GD Engineering

AN SPX BRAND

# Bandlock™ 2

## Quick Opening Closure

SPX®

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## Quick-Opening Closure

### Innovative Design Features

GD Engineering is a world leader in the manufacture of quick opening closures. Our GD Bandlock™ 2 is the original and benchmark design for global high-pressure applications with over 20,000 units in operation worldwide.

GD Bandlock™ 2 Closures provide horizontal or vertical access to any pressure vessel in seconds. Compared with other quick-opening closures they can be operated safely at remarkable speed — any size of unit can be opened or closed in less than a minute, with no special tools required.

Computer-aided technology has played a large part in the design of Bandlock™ 2. The main pressure-loaded sections have been designed to save weight by employing finite element analytical techniques and proof testing by strain gauges, while still adhering to primary pressure vessel code requirements.

The tried and tested locking band mechanism which gives the range its name is a duplex stainless steel conical thrust ring fitted between the door and hub, transmitting the pressure load uniformly around the full 360° circumference of the hub.

Typical applications include:

- Pipeline pig traps
- Filters
- Coalescers
- Strainers
- Separators
- Meter skid systems
- Hydrocyclones

### Technical Specification

| | |
|---|---|
| **Size Range** | 6” to 100” Nominal diameter |
| **Class Ratings** | ASME 150# through to 2500#<br>For Pressures in excess of 2500# contact GD Engineering. |
| **Design Specifications** | ASME VIII Division 1<br>ASME VIII Division 1 with ‘U’ Stamp<br>ASME VIII Division 2<br>PD 5500 / BS EN 13445 |
| **Closure Orientation** | Horizontal or Vertical. |
| **Termination Design Specifications** | ASME B31.3, B31.4, B31.8<br>Other International standards are available on request. |
| **Types of Connection** | Butt Welded, Butt Welded with mitre for inclined/declined vessels, Reduced Access or Flanged to clients requirements. |
| **Materials of Construction** | ASTM A350 LF2 /<br>ASME II SA350 LF2<br>ASTM A105 / ASME II SA105<br>ASTM A694 F42 to ASTM A694 F70<br>Grade 304L or 316L Stainless Steel<br>Duplex Stainless Steel (UNS S31803) |
| **Elastomeric Sealing** | Nitrile, Viton and ED Resistant elastomers. Other material options available on request. |
| **Standard Closure Finish** | Removable rust preventative for client to finish paint after welding to vessel. |
| **Special Closure Finish** | Grade 316 Stainless Steel or Inconnel 625 Weld Overlay |
| **Accessories** | The Bandlock™ 2 closure can be fitted with a ‘Smith Flow Control’ Type DL-3 Interlock. Other types of interlocks available on request.<br><br>Horizontal Closures can be supplied with protective weather covers (Vertical closures are supplied with protective weather covers as standard). |

**Integral Safety Devices**
Safety has been engineered into the Bandlock™ 2 at every stage of its design and manufacture. A hand-operated pressure warning screw integrated into the mechanism prevents the door being unlocked until it is confirmed that the vessel's internal pressure has been relieved. Additional secondary safety features, such as mechanical key interlocks, can be fitted and integrated with control valve operations.

For complete safety, the locking band can be seen at all times, which satisfies design code requirements and means that the operator can actually see that the door is securely closed and locked.

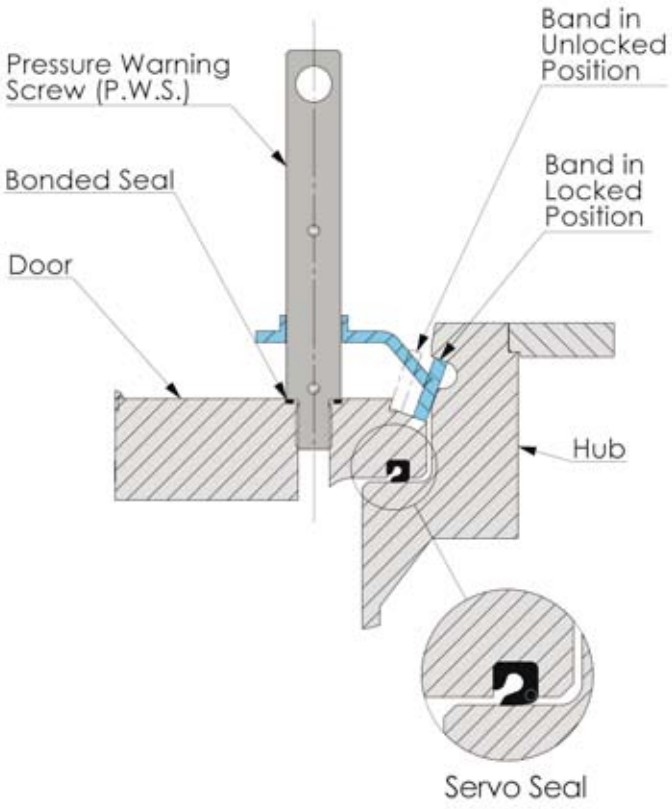
**Door Hinging**
For horizontal use the door is double pivoted on hinges with self-lubricating bearings. The bolted fitment allows adjustment for wear and can be specified for right or left swing.

Vertical installation includes a davit which enables the Bandlock™ 2 door to be lifted and swung clear of the hub. At diameters over 30", lifting eyebolts are normally fitted instead of the davit, so that the door can be lifted out of the way.

**Seal Material**
The standard seal is 75° shore hardness Nitrile material. Viton, HNBR and explosive decompression-resistant materials grades are also available. Temperature range is -45°C to +210°C according to the elastomer specified.

**Hydrostatic Testing**
Normally carried out as part of the final vessel test but an individual closure hydrotest can be provided as an option.

**Unique Seal with Integral Anti-Extrusion Spring**
To give a completely pressure-tight seal, the purpose-designed servo acting lip seal energises at zero pressure. For both Horizontal and Vertical Installations the seal is housed in the door away from the working area for protection and long life, and is easily fitted without tools. The one-piece moulding is available in a range of elastomers and incorporates a stainless steel spring to prevent extrusion and provide a full vacuum capability.




**Size and Pressure Range**
Bandlock™ 2 is available to suit differing vessel sizes and pressures from 6" to 100" diameters with hub sized for welding to any diameter and thickness, for any pressure from ASME Class 150 though to 2500 (425 bar working pressure).

**Materials**
Forged steel hubs with forged or plate doors can be supplied to meet all international material specifications. NACE Standard MR-01-75 / ISO 15156 materials are available.

**Approved Design**
Standard units meet ASME VIII Div.1. The requirement of other pressure vessel codes, such as ASME VIII Div. 2 and PD5500 can be accommodated. ASME Code Stamp with U-2A partial data report can be furnished as an option. Code stamping verifies shop inspection of the closure and materials by an ASME Authorised Inspector.

**European Pressure Equipment Directive (97/23/EC)**
The following options are available:

- Technical file — submitted to vessel fabricator for incorporation into CE Marking of vessel
- CE Marking of Closure by GD Engineering

# Operating Sequence

Operational safety has been engineered into the Bandlock™ 2 closure at every stage of its design and manufacture. The following guidelines illustrate the safe opening and closing sequence of the GD Engineering Bandlock™ 2 closure.

**Step 1**

Before attempting to open the closure, check that the vessel is fully isolated, drained and vented from any pressure source. On completion of the isolation and venting procedure, slacken off the pressure warning screw without attempting to remove it, any residual pressure in the unit will be indicated. Should an indication be given, close the pressure warning screw and re-check the status of all valves.

Fig. 1

Fig. 2

**Step 2**

When completely satisfied that the closure is safe to open, remove the pressure warning screw and its integral locking plate from the closure.

**Step 3**

Locate the universal handle into the drive link mechanism attached to the Horseshoe mechanism. Make sure that the universal handle is positively located in the hole provided.

Fig. 3

Fig. 4

**Step 4**

Rotate the universal handle anti-clockwise through approximately 180°. This will actuate the drive link and horseshoe mechanism and progressively contract the band onto the door recess. The universal handle should then be removed.

**Step 5**

Using the door hinge handle, swing the door into its open position with minimal force. The door is mounted on a double pivot mechanism which gives a degree of straight line movement and also allows the door to be rotated for access to the seal and band.

Closing the Bandlock™ 2 closure is simply a reversal of the opening sequence.

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Your local contact:

GD Engineering, An SPX Brand
Retford Road
Worksop
Nottinghamshire S80 2PY
Phone: +44 (0) 1909 482323 Fax: +44 (0) 1909 477902
E-mail: gd@spx.com

For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.gdengineering.com.



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