API 682 4th edition
Category 2/3 Configurations

Mechanical seals

Piping plans

Seal supply systems

Configuration

3CW-FB
**EagleBurgmann seal supply systems and components**

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<td>41</td>
<td>WE6 Water cooler, WEL6 Air cooler, SP6 Temperature indicator, ZVG6 Cyclone separator</td>
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<td>32</td>
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<td>TS66 Barrier/buffer fluid system, TS66 Barrier/buffer fluid system</td>
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</tr>
<tr>
<td>53A*</td>
<td>LS66 Leakage collection reservoir</td>
</tr>
<tr>
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<td>LS66 Leakage collection reservoir</td>
</tr>
<tr>
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<td>Engineered to customer’s specifications</td>
</tr>
</tbody>
</table>

**API piping plans applicable for 3CW-FB configuration**

**Process side**

- **Plan 01**: Integral (internal) recirculation from the pump discharge to the seal chamber

- **Plan 02**: Dual-ended seal chamber with no recirculation of flushed fluid. Flush connections plugged

- **Plan 03**: Circulation between the seal chamber and the pump created by the design of the seal chamber. Flush connections plugged

- **Plan 11 (12)**: Recirculation from the pump discharge through a flow control orifice (in Plan 12 through a strainer and a flow control orifice) into the seal chamber

- **Plan 23**: Recirculation from a circulation device in the seal chamber through a cooler and back into the seal chamber

**Between seals**

- **Plan 31**: Recirculation from the pump discharge through a flow control orifice in the seal chamber to the pump suction line

- **Plan 41**: Recirculation from the pump discharge through a flow control orifice into the seal chamber. The solids are delivered to the pump suction line

- **Plan 53A**: Air or clean water or steam delivery into the seal chamber. The quench stream can be pressurized by an external source to the atmospheric side of the seal faces. The quench stream can be low-pressure steam, nitrogen or clean water. (Plan 41: tapered and plugged atmospheric side connection to purchaser’s use)

- **Plan 53B**: Barrier fluid system pressurized by a bladder accumulator supplying clean fluid for an arrangement 3 pressurized dual seal

- **Plan 53C**: Barrier fluid system pressurized by a piston accumulator supplying clean fluid for an arrangement 3 pressurized dual seal

- **Plan 65A**: Atmospheric leakage collection and alarm system for condensing leakage. Failure of the seal will be detected by an excessive flow rate into the leakage collection system

- **Plan 65B**: Atmospheric leakage collection and detection system for condensing leakage. Failure of the seal will be detected by a cumulative leakage into the system

**Atmospheric side**

- **Plan 62 (61)**: Quench stream chosen from an external source to the atmospheric side of the seal faces. The quench stream can be low-pressure steam, nitrogen or clean water. (Plan 61: tapered and plugged atmospheric side connection to purchaser’s use)

**Solutions for more safety and productivity**

The new 4th edition of API 682 is in line with the latest achievements and current developments. EagleBurgmann offers the widest portfolio of seals and seal supply systems acc. to API 682 4th edition, and consequently has the optimum product for each API-complaint requirement: Technically mature, practical solutions that provide significantly greater safety and process reliability in refining technology, petrochemical, oil & gas and chemical industries.

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**Important note**

All the technical specifications are based on extensive tests and our many years of experience. However, the diversity of possible applications means that they can only serve as a guide only.

Further, the operating ranges of each specified product depend on the respective operating conditions. Hence, seal manufacturers recommend consulting with our specialist engineers.

Subject to change.

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**EagleBurgmann** is one of the leading international system providers of sealing technology. For more than 20 years we have been actively contributing our expertise to developing and implementing the API 682 standard for the selection and application of seals and seal supplies in centrifugal and rotary pumps.
**Features**
- API 682 Category 2 and 3, Type A, Arrangement 3 seal
- Dual seal in face-to-back arrangement
- Balanced
- Cartridge unit
- Rotating multiple springs
- Integrated pumping device
- Suitable for pressure reversals
- Universally applicable both for retrofits or original equipment
- Efficient stock keeping due to standardized components
- Extended selection of materials
- Optimized torque transmission
- Extended field of operation in terms of temperature and pressure
- Metal parts also in special materials available

**Advantages**
- Universally applicable both for retrofits or original equipment
- Efficient stock keeping due to standardized components
- Extended selection of materials
- Optimized torque transmission
- Extended field of operation in terms of temperature and pressure
- Metal parts also in special materials available

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Highly volatile hydrocarbons
- LPG plants
- API 610/ISO 13709 pumps
- Process pumps

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**Operating range (see note on page 3)**
- Shaft diameter: \( d = 20 \ldots 110 \text{ mm (0.79" \ldots 4.33")} \)
- Pressure: \( p_1 = \ldots 42 \text{ bar (609 PSI)} \)
- Temperature: \( t = -40 \degree C \ldots +176 \degree C \)
  \(-40 \degree F \ldots +349 \degree F\)*
- Sliding velocity: \( v_g = 23 \text{ m/s (76 ft/s)} \)
- Axial movement:
  - \( d \leq 40 \text{ mm \pm 1.0 mm} \)
  - \( d > 40 \text{ mm \pm 1.5 mm} \)
- Engineered up to 260 \degree C (500 \degree F) with FFKM (K) secondary seals

**Materials**
- Seal rings: Blister resistant carbon, Silicon carbide SSIC (Q1), RBSiC (Q2)
- Mating rings: Silicon carbide SSIC (Q1), RBSiC (Q2)
- Secondary seals: EPDM (E), NBR (P), FKM (V), FFKM (K)
- Springs: Hastelloy® C-276 (M5)
- Metal parts: CrNiMo steel 316 (G) or equivalent, optional materials on request.

**Recommended piping plans**
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Between seals: 53A, 53B, 53C, 54
- Atmospheric side: 61, 62, 65A, 65B

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**Diagram**

**Item**
- 1.1.1, 1.2.1 Seal ring
- 1.1.2, 1.2.2 Driver
- 1.1.3, 1.2.3 Thrust ring
- 1.1.4, 1.2.4, 2.1.4, 2.3 O-Ring
- 1.1.5, 2.1.5 Spring
- 1.1.6, 1.2, 12 Set screw
- 1.2, 2.2 Mating ring
- 3 Seal sleeve
- 4 Gland plate
- 5 Key
- 6 Adapter ring
- 7 Throttle ring
- 8 Adaptor
- 9 Setting device
- 10 Hexagon bolt
- 11 Set ring
- 1.1.1, 2.1.1 F Flush
- 1.1.2, 2.1.2 LBO Liquid barrier OUT
- 1.1.3, 2.1.3 LBI Liquid barrier IN
- 1.1.4, 1.3, 2.1.4, 2.3 Q Quench
- 1.1.5, 2.1.5 D Drain
**Features**

- API 682 Category 2 and 3, Type A, Arrangement 3 seal
- Dual seal in face-to-back arrangement
- Same seal size on inboard and outboard seal
- Balanced
- Cartridge unit
- Rotating multiple springs
- Solid seal faces

**Advantages**

- Compact design
- Low heat generation and power consumption due to narrow seal face width
- Longer seal life
- Pressure-balanced design prevents mating ring being forced out under reverse pressure
- No damage to shaft sleeve as dynamic O-Ring is not in direct contact with the sleeve

**Recommended applications**

- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Highly volatile hydrocarbons
- LPG plants
- API 610/ISO 13709 pumps
- Process pumps

**Operating range (see note on page 3)**

- Shaft diameter: d1 = 20 ... 110 mm (0.79" ... 4.33")
- Pressure: p = vacuum ... 42 bar ... (609 PSI)
- Temperature: t = –40 °C ... +176 °C (~40 °F ... +349 °F)*
- Sliding velocity: vg = 23 m/s (... 75 ft/s)
- * Engineered up to 260 °C (500 °F) with FFKM (K) secondary seals

**Materials**

- Seal rings: Blister resistant carbon, Silicon carbide SSiC (Q1), RBSiC (Q2)
- Mating rings: Silicon carbide SSiC (Q1), RBSiC (Q2)
- Secondary seals: FKM (V), FFKM (K), EPDM (E), NBR (P)
- Springs: Hastelloy® C-276 (M5)
- Metal parts: CrNiMo steel 316 (G), Duplex (G1)

**Recommended piping plans**

- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Between seals: 53A, 53B, 53C, 54
- Atmospheric side*: 61, 62, 65A, 65B
- * Throttle bushing on request.
**Features**
- API 682 Category 2 and 3, Type A, Arrangement 3 seal
- Dual seal in face-to-back arrangement
- Same size of inboard and outboard seal
- Balanced
- Cartridge unit
- Stationary multiple springs
- Solid seal faces

**Advantages**
- Suitable for higher speeds
- Good followability due to no influence from run-out, squareness or vibration of the shaft
- Compact design
- Low heat generation and power consumption due to narrow seal face width
- Longer seal life
- Pressure-balanced design prevents mating ring being forced out under reverse pressure
- No damage to shaft sleeve as dynamic O-Ring is not in direct contact with the sleeve

**Materials**
- Seal rings: Blister resistant carbon, Silicon carbide SSiC (Q1), RBSiC (Q2)
- Mating rings: Silicon carbide SSiC (Q1), RBSiC (Q2)
- Secondary seals: FKM (V), FFKM (K), EPDM (E), NBR (P)
- Springs: Hastelloy® C-276 (M5)
- Metal parts: CrNiMo steel 316 (G)

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Highly volatile hydrocarbons
- LPG plants
- API 610/ISO 13709 pumps
- Process pumps

**Operating range (see note on page 3)**
- Shaft diameter: \( d_1 = 20 \ldots 110 \text{ mm (0.79" \ldots 4.33")} \)
- Pressure: \( p = 60 \text{ bar (870 PSI)} \)
- Temperature: \(-40 \degree \text{C \ldots +176 \degree \text{C (-40 \degree F \ldots +349 \degree F)} \)\)
- Sliding velocity: \( v_g = 50 \text{ m/s (164 ft/s)} \)
- * Engineered up to 260 \degree \text{C (500 \degree F)} with FFKM (K) secondary seals

**Recommended piping plans**
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
  - Between seals: 53A, 53B, 53C, 54
  - Atmospheric side: 61, 62, 65A, 65B
  - * Throttle bushing on request

**Materials**
- Seal ring: 1.1.1, 2.1.1, 1.1.2, 1.3, 2.1.2, 2.3, 2.6, 3, 9, 14
- O-Ring: 1.1.2, 1.3, 2.1.1, 2.3, 2.6, 3, 9, 14
- Spring: 1.1.3, 2.1.3, 1.2, 2.2
- Mating ring: 2.4
- Collar: 2.5, 16
- Drive screw: 2.7, 18, 19
- Gland plate: 2.7, 18, 19
- Pin: 2.7, 18, 19
- Flow distributor: 2.7, 18, 19
- Retaining ring: 2.7, 18, 19
- Hexagon bolt: 2.7, 18, 19
- Seal sleeve: 2.7, 18, 19
- Drive collar: 2.7, 18, 19
- Setting device: 2.7, 18, 19
- HSH Cap screw: 2.7, 18, 19
- Flush: LBO
- Liquid barrier OUT: LBI

**Item** | Description
--- | ---
11.1.1, 2.1.1 | Seal ring
1.1.2, 1.3, 2.1.2, 2.3, 2.6, 3, 9, 14 | O-Ring
1.1.3, 2.1.3 | Spring
1.2, 2.2 | Mating ring
2.4 | Collar
2.5, 16 | Drive screw
2.7, 18, 19 | Gland plate
2.7, 18, 19 | Pin
2.7, 18, 19 | Flow distributor
2.7, 18, 19 | Retaining ring
2.7, 18, 19 | Hexagon bolt
2.7, 18, 19 | Seal sleeve
2.7, 18, 19 | Drive collar
2.7, 18, 19 | Setting device
2.7, 18, 19 | HSH Cap screw
LBO | Flush
LBI | Liquid barrier IN
**Features**
- API 682 Category 2 and 3, Type B, Arrangement 3 seal
- Dual seal in face-to-back arrangement
- Same seal size of inboard and outboard seal
- Balanced
- Cartridge unit
- Rotating metal bellows
- Shrink fitted seal rings and solid mating rings
- Bellows design allows use of balanced seal with plain sleeve
- Absence of dynamic O-Ring eliminates/reduces seal face hang-up
- Bellows design minimizes variation in face load due to shaft expansion or face wear
- Resistant to abrasive particles in the medium, no shaft or sleeve fretting
- Low heat generation and power consumption due to narrow seal face width
- Longer seal life

**Advantages**
- Compact design
- Bellows design allows use of balanced seal with plain sleeve
- Absence of dynamic O-Ring eliminates/reduces seal face hang-up
- Bellows design minimizes variation in face load due to shaft expansion or face wear
- Resistant to abrasive particles in the medium, no shaft or sleeve fretting
- Low heat generation and power consumption due to narrow seal face width
- Longer seal life

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- LPG plants
- API 610/ISO 13709 pumps
- Process pumps

**Materials**
- Seal rings: Blister resistant carbon
- Mating rings: Silicon carbide SSiC (Q1), RBSiC (Q2)
- Bellows: Hastelloy® C-276 (M5), option: Inconel® 718 (M6)
- Secondary seals: FKM (V), FFKM (K), EPDM (E), NBR (P)
- Metal parts: CrNiMo steel 316 (G), Hastelloy® C-276 (M5)

**Recommended piping plans**
- Process side: 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Between seals: 53A, 53B, 53C, 54
- Atmospheric side*: 61, 62, 65A, 65B

**Operating range (see note on page 3)**
- Shaft diameter: \(d_1 = 20 \ldots 110 \text{ mm (0.79” \ldots 4.33“)}\)
- Pressure: \(p = \text{vacuum} \ldots 20 \text{ bar (290 PSI)}\)
- Temperature: \(t = -40 \degree \text{ C} \ldots +200 \degree \text{ C} (-40 \degree \text{ F} \ldots +392 \degree \text{ F})\)
- Sliding velocity: \(v_g \leq 23 \text{ m/s (75 ft/s)}\)

**Item**
- Seal ring with bellows unit
- O-Ring
- Set screw
- Mating ring
- Seal sleeve
- Pumping ring
- Gland plate
- Retaining ring
- Drive collar
- Setting device
- HSH Cap screw

**Description**
- Seal ring with bellows unit
- O-Ring
- Set screw
- Mating ring
- Seal sleeve
- Pumping ring
- Gland plate
- Retaining ring
- Drive collar
- Setting device
- HSH Cap screw

*Throttle bushing on request*
Features
- API 682 Category 2 and 3, Type C, Arrangement 3 seal
- Dual seal in face-to-back arrangement
- Balanced
- Cartridge unit
- Rotating metal bellows
- Shrink fitted seal rings and solid mating rings

Advantages
- Compact design
- Suited for applications with extreme high and low temperatures
- Absence of dynamic O-Ring eliminates/reduces seal face hang-up
- Bellows design minimizes variation in face load due to shaft expansion or face wear
- Resistant to abrasive particles in the medium, no shaft or sleeve fretting
- Also available in double ply design

Recommended applications
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- LPG plants
- API 610/ISO 13709 pumps
- Process pumps

Operating range (see note on page 3)
- Shaft diameter: \( d_1 = 20 \ldots 110 \text{ mm} (0.79" \ldots 4.33") \)
- Pressure single ply bellows:
  \( p = \text{vacuum} \ldots 25 \text{ bar} (\ldots 363 \text{ PSI}) \)
- Pressure double ply bellows:
  \( p = \text{vacuum} \ldots 35 \text{ bar} (\ldots 508 \text{ PSI}) \)
- Temperature: \( t = -75 \degree C \ldots +400 \degree C \)
  (-103 \degree F \ldots +752 \degree F)
- Sliding velocity: \( v_g \ldots 23 \text{ m/s} (\ldots 75 \text{ ft/s}) \)
  \( * \ p > 20 \text{ bar} (290 \text{ PSI}) \) on request

Materials
- Seal rings: Blister resistant carbon, Silicon carbide SSiC (Q1), RBSiC (Q2)
- Mating rings: Silicon carbide SSiC (Q1), RBSiC (Q2)
- Bellows: Inconel® 718 (M6)
- Secondary seals: Graphite (G)
- Metal parts: CrNiMo steel 316 (G), Carpenter® 42 (T4)

Recommended piping plans
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Between seals: 53A, 53B, 53C, 54
- Atmospheric side*:
  - 61, 62, 65A, 65B
  \( * \) Throttle bushing on request

Item  Description
1, 14  Seal ring with bellows unit
2, 21, 25  Graphite ring
3  Collar
4, 17  Spring washer
5, 18, 23  HSH Cap screw
6, 19, 29  Set screw
7, 20  Mating ring
9  Clamp sleeve
11, 22  Gland plate
12  Gasket
16  Pumping ring
24  Seal sleeve
26  Drive collar
27  Pin
28  Clamping sleeve
30, 32  Hexagon belt
31  Setting device
32  Guiding sleeve

Option
- LBO  Liquid barrier OUT
- LBI  Liquid barrier IN
Features
- API 682 Category 2 and 3, Type C, Arrangement 3 seal
- Dual seal in face-to-back arrangement
- Balanced
- Cartridge unit
- Stationary metal bellows
- Shrink fitted seal rings and solid mating rings

Advantages
- Suitable for higher speeds
- Good followability due to no influence from run-out, squareness or vibration of the shaft
- Compact design
- Low heat generation and power consumption due to narrow seal face width
- Longer seal life
- Also available in double ply design
- Suited for applications with extreme high and low temperatures
- Absence of dynamic O-Ring eliminates/reduces seal face hang-up
- Bellows design minimizes variation in face load due to shaft expansion or face wear
- Resistant to abrasive particles in the medium, no shaft or sleeve fretting

Recommended applications
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- LPG plants
- API 610/ISO 13709 pumps
- Process pumps

Operating range (see note on page 3)
- Shaft diameter: d1 = 20 … 110 mm (0.79" … 4.33")
- Pressure single ply bellows:
  - p = vacuum … 20 bar (… 290 PSI)
- Pressure double ply bellows:
  - p = vacuum … 35 bar (… 508 PSI)
- Temperature: t = −200 °C … +400 °C
  (-328 °F … +752 °F)
- Sliding velocity: vg … 50 m/s (… 164 ft/s)

Materials
- Seal rings: Blister resistant carbon, Silicon carbide SSIC (Q1), RBSiC (Q2)
- Mating rings: Silicon carbide SSIC (Q1), RBSiC (Q2)
- Bellows: Inconel® 718 (M6)
- Secondary seals: Graphite (G)
- Metal parts: CrNiMo steel 316 (G), Carpenter® 42 (T4)

Recommended piping plans
- Process side: 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Between seals: 53A, 53B, 53C, 54
- Atmospheric side*: 61, 62, 65A, 65B
- * Throttle bushing on request

Item | Description
--- | ---
1.1 | Seal ring with bellows unit
1.2 | Gasket
1.3, 10, 11 | Spring washer
1.4, 11 | HSH Cap screw
2 | Mating ring
3, 5, 13, 14 | Graphite ring
4 | Retainer
6 | Retaining ring
7 | Thrust ring
8 | Split ring
9 | Drive ring
15, 17 | Gland plate
12 | Seal sleeve with pumping ring
20, 27 | Hexagon bolt
22 | Drive collar
24 | Clamp sleeve
25 | Set screw
28 | Setting device
F | Flush
LBO | Liquid barrier OUT
LBI | Liquid barrier IN
**Features**

Heat exchangers of the WEF6000-A4 range are used to cool process/barrier fluids in seal supply circuits. WEF6000-A4 heat exchangers are fully compliant with API 682 4th edition regulations. The process/barrier medium is directed through the tube, and the cooling medium is directed through the shell.

Venting and draining of the process/barrier medium side as well as the cooling water side is ensured. In addition, the heat exchangers can also be combined with a temperature instrument in the supply line to the mechanical seal (optional in accordance with API 682 4th edition).

**Advantages**

- Operating limits up to 45 bar/260 °C (653 PSI/500 °F) (tube side): suitable for a wide range of demanding operating conditions.
- Cooling water side and process side can be completely vented and drained.
- Seamless pipes on process side
- Special design without welding inside the cooler
- Higher cooling water velocity due to innovative cooler design
- Stainless steel 316L: high resistance to corrosive media

**Recommended applications**

- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Notes**

Design and production in accordance with EU Pressure Equipment Directive PED 97/23 EC.

Cleaning: Process/barrier medium side and cooling water side: flush with a suitable solvent.

**Product variants**

<table>
<thead>
<tr>
<th>Designation</th>
<th>WEF6100-A4</th>
<th>WEF6100-A4</th>
<th>WEF6000-A4</th>
<th>WEF6000-A4</th>
</tr>
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<tbody>
<tr>
<td>Type of heat exchanger</td>
<td>ASME</td>
<td>PED</td>
<td>ASME</td>
<td>PED</td>
</tr>
<tr>
<td>DRAIN/VENT CONNECTION</td>
<td>NPT 1/2&quot;</td>
<td>NPT 1/2&quot;</td>
<td>NPT 1/2&quot;</td>
<td>NPT 1/2&quot;</td>
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<tr>
<td>Allowable pressure</td>
<td>45 bar (653 PSI)</td>
<td>45 bar (653 PSI)</td>
<td>45 bar (653 PSI)</td>
<td>45 bar (653 PSI)</td>
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<td>Allowable temperature cooling water side (shell side)</td>
<td>-29 °C ... +150 °C</td>
<td>-29 °C ... +150 °C</td>
<td>-29 °C ... +150 °C</td>
<td>-29 °C ... +150 °C</td>
</tr>
<tr>
<td>Allowable temperature process/ barrier medium side (tube side)</td>
<td>-29 °C ... +260 °C</td>
<td>-29 °C ... +260 °C</td>
<td>-29 °C ... +260 °C</td>
<td>-29 °C ... +260 °C</td>
</tr>
<tr>
<td>Cooling capacity (kW)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<tr>
<td>Required cooling water quantity (m³/h)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
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<tr>
<td>Metal parts</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
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</tbody>
</table>

Other versions on request.

1) Design data, permissible working values depend on the actual conditions of service.
2) Guidelines with buffer/barrier fluid water 60 °C (140 °F) – cooling water 20 °C (68 °F).
3) Guidelines with buffer/barrier fluid oil 60 °C (140 °F) – cooling water 20 °C (68 °F).
Features

Heat exchangers of the WEL6000-A4 range (shown here: WEL6002-A4) are used to cool process/barrier fluids in seal supply circuits. The heat exchangers are made of helical, laserwelded finned tubes. The cooling medium is ambient air. It is important, therefore, for WEL heat exchangers to be installed in well ventilated places indoors or, ideally, outdoors. There is a choice of three different basic versions of the WEL6000-A4 range as well as supplied fully assembled together with valves, base frame and other system components.

Advantages

- Operating limits up to 44 bar/260 °C (638 PSI/500 °F) (tube side): suitable for a wide range of demanding operating conditions.
- Can be completely vented and drained
- Seamless pipes
- Stainless steel 316L: high resistance to corrosive media

Recommended applications

- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

Notes

Design and production in accordance with EU Pressure Equipment Directive PED 97/23 EC.
Equipment Directive PED 97/23 EC.
Design, calculation and production acc. to ASME VIII, Div. 1 (cooler not subject to ASME stamp requirements, piping <6")

Product variants

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type of heat exchanger</th>
<th>Number of finned tubes</th>
<th>Connections</th>
<th>Drain/vent connection</th>
<th>Allowable pressure</th>
<th>Allowable temperature process/barrier medium side (tube side)</th>
<th>Cooling capacity (kW)</th>
<th>Cooling capacity (kW)</th>
<th>Volume (liters)</th>
<th>Metal parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEL6001-A4A001-D0</td>
<td>ASME PED</td>
<td>1</td>
<td>Flange 3/4&quot;, 600 lbs</td>
<td>Flange 1/2&quot;, 600 lbs</td>
<td>44 bar (638 PSI)</td>
<td>-30 °C… +260 °C</td>
<td>1.5</td>
<td>2</td>
<td>1.2</td>
<td>316L</td>
</tr>
<tr>
<td>WEL6002-A4A001-D0</td>
<td>ASME PED</td>
<td>2</td>
<td>Flange 3/4&quot;, 600 lbs</td>
<td>Flange 1/2&quot;, 600 lbs</td>
<td>44 bar (638 PSI)</td>
<td>-30 °C… +260 °C</td>
<td>2</td>
<td>1.5</td>
<td>2.4</td>
<td>316L</td>
</tr>
<tr>
<td>WEL6003-A4A001-D0</td>
<td>ASME PED</td>
<td>2</td>
<td>Flange 3/4&quot;, 600 lbs</td>
<td>Flange 1/2&quot;, 600 lbs</td>
<td>44 bar (638 PSI)</td>
<td>-30 °C… +260 °C</td>
<td>3</td>
<td>2</td>
<td>4.8</td>
<td>316L</td>
</tr>
</tbody>
</table>

Other versions on request.

1) Design data, permissible working values depend on the actual conditions of service.
2) Guidelines with buffer/barrier fluid water 60 °C (140 °F) – ambient temperature 20 °C (68 °F); moved air at min. 0.7 m/s (2.3 ft/s); product flow rate 8 l/min.
3) Guidelines with buffer/barrier fluid oil 60 °C (140 °F) – ambient temperature 20 °C (68 °F); moved air at min. 0.7 m/s (2.3 ft/s); product flow rate 8 l/min.
4) Version with screwed connection G1/2" available as an option.
**Features**
The ZY6000-A4 range is available in three versions:

- **ZYA6000-A4:** Cyclone separator for high flow rates and high pressures.
- **ZYB6000-A4:** Cyclone separator for high flow rates and high pressures; 100 % X-ray capability.
- **ZYC6000-A4:** Cast version, block-type design with integral flanges.

**Advantages**
- Contamination is automatically conveyed to the suction nozzle of the pump: maintenance-free mode of operation for guaranteed reliability
- High filtration efficiency
- Wide range of products for the optimum solution for every application
- ZYA6000-A4 and ZYB6000-A4: available for operating pressures of up to 200 bar (2,900 PSI)
- ZYC6000-A4 in block-type design with integrated flange connections: low space requirements because of compact design

**Functional description**
Cyclone separators of the ZY6000-A4 range are used to clean mainly aqueous liquids containing contamination such as dirt and solids (e.g., in circulation systems of sewage, sludge or pipeline pumps).

The best possible filtration efficiency is achieved when the specific weight of the solids is much higher than that of the carrier liquid and when the differential pressure is as large as possible within the permissible pressure range (min. 1.7 bar (24.7 PSI) in accordance with API 682). The viscosity of the medium is a factor that also needs to be taken into account.

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Product variants**

<table>
<thead>
<tr>
<th>Designation</th>
<th>ZYA6000</th>
<th>ZYB6000</th>
<th>ZYC6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Standard</td>
<td>100 % X-ray capability</td>
<td>Cast version</td>
</tr>
<tr>
<td>Allowable pressure</td>
<td>60 bar (870 PSI)</td>
<td>60 bar (870 PSI)</td>
<td>60 bar (870 PSI)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-29 °C ... +150 °C</td>
<td>-29 °C ... +150 °C</td>
<td>-29 °C ... +150 °C</td>
</tr>
<tr>
<td>O-Ring</td>
<td>Viton®</td>
<td>Viton®</td>
<td>Viton®</td>
</tr>
<tr>
<td>Wetted parts</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
</tr>
</tbody>
</table>

Other versions on request.

1) Max. permissible working values depend on version.

Other materials on request, e.g. FKM, EPDM.
**Features**

The EagleBurgmann flush unit of the SPX6000-A4 range consists of a manifold with integrated inline filter supplied together with a needle valve and pressure gauge. Optional available with temperature gauge and/or flow indicator. The unit is used to control the flushing of a mechanical seal.

**Advantages**

- Compact design due to integral filter
- Modular concept – optimal monitoring equipment available

**Recommended applications**

- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Functional description**

The SPX6000-A4 flush unit continuously supplies flushing media from an external source to the mechanical seal. This plan is almost always used in combination with a throat bushing which serve as a throttle device to maintain a higher pressure in the stuffing box to isolate the pumped product from the seal chamber.

**Item** | **Description**
--- | ---
1 | Pressure indicator
2 | Needle valve
3 | Integral filter
4 | Valve
A | From external source
B | To mechanical seal

**Product variants**

<table>
<thead>
<tr>
<th>Designation</th>
<th>SPX6000-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowable pressure</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature</td>
<td>-20 °C ... +120 °C (-4 °F ... +248 °F)</td>
</tr>
<tr>
<td>Process connections</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>Metal parts</td>
<td>316L</td>
</tr>
</tbody>
</table>

Other versions on request.

© EagleBurgmann
The EagleBurgmann barrier/buffer fluid systems of the TSA6000-A4 range meet all the requirements to supply mechanical seals in accordance with the API682 4th edition guidelines. The vessels are equipped with all essential connections for fitting additional components. The range is available in two standard vessel sizes with dished heads, and a bottom-flanged version which can be dismantled (TSB6000-A4) is also available. The modular system allows the TSA6000-A4 vessels to be combined with a wide range of system components such as level transmitter, pressure transmitter, base frame, etc.

**Advantages**
- Operating limits up to 44 bar/260 °C (638 PSI/500 °F): suitable for a wide range of demanding operating conditions
- Robust design with weld-pad type sightglass for optimum visual level monitoring
- Modular system: combination possible with a wide range of system components

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Notes**
Design and production available in accordance with EU Pressure Equipment Directive PED 97/23 EC. Design, calculation and production available acc. to ASME VIII, Div. 1. 3rd party inspection, ASME stamp on request.

**Functional description**
The TS system performs all the basic functions of a barrier/buffer system for the operation of dual seals:
- To pressurize the barrier/buffer chamber
- Leakage compensation
- Barrier/buffer fluid is circulated by thermosiphon effect or forced circulation system
- To cool the seal
- To selectively absorb product leakage and prevent dry running (tandem arrangement)

Use compressed air or nitrogen for pressurization; pressurization is monitored by a pressure transmitter (default). The incorporated level transmitter issues a signal whenever the level of barrier/buffer fluid is too low.

**Installation**
P&ID for TSA6000-A4, Plan 53A
A From mechanical seal
B To mechanical seal
C Filling connection
D Cooling water IN
E Cooling water OUT
F Drain
G N2 IN

© EagleBurgmann

Plan 53A

TSA6 Barrier/Buffer fluid system
<table>
<thead>
<tr>
<th>Designation</th>
<th>TSA6000-A4</th>
<th>TSA6001-A4</th>
<th>TSA6002-A4</th>
<th>TSA6003-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Equipment Directive</td>
<td>ASME</td>
<td>PED</td>
<td>ASME</td>
<td>PED</td>
</tr>
<tr>
<td>For shaft diameters ≤60 mm (acc. to API 682)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>For shaft diameters &gt;60 mm (acc. to API 682)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Integrated cooling coil</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Volume, vessel (liters)</td>
<td>15</td>
<td>15</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Volume, tube (liters)</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Allowable pressure – shell ¹</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable pressure – tube ³</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature – vessel ¹</td>
<td>-29 °C … +260 °C</td>
<td>-29 °C … +260 °C</td>
<td>-29 °C … +260 °C</td>
<td>-29 °C … +260 °C</td>
</tr>
<tr>
<td>Allowable temperature – system ¹</td>
<td>-29 °C … +260 °C</td>
<td>-29 °C … +260 °C</td>
<td>-29 °C … +260 °C</td>
<td>-29 °C … +260 °C</td>
</tr>
<tr>
<td>Liquid volume at NLL – Normal Liquid Level (liters)</td>
<td>12</td>
<td>12</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Working volume MAX-MIN (liters)</td>
<td>4</td>
<td>4</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Cooling capacity – without cooling water (kW) ³</td>
<td>0.75</td>
<td>0.75</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cooling capacity – natural circulation (kW) ³</td>
<td>1.9</td>
<td>1.9</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Cooling capacity – forced circulation (kW) ³</td>
<td>5</td>
<td>5</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Required cooling water quantity (m³/h)</td>
<td>0.4</td>
<td>0.4</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Metal parts</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
</tr>
<tr>
<td>Sight-glass</td>
<td>Borosilicate</td>
<td>Borosilicate</td>
<td>Borosilicate</td>
<td>Borosilicate</td>
</tr>
<tr>
<td>Gaskets</td>
<td>PTFE</td>
<td>PTFE</td>
<td>PTFE</td>
<td>PTFE</td>
</tr>
<tr>
<td>Net weight (approx.)</td>
<td>68 kg (150 lbs)</td>
<td>68 kg (150 lbs)</td>
<td>75 kg (165 lbs)</td>
<td>75 kg (165 lbs)</td>
</tr>
</tbody>
</table>

Other versions on request:

¹ Design data, permissible working values depend on the actual conditions of service.
² Guidelines with barrier/buffer fluid water 60 °C (140 °F) – cooling water 20 °C (68 °F).
³ Guidelines with barrier/buffer fluid water 60 °C (140 °F) – ambient temperature 20 °C (68 °F) (valid for thermosiphon systems without cooling water with natural circulation resp. forced circulation).
Features
The EagleBurgmann barrier/buffer fluid systems of the TSB6000-A4 range meet all the requirements to supply mechanical seals in accordance with the API 682 4th edition guidelines. The vessels are equipped with all essential connections for fitting additional components. TSB6 bottom-flanged vessels are available in two standard sizes. A version with dished heads (TSA6000-A4) is also available. The modular system allows the TSB6000-A4 vessels to be combined with a wide range of system components such as level transmitter, pressure transmitter, base frame, etc.

Advantages
- Operating limits up to 44 bar/260 °C (638 PSI/500 °F): suitable for a wide range of demanding operating conditions
- Robust design with weld-pad type sightglass for optimum visual level monitoring
- Modular system: combination possible with a wide range of system components

Recommended applications
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

Notes
Design and production available in accordance with EU Pressure Equipment Directive PED 97/23 EC. Design, calculation and production available acc. to ASME VIII, Div. 1. 3rd party inspection, ASME stamp on request.

Functional description
The TS system performs all the basic functions of a barrier/buffer system for the operation of dual seals:

- To pressurize the barrier/buffer chamber
- Leakage compensation
- Barrier/buffer fluid is circulated by thermosiphon effect or forced circulation system
- To cool the seal
- To selectively absorb product leakage and prevent dry running (tandem arrangement)

Use compressed air or nitrogen for pressurization; pressurization is monitored by a pressure transmitter (default). The incorporated level transmitter issues a signal whenever the level of barrier/buffer fluid is too low.

Installation
P&ID for TSB6000-A4, Plan 53A
A From mechanical seal
B To mechanical seal
C Filling connection
D Cooling water IN
E Cooling water OUT
F Drain
G N2 IN
<table>
<thead>
<tr>
<th>Product variants</th>
<th>TSB0000-A4</th>
<th>TSB0001-A4</th>
<th>TSB0002-A4</th>
<th>TSB0003-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Equipment Directive</td>
<td>ASME</td>
<td>PED</td>
<td>ASME</td>
<td>PED</td>
</tr>
<tr>
<td>For shaft diameters ≤60 mm (acc. to API 682)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For shaft diameters &gt;60 mm (acc. to API 682)</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Integrated cooling coil</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Volume, vessel (litters)</td>
<td>15</td>
<td>15</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Volume, tube (litters)</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Allowable pressure – shell(^1)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable pressure – tube(^1)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature – vessel(^1)</td>
<td>–29 °C ... +260 °C</td>
<td>–29 °C ... +260 °C</td>
<td>–29 °C ... +260 °C</td>
<td>–29 °C ... +260 °C</td>
</tr>
<tr>
<td></td>
<td>(–20 °F ... +500 °F)</td>
<td>(–20 °F ... +500 °F)</td>
<td>(–20 °F ... +500 °F)</td>
<td>(–20 °F ... +500 °F)</td>
</tr>
<tr>
<td>Allowable temperature – system(^1)</td>
<td>–29 °C ... +260 °C</td>
<td>–29 °C ... +260 °C</td>
<td>–29 °C ... +260 °C</td>
<td>–29 °C ... +260 °C</td>
</tr>
<tr>
<td></td>
<td>(–20 °F ... +500 °F)</td>
<td>(–20 °F ... +500 °F)</td>
<td>(–20 °F ... +500 °F)</td>
<td>(–20 °F ... +500 °F)</td>
</tr>
<tr>
<td>Liquid volume at NLL – Normal Liquid Level (litters)</td>
<td>12</td>
<td>12</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Working volume MAX-MIN (litters)</td>
<td>4</td>
<td>4</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Cooling capacity – without cooling water (kW)(^2)</td>
<td>0.75</td>
<td>0.75</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cooling capacity – natural circulation (kW)(^2)</td>
<td>1.9</td>
<td>1.9</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Cooling capacity – forced circulation (kW)(^2)</td>
<td>5</td>
<td>5</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Required cooling water quantity (m³/h)</td>
<td>0.4</td>
<td>0.4</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Metal parts</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
</tr>
<tr>
<td>Sight-glass</td>
<td>Borosilicate</td>
<td>Borosilicate</td>
<td>Borosilicate</td>
<td>Borosilicate</td>
</tr>
<tr>
<td>Gaskets</td>
<td>PTFE</td>
<td>PTFE</td>
<td>PTFE</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

Other versions on request.

\(^1\) Design data, permissible working values depend on the actual conditions of service.

\(^2\) Guidelines with barrier/buffer fluid water 60 °C (140 °F) – cooling water 20 °C (68 °F).

\(^3\) Guidelines with barrier/buffer fluid water 60 °C (140 °F) – ambient temperature 20 °C (68 °F) (valid for thermosiphon systems without cooling water with natural circulation resp. forced circulation).
**Features**
Pressurized barrier system (closed circuit) for use in seal systems with high pressures and/or for hazardous/ environmentally harmful processes. The SPB6000-A4 (Plan 53B) range is available with a pressure accumulator, cooler (finned tube, water or air cooler with fan) and a wide range of instruments. A refilling unit must be provided.

**Advantages**
- Pressurization occurs by means of a pre-loaded bladder accumulator
- Membranes in the accumulator separate the nitrogen from the barrier medium: nitrogen cannot get into the barrier medium or process medium
- Barrier pressure is created without any need for connection to a nitrogen supply
- Available with finned tube, water or air coolers with fan
- Modular system: combination possible with a wide range of system components/instruments

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Functional description**
The SPB6000-A4 is designed to perform the following functions of a barrier system:
- To pressurize the buffer chamber
- Leakage compensation
- To cool the seal

Pressurization (> process pressure) prevents the process medium from getting into the barrier circuit or the atmosphere. Pressurization is supplied by a pressure accumulator which is pre-loaded with nitrogen. Circulation in the barrier circuit occurs via the thermostiphon principle or by forced circulation, e.g., with a pumping screw.

**Notes**
Design and production available in accordance with EU Pressure Equipment Directive PED 97/23 EC. Design, calculation and production available acc. to ASME VIII, Div. 1. 3rd party inspection, ASME stamp on request.
Installation

P&ID for SPB6000-A4
Barrier fluid system with bladder accumulator
A From mechanical seal
B To mechanical seal
C Fill
F Drain
G Vent
H N₂ Precharge

Product variants

<table>
<thead>
<tr>
<th>Designation</th>
<th>SPB6000-A4</th>
<th>SPB6001-A4</th>
<th>SPB6002-A4</th>
<th>SPB6003-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Equipment Directive</td>
<td>ASME</td>
<td>PED</td>
<td>ASME</td>
<td>PED</td>
</tr>
<tr>
<td>Type of heat exchanger</td>
<td>Air cooler¹</td>
<td>Water cooler²</td>
<td>Air cooler¹</td>
<td>Water cooler²</td>
</tr>
<tr>
<td>For shaft diameters ≤ 60 mm (acc. to API 682)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>For shaft diameters &gt; 60 mm (acc. to API 682)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bladder accumulator (l)</td>
<td>20</td>
<td>20</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Allowable pressure¹</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature bladder accumulator¹</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
</tr>
<tr>
<td>Allowable temperature system¹</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C ... +90 °C (-4 °F ... +194 °F)</td>
</tr>
<tr>
<td>Cooling capacity – with water cooled heat exchanger (kW)²</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Cooling capacity – with water cooled heat exchanger (kW)³</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cooling capacity – with air cooled heat exchanger (kW)⁴</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Required cooling water quantity (m³/h)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Metal parts</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
</tr>
<tr>
<td>Accumulator</td>
<td>CrMo steel</td>
<td>CrMo steel</td>
<td>CrMo steel</td>
<td>CrMo steel</td>
</tr>
<tr>
<td>Bladder</td>
<td>Nitrile</td>
<td>Nitrile</td>
<td>Nitrile</td>
<td>Nitrile</td>
</tr>
</tbody>
</table>

Other versions on request.

¹ Design data, permissible working values depend on the actual conditions of service.
² Guidelines with barrier fluid water 60 °C (140 °F) – cooling water 20 °C (68 °F).
³ Guidelines with barrier fluid oil 60 °C (140 °F) – cooling water 20 °C (68 °F).
⁴ Guidelines with barrier fluid water 60 °C (140 °F) – ambient temperature 20 °C (68 °F); moved air at min. 0.7 m/s (2.3 ft/s); product flow rate 8 l/min.
⁵ Guidelines with barrier fluid water 60 °C (140 °F) – ambient temperature 20 °C (68 °F); moved air at min. 0.7 m/s (2.3 ft/s); product flow rate 8 l/min.
⁶ WEL6002-A4
⁷ WEF6000-A4
SPC6 Barrier fluid system with piston accumulator

Features
Pressurized barrier system (closed circuit) for use in seal systems with high pressures and/or for hazardous/environmentally harmful processes. The SPC6000-A4 (Plan 53C) range is available with a pressure booster, cooler (finned tube, water or air cooler with fan) and a wide range of instruments. A refilling unit must be provided.

Advantages
- Pressurization occurs by means of a pressure booster
- Automatic setting of the barrier pressure via reference pressure: simple and reliable mode of operation
- Safe operation even in case of pressure changes
- Barrier pressure is created without any need for connection to a nitrogen supply
- Available with finned tube, water or air coolers with fan
- Modular system: combination possible with a wide range system components/instruments

Recommended applications
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

Functional description
The SPC6000-A4 is designed to perform the following functions of a barrier system:

- To pressurize the buffer chamber
- Leakage compensation
- To cool the seal

Pressurization (> process pressure) prevents the process medium from getting into the barrier circuit or the atmosphere. Circulation in the barrier circuit occurs via the thermostopon principle or by forced circulation, e.g., with a pumping screw.

Notes
3rd party inspection, ASME stamp on request.
### Product variants

<table>
<thead>
<tr>
<th>Designation</th>
<th>SPC6000-A4</th>
<th>SPC6001-A4</th>
<th>SPC6002-A4</th>
<th>SPC6003-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Equipment Directive</td>
<td>ASME</td>
<td>PED</td>
<td>ASME</td>
<td>PED</td>
</tr>
<tr>
<td>Type of heat exchanger</td>
<td>Air cooler</td>
<td>Water cooler</td>
<td>Air cooler</td>
<td>Water cooler</td>
</tr>
<tr>
<td>For shaft diameters ≤ 60 mm (acc. to API 682)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>For shaft diameters &gt; 60 mm (acc. to API 682)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston accumulator (liters)</td>
<td>2.8</td>
<td>2.8</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Allowable pressure</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature piston accumulator</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
</tr>
<tr>
<td>Allowable temperature system</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
<td>-20 °C … +90 °C (-4 °F ... +194 °F)</td>
</tr>
<tr>
<td>Cooling capacity – with water cooled heat exchanger (kW)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Cooling capacity – with air cooled heat exchanger (kW)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Required cooling water quantity (m³/h)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Cooling capacity – with air cooled heat exchanger (kW)</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Cooling capacity – with water cooled heat exchanger (kW)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Metal parts</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
<td>316L</td>
</tr>
</tbody>
</table>

Other versions on request

1) Design data, permissible working values depend on the actual conditions of service.
2) Guidelines with barrier fluid water 60 °C (140 °F) – cooling water 20 °C (68 °F).
3) Guidelines with barrier fluid oil 60 °C (140 °F) – cooling water 20 °C (68 °F).
4) Guidelines with barrier fluid water 60 °C (140 °F) – ambient temperature 20 °C (68 °F); moved air at min. 0.7 m/s (2.3 ft/s); product flow rate 8 l/min.
5) Guidelines with barrier fluid oil 60 °C (140 °F) – ambient temperature 20 °C (68 °F); moved air at min. 0.7 m/s (2.3 ft/s); product flow rate 8 l/min.

a) WEL6002-A4
b) WEF6000-A4
**Features**
The EagleBurgmann leakage control systems of the LSA6000 range in accordance with API Plan 65A consist of a leakage collection tank with integrated orifice and overflow pipe. The level can be monitored with the differential pressure transmitter which is supplied together with a five-way manifold valve.

**Advantages**
- Seal failure detection
- Safe discarding of excessive seal leakage
- To ensure durability, all components are corrosion resistant.

**Recommended applications**
- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Functional description**
In accordance with API Plan 65A, the LSA6000 leakage control system is used to discharge leakage from single seals. The outboard leakage is collected in an external tank; the leakage volume is monitored (level in the tank).

**Installation**
![P&ID for LSA6000-A4 Leakage collection system]

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**Product variants**

<table>
<thead>
<tr>
<th>Designation</th>
<th>LSA6000-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Equipment Directive</td>
<td>PED</td>
</tr>
<tr>
<td>Volume of vessel (liters)</td>
<td>4</td>
</tr>
<tr>
<td>Allowable pressure</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature</td>
<td>-20 °C ... +120 °C (-4 °F ... +248 °F)</td>
</tr>
<tr>
<td>Connection</td>
<td>Flange 3/4&quot;, 600 lbs</td>
</tr>
<tr>
<td>Metal parts</td>
<td>316L</td>
</tr>
</tbody>
</table>

Other versions on request.

1 Design data, permissible working values depend on the actual conditions of service.
In accordance with API Plan 65B, the EagleBurgmann leakage control systems of the LSB6000 range consist of a leakage collection tank with valve and overflow pipe. The level can be monitored with the differential pressure transmitter which is supplied together with a five-way manifold valve.

- Seal failure detection
- Safe discarding of excessive seal leakage
- To ensure durability, all components are corrosion resistant.

In accordance with API Plan 65B, the LSB6000 leakage control system is used to discharge leakage from single seals. The outboard leakage is collected in an external tank; the leakage volume is monitored (level in the tank).


Notes
3rd party inspection, ASME stamp on request.

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**Features**

- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Advantages**

- Refining technology
- Oil and gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology

**Recommended applications**

- Seal failure detection
- Safe discarding of excessive seal leakage
- To ensure durability, all components are corrosion resistant.

**Functional description**

In accordance with API Plan 65B, the LSB6000 leakage control system is used to discharge leakage from single seals. The outboard leakage is collected in an external tank; the leakage volume is monitored (level in the tank).

**Notes**

3rd party inspection, ASME stamp on request.

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**Product variants**

<table>
<thead>
<tr>
<th>Designation</th>
<th>LSB6000-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Equipment Directive</td>
<td>PED</td>
</tr>
<tr>
<td>Volume of vessel (liters)</td>
<td>4</td>
</tr>
<tr>
<td>Allowable pressure(1)</td>
<td>44 bar (638 PSI)</td>
</tr>
</tbody>
</table>
| Allowable temperature(1) | -20 °C ... +120 °C  
(-4 °F ... +248 °F) |
| Connection            | Flange 3/4", 600 lbs |
| Metal parts            | 316L |

Other versions on request.

(1) Design data, permissible working values depend on the actual conditions of service.
Features
The measuring unit of the SPT6000-A4 range is used to visually monitor the operating temperature.

The measuring unit consists of a bi-metallic temperature gauge (NG100) with protective sleeve installed in a measuring block incl. drain connection.

Advantages
• Operating limits up to 45 bar/260 °C (653 PSI/500 °F) (design parameters)
• Temperature indicating range up to 200 °C (392 °F)
• Wetted parts: Stainless steel 316L for high resistance to corrosive media

Recommended applications
• Refining technology
• Oil and gas industry
• Petrochemical industry
• Chemical industry
• Power plant technology

Product variants
<table>
<thead>
<tr>
<th>Designation</th>
<th>SPT6000-A4</th>
<th>SPT6000-A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections – process</td>
<td>Flange 3/4&quot;, 600 lbs</td>
<td>Flange 3/4&quot;, 600 lbs</td>
</tr>
<tr>
<td>Connections – drain</td>
<td>G 1/2&quot;</td>
<td>G 1/2&quot;</td>
</tr>
<tr>
<td>Allowable pressure ¹</td>
<td>45 bar (653 PSI)</td>
<td>45 bar (653 PSI)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 °C ... +120 °C</td>
<td>0 °C ... +200 °C</td>
</tr>
<tr>
<td>(32 °F ... +256 °F)</td>
<td>(+32 °F ... +392 °F)</td>
<td></td>
</tr>
<tr>
<td>Wetted parts</td>
<td>316L</td>
<td>316L</td>
</tr>
</tbody>
</table>

¹ Other versions on request.
² Design data, permissible working values depend on the actual conditions of service.
Our service modules

The modular seal service offered through TotalSealCare is as individual as are the demands of our customers. The range of services spans complete maintenance of all installed seals, through to stock management, as well as engineering, training and electronic data documentation.

Our TotalSealCare services consist of individual modules from which we assemble individualized service packages.

You can benefit from our many years of experience and expertise in all areas of seal technology, and our major store of practical knowledge.

Consulting & engineering

After establishing and analyzing all of the seals in a system, we work out standardization concepts based on the as-is status. The results we are hoping for are to reduce the number of seal types, sizes and materials used, and to improve the key figures of the system. We advise you relating to codes of practice and statutory regulations, and indicate what actions need to be taken.

Maintenance

In the plant or in the service center, qualified fitters and technicians look after all the aspects of seal maintenance: installation, startup, servicing, conversion, overhaul and repair. We record and document functionally relevant data (fault causes, measures for repair, costs). This means it is possible to assess seal operating times and maintenance costs on a continuous basis, thereby defining measures for extending service intervals.

On-site service

Our on-site service includes the components of an overhaul service, conversions and service container. We deploy a service unit directly on your premises: equipped with the basic suite of seals or a stock of seals discussed with you in advance, and staffed by qualified personnel. On-site, our work includes producing the necessary gaskets, ensuring that the documentation is complete and advising our customers on selecting and installing seals. Our range of services is rounded off by complete conversions (e.g. acc. to TA-Luft).

Inventory management

Based on your individual requirements and the applicable quality regulations, we develop a concept for inventory management of complete seals and spare parts. Furthermore, we optimize stocking on site or in the EagleBurgmann service center. In this way, you can reduce your administration overhead and concentrate on your key operations.

Technical analysis & support

A team of seal specialists is responsible for rectifying process malfunctions or “bad actors”. The latest methods such as thermography or data logging are used for diagnosing positions that are critical for the operation of the system and for working out measures to rectify them. In our research and development centers, we perform realistic tests on test rigs or in original pumps. The objective is to extend the MTBF and to increase system serviceability by individual and constructive solutions.

Seminars & training

We offer an extensive range of continuing education programs in seal technology. For service and maintenance personnel, skilled staff and engineers from various branches of industry such as refining, chemicals, power generation, foodstuffs, paper and pharmaceuticals. Our range includes group seminars, individual training and seminars specifically tailored to your requirements. At our premises or at a location of your choice.

Service agreements

We offer our customers specific agreements that can be combined from the six service modules. Whether for individual seal systems, critical process elements, specific system areas or an extensive seal service for complete plants: the modular structure of our service makes it possible to satisfy individual requirements. With our tried-and-tested monitoring instrument, SEPRO, we can also record all data relevant for the seals for documentation and evaluation purposes.
EagleBurgmann is one of the internationally leading companies for industrial sealing technology. Our products are used everywhere where safety and reliability are important: in the oil and gas industry, refining technology, the petrochemical, chemical and pharmaceutical industries, food processing, power, water, mining, pulp & paper, aerospace and many other spheres. Every day, more than 6,000 employees contribute their ideas, solutions and commitment towards ensuring that customers all over the world can rely on our seals. Our modular TotalSealCare service underlines our strong customer orientation and offers tailor-made services for every application.