes | 50 - 180 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 521

## CHETRA Type 521

**For Mixers / Granulators / Dryers – Low-speed Equipment**

In the case of a liquid-lubricated double seal in low-speed equipment and poorly lubricated barrier media such as DM water, special requirements are placed on the seal. The type 521 rotary/stationary rings are equipped with the CHETRA Aktiv-LUB system to meet these requirements. This ensures a disturbance („squeak")-free operation, which also counteracts increased wear of the rotary surfaces.

For many other demanding sealing requirements, such as sealing of aniline, latex, and PVC. Proven CHETRA solutions are also available for special bead mill applications, evaporators, decaffeination plants, chest agitators, homogenizers, etc.

## STANDARD

- Work standard, EHEDG Concept

## DESCRIPTION

- Double-acting
- Pre-assembled ready for use cartridge GLRD
- Independent of direction of rotation
- Unbalanced
- Multiple springs
- Stationary design
- **Sterile version (media-side)**

## TYPICAL USES

- For low-speed equipment, also with Aktiv-LUB® rotary surface lubrication system, which guarantees a disturbance-free operation with no squeaking when using poorly lubricated barrier media
- Suitable for paste-like media

## OTHER VERSIONS

- With / without bearing
- In low dead-space version, CIP/SIP-capable

## OPERATION

- With higher sealing pressure

## MATERIAL

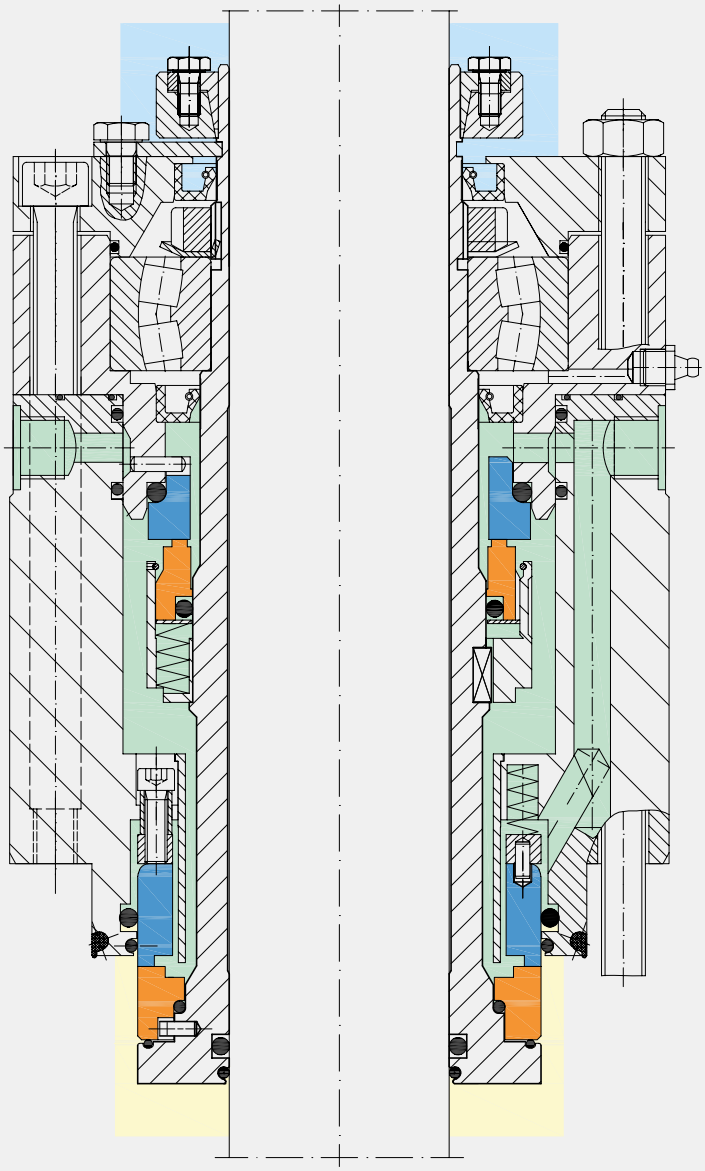
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, EPDM, PTFE | V, E, $T_1$/$T_2$ |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY FOOD PHARMA



## TYPE 521



## TECHNICAL DATA

| | |
|---|---|
| pmax | Vacuum to 10 bar |
| tmax | to +150° C<br>(dep. on the secondary seal) |
| n | 7-150 1/min |
| Seal sizes | 35, 60, 80, 100 mm,<br>also in inch sizes |

Larger dimensions on request.

- SEAL adapted to equipment to be sealed
- Double-acting mixer seal; CIP/SIP-capable

# CHETRA
# SEAL Type 541

## CHETRA Type 541

**For Mixers / Agitators, also Pharmaceuticals, sterile applications**
**Bottom Drives**

Liquid-lubricated double seal designed for use with bottom drive equipment.
The type 541 rotary/stationary rings are specially designed for these requirements.

**Special version for: butadiene / bottom-entry agitators**

Butadiene is permanently elastic after hardening - this means very high costs in case of sealing problems just from cleaning the system (often with water under 400 bar pressure). Structural design: „self-adjusting" stationary design, guided barrier fluid flow, protection of sensitive components, metered external flushing. seal adapted to the equipment.
Preferred materials: $U_2$ $U_2$ V $G_1$ $G_1$ + $U_2$ $Q_2$ V

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | $A_1$, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_1$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard

## DESCRIPTION

- Double-acting
- Pre-assembled ready for use cartridge style
- Integrated bearing
- Double balanced
- Independent of direction of rotation
- Multiple springs protected
- Stationary design

## TYPICAL USES

- Suitable for top or bottom installation
- For high-speed equipment
- Suitable for paste-like media, for bottom installation with overpressure
- In sterile version for pharmaceuticals and food processing applications

## OTHER VERSIONS

- **Type 541L**,
  - in low-dead space design CIP/ SIP capable, built according to EHEDG design

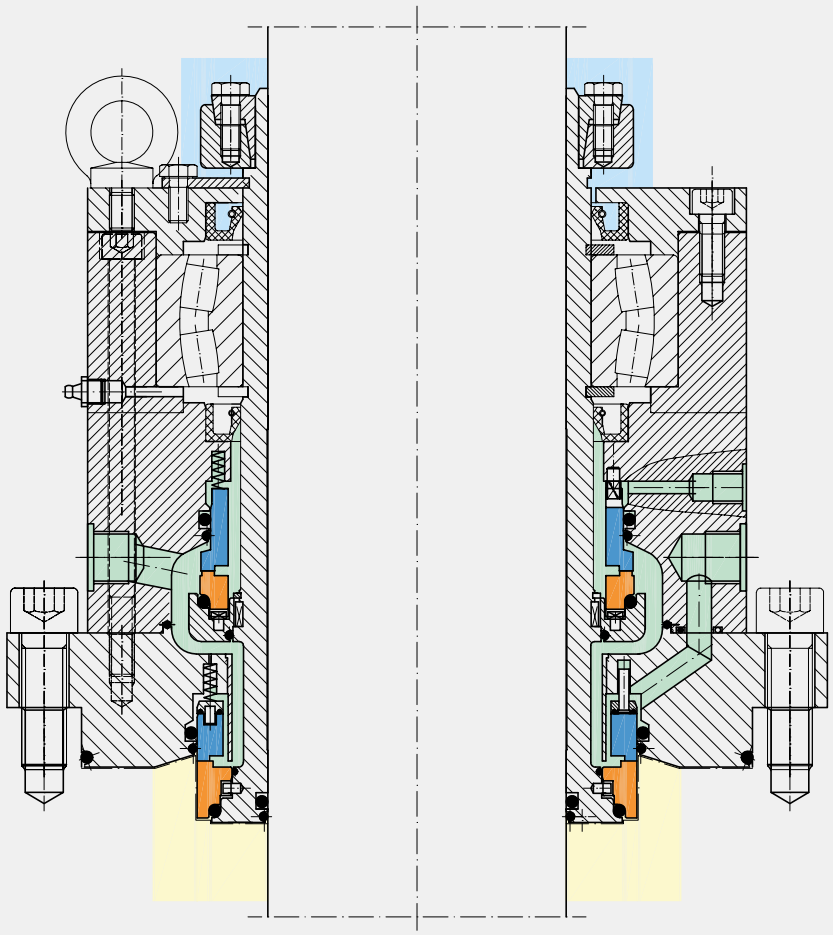
## OPERATION

- With higher sealing pressure, according to API plan 53, metered external flushing

CHEMISTRY | FOOD | PHARMA

## TYPE 541S/L

› double mechanical seal, spec. designed for polimeric solutions (butadiene)



## TECHNICAL DATA

| | |
|---|---|
| pmax | to 20 bar |
| tmax | to +220° C<br>(dep. on the secondary seal) |
| vmax | 10 m/ s |
| Seal sizes | 30 - 200 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

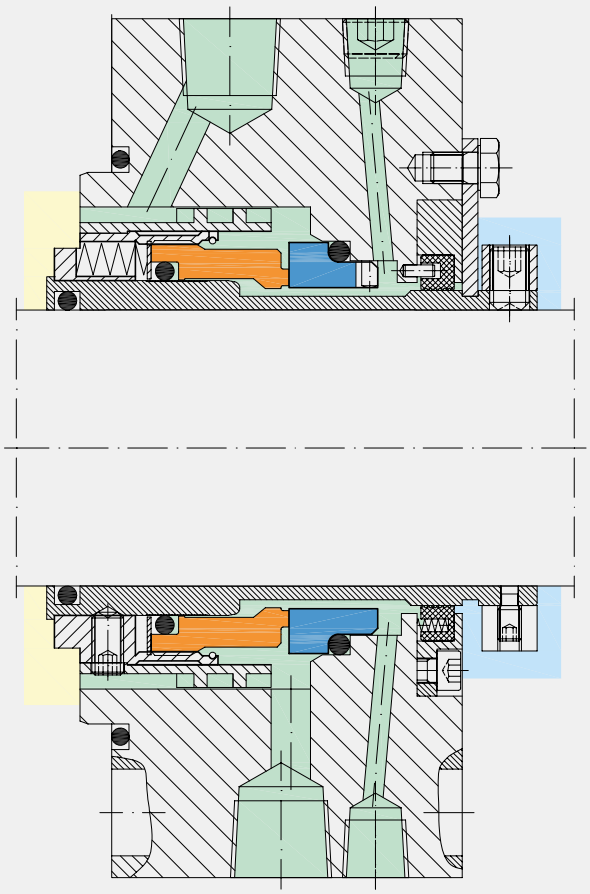
SEAL adapted for the equipment to be sealed.

# API 682
# MECHANICAL SEALS
## INCLUDING
## ENGINEERED SEALS


| | |
|---|---|
| SEAL Type 151CA / CAF | 125 |
| SEAL Type 201A | 126 |
| SEAL Type 700 | 128 |
| SEAL Type 801TAD | 130 |
| SEAL Type 807 | 132 |
| SEAL Type 825TAG | 134 |
| SEAL Type 851 | 136 |
| SEAL Type 875AS / A | 140 |
| SEAL Type 881 | 142 |


# CHETRA
# SEAL Type 151CA / CAF

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TECHNICAL DATA

| | |
|---|---|
| pmax (dynamic) | 50 bar |
| pmax (static) | 60 bar |
| tmax | -40° C to +250° C |
| vmax | 25 m/s |
| Seal sizes | 20 - 110 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

## CHETRA Type 151CA/CAF

## DESCRIPTION

- Single-acting
- Balanced
- Independent of direction of rotation
- Fixed and floating throttle possible

## STANDARD

- API 682

## OTHER DESIGNS

- Cartridge: **Type 151CA** + **151CAF** (according to API 682)

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon / silicon carbide,<br>silicon carbide / silicon carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $Q_6$ etc. |
| Secondary seals | FKM, EPDM, PTFE, Nbr, FFKM etc. | V, E, P, K etc. |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# CHETRA
# SEAL Type 201A

## CHETRA Type 201A Cartridge single mechanical seal

In pipeline pumps, both crude oil products and finished products are transported. Due to the pressure conditions as well as in connection with dimension and speed (PV factor), the seal must have a design that is appropriately robust and insensitive to solids.

Multipoint injection, rotary surface design for a high PV factor and other design measures result in a reliable, robust seal with a long service life (MTBR).

## STANDARD

- According to API 682, incl. ES – Engineered seal

## DESCRIPTION

- Single-acting
- Pre-assembled ready for use cartridge style
- Balanced
- Independent of direction of rotation
- Multiple springs protected
- Stationary design

## TYPICAL USES

- Pipeline pumps
- Water injection pumps
- High pressure range
- High solids content

## OTHER DESIGNS

- **Type 201/201A**
  - With flushing connection, quenchable
- **Type 201AHD – Heavy Duty**

## OPERATION

- According to API plan 01 / 11 / 31 / 61 / 62

## MATERIAL

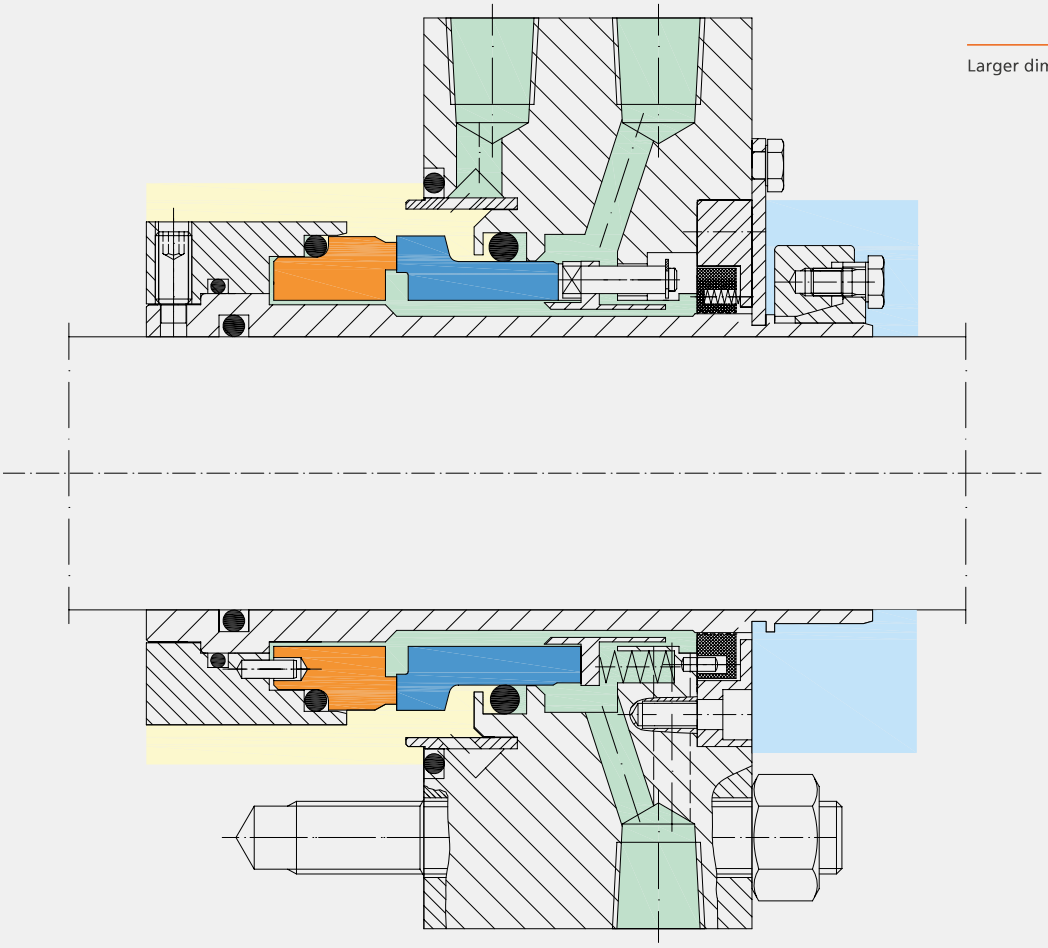
| | | |
|---|---|---|
| Rotary / stationary rings | Hard carbon; silicon carbide | $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_2/T_1$, K |
| Metal parts | 1.4571 (316 Ti) etc. | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 201A



## TECHNICAL DATA

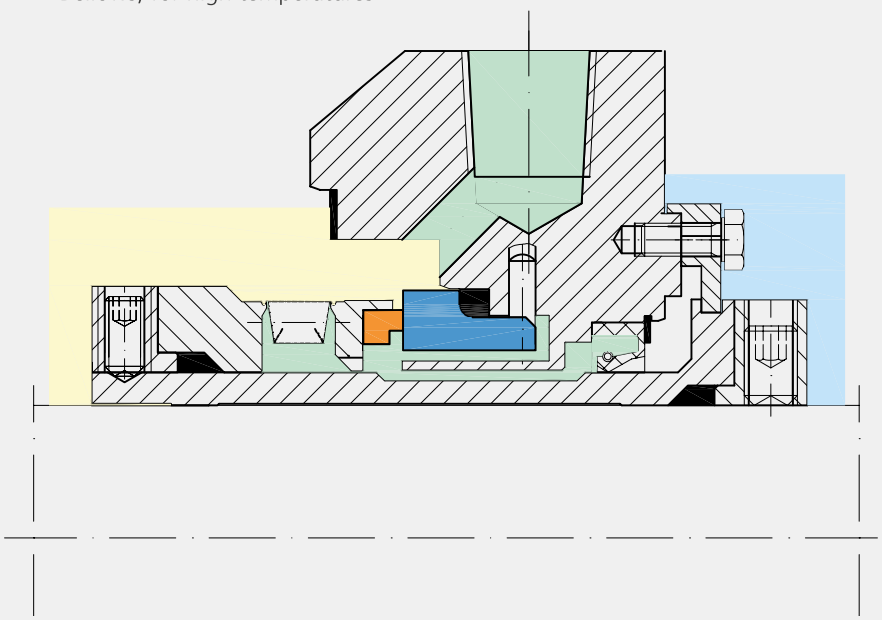
| | |
|---|---|
| pmax | 100 bar |
| pmax (Typ 201AHD) | 150 bar |
| tmax | -80° C to +220° C |
| vmax | 35 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 700 API 682 version

## VERSION 700SA

› **Single-acting cartridge seal**
Bellows, for high temperatures

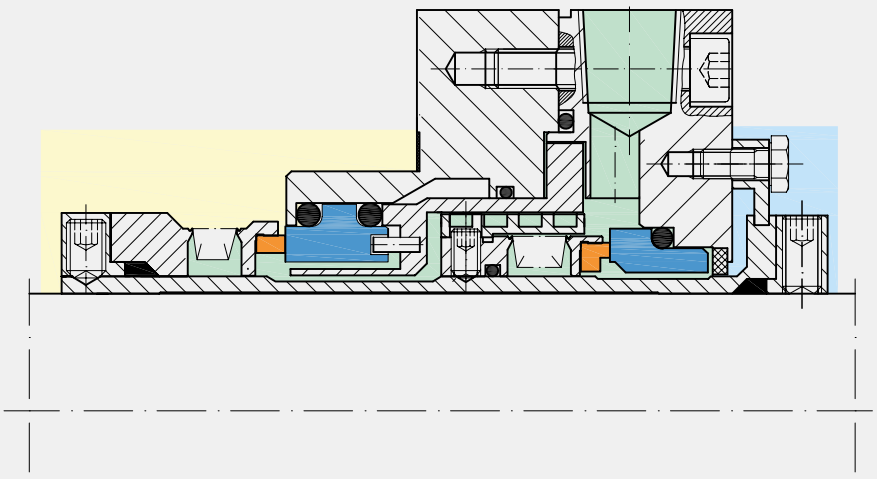


## TECHNICAL DATA

| | |
|---|---|
| pmax | 28 bar with external pressurization. max.10 bar with internal pressurization |
| tmax | -80° C to +315° C |
| vmax | 25 m/s |

## VERSION 875A / AS

› **Double-acting cartridge seal**
Bellows, for high temperatures



## TECHNICAL DATA

| | |
|---|---|
| pmax | 28 bar |
| tmax | -40° C to +400° C |
| vmax | 25 m/s |

# CHETRA
# SEAL Type 801TAD

## CHETRA Type 801TAD

**Cartridge seal, double-acting**

Back-up seal, dry running seal on atmospheric side. Collecting leakage in a cup with indicator, possibility of alarm display by API plan 75 system. For vertical and horizontal use.

## STANDARD

- API 682 and work standard

## DESCRIPTION

- Double-acting
- Liquid seal
- Dry running on atmospheric side
- Stationary design on product side

## TYPICAL USES

- Loading pumps
- Tank farm
- Ammonia
- Crude oil
- Fuels

## OPERATION

- API plan 11, 13, 75, 61 (62)

## MATERIAL

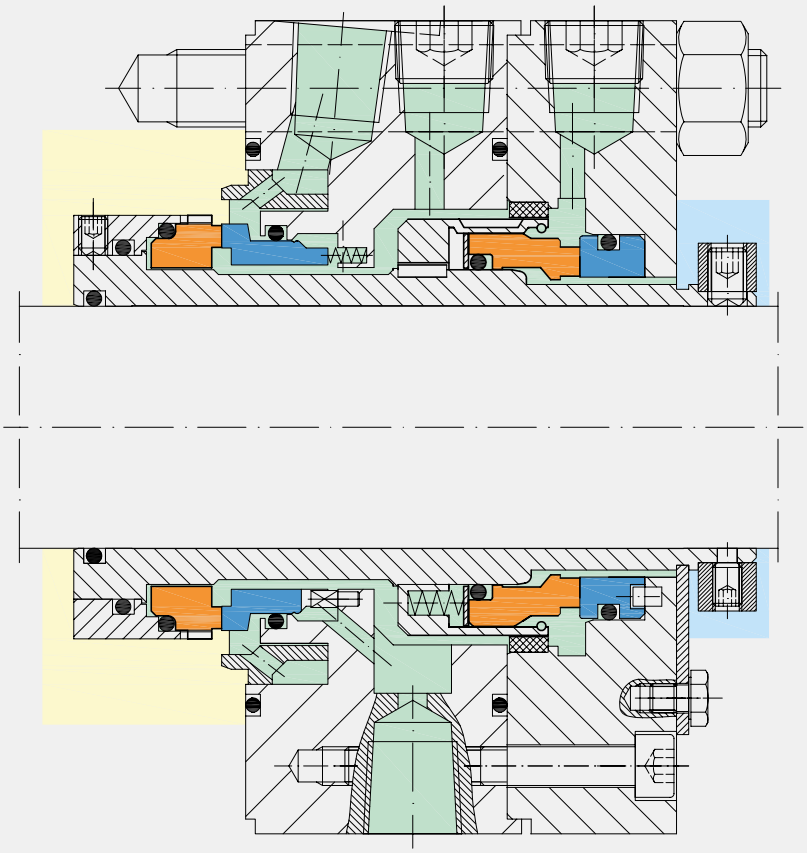
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $Q_2$ |
| Secondary seals | EPDM, FKM, FFKM | E, V, K |
| Metal parts | 1.4571 (316 Ti), 1.4404 etc. | $G_1$, $G_8$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 801TAD



## TECHNICAL DATA

| | |
|---|---|
| pmax | 35 bar |
| tmax | -40° C to +260° C<br>(dep. on the secondary seal<br>API max. 176° C) |
| vmax | 25 m/s |
| Seal sizes | 30 - 110 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 807

## CHETRA Type 807 standardized mechanical seal

**Cartridge Mechanical seal, double-acting**

High-quality, standard double cartridge seal with High-Tech design features for demanding applications

Exclusive use of robust solid rotary/stationary rings in "self-adjusting" configuration and stationary design, therefore minimal seal face distortion from pressure and thermal load.
Guided circulation flow for optimum heat dissipation and to achieve maximum service life.

## MATERIAL

| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide, tungsten carbide | A, $B_1$, $B_2$, $Q_1$, $Q_2$, $U_2$ |
| Secondary seals | FKM, EPDM, PTFE, FFKM | V, E, $T_1$/$T_2$, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD

- Work standard API 682 (incl. ES)

## DESCRIPTION

- Double-acting
- Pre-assembled, ready for use cartridge seal
- Double-balanced
- Independent of direction of rotation
- Multiple springs protected
- Stationary design

## TYPICAL USES

- In pump applications with clean media
- Suitable for media near the boiling point
- Light hydrocarbons
- Use in the low-temperature range

## OTHER VERSIONS

- **Type 807S** in special designs
- **Type 807AS**, in design according to API 682
  - For petrochemical and refinery applications
  - For pipeline pumps
- **Type 806; 809; 808** and **808S** especially for the paper industry
- **Type 809DC**, for general, universal applications

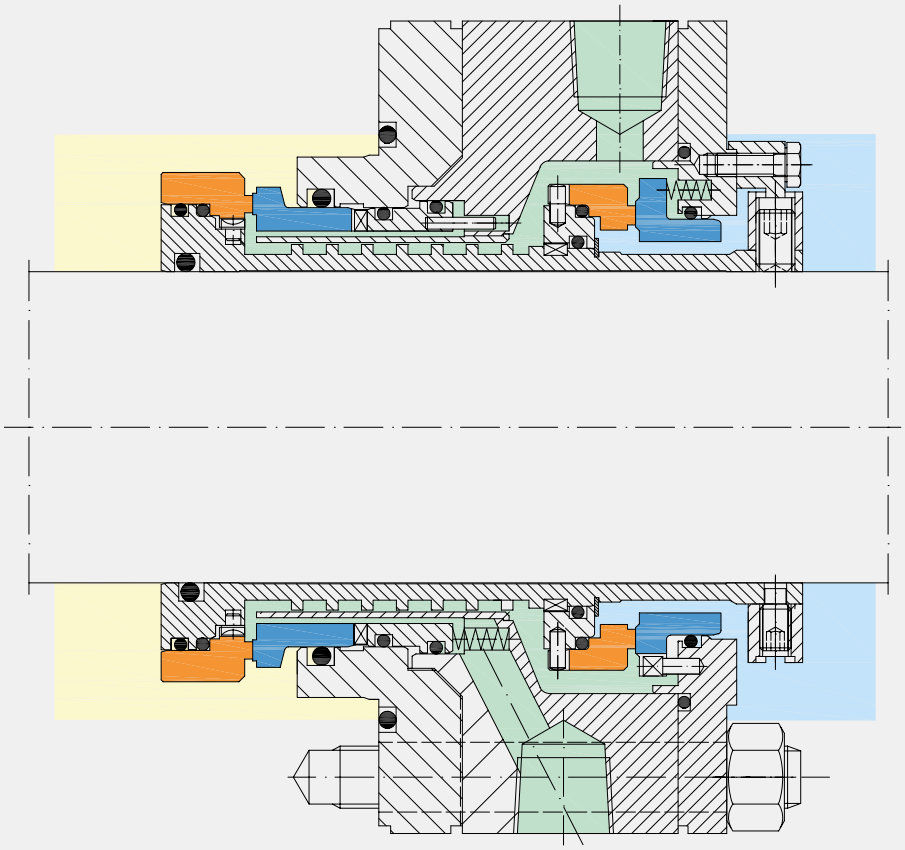
## OPERATION

- API plan 52 or 53 (i.e., as tandem seal with unpressurized supply or as double seal with higher sealing pressure)

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 807



## TECHNICAL DATA

| | |
|---|---|
| pmax | Full vaccum to 35 bar |
| tmax | -80° C to +260° C<br>(dep. on the secondary seal) |
| vmax | 25 m/s |
| Seal sizes | 25 - 100 mm,<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

› Standard double seal
for demanding applications

# CHETRA
# SEAL Type 825TAG

## CHETRA Type 825TAG
**Cartridge seal, double-acting**

Back-up (containment-)seal, atmospheric side under N2-pressure > than pressure to be sealed.
For vertical and horizontal use.

## STANDARD

- API 682 and work standard

## DESCRIPTION

- Double-acting
- outer seal as back-up with $N_2$
- Rotary design on product side
- Liquid seal

## TYPICAL USES

- Crude oil
- Diesel
- Fuels
- Unstabilized petrol

## OPERATION

- API plan 11, 13, 72, 61 (62)

## MATERIAL

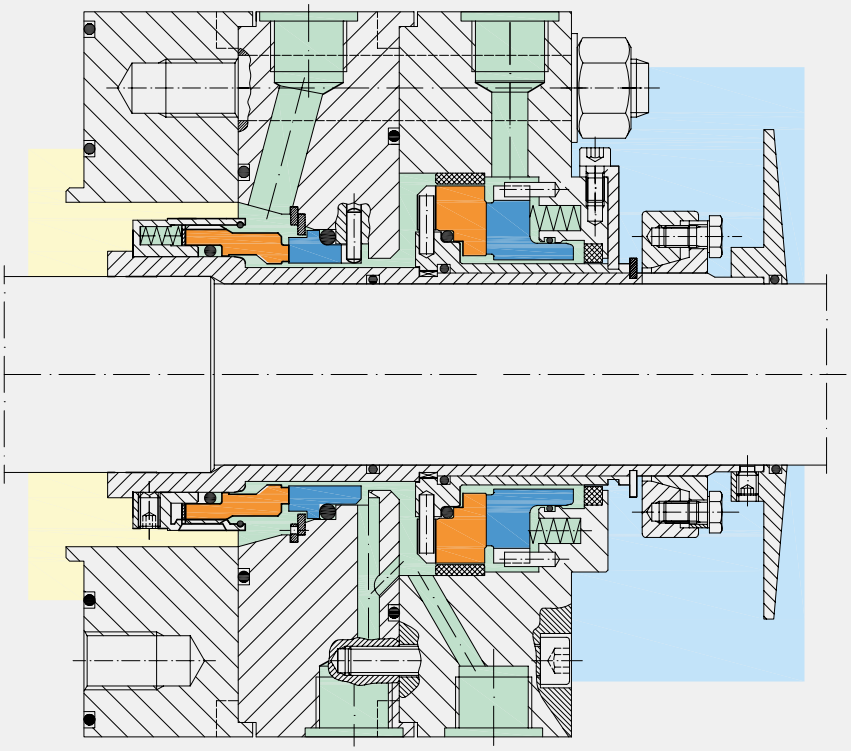
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, FFKM etc. | V, K etc. |
| Metal parts | 1.4571 (316 Ti), 1.4404 etc. | $G_1$, $G_8$ etc. |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 825TAG



## TECHNICAL DATA

| | |
|---|---|
| pmax | 35 bar |
| tmax | -40° C to +260° C<br>(dep. on the secondary seal<br>API max. 176° C) |
| vmax | 25 m/s |
| Seal sizes | 30 - 110 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Typ 851

## CHETRA Mechanical seal Type 851

Double seal back-to-back, as well as Tandem seal and face-to-back version, incl. API 682.

## STANDARD

- Work standard, API 682 (incl. ES)

## DESCRIPTION

- In various versions:
  as back-to-back and tandem version

## TYPICAL USES

- Sealing of toxic and explosive media, such as aromatics, as well as highly flammable and self-igniting media, LPG, solvents, etc.

## OTHER VERSIONS

- **Type 851B** back-to-back
- **Type 851B/T** double-balanced
- **Type 851T-A**
- **Type 851T** Tandem version according to API 682
- **Type 851TB** Tandem face-to-back version according to API 682

## OPERATION

- API plan 53A / 53B,
  as well as API plan 52

## MATERIAL

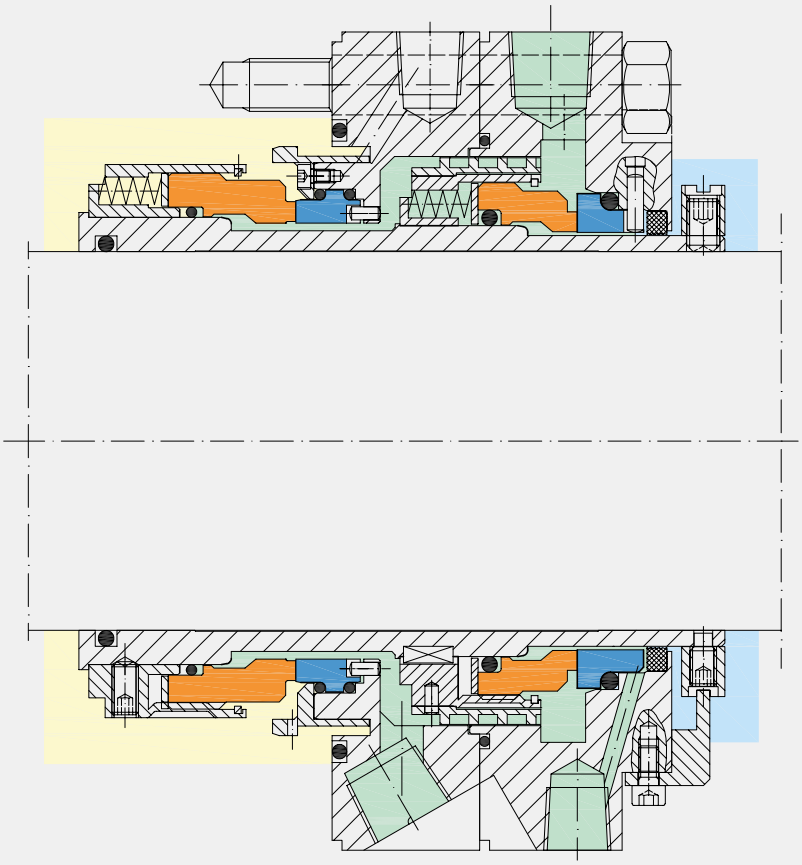
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | $B_1$, $Q_1$, $Q_2$ |
| Secondary seals | FKM, FFKM | V, K |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYP 851TB



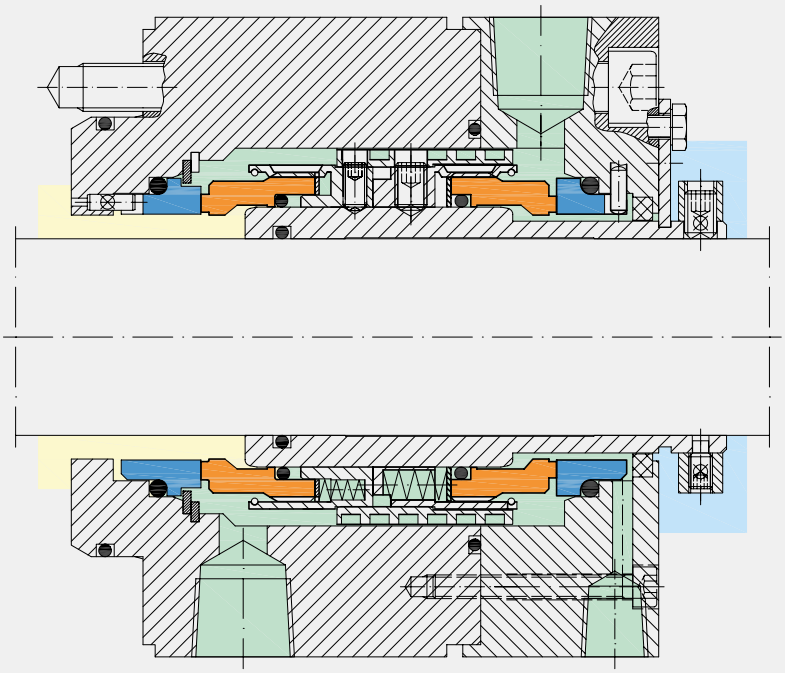
## TECHNICAL DATA

| | |
|---|---|
| pmax | 50 bar |
| tmax | -120° C to +260° C<br>(in API +176° C) |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 851 other version

## TYPE 851B/T



## TECHNICAL DATA

| | |
|---|---|
| pmax | 50 bar |
| tmax | -120° C to +260° C (in API applications max. 176° C) |
| vmax | 25 m/s |
| Seal sizes | 20 - 200 mm (API to max. 110 mm) also in inch sizes, see dimension sheet |

Larger dimensions on request.

## TYPICAL USES

- For sealing of highly flammable and self-igniting media
- Light hydrocarbons
- LPG/liquid gas
- Solvents and similar in applications with flare connection
- For low temperature use

# CHETRA
# SEAL Type 875AS / A

## CHETRA Type 875AS

**For demanding applications in refineries, dependent of direction of rotation**

With the 875AS, CHETRA offers a sophisticated seal that has been specially developed with feed screws eliminating the need for an additional circulation pump in the sealing system. Successfully used by well-known refineries and in the petrochemical industry.

This seal is a compact design. The design was developed for high temperatures with respect to construction and materials.
High volume flows are achieved in the seal with the integrated feed screw.
This seal can be operated with air or water coolers without any loss of performance.

## STANDARD

- Work standard, API 682 (875A) based on API 682 (875AS)

## DESCRIPTION

- Pre-assembled ready-for-service cartridge seal
- Liquid-lubricated
- Feed screw
- No O-ring friction due to the use of graphite elements
- ATEX-compliant
- Modern refinery seal for high temperatures
- Version based on API and according to operator standard

## TYPICAL USES

- In centrifugal pumps, in the chemical industry, petrochemical industry, refineries

## OTHER VERSIONS

- **Type 861AS**
  Similar design, but back-to-back without bellows, with multiple springs

## OPERATION

- According to API plan 53B, 53C, with overpressure

## MATERIAL

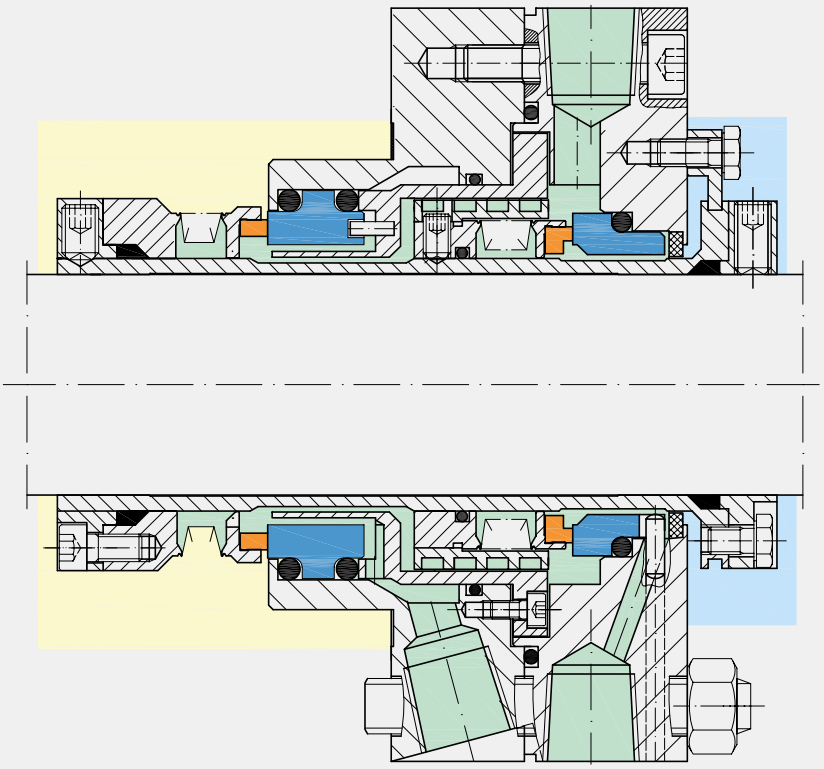
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide etc. | A, $Q_2$ etc. |
| Secondary seals | FKM, EPDM, FFKM, graphite, PTFE | V, E, K, G, $T_1$/ $T_2$ |
| Metal bellows | Inconel 718, AM 350 etc. | $M_4$, $E_4$ |
| Metal parts | 1.4571 (316 Ti) | $G_1$ etc. |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 875A



## TECHNICAL DATA

| | |
|---|---|
| pmax | 28 bar |
| tmax | -40° C to +400° C |
| vmax | 25 m/s |
| Seal sizes | 30 - 100 mm<br>also in inch sizes,<br>see dimension sheet |

Larger dimensions on request.

# CHETRA
# SEAL Type 881

## CHETRA Type 881

## DESCRIPTION

› Double-acting cartridge seal for specially demanding applications, stationary design, integrated feed screw, double balanced

## STANDARD

› Work standard, API 682 (incl. ES), ATEX

## MATERIAL

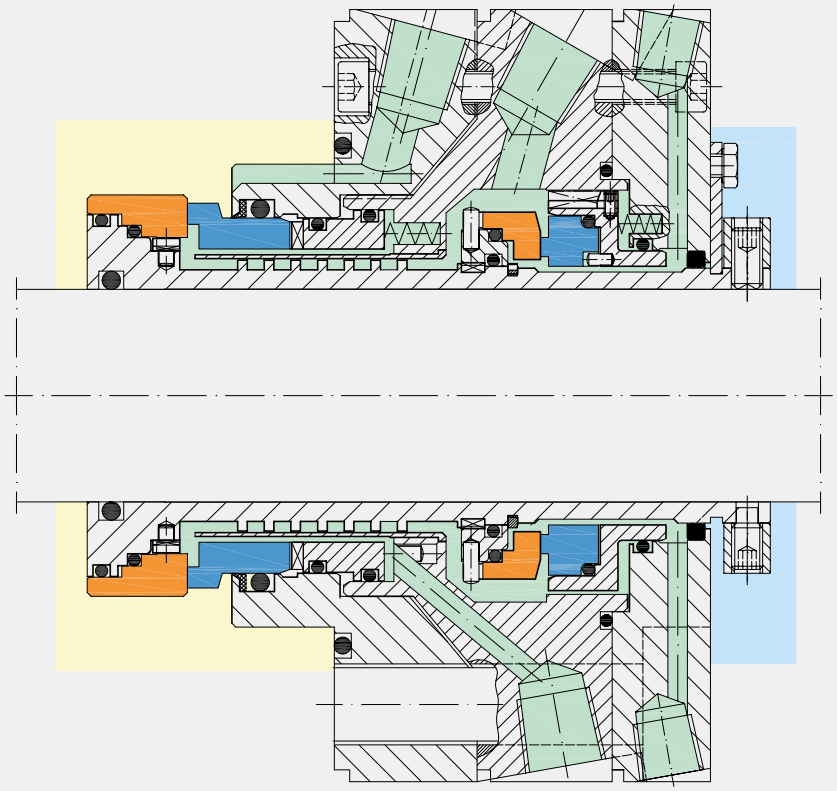
| | | |
|---|---|---|
| Rotary / stationary rings | Carbon, silicon carbide | A, $B_1$, $Q_1$, $Q_2$ etc. |
| Secondary seals | FKM etc. | V etc. |
| Metal parts | 1.4571 (316 Ti) | $G_1$ |
| Springs | Hastelloy C | $M_2$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY



## TYPE 881D



## TECHNICAL DATA

| | |
|---|---|
| pmax | 80 bar |
| tmax | -120° C to +260° C |
| vmax | 35 m/s |
| Seal sizes | 20 - 200 mm<br>also in inch sizes,<br>see dimension sheet |

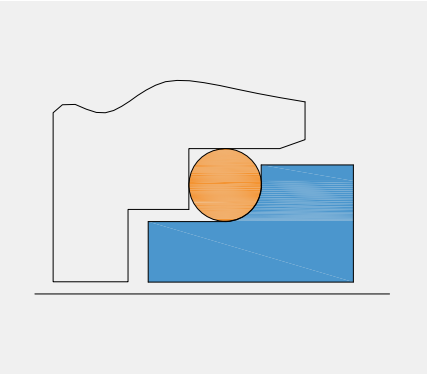
Larger dimensions on request.

# STATIONARY RINGS


| | |
|---|---|
| DIN STATIONARY RING | 146 |
| STATIONARY RING Type BM | 146 |
| STATIONARY RING Type ISO 3069 | 146 |
| STATIONARY RING Type T | 146 |
| STATIONARY RING Type B1 | 147 |
| STATIONARY RING Type B2 | 147 |
| STATIONARY RING Type T | 147 |
| STATIONARY RING Materials | 147 |

# CHETRA
# Stationary Rings

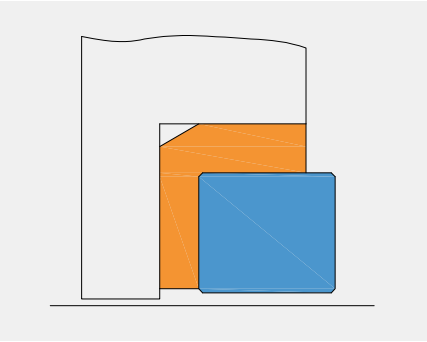
## DIN STATIONARY RING
## ACCORDING TO DIN EN 12756



- Self-aligning unit with anti-rotation pin and O-ring
- Without anti-rotation pin and short design = DIN-KL-stationary

| | | |
|---|---|---|
| Material | Chromecast, Silicon carbide, Tungsten carbide | S, $Q_1$, $Q_2$, $U_2$ |
| O-ring | FKM, Nitrile, EP, PTFE, FFKM | V, N, E, T, K a.o. |

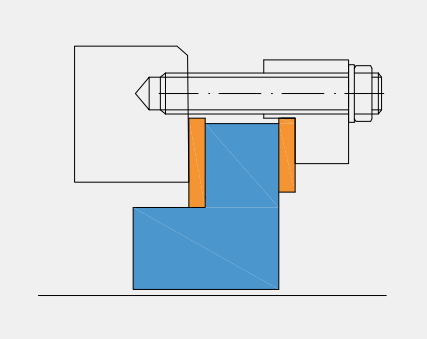
## TYPE BM
## ACCORDING TO DIN EN 12756



- Block shape with rubber boot as anti-rotation unit

| | | |
|---|---|---|
| Material | Chromecast, Silicon carbide, Tungsten carbide | S, $Q_1$, $Q_2$, $U_2$ |
| O-ring | FKM, Nitrile, EP, PTFE, FFKM | V, N, E, T, K a.o. |

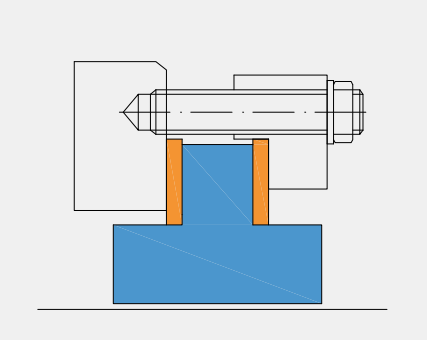
## TYPE ISO 3069
## ACCORDING TO ISO 3069



- Blockform in L-shape with gaskets

| | | |
|---|---|---|
| Material | Ceramic, Silicon carbide | V, $Q_1$, $Q_2$ |
| Gasket | IT, PTFE | F, T |

## TYPE T
## WORK STANDARD

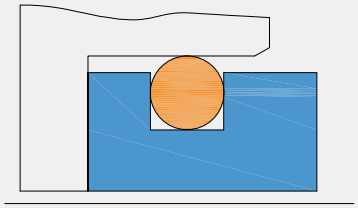


- Blockform in T-shape with gaskets
  Both sides usable as seal face

| | | |
|---|---|---|
| Material | Silicon carbide | $Q_1$, $Q_2$ |
| Gasket | IT, PTFE | F, T |

## TYPE B1
## ACCORDING TO ANSI

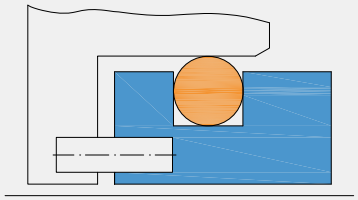
› Blockform (design B1) with O-ring



| | | |
|---|---|---|
| Material | Silicon carbide, Tungsten carbide | $Q_1$, $Q_2$, $U_2$ |
| O-ring | FKM, Nitrile, EP | V, N, E a.o. |

## TYPE B2
## WORK STANDARD

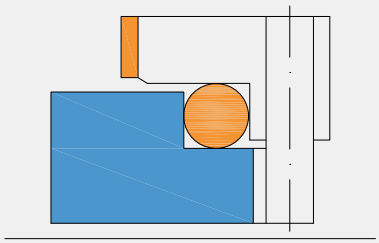
› Blockform (design B2) with anti-rotation pin and O-ring



| | | |
|---|---|---|
| Material | Silicon carbide, Tungsten carbide | $Q_1$, $Q_2$, $U_1$, $U_2$ |
| O-ring | FKM, Nitrile, EP | V, N, E a.o. |

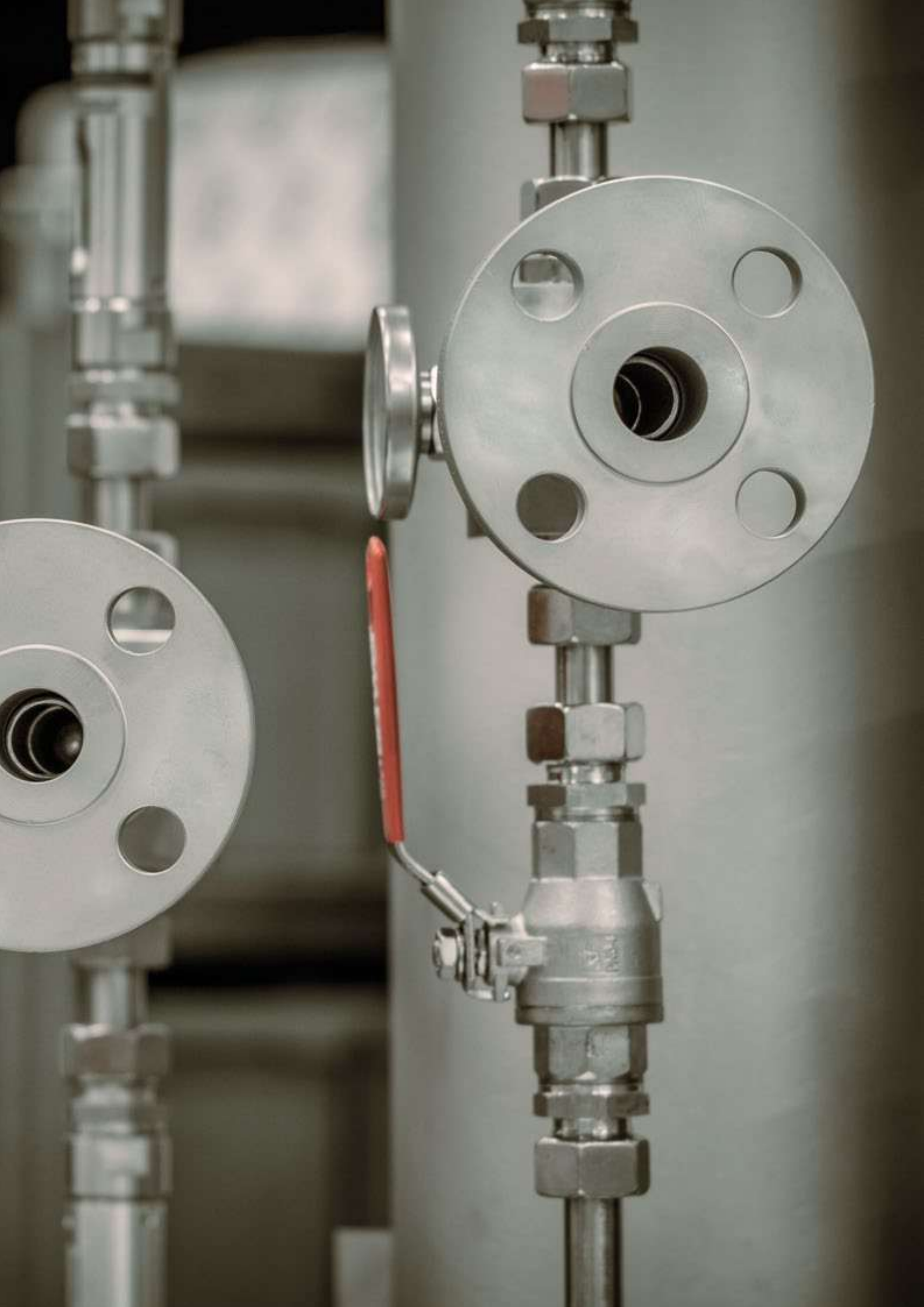
## TYPE DIN-SEG
## WORK STANDARD (DIN/ISO)

› Stationary combining DIN-seat with ISO-adapter ring, gasket, with anti-rotation pin and O-ring, self aligning



| | | |
|---|---|---|
| Material | Silicon carbide | $Q_1$, $Q_2$ |
| Gasket | IT, PTFE | F, T |
| O-ring | FKM, EP, PTFE | V, E, T |
| Adapter ring | 1.4571(316 Ti) | $G_1$ |

Special and additional designs on request



# 03.
# SUPPLY SYSTEMS / API PLANS


## Supply Systems

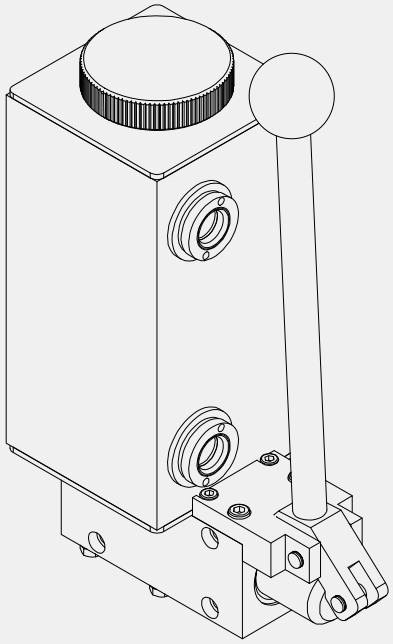
Manual refill pump 150
Water cooler type WT 151
Cyclone separator 152
Pressure transmitter type 6LK-PT 64 153
Flush system type 32 154
Quench system type 51 155
Buffer and barrier fluid system
Type 52 / 53A 156
Loopsystem Type 53B 158
Leakage system type 65 160
Leakage system type 75 161
Gas panel type 72/74 162
Refill system 163

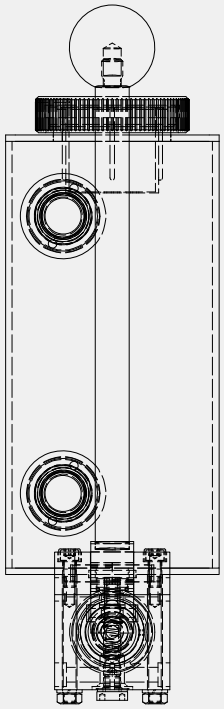
## API Plans

API Plan 01 164
API Plan 02 164
API Plan 11 164
API Plan 12 165
API Plan 13 165
API Plan 14 165
API Plan 21 166
API Plan 23 166
API Plan 31 166
API Plan 32 167
API Plan 41 167
API Plan 51 167
API Plan 52 168
API Plan 53A 168
API Plan 53B 168
API Plan 53C 169
API Plan 54 169
API Plan 61 169
API Plan 62 170
API Plan 65(A) 170
API Plan 72 170
API Plan 74 171
API Plan 75 171
API Plan 76 171

# Manual refill pump Type II

CHEMISTRY | FOOD | OIL & GAS | PHARMA | REFINERIES & PETROCHEMISTRY





## DESCRIPTION

Supply systems can be filled by the CHETRA refill pump.
A check valve is integrated in the manual refill pump, therefore also pressurized supply systems can be refilled.
A filter is integrated into the filler neck to keep away any particles of dirt.

- Vessel volume 2L
- Vessel volume 5L
- ATEX conformity

## TYPICAL APPLICATIONS

- Chemical industry
- Food industry
- Oil & Gas
- Petrochemical industry
- Pharmaceutical industry
- Refineries

## ADDITIONAL DESIGNS

- Upon request

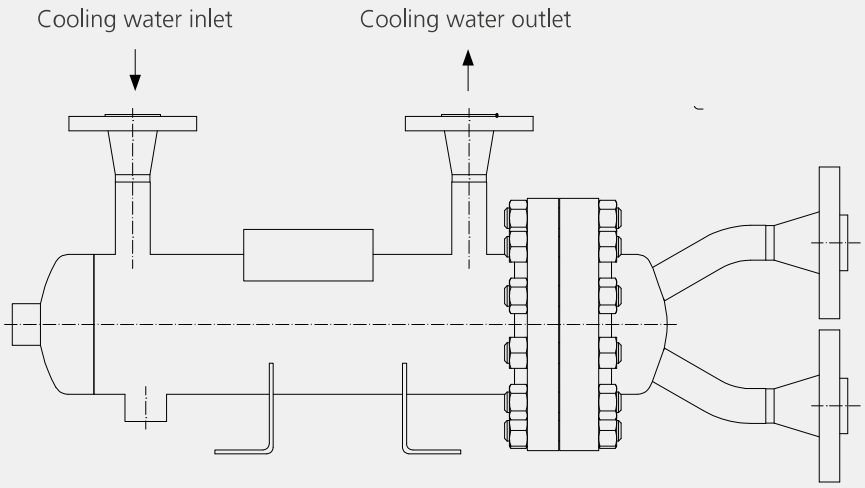
## MATERIAL

| | | |
|---|---|---|
| Vessel | 1.4301, 304SS | $F_3$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# Water cooler
# Type WT

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY




## TECHNISCHE DATEN

| | System incl. instruments |
|---|---|
| Content | acc. application |
| Max. working pressure | 40 bar |
| Max. working temperature | acc. application |

## DESCRIPTION

CHETRA water cooler is used for cooling the barrier fluid or the media to be sealed. The media circulates through the tube bundle. The cooling water circulates through the shell.
Circulation is effected be means of a circulating device in the mechanical seal. Optionally a temperature measuring device or other measuring instruments can be installed into the entry line and return line.

## MATERIAL

| | |
|---|---|
| 1.4571 or 1.4401/1.4404 | $G_1$ or $G_8$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD / APPROVAL

- PED 2014/68/EU
- ASME VIII Div. 1

## TYPICAL APPLICATIONS

- Boiler feed applications
- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## ADDITIONAL DESIGNS

upon request

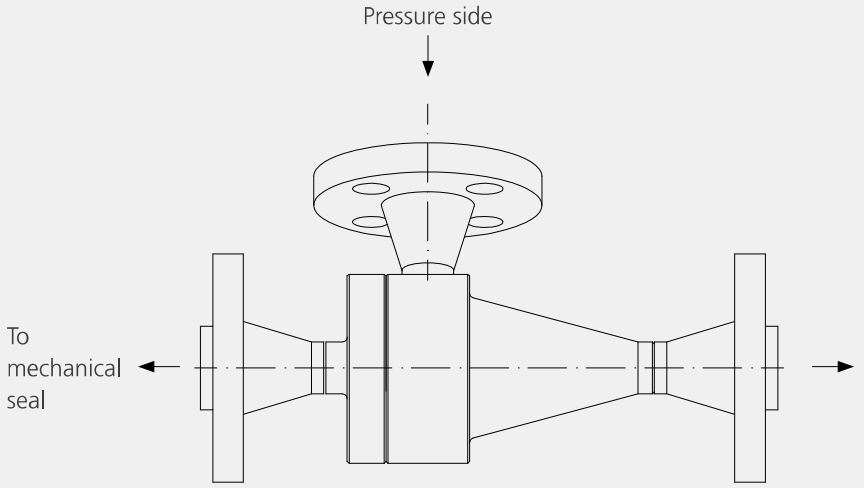
- Additional approvals
- High-pressure design
- High-temperature design
- Material in duplex and superduplex

## METHOD OF OPERATION

- API plan 21, 22, 23, 41, 53B

# Cyclone separator Type Z

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY




## TECHNICAL DATA

| | System incl. instruments |
|---|---|
| Content | acc. application |
| Max. working pressure | acc. application |
| Max. working temperature | acc. application |

## DESCRIPTION

To remove or minimize solids and dirt particles from the flush.

The cleaned media will enter the mechanical seal, solids and dirt particles are transferred to the suction side (API plan 31).

## MATERIAL

| | |
|---|---|
| 1.4571 | $G_1$ |
| 1.4401/1.4404 | $G_0$, $G_8$ |
| 1.4462 | $G_4$ - Duplex |
| 1.4501 | $G_{12}$ - Superduplex |

## DESCRIPTION

- Solids and dirt particles are returned to the suction pressure side

## TYPICAL APPLICATIONS

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## ADDITIONAL DESIGN

- Threaded connections

## METHOD OF OPERATION

- API plan 31, 41

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# Pressure transmitter Type 6LK-PT 64

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY

## TECHNICAL DATA

| | |
|---|---|
| Vessel volume | 6l |
| Cooling pipe volume | 0,32l |
| Operating pressure | max. 64 bar |
| Temperature range | -60°C to +200°C |
| Ratio | 1 : 1,15 |

## DESCRIPTION

A CHETRA pressure transmitter provides a permanently acting pressure load for double mechanical seals even at very high pressures.
The automatically adjusted barrier pressure is effected by an impulse line. Thereby higher pressure fluctuations are equalized.
The cooling of the sealing fluid can be achieved by an integrated cooling coil or by an external cooling unit.

## STANDARD / APPROVAL

- PED 2014/68/EU

## TYPICAL APPLICATIONS

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## ADDITIONAL DESIGN

- With fittings
- Engineered (Design and instrumentation acc. to customers request and technical check)
- Additional approvals by inquiry

## METHOD OF OPERATION

- API plan 53C
  external cooling possible

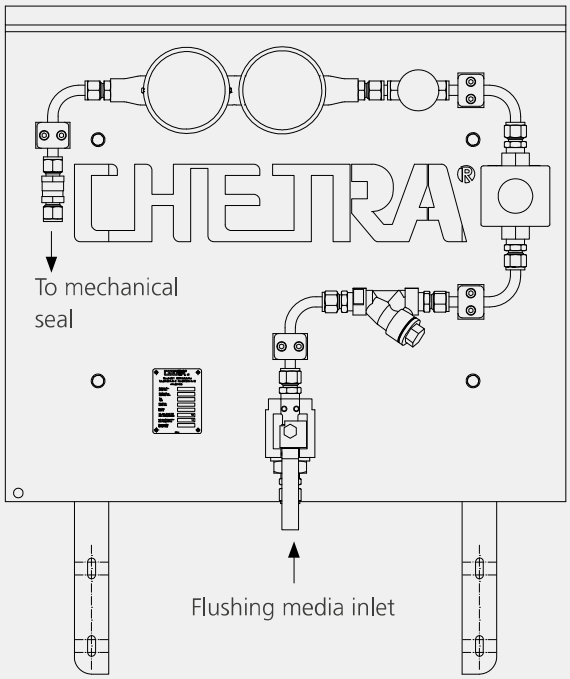
## MATERIAL

| | |
|---|---|
| 1.4571, 316Ti | $G_1$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# Flush system Type 32

CHEMISTRY | FOOD | OIL & GAS | PHARMA | REFINERIES & PETROCHEMISTRY




## TECHNICAL DATA

| | System incl. instruments |
|---|---|
| Content | acc. application |
| Max. working pressure | 40 bar |
| Max. working temperature | acc. application |

## DESCRIPTION

For single acting or double acting mechanical seals: Clean flush media is supplied from an external source. The compatibility of the external flush media with the product being sealed has to be checked.
This flush system is often used in high-temperature applications or in cases of gaseous media containing solids or poorly lubricating products.

- Temperature monitoring
- Pressure monitoring
- Flush monitoring
- Filter / dirt remover

## MATERIAL

| | | |
|---|---|---|
| Plate | 1.4571, 316Ti or 1.4401/1.4404, 316SS / 316L | $G_1$ or $G_0$, $G_8$ |
| Pipes and fittings | 1.4571, 316Ti or 1.4401/1.4404, 316SS / 316L | $G_1$ or $G_0$, $G_8$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD / APPROVAL

- API 682 3rd. Edition
- API 682 4th. Edition

## TYPICAL APPLICATIONS

- Chemical industry
- Food industry
- Oil & Gas
- Petrochemical industry
- Pharmaceutical industry
- Refineries

## ADDITIONAL DESIGNS

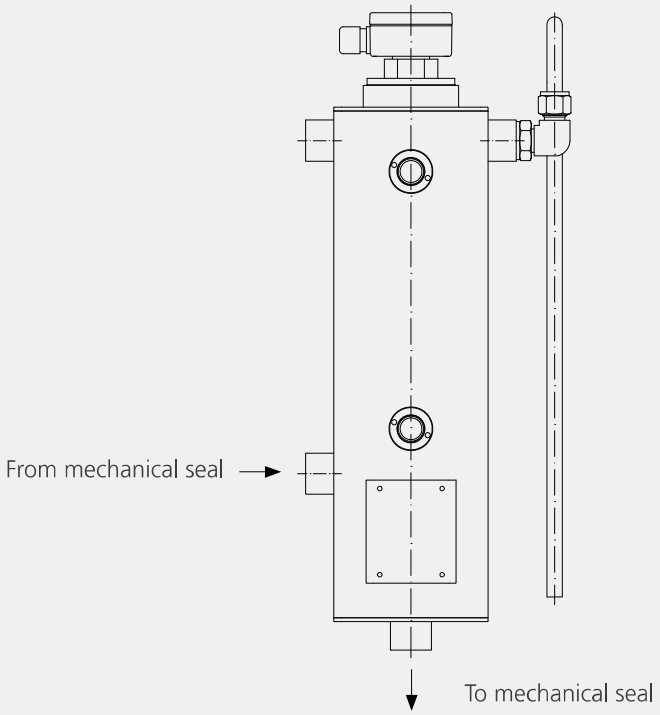
- Engineered (Design and instrumentation acc. to customers request and technical check)
- Additional approvals by inquiry

## METHOD OF OPERATION

- API plan 32

# Quench system Type 51

CHEMISTRY | OIL & GAS | PHARMA | REFINERIES & PETROCHEMISTRY




## TECHNICAL DATA

| | System incl. instruments |
|---|---|
| Content | 3L / 5L / 8L |
| Max. working pressure | unpressurized operation |
| Max. working temperature | acc. application |

## DESCRIPTION

With a CHETRA quench system single acting mechanical seals can be operated with a dead-end blanket.
Circulation by the thermosiphon principle.
Sight-glasses can be in round or elongated shape.

- Vessel (reservoir): 3l / 5l / 8l
- Filling level measuring unit

## STANDARD / APPROVAL

- API 682

## TYPICAL APPLICATIONS

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## ADDITIONAL DESIGNS

- Engineered (Design and instrumentation acc. to customers request and technical check)

## METHOD OF OPERATION

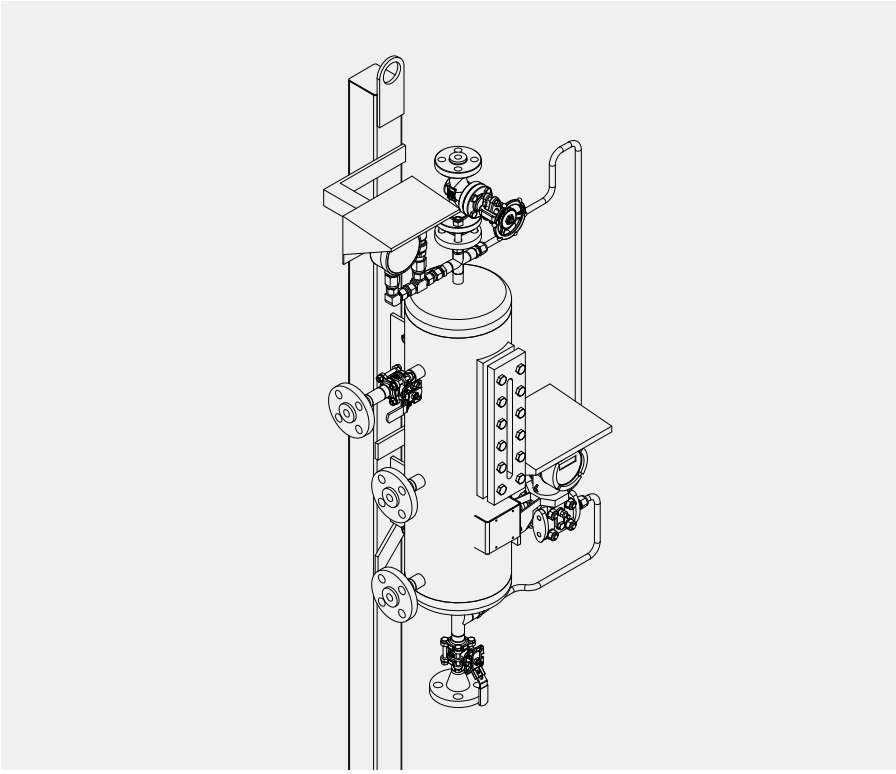
- API plan 51

## MATERIAL

| | | |
|---|---|---|
| Vessel (reservoir) | 1.4301, 304SS | $F_3$ |
| Sight-glass | Borosilicate glass | |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# Buffer and Barrier Fluid System Type 52 / 53A



## DESCRIPTION

The CHETRA buffer and barrier fluid system is used for double-acting mechanical seals. The barrier fluid is circulated either by the thermosiphon principle, or by means of a conveying device in the seal, or through the use of a circulation pump.
The sealing medium can also be cooled by a cooling coil integrated in the vessel.
Level and pressure monitoring prevents the seal from dry running.
In case of unpressurized operation (Plan 52), the product-side leakage is absorbed by the supply system.
Due to the modular principle, the vessels can be combined with different measuring instruments and system components.

## MATERIAL

| | |
|---|---|
| Vessel | 1.4571 (G1) or 1.4401/1.4404 (G0/G8) |
| Sight glass | Borosilicate glass |

## STANDARD

- DGRL 2014/68/EU
- ASME VIII Div.1
- API 682 3rd./4th. Edition

## DESCRIPTION

- Vessel with borosilicate sight-glass V=12L / 20L
- Vessel with cooling coil
- Pressure transmitter with local display
- Level transmitter with local display
- Range of application 40 bar / 200°C

## TYPICAL USES

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## OTHER VERSIONS

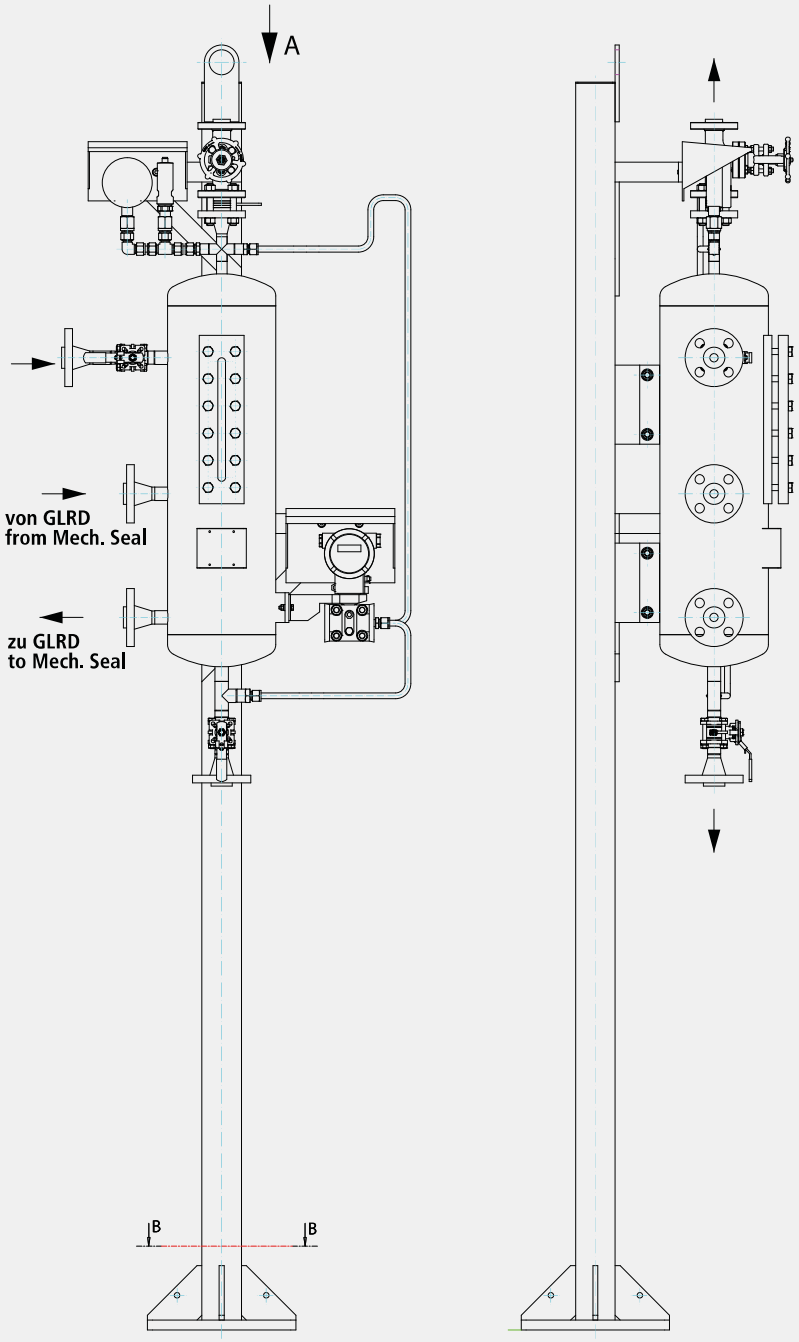
- Split design
- Engineered (design/instrumentation according to customer requirements)
- Other possible approvals on request

## OPERATION

- API plan 52, 53A
  Plan 53A with nitrogen blanket

CHEMISTRY | ENERGY & WATER | FOOD | OIL & GAS | PAPER | PHARMA | REFINERIES & PETROCHEMISTRY

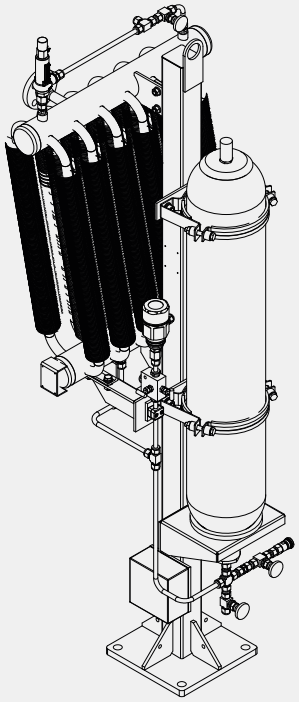
## TYPE 52 / 53A




## TECHNICAL DATA

| | |
|---|---|
| pmax | 40 bar |
| tmax | 200° C |

# Loop System Type 53B



## DESCRIPTION

The CHETRA loop system is used for double-acting mechanical seals at higher pressures and hazardous, environmentally harmful products.
A bladder accumulator installed in the system ensures a closed sealing medium circulation. Due to the pressurization of the bladder accumulator, a permanent connection to a nitrogen network is not necessary. Slight pressure fluctuations in the process can be absorbed as well as leakage compensation of the rotary surface pairings. The resulting heat is dissipated in the mechanical seals by a cooling unit (depending on the application, a water cooler or an air cooler with finned tubes).
The barrier fluid can be circulated by means of a conveying device in the seal or a circulation pump or by the thermosiphon principle.
Due to the modular principle, the loop systems can be combined with different measuring instruments and system components.
The barrier fluid can be replenished by a manual replenishment pump installed on the system or by remote or by central barrier fluid systems.

## MATERIAL

| | |
|---|---|
| Bladder accumulator | carbon steel or stainless steel – acc. to barrier fluid |
| Air cooler | Stainless steel |
| Fittings and piping | Stainless steel |

## STANDARD

- DGRL 2014/68/EU
- ASME VIII Div.1
- API 682 3rd./4th. Edition

## DESCRIPTION

- Bladder accumulator
- Finned tube air cooler or water cooler
- Pressure transmitter with local display
- Temperature transmitter with local display – gas-side (API 4th Ed.)
- Temperature monitoring

## TYPICAL USES

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## OTHER VERSIONS

- Welded version on request
- Engineered (design/instrumentation according to customer requirements)
- Other possible approvals on request

## OPERATION

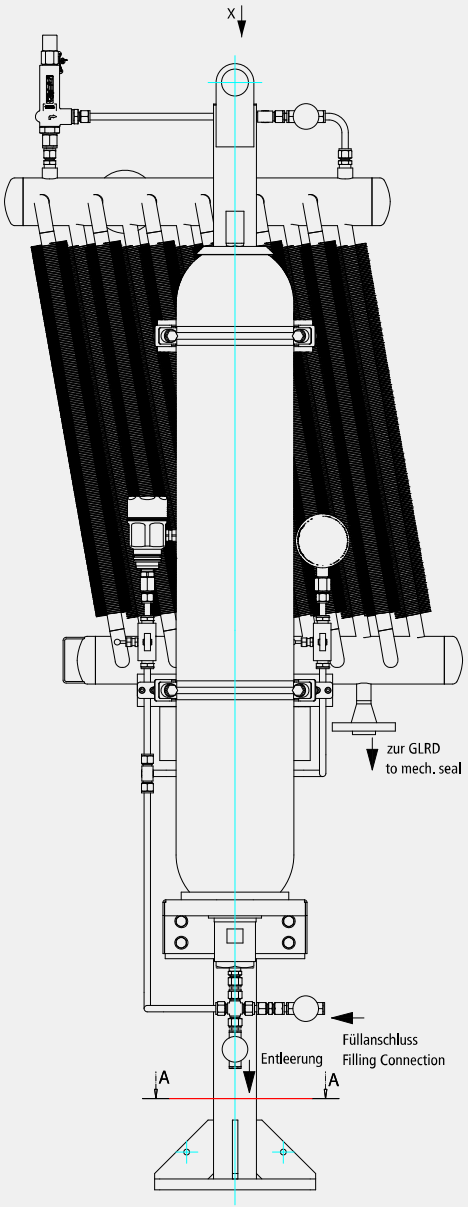
- API plan 53B

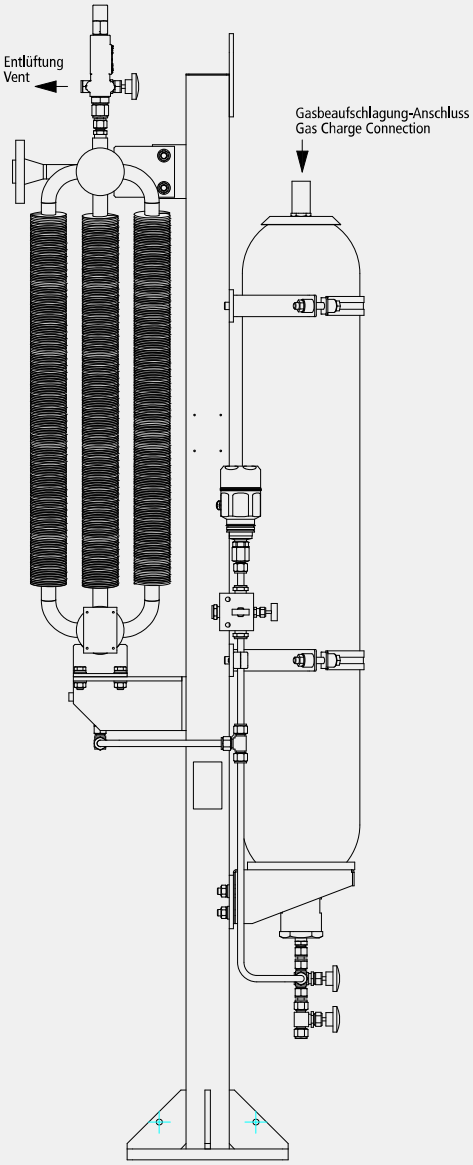
CHEMISTRY | ENERGY & WATER | FOOD | OIL & GAS | PAPER | PHARMA | REFINERIES & PETROCHEMISTRY

## TYPE 53B

## TECHNICAL DATA

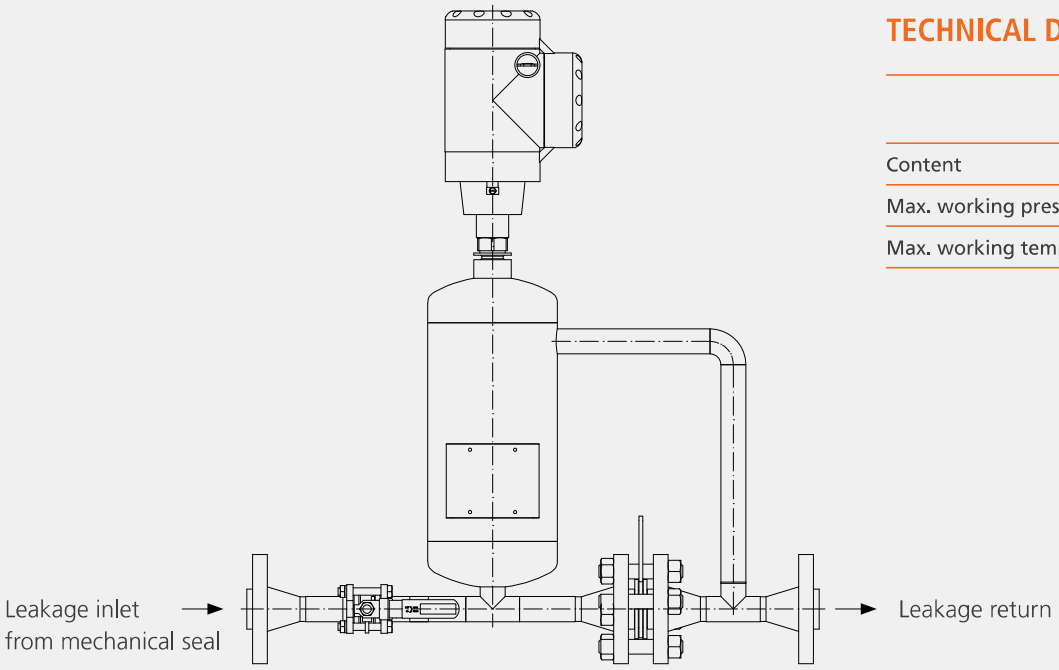
| | |
|---|---|
| pmax | 40 bar |
| tmax | 200° C |



# Leakage system Type 65

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY




## TECHNICAL DATA

| | System incl. instruments |
|---|---|
| Content | 3L |
| Max. working pressure | 40 bar |
| Max. working temperature | acc. application |

## DESCRIPTION

To collect and monitor leakage on atmospheric side of single-acting and double-acting mechanical seals.

Often used in pipeline pumps

- Vessel volume: 3l
- Filling level measuring unit
- Orifice
- Welded-in ball valves

## STANDARD / APPROVAL

- PED 2014/68/EU
- ASME VIII Div. 1
- API 682 3rd ed.
- API 682 4th ed.

## TYPICAL APPLICATIONS

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## MATERIAL

| | | |
|---|---|---|
| Vessel | 1.4571, 316Ti or 1.4401/1.4404, 316SS/316L | $G_1$ or $G_0$, $G_8$ |
| Level indicator | Borosilicate glass | |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## ADDITIONAL DESIGNS

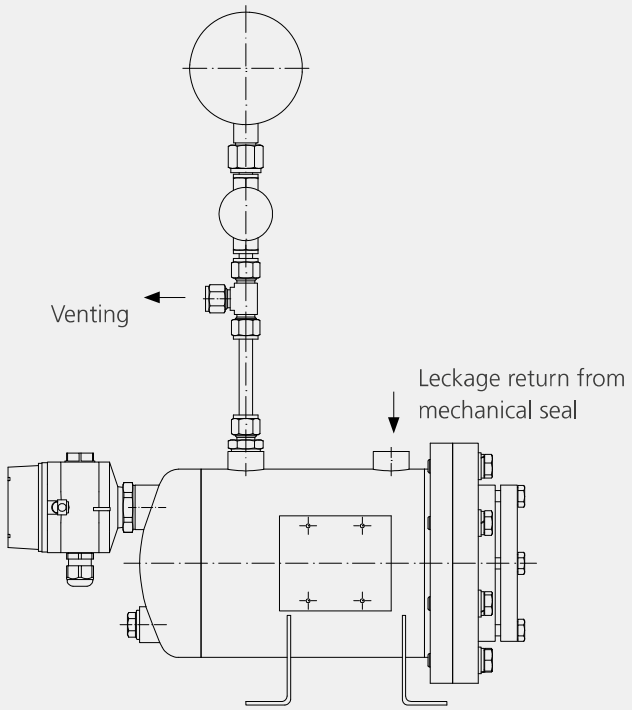
- With fittings
- Engineered (Design and instrumentation acc. to customers request and technical check)
- Additional approvals by inquiry

## METHOD OF OPERATION

- API plan 65, 65A, 65B

# Leakage system Type 75

CHEMISTRY | OIL & GAS | REFINERIES & PETROCHEMISTRY




## TECHNICAL DATA

Barrier gas system

| | |
|---|---|
| Design pressure | 50 bar |
| Working pressure | pressureless (72)<br>Stuffingboxpressure + 2 barg (74) |
| Design temperature | acc. application |
| Working temperature | acc. application |
| Alarm set-up | acc. application |
| Media | acc. application |

## DESCRIPTION

To collect leakage on atmospheric side of mechanical seals and to enable monitoring.

Often used on loading pumps.

- Vessel volume: 4l / 12l
- Filling level measuring unit
- Pressure monitoring

## MATERIAL

| | | |
|---|---|---|
| Vessel | 1.4571, 316Ti or 1.4401/1.4404, 316SS/316L | $G_1$ or $G_0$, $G_8$ |
| Level indicator | Borosilicate glass | |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD / APPROVAL

- PED 2014/68/EU
- ASME VIII Div. 1
- API 682 3rd ed.
- API 682 4th ed.

## TYPICAL APPLICATIONS

- Chemical industry
- Oil & Gas
- Petrochemical industry
- Refineries

## ADDITIONAL DESIGNS

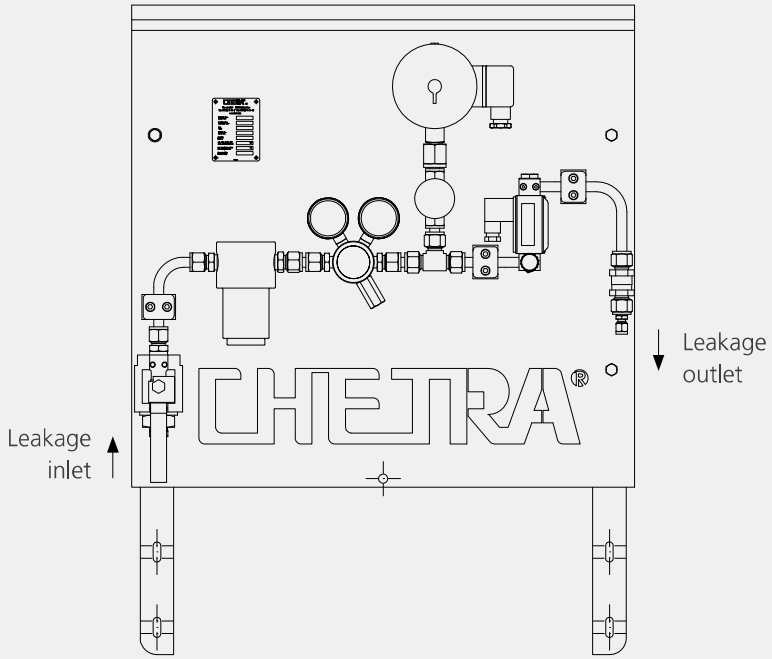
- Welded design
- Engineered (Design and instrumentation acc. to customers request and technical check)
- Additional approvals by inquiry

## METHOD OF OPERATION

- API plan 75

# Gas panel
# Typ 72/74

CHEMISTRY | FOOD | OIL & GAS | PHARMA | REFINERIES & PETROCHEMISTRY




## TECHNICAL DATA

Barrier gas system

| | |
|---|---|
| Design pressure | 50 bar |
| Working pressure | pressureless (72)<br>Stuffing box pressure +2 bar g (72) |
| Design temperature | acc. application |
| Working temperature | acc. application |
| Alarm set-up | acc. application |
| Media | acc. application |

## DESCRIPTION

CHETRA gas panel system for gas-lubricated double and tandem mechanical seals. The barrier gas or buffer gas is supplied to the mechanical seal through a filter.

- Filter
- Pressure monitoring
- Flow regulation monitoring

## MATERIAL

| | | |
|---|---|---|
| Plate | 1.4571, 316Ti or 1.4401/1.4404, 316SS/316L | $G_1$ or $G_0$, $G_8$ |
| Pipes and fittings | 1.4571, 316Ti or 1.4401/1.4404, 316SS/316L | $G_1$ or $G_0$, $G_8$ |

Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

## STANDARD / APPROVAL

- API 682 3rd. Edition
- API 682 4th. Edition

## TYPICAL APPLICATIONS

- Chemical industry
- Food industry
- Oil & Gas
- Petrochemical industry
- Pharmaceutical industry
- Refineries

## ADDITIONAL DESIGNS

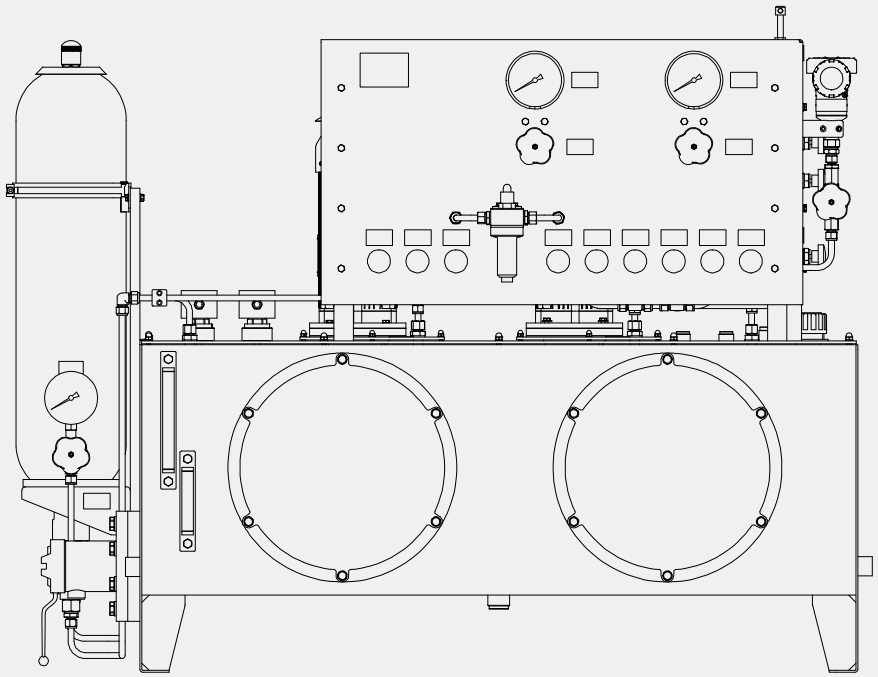
- Engineered (Design and instrumentation acc. to customers request and technical check)
- Additional approvals by inquiry

## METHOD OF OPERATION

- API plan 72, 74

# Refill system

CHEMISTRY | FOOD | OIL & GAS | PHARMA | REFINERIES & PETROCHEMISTRY



## DESCRIPTION

Supply systems can be refilled by the CHETRA refill system.
The mobile refill unit is equipped with a manual refill pump and a tube.
The central refill unit is equipped with a pump, a bladder accumulator and an optional vessel heater. Up to 25 CHETRA loop systems (53B) can be supplied.
The refill and monitoring are fully automated.

- Vessel volume: 40l (mobile unit)
- Vessel volume: 60l (central unit)
- In compliance with ATEX

## TYPICAL APPLICATIONS

- Chemical industry
- Food industry
- Oil & Gas
- Petrochemical industry
- Pharmaceutical industry
- Refineries

## ADDITIONAL DESIGNS

- Engineered (Design and instrumentation acc. to customers request and technical check)

## MATERIAL

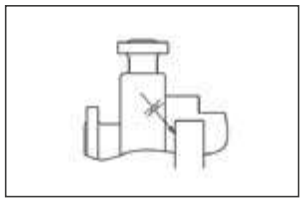
| | | |
|---|---|---|
| Plate | 1.4571 or 1.4401/1.4404 | $G_1$ or $G_0$, $G_8$ |

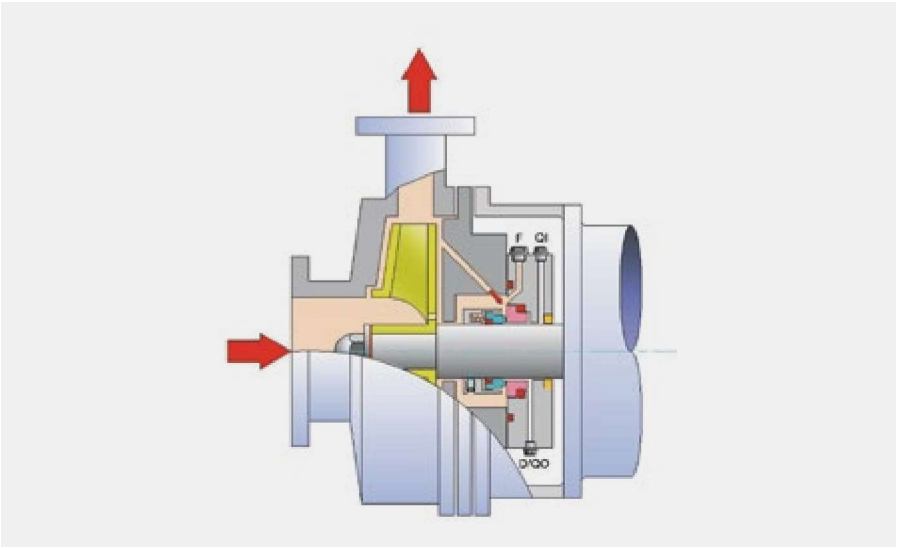
Other material requirements on request | Telephone: 089 32 94 64 - 0 | Email: chetra@chetra.de

# API PLANS
## For Diverse Circulation Systems

### API PLAN 01

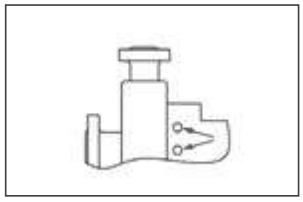
› Internal circulation from discharge point to seal (mechanical seal)

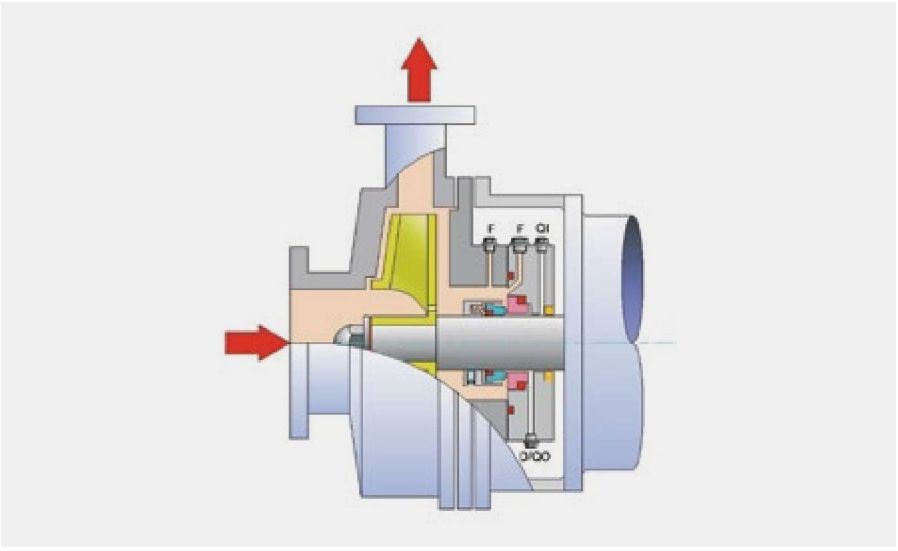




### API PLAN 02

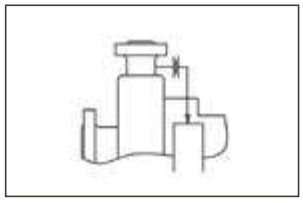
› Dead ended operation
› Without circulation

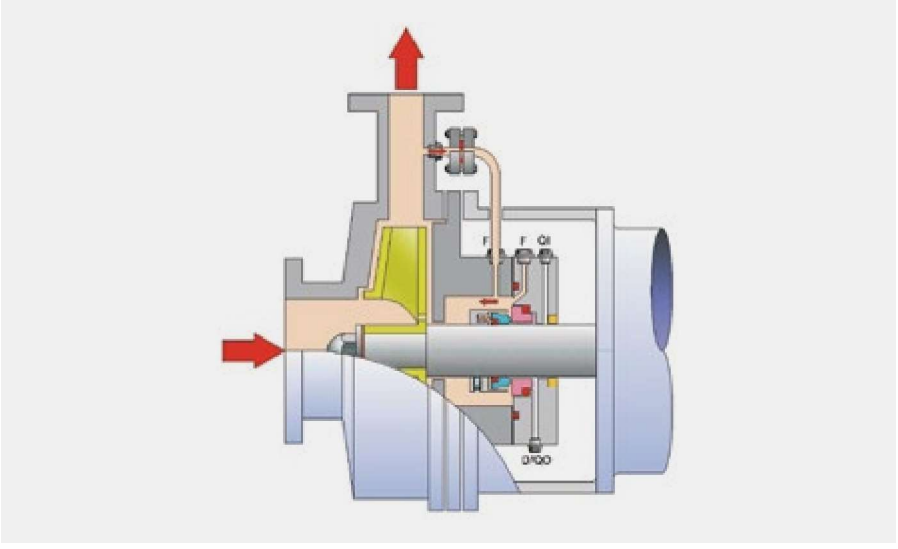




### API PLAN 11

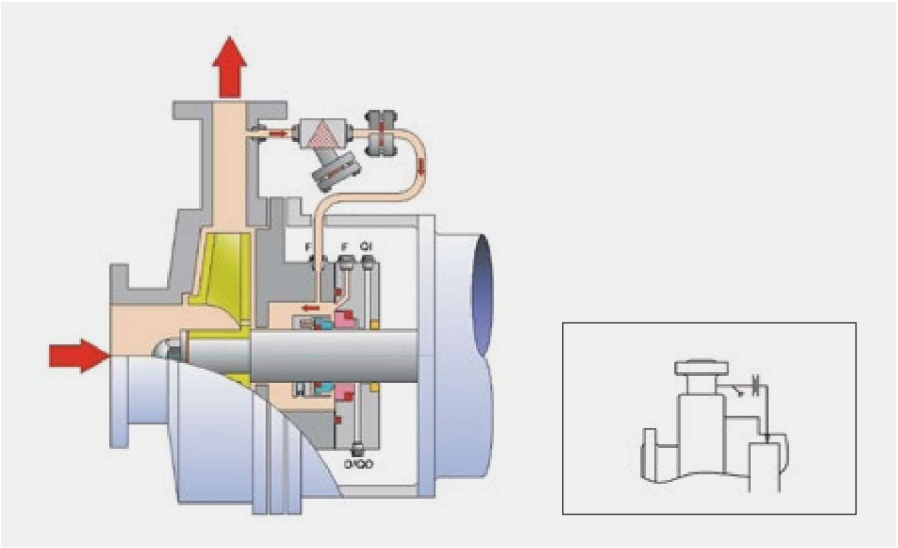
› Circulation through orifice from discharge point to seal chamber
› Standard plan single seal





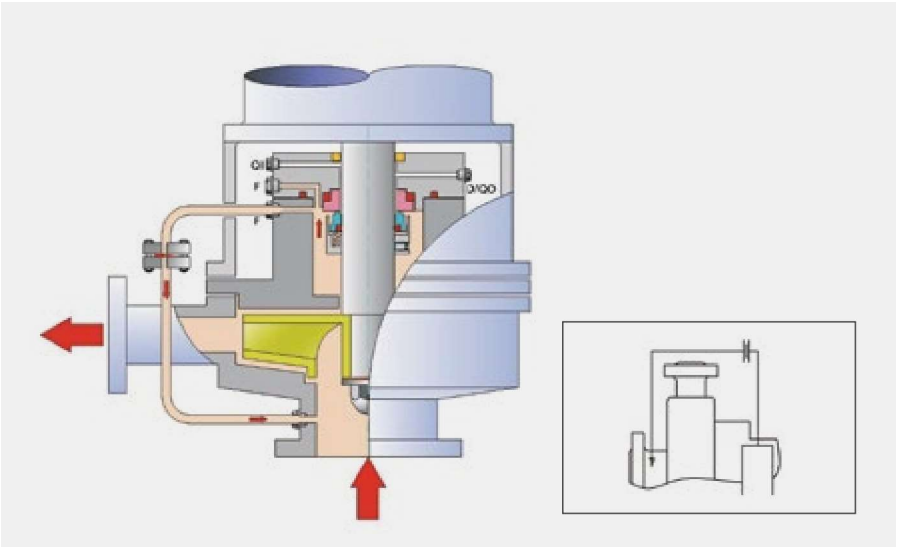
## API PLAN 12

- Circulation through a strainer and orifice from discharge point to seal



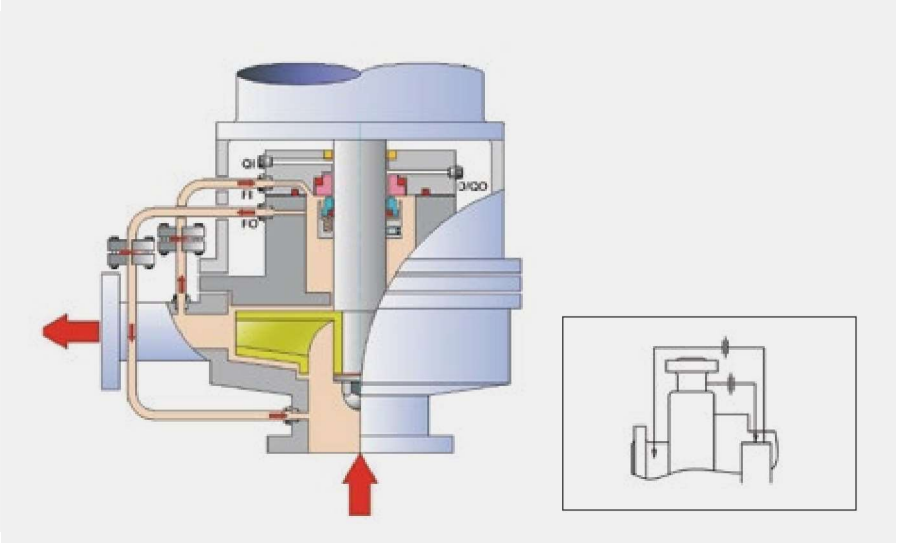
## API PLAN 13

- Circulation through orifice from suction piece to seal chamber
- Standard plan vertical pumps



## API PLAN 14

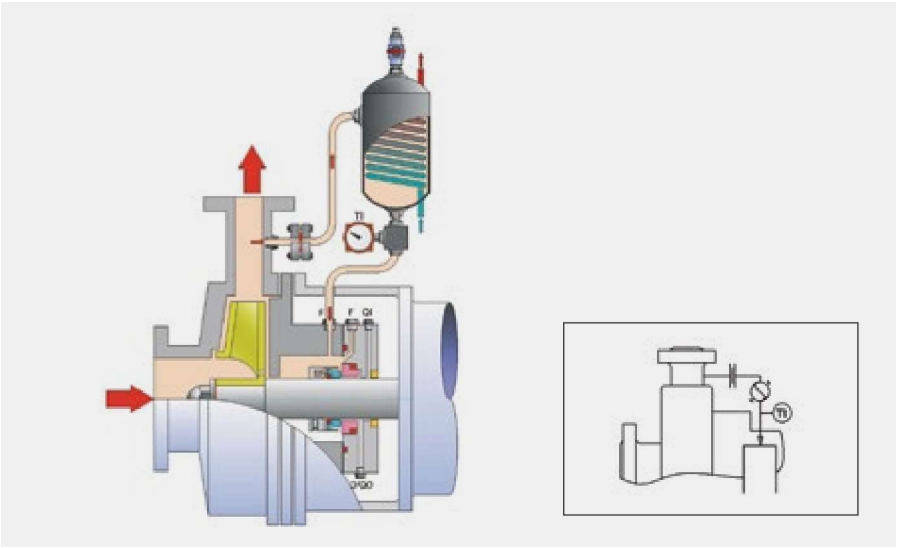
- Circulation through orifice from discharge point to seal
- Simultaneous circulation through orifice from seal to suction side



# API PLANS
## For Diverse Circulation Systems

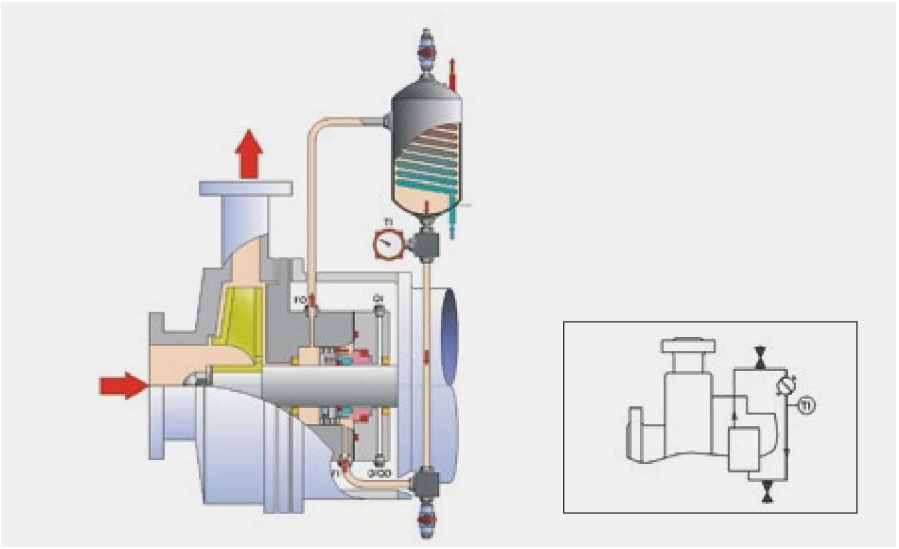
### API PLAN 21

- Circulation through orifice and cooler from discharge point to seal chamber
- Increased heat dissipation (21 combined with 31 = plan 41)



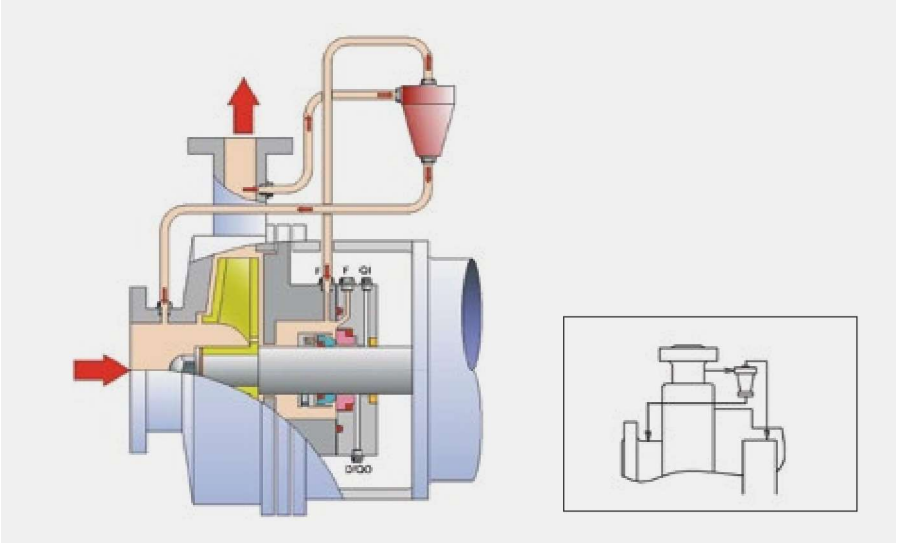
### API PLAN 23

- Circulation with seal-integrated conveying system through cooler from seal back to seal chamber
- Standard plan hot water applications



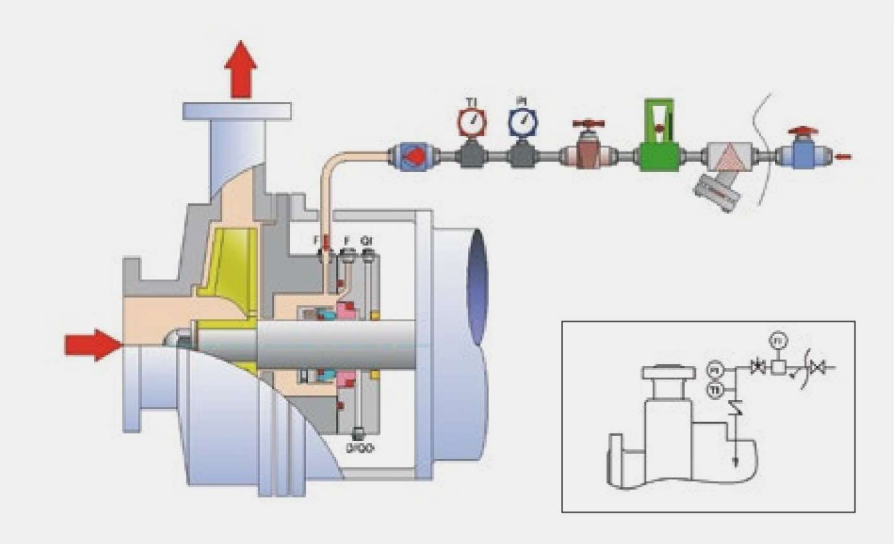
### API PLAN 31

- Circulation through cyclone separator from discharge point to seal chamber
- Solids return to suction point (21 combined with 31 = plan 41)



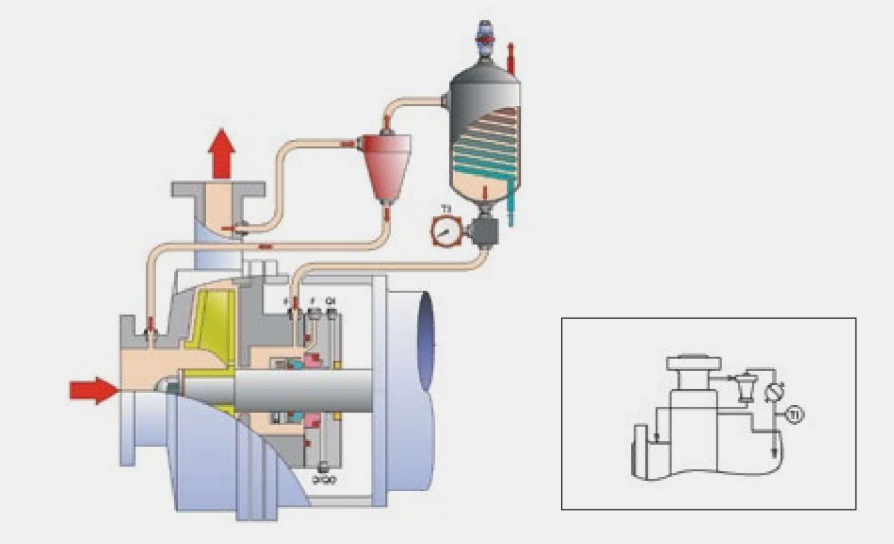
## API PLAN 32

› Clean liquid from external source into seal chamber



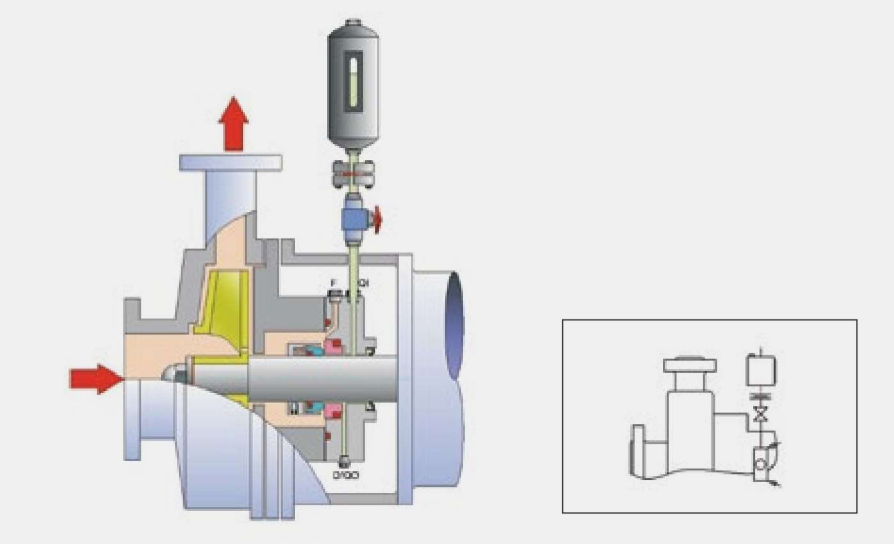
## API PLAN 41

› Circulation through cyclone separator and heat exchanger from discharge point to seal



## API PLAN 51

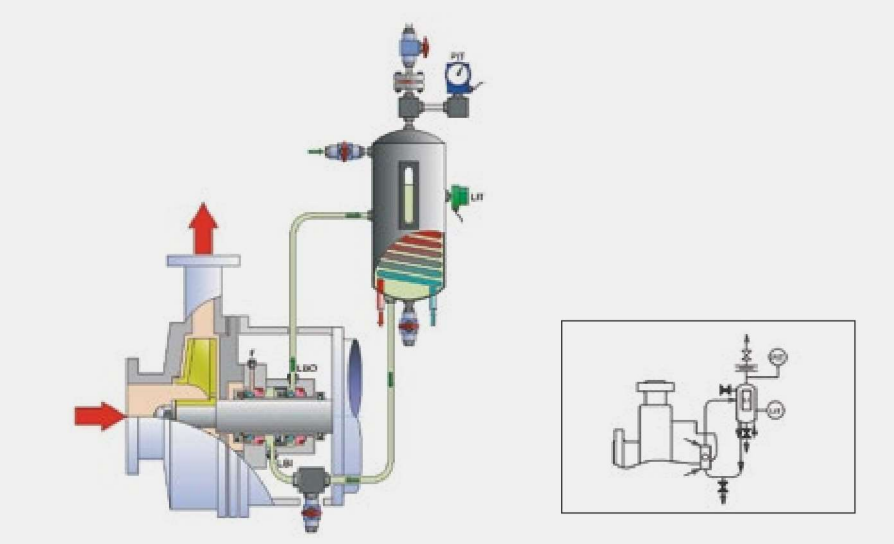
› Dead-end pressureless supply of vessel to quench connection or tandem seal



# API PLANS
## For Diverse Circulation Systems

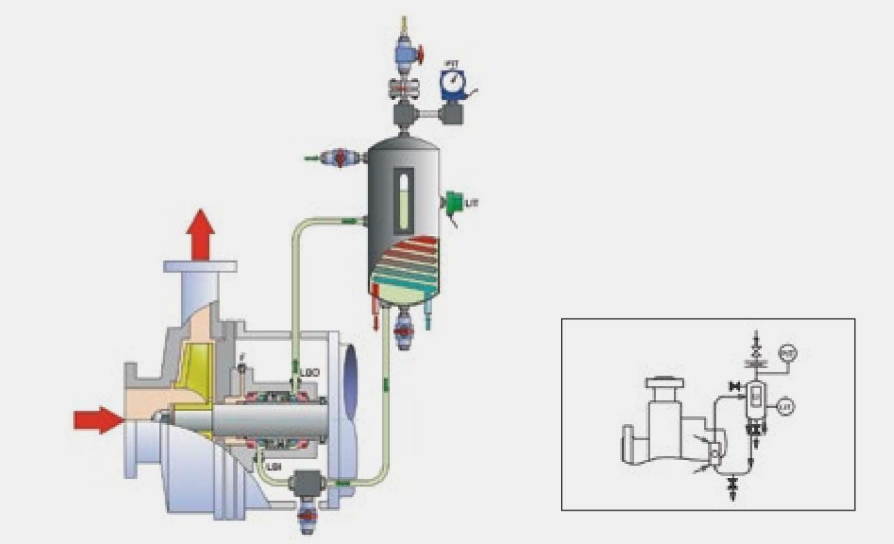
### API PLAN 52

- Circulation of pressureless buffer vessel by a conveying system integrated in the seal
- Tandem (double) seal



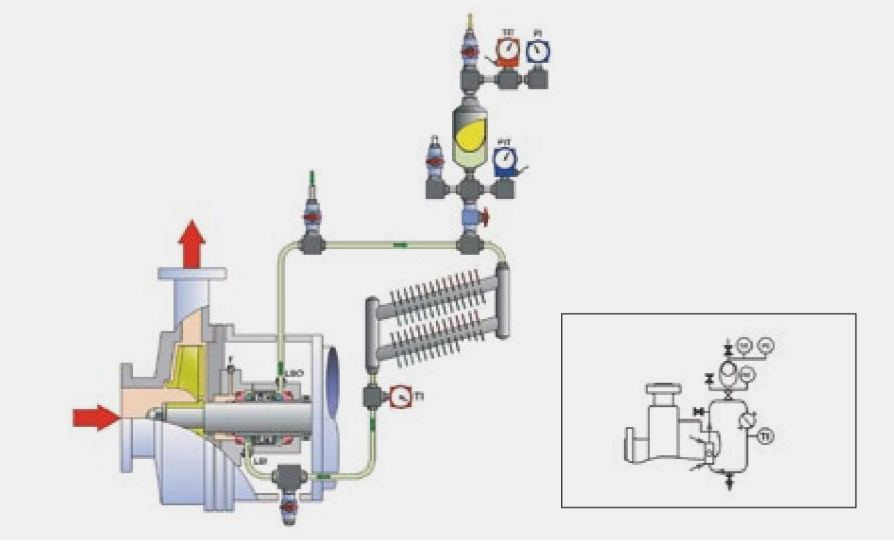
### API PLAN 53A

- Circulation of barrier fluid vessel / higher sealing pressure usually through N2 supply by means of a conveying system integrated in the seal
- Double seal



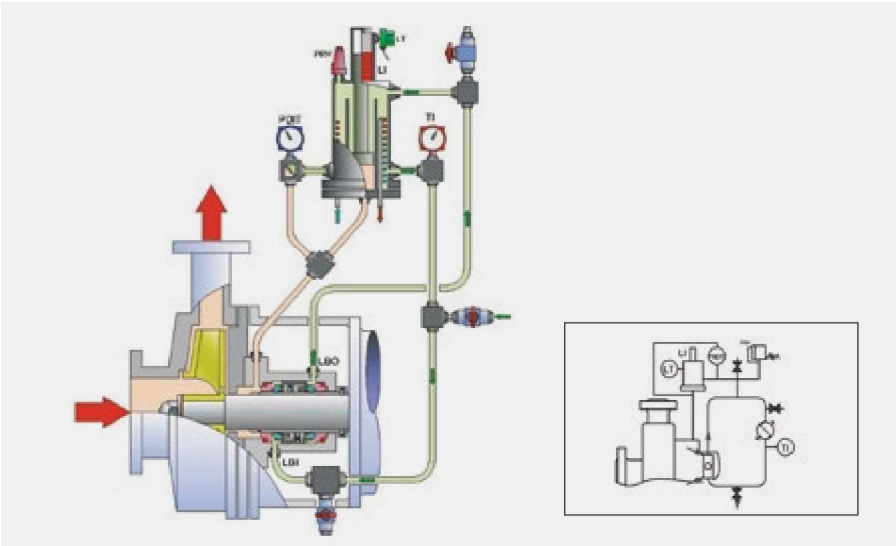
### API PLAN 53B

- Circulation of barrier fluid pressurizing by means of bladder accumulator
- Conveying system integrated in seal
- Additional heat exchanger (water or air cooler)
- Higher pressure possible than with plan 53A



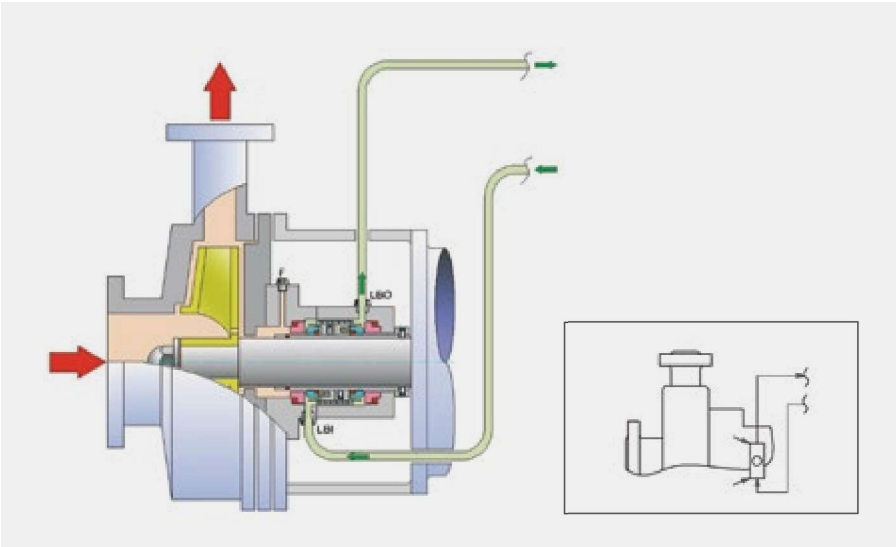
## API PLAN 53C

- Circulation of barrier fluid pressurizing by pressure transmitter
- Higher pressure possible than with plan 53A
- Barrier pressure regulates automatically depending on the pressure to be sealed



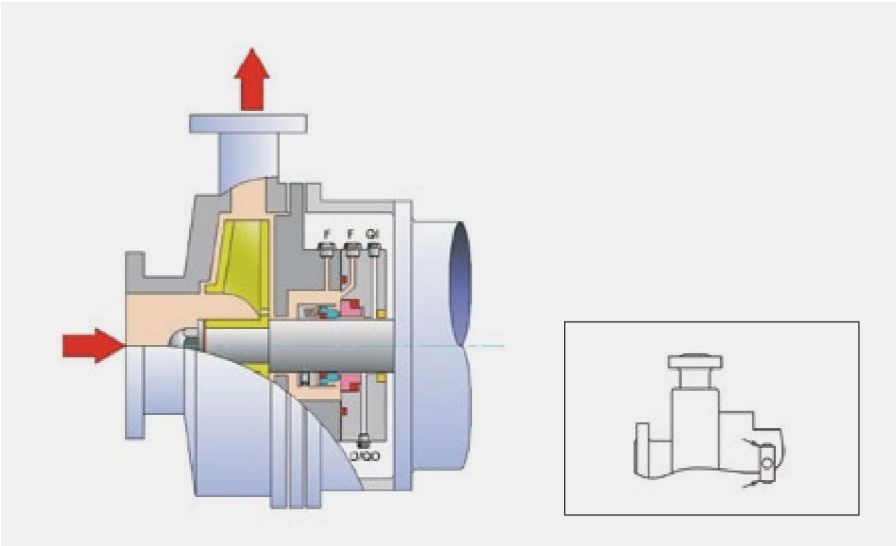
## API PLAN 54

- Pressurized clean barrier fluid fed to the seal chamber from external system (same with API plan 55 but pressureless)



## API PLAN 61

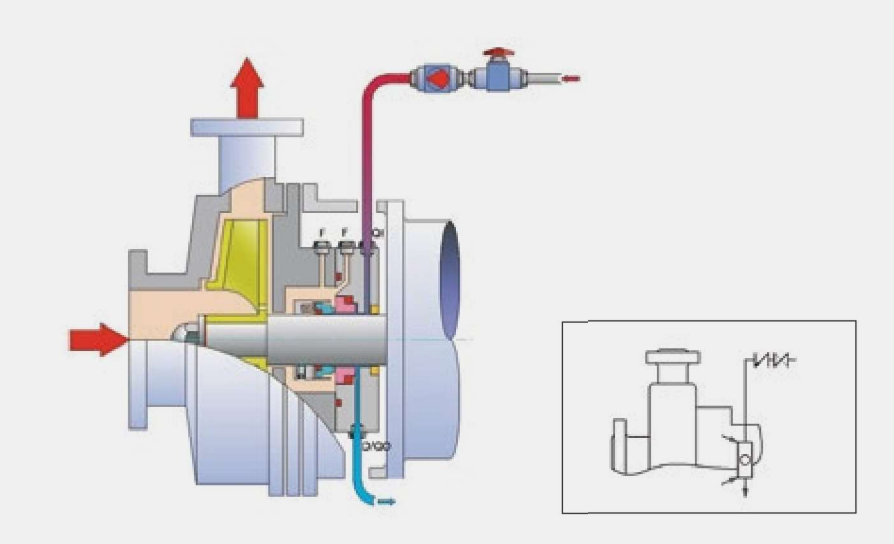
- Quench connections for decision by the operator (connections equipped with plugs upon delivery)



# API PLANS
## For Diverse Circulation Systems

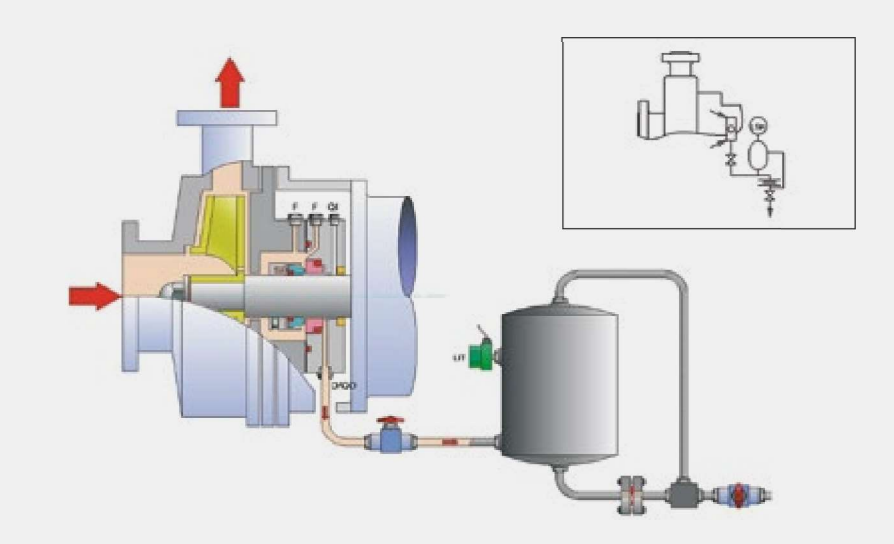
### API PLAN 62

- Circulation of barrier fluid pressurizing by pressure transmitter
- Higher pressure possible than with plan 53A
- Barrier pressure regulates automatically in dependence on pressure to be sealed



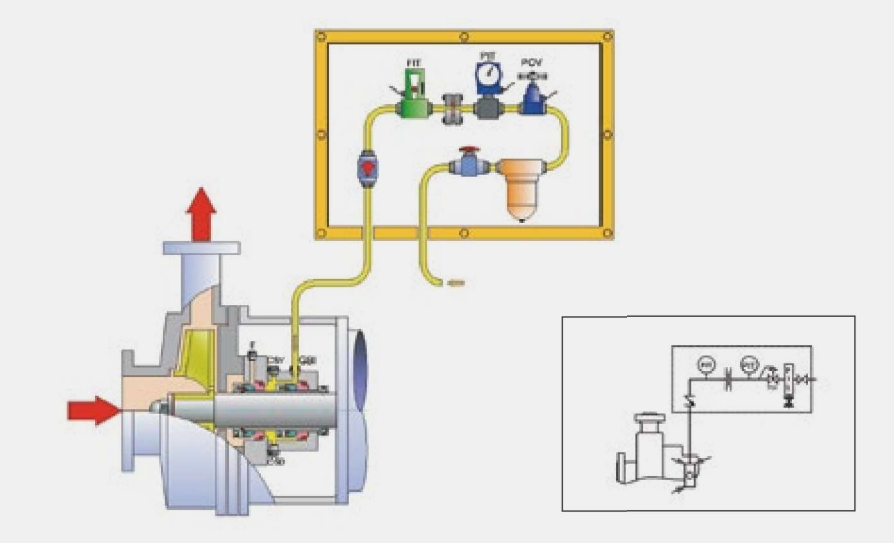
### API PLAN 65 (A)

- Pressurized clean barrier fluid fed to the seal chamber from external system



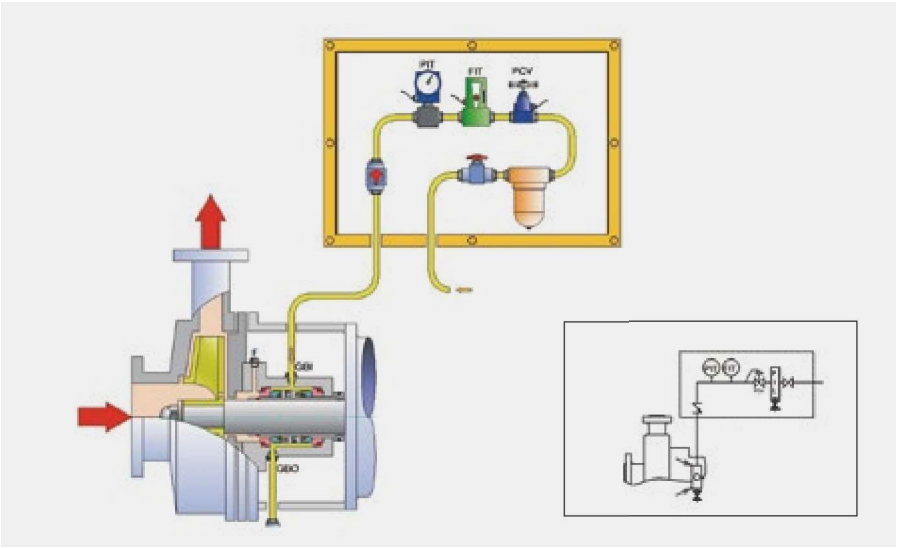
### API PLAN 72

- Quench connections for decision by the operator (connections equipped with plugs upon delivery)



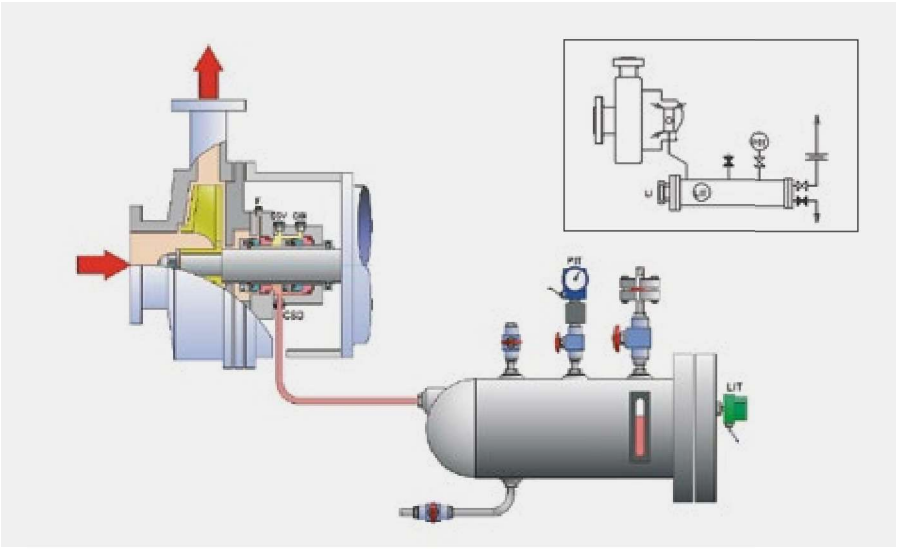
## API PLAN 74

- Supply system for pressurized, gas-buffered double seal, typically N2 as barrier gas (approx. 2 bar higher than pressure to be sealed)
- Use of a gas control panel for barrier pressure regulation, for filtering and moisture removal in the sealing gas



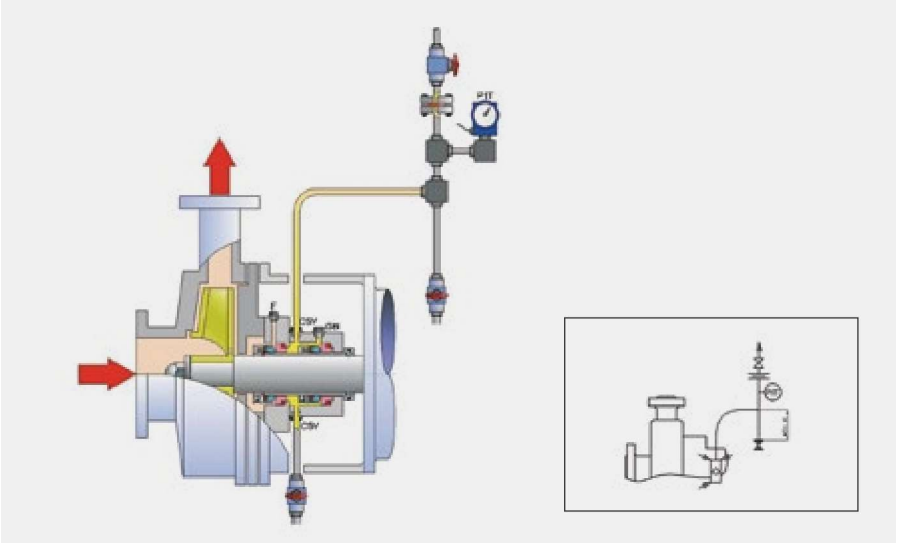

## API PLAN 75

- Leakage control / leakage vessel with pressure display and pressure switch in connection with back-up seal, the product-side seal is a liquid-lubricated seal (can be used independently of plan 72)
- Use for media that are liquid or that condense at ambient temperatures




## API PLAN 76

- Supply configuration to direct seal leakage that is non-condensing at ambient temperature to torch or vapor recovery system
- Product-side seal liquid-lubricated (can be used in connection with plan 72)



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