CR Series of Shielding Containers

LB 7440, LB 7442, LB 7444
Shieldings for Point Sources

Encapsulated radioactive sources are used for industrial applications. The radioactive substance is contained in a tightly sealed stainless steel Source Capsule, sometimes with several walls. The Source Capsule is mounted in a shielding Housing using a Source Holder. This shielding must meet several criteria:

- The radiation must be shielded to a safe level for the operating personnel.
- The radiation outlet channel must be lockable for transport and during installation.
- The source capsule must be protected from both mechanical damage and from environmental influences.

The shielding container consists of a cast-steel lead-filled Housing. A rotary Lockable Shutter is provided to close the radiation outlet channel. The shutter is rotated by a Handle which is secured in the open or closed position by a padlock.* The Source Holder is protected against unauthorised access by the Handle.

The shielding container has a mounting flange. The models LB 7440 and LB 7442 also have a mounting pad with tapped holes for bracket mounting.

The models with suffix “F” are used for level measurements, having a larger radiation outlet diameter. The models with suffix “D” are used for density measurements, having a smaller diameter for the radiation beam.

This range of products is designated “CR” and features improved resistance to corrosion:
- Sturdy cast steel housing
- Radiation outlet channel cover plate, made from stainless steel.
- Lockable Shutter, connecting shaft and Handle made of stainless steel.
- Tungsten source holder.
- Lockable by means of a padlock in a stainless steel locking device.

Options

- Pneumatic shutter mechanism which is fail safe if pressure drops. (Option I)**
- Indication of the shutter position using a limit switch or proximity initiators. (Option II).

...for extreme conditions

A rubber cover with a Perspex window for viewing the locking mechanism for use in exceptionally dirty, polluted and corrosive environments. (Option III)

* In some countries, the handle may not be locked in the open position.
** Option I is not available in the USA.
Dimensions

Data for Pneumatic Shutter Operation and Indicator Contacts

Compressed Air
- min. $4 \times 10^5$ Pa (4 bar)
- max. $7 \times 10^5$ Pa (7 bar)
- Connection: G 1/8

Indication OPEN/CLOSED
- Option Ila: IP 65 2 contacts (OPEN/CLOSED)
  - max. 250 V AC, 1A
  - 48 V DC, 1A

Air Quality
- Clean (as used for pneumatic tools), Free of oil

Temperature range:
- -20 °C to + 80 °C

Option IIC: 2 proximity switches. Intrinsically safe power supply required.
Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>LB 7440 CR</th>
<th>LB 7442 CR</th>
<th>LB 7444 CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielding thickness (mm lead) approx.</td>
<td>67</td>
<td>97</td>
<td>132</td>
</tr>
<tr>
<td>Angle of radiation beam approx.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Part Nr.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LB 7440 F 16°</td>
<td>37625</td>
<td>LB 7442 F 11°</td>
<td>37627</td>
</tr>
<tr>
<td>LB 7440 D 11°</td>
<td>37624</td>
<td>LB 7442 D 7°</td>
<td>37626</td>
</tr>
<tr>
<td>Shielding thickness approx.</td>
<td>67 mm lead</td>
<td>97 mm lead</td>
<td>117 mm lead, 15 mm tungsten</td>
</tr>
<tr>
<td>Attenuation factor approx.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For 60Co</td>
<td>30</td>
<td>180</td>
<td>1 800</td>
</tr>
<tr>
<td>For 137Cs</td>
<td>700</td>
<td>16,000</td>
<td>650,000</td>
</tr>
<tr>
<td>Dose rates D (µSv/h) at 1 m distance from the surface of the shielding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With 60Co</td>
<td>D = 1.1 x 10⁻² x A (MBq)</td>
<td>D = 1.7 x 10⁻³ x A (MBq)</td>
<td>D = 1.5 x 10⁻⁴ x A (MBq)</td>
</tr>
<tr>
<td>With 137Cs</td>
<td>D = 1.4 x 10⁻⁴ x A (MBq)</td>
<td>D = 5.4 x 10⁻⁶ x A (MBq)</td>
<td>D = 1.1 x 10⁻⁷ x A (MBq)</td>
</tr>
<tr>
<td>Dose rates D (µSv/h) at 30 cm distance from the surface of the shielding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With 60Co</td>
<td>Do = 7 x 10⁻² x A (MBq)</td>
<td>Do = 1 x 10⁻² x A (MBq)</td>
<td>Do = 9 x 10⁻⁴ x A (MBq)</td>
</tr>
<tr>
<td>With 137Cs</td>
<td>Do = 7 x 10⁻⁴ x A (MBq)</td>
<td>Do = 3.1 x 10⁻⁵ x A (MBq)</td>
<td>Do = 7.3 x 10⁻⁷ x A (MBq)</td>
</tr>
<tr>
<td>Dose rate Do (µSv/h) at the surface of the shielding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With 60Co</td>
<td>Do = 1.6 x A (MBq)</td>
<td>Do = 0.14 x A (MBq)</td>
<td>Do = 8 x 10⁻³ x A (MBq)</td>
</tr>
<tr>
<td>With 137Cs</td>
<td>Do = 1.6 x 10⁻² x A (MBq)</td>
<td>Do = 0.43 x 10⁻³ x A (MBq)</td>
<td>Do = 6.5 x 10⁻⁶ x A (MBq)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>max. 200 °C</td>
<td>max. 200 °C</td>
<td>max. 200 °C</td>
</tr>
</tbody>
</table>

Subject to changes without notice

Installation examples

Flange mounting

Bracket mounting

Dose rate Do (µSv/h) at the surface of the shielding

With 60Co

- Do = 1.6 x A (MBq)
- Do = 0.14 x A (MBq)
- Do = 8 x 10⁻³ x A (MBq)

With 137Cs

- Do = 1.6 x 10⁻² x A (MBq)
- Do = 0.43 x 10⁻³ x A (MBq)
- Do = 6.5 x 10⁻⁶ x A (MBq)

Subject to changes without notice