EagleBurgmann mechanical seals applicable for this configuration

<table>
<thead>
<tr>
<th>Seal type A</th>
<th>Seal type B</th>
<th>Seal type C</th>
</tr>
</thead>
<tbody>
<tr>
<td>(balanced pusher seals)</td>
<td>(Metal bellows seals with O-Rings)</td>
<td>(Metal bellows seals with flexible graphite)</td>
</tr>
<tr>
<td>H75VA4-S</td>
<td>LEK777</td>
<td>SH</td>
</tr>
<tr>
<td>LL9UC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EagleBurgmann seal supply systems and components

**Plans**

- 21 (22), 23: WEF6 Water cooler, WEL6 Air cooler, SPF6 Temperature indicator
- 31: ZVA6 Cyclone separator
- 41: WEF6 Water cooler, WEL6 Air cooler, SPF6 Temperature indicator, ZVA6 Cyclone separator
- 32: SPX6 Flush unit
- 51: GTF6 Quench system
- 65A: LSA6 Leakage collection reservoir
- 65B: LSB6 Leakage collection reservoir
- 66A, 66B: SPF6 Leakage detection system
- 62 (81), 99: Engineered to customer’s specifications

**Engineered Seals**

Beyond API specifications, EagleBurgmann offers a comprehensive range of engineered seals tailored to customer’s specification. Please inquire.

**API piping plans applicable for 1CW-FL configuration**

**Process side**

- **Plan 01**: Integral (internal) recirculation from the pump discharge to the seal chamber.
- **Plan 02**: Dead-ended seal chamber with no recirculation of flushed fluid. Flush connections plugged.
- **Plan 03**: Circulation between the seal chamber and the pump suction by the design of the seal chamber. Flush connections plugged.
- **Plan 21 (22)**: Recirculation from the pump discharge through a flow control orifice and back into the pump suction piping.
- **Plan 22**: Recirculation from a circulation device in the seal chamber through a cooler and back into the seal chamber.
- **Plan 31**: Recirculation from the pump discharge through a flow control orifice delivering the drain fluid to the seal chamber. The solids are delivered to the pump suction line.
- **Plan 32**: Recirculation of clean fluid into the seal chamber from an external source.

**Atmospheric side**

- **Plan 51**: Reservoir providing a dead-ended blanket for fluid to the quench connection of the gland packs. Only recommended for vertical pumps.
- **Plan 62 (K1)**: Quench stream from an external source to the atmospheric side of the seal faces. The quench streams can be low pressure clean, stripping or clean water. (Plan 61: tapped and plugged atmospheric-side connections for purchaser’s use.)
- **Plan 64A**: An orifice plug in the drain part minimizes the seal leakage leaving the seal gland and allows for detection of a seal failure by an alarm of the monitoring pressure transmitter.
- **Plan 65A**: Atmospheric leakage collection and alarm system for condensed leakage. Failures of the seal will be detected by an excessive flow rate into the leakage collection system.
- **Plan 65B**: Atmospheric leakage collection and alarm system for condensed leakage. Failures of the seal will be detected by a cumulative leakage into the system.
- **Plan 66B**: Atmospheric leakage collection and alarm system for condensing leakage. Failures of the seal will be detected by detection of a seal leakage leaving the seal gland and allow for detection of a seal failure by an alarm of the monitoring pressure transmitter.
- **Plan 68**: Engineered piping plan not defined by other existing plans.

**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 serve as guide values only. It should be noted that the extremal values of each operating parameter closely approximate at the same time bounds of test detection. Furthermore, the operating range of each specific product depends on the respective shaft diameter, materials used, mode of operation and further factors. Consequently, depending on the medium to be sealed, a guarantee can only be given in the individual case if the exact conditions of application are known and these are confirmed in a special agreement. When critical conditions of operation are involved, we recommend consulting with our specialist engineers.

The API experts

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 supply systems in centrifugal and rotary pumps.

**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-compliant requirement. Technically mature, practical solutions that provide significantly greater safety and process reliability in refining technology, petrochemicals, oil & gas and chemical industries.

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 serve as guide values only. It should be noted that the extremal values of each operating parameter closely approximate at the same time bounds of test detection. Furthermore, the operating range of each specific product depends on the respective shaft diameter, materials used, mode of operation and further factors. Consequently, depending on the medium to be sealed, a guarantee can only be given in the individual case if the exact conditions of application are known and these are confirmed in a special agreement. When critical conditions of operation are involved, we recommend consulting with our specialist engineers.

Subject to change.
Features
- API 682 Category 2 and 3, Type A, Arrangement 1 seal
- Single seal
- Balanced
- Cartridge unit
- Rotating multiple springs
- Bi-directional design
- Integrated pumping device available

Advantages
- Compact design
- Universally applicable both for retrofits or original equipment
- Efficient stock-keeping due to standardized components
- Extended selection of materials
- 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

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: \( v_g = 23 \text{ m/s (75 ft/s)} \)
- Axial movement:
  - \( d \leq 40 \text{ mm } \pm 1.0 \text{ mm} \)
  - \( d \geq 40 \text{ mm } \pm 1.5 \text{ mm} \)
- *Engineered up to 260 \degree C (500 \degree F) with FFKM (K) secondary seals

Materials
- Seal ring: Blister resistant carbon, Silicon carbide SSiC (Q1), RBSiC (Q2)
- Matting ring: 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, 34
- Atmospheric side:
  - 51, 61, 62, 65A, 65B, 66A, 66B

Item Description
1.1.1 Seal ring
1.1.2 Driver
1.1.3 Thrust ring
1.1.4, 1.3, 3, 6 O-Ring
1.1.5, 8 Spring
1.1.6, 13 Set screw
1.2 Mating ring
2 Seal sleeve
4 Gland plate
5 Flow distributor
7 Throttle ring
9 Disc
10 Setting device
11 Hexagon bolt
12 Set ring
F Flush
Q Quench
D Drain
**Features**
- API 682 Category 2 and 3, Type A, Arrangement 1 seal
- Single seal
- Balanced
- Cartridge unit
- Rotating multiple springs
- Solid seal faces
- 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
- Extended selection of materials
- Metal parts also in special materials available

**Advantages**
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Atmospheric side:
  - 51, 61, 62, 65A, 65B, 66A, 66B

**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: \( d_1 = 20 \ldots 110 \text{ mm (0.79'' \ldots 4.33'')} \)
- Pressure: \( p = \text{vacuum} \ldots 42 \text{ bar (609 PSI)} \)
- Temperature: \( t = -40 \degree \text{ C} \ldots +176 \degree \text{ C} (-40 \degree \text{ F} \ldots +349 \degree \text{ F}) \)
- Sliding velocity: \( v_g \ldots 23 \text{ m/s (75 ft/s)} \)

*Engineered up to 260 \degree \text{ C} (500 \degree \text{ F}) with FFKM (K) secondary seals

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

**Recommended piping plans**
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
- Atmospheric side:
  - 51, 61, 62, 65A, 65B, 66A, 66B

**Item**
- 1.1 Seal ring
- 1.2, 1.6, 3, 4, 6 O-Ring
- 1.3 Spring
- 1.4 Thrust ring
- 1.5 Drive screw
- 1.7 Collar
- 1.8, 12 Set screw
- 2 Mating ring
- 5 Seal sleeve
- 7 Gland plate
- 8 Flow distributor
- 9 Retaining ring
- 10 Throttle bushing
- 11 Drive collar
- 13 Setting device
- 14 HSH Cap screw

**Description**
- Seal ring
- O-Ring
- Spring
- Thrust ring
- Drive screw
- Collar
- Set screw
- Mating ring
- Seal sleeve
- Gland plate
- Flow distributor
- Retaining ring
- Throttle bushing
- Drive collar
- Setting device
- HSH Cap screw

**Item**

**Description**

- Seal ring
- O-Ring
- Spring
- Thrust ring
- Drive screw
- Collar
- Set screw
- Mating ring
- Seal sleeve
- Gland plate
- Flow distributor
- Retaining ring
- Throttle bushing
- Drive collar
- Setting device
- HSH Cap screw
Seal type A

**Features**
- API 682 Category 2 and 3, Type A, Arrangement 1 seal
- Single 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

**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 (product seal): \(p = \text{vacuum} \ldots 60 \text{ bar} \ (\ldots 870 \text{ PSI})\)
- Temperature: \(-40^\circ \text{C} \ldots +176^\circ \text{C} \ (-40^\circ \text{F} \ldots +349^\circ \text{F})^*\)
- Sliding velocity: \(v_g = 50 \text{ m/s} \ (164 \text{ ft/s})\)
- *Engineered up to \(260^\circ \text{C} \ (500^\circ \text{F})\) with FFKM (K) secondary seals

**Materials**
- Seal ring: Blister resistant carbon, Silicon carbide SiSiC (Q1), RBSiC (Q2)
- Mating ring: 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)

**Recommended piping plans**
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
Category 2 and 3 • 1CW-FL

Seal type A

Features
- API 682 Category 2 and 3, Type A, Arrangement 1 seal
- Single seal
- Balanced
- Cartridge unit
- Stationary multiple springs
- Shrink-fitted seal ring
- Solid mating ring

Advantages
- Engineered seal for extended requirements
- Deformation-optimized seal for high pressure and high sliding velocity
- Insensitive to shaft deflections due to stationary design
- Version for extreme applications available

Materials
- Oil and gas industry
- Refining technology
- Chemical industry
- Hot water
- Sour water
- Caustic soda
- Amines
- Crystalizing media
- Crude oil
- Process water
- Crude oil feed pumps
- Injection pumps
- Multiphase pumps

Recommended applications
- Shaft diameter: \( d_1 = 40 \ldots 110 \text{ (250) mm} \)
- Pressure: \( p_1 = 42 \text{ (150) bar (609 (2,175) PSI)} \)
- Temperature: \( t = -40 \text{ °C} \ldots 176 \text{ °C (609 (2,175) °F)} \)
- Sliding velocity: \( v_g = 23 \text{ (60) m/s (76 (197) ft/s)} \)
- Axial movement: ±3.0 mm

Operating range (see note on page 3)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seal ring</td>
</tr>
<tr>
<td>2, 6, 8, 12, 13</td>
<td>D-Ring</td>
</tr>
<tr>
<td>3, 16</td>
<td>Spring</td>
</tr>
<tr>
<td>4</td>
<td>Thrust ring</td>
</tr>
<tr>
<td>5</td>
<td>Mating ring</td>
</tr>
<tr>
<td>7, 10</td>
<td>Set screw</td>
</tr>
<tr>
<td>9</td>
<td>Sleeve</td>
</tr>
<tr>
<td>11</td>
<td>Seal sleeve</td>
</tr>
<tr>
<td>14</td>
<td>Gland plate</td>
</tr>
<tr>
<td>15</td>
<td>Throttle ring</td>
</tr>
<tr>
<td>17</td>
<td>Disk</td>
</tr>
<tr>
<td>18</td>
<td>Set ring</td>
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<td>19</td>
<td>Setting device</td>
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<td>20</td>
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<td>21</td>
<td>Plug</td>
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<td>F</td>
<td>Flush</td>
</tr>
<tr>
<td>Q</td>
<td>Quench</td>
</tr>
<tr>
<td>D</td>
<td>Drain</td>
</tr>
</tbody>
</table>

Recommended piping plans
- Process side:
  - 01, 02, 03, 11, 12, 13, 14, 21, 22, 23, 31, 32, 41
Seal type C

Features
- API 682 Category 2 and 3, Type C, Arrangement 1 seal
- Single seal
- Balanced
- Cartridge unit
- Stationary metal bellows
- Shrink fitted seal ring and solid mating ring

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: \( d_1 = 20 \ldots 110 \text{ mm (0.79” \ldots 4.33”)} \)
- Pressure single ply bellows: \( p = \text{ vacuum } \ldots \text{ 20 bar} \) (\( \ldots 290 \text{ PSi} \)), Pressure two ply bellows: \( p = \text{ vacuum } \ldots \text{ 35 bar} \) (\( \ldots 508 \text{ PSi} \))
- Temperature: \( t = -130 \text{ °C } \ldots +400 \text{ °C (-202 °F } \ldots +752 °F) \)
- Sliding velocity: \( v_g \ldots 50 \text{ m/s (\ldots 164 ft/s)} \)

Materials
- Seal ring: Blister resistant carbon, Silicon carbide SSIC (Q1), RBSiC (Q2)
- Mating ring: 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
- Atmospheric side:
  - 51, 61, 62, 65A, 65B, 66A, 66B

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Seal ring with bellows unit</td>
</tr>
<tr>
<td>1.2, 11</td>
<td>Gasket</td>
</tr>
<tr>
<td>1.3</td>
<td>Baffle sleeve</td>
</tr>
<tr>
<td>1.4, 7, 24</td>
<td>Spring washer</td>
</tr>
<tr>
<td>1.5, 8, 17, 27</td>
<td>HSH Cap screw</td>
</tr>
<tr>
<td>2</td>
<td>Matting ring</td>
</tr>
<tr>
<td>3, 6, 9</td>
<td>Graphite ring</td>
</tr>
<tr>
<td>4</td>
<td>Retainer</td>
</tr>
<tr>
<td>5</td>
<td>Pin</td>
</tr>
<tr>
<td>10</td>
<td>Seal sleeve</td>
</tr>
<tr>
<td>12</td>
<td>Gland plate</td>
</tr>
<tr>
<td>13</td>
<td>Flow distributor</td>
</tr>
<tr>
<td>14</td>
<td>Retaining ring</td>
</tr>
<tr>
<td>15</td>
<td>Throttle bushing</td>
</tr>
<tr>
<td>16</td>
<td>Adapter</td>
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<tr>
<td>18</td>
<td>Thrust ring</td>
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<tr>
<td>19</td>
<td>Drive ring</td>
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<tr>
<td>20</td>
<td>Split ring</td>
</tr>
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<td>21</td>
<td>Drive collar</td>
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<td>22</td>
<td>Clamp sleeve</td>
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<td>Hexagon bolt</td>
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<td>26</td>
<td>Setting device</td>
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<td>F</td>
<td>Flush</td>
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<tr>
<td>Q</td>
<td>Quench</td>
</tr>
<tr>
<td>D</td>
<td>Drain</td>
</tr>
</tbody>
</table>
Seal type C

MBS682

Features
- API 682 Category 2 and 3, Type C, Arrangement 1 seal
- Single seal
- Balanced
- Cartridge unit
- Rotating metal bellows
- Shrink fitted seal ring and solid mating ring

Advantages
- Compact design
- Suitable 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: \( t = -75 \degree \text{C} \ldots +400 \degree \text{C} (-103 \degree \text{F} \ldots +752 \degree \text{F}) \)
- 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 ring: Blister resistant carbon, Silicon carbide SSiC (Q1), RBSiC (Q2)
- Mating ring: 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

Item | Description
--- | ---
1 | Seal ring with bellows unit
2, 8, 10 | Graphite ring
3 | Collar
4 | Spring washer
5 | HSH Cap screw
6, 14 | Set screw
7 | Mating ring
9 | Seal sleeve
11 | Drive collar
12 | Pin
13 | Clamping sleeve
15, 20 | Hexagon bolt
16 | Gland plate
17 | Gasket
18 | Throttle bushing
19 | Setting device
21 | Baffle sleeve
22, 23 | Retaining ring

F | Flush
Q | Quench
D | Drain
Seal type B

Features
- API 682 Category 2 and 3, Type B, Arrangement 1 seal
- Single Seal
- Balanced
- Cartridge unit
- Rotating metal bellows
- Shrink fitted seal ring and solid mating ring

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

Operating range (see note on page 3)
- Shaft diameter: d1 = 20 ... 110 mm (0.79" ... 4.33")
- Pressure: p = vacuum ... 20 bar (290 PSI)
- Temperature: t = -40 °C ... +200 °C (-40 °F ... +392 °F)
- Sliding velocity: vg = 23 m/s (75 ft/s)

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

Item Description
1 Seal ring with bellows unit
2, 5, 7, 9 O-Ring
3, 14, 15 Set screw
4 Mating ring
6 Seal sleeve
8 Gland plate
10 Flow distributor
11 Retaining ring
12 Throttle bushing
13 Drive collar
16 Setting device
17 HSH Cap screw

F Flush
Q Quench
D Drain
Category 2 and 3 • 1CW-FL

WEF6 Water cooler

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>WEF61000-A4</th>
<th>WEF6000-A4</th>
<th>WEF60000-A4</th>
</tr>
</thead>
<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>
</tr>
<tr>
<td>Allowable pressure (bar/PSI)</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>
</tr>
<tr>
<td>Allowable temperature cooling water side (shell side) (°C)</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) (°C)</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>
</tr>
<tr>
<td>Cooling capacity (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>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).
**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.
- 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></th>
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<th></th>
<th></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 3/4&quot;, 600 lbs</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>1.5</td>
<td>1.2</td>
<td>1.2</td>
<td>316L</td>
</tr>
<tr>
<td>WEL6002-A4A001-D0</td>
<td>ASME PED</td>
<td>2</td>
<td>Flange 1/2&quot;, 600 lbs</td>
<td>Flange 1/2&quot;, 600 lbs</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</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 1/2&quot;, 600 lbs</td>
<td>Flange 1/2&quot;, 600 lbs</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>-29 °C ... +260 °C (-20 °F ... +500 °F)</td>
<td>44 bar (638 PSI)</td>
<td>2</td>
<td>1.5</td>
<td>2.4</td>
<td>316L</td>
</tr>
</tbody>
</table>

(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.
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.

**Features**

- 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

**Advantages**

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

**Recommended applications**

**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”, 600 lbs</td>
<td>Flange 3/4”, 600 lbs</td>
</tr>
<tr>
<td>Connections – drain</td>
<td>G 1/2”</td>
<td>G 1/2”</td>
</tr>
<tr>
<td>Allowable pressure</td>
<td>45 bar (653 PSI)</td>
<td>45 bar (653 PSI)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 °C... +120 °C (+32 °F... +248 °F)</td>
<td>0 °C... +200 °C (+32 °F... +392 °F)</td>
</tr>
<tr>
<td>Wetted parts</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.
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 dirts 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

### Installation

P&ID for ZY6000-A4 Cyclone separators
A Contaminated liquid IN
B Clean liquid OUT
C Separated liquid OUT

### 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 (-20 °F ... +302 °F)</td>
<td>-29 °C ... +150 °C (-20 °F ... +302 °F)</td>
<td>-29 °C ... +150 °C (-20 °F ... +302 °F)</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.
2) Other materials on request, e.g. FKM, EPDM.
SPP6 Leakage detection system

Features
The EagleBurgmann leakage control systems of the SPP6006-A4 range consist of a pressure transmitter which is supplied together with a block and bleed valve.

Advantages
- Compact design
- Easy to integrate in existing piping systems.

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

Functional description
The SPP6006-A4 leakage control system is used to detect leakage from single seals. In case of a seal failure, the SPP6006-A4 is required to monitor excessive leakage. If the seal leakage exceeds a certain value, the bushing/orifice will limit the amount of leakage leaving the seal gland. Consequently the pressure will increase on the upstream side of the inner bushing. The pressure is monitored by means of the transmitter which will provide information about seal performance and seal failure.

Product variants

<table>
<thead>
<tr>
<th>Designation</th>
<th>SPP6006-A4</th>
<th>SPP6006-A4</th>
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<tbody>
<tr>
<td>Process connections</td>
<td>1/2&quot; NPT</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>Pressure range</td>
<td>0 ... 55 bar (0 ... 798 PSI)</td>
<td>0 ... 55 bar (0 ... 798 PSI)</td>
</tr>
<tr>
<td>Calibration range</td>
<td>0 ... 16 bar (0 ... 232 PSI)</td>
<td>0 ... 40 bar (0 ... 580 PSI)</td>
</tr>
<tr>
<td>Allowable temperature</td>
<td>-29 °C ... +120 °C (-20 °F ... +248 °F)</td>
<td>-29 °C ... +120 °C (-20 °F ... +248 °F)</td>
</tr>
<tr>
<td>Wetted parts</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.
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.

Design data, permissible working values depend on the actual conditions of service.
QFT6 Quench system

**Features**

Quench fluid supply systems are used with single mechanical seals. They act as a convenient fluid reservoir. The QFT6000-A4 stainless steel tank is equipped with a sight glass for monitoring the MIN/MAX filling level and can be fastened with a lug fixture.

**Advantages**

- Sight-glass for MIN/MAX monitoring has a large indicator area
- Filling is possible via a filling filter or a separate pipe connection
- Combined filling and ventilation filter in the quench fluid tank for reliable operation
- Tank made of 1.4571: high resistance to corrosive media

**Recommended applications**

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

**Functional description**

Quench fluid systems (Plan 51) are employed to:

- Absorb leakage
- Monitor the leakage rate (e.g., through periodic reading of the level in the tank)
- Prevent icing
- Protect against dry running
- Stabilize the lubricating film
- Exclude air from the media in order to prevent a reaction with oxygen in the air

**Product variants**

<table>
<thead>
<tr>
<th>Designation</th>
<th>QFT6000/M001-D0</th>
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<tbody>
<tr>
<td>Pressure Equipment Directive</td>
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<tr>
<td>Volume, vessel (liters)</td>
<td>3</td>
</tr>
<tr>
<td>Allowable pressure</td>
<td>Pressureless</td>
</tr>
<tr>
<td>Allowable temperature system</td>
<td>-29 °C ... +100 °C (-20 °F ... +212 °F)</td>
</tr>
<tr>
<td>Metal parts (tank)</td>
<td>316Ti</td>
</tr>
<tr>
<td>Filling filter</td>
<td>Glass-fibre-reinforced polyamide</td>
</tr>
<tr>
<td>Sight-glass</td>
<td>Glass</td>
</tr>
<tr>
<td>Gasket</td>
<td>FKM</td>
</tr>
</tbody>
</table>

Other versions on request.

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

**Installation**

- Item | Description
- A    | To mechanical seal
**Plan 65A**

**LSA6 Leakage collection reservoir**

### 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).

### 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

![Diagram of LSA6000-A4 Leakage collection system](image)

**P&ID for LSA6000-A4 Leakage collection system**

- A From mechanical seal
- B To leakage collection system

### 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(^1)</td>
<td>44 bar (638 PSI)</td>
</tr>
<tr>
<td>Allowable temperature(^1)</td>
<td></td>
</tr>
</tbody>
</table>
-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**

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.

**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 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**

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 LSB6000-A4

Leakage collection system

A From mechanical seal
B To liquid collection system

**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>
<tr>
<td>Allowable temperature(^1)</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>

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

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