SPECIFIC SAFETY INSTRUCTION SSI-M-2-1

PRESSURE VESSELS
1 INTRODUCTION

For the convenience of the reader, this Specific Safety Instruction used the masculine gender only. However, its use shall be understood as referring to both genders unless the context clearly indicates a reference to one gender only.

1.1 Legal basis

In accordance with its intergovernmental status, the Organization establishes and updates Safety Rules to implement its Safety Policy.

This Specific Safety Instruction forms part of the CERN Safety Rules and is issued pursuant to the Staff Rules and Regulations and the CERN Safety Policy.

1.2 Purpose and scope

The purpose of this Specific Safety Instruction is to define the additional Safety requirements, compared to General Safety Instruction GSI-M-2 “Standard pressure equipment”, relating to pressure vessels used at CERN that are subject to or could be subject to a maximum allowable pressure of \( PS > 0.5 \) bar\(^1\).

The following vessels and their safety accessories are excluded from the scope of this Specific Safety Inspection:

- cryogenic vessels;
- vessels subjected to an open flame;
- simple pressure vessels;
- vessels used for heating, ventilation and air conditioning (HVAC);
- transportable pressure vessels.

1.3 Definitions

For the purposes of this Specific Safety Instruction, the following definitions shall apply:

- **Cryogenic vessel**: vessel used at a temperature equal to or lower than 123.15 K.
- **Group 1**: according to Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997, a group of dangerous fluids comprising those which are:
  - explosive;
  - extremely flammable;
  - highly flammable;
  - flammable (where the maximum allowable temperature is higher than the flash point);
  - very toxic;
  - toxic;
  - combustive.
- **Group 2**: group of fluids not included in Group 1.
- **Maximum allowable pressure \( PS \)**: maximum pressure for which the equipment is designed, as specified by the manufacturer.
- **Pressure vessel**: container designed and built to contain pressurised fluids, including the components directly attached to it up to and including the device provided for connection to other equipment. A vessel may consist of one or several compartments.
- **Simple pressure vessel**: any welded vessel subjected to an internal pressure greater than 0.5 bar\(^1\) that is intended to contain air or nitrogen and is not intended to be fired, as defined in Directive 2009/105/EC of the European Parliament and of the Council of 16 September 2009.
- **\( V \)**: volume of vessel.

For other definitions please refer to section 1.3 of Safety Regulation SR-M “Mechanical equipment” and to General Safety Instruction GSI-M-2 “Standard pressure equipment”.

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\(^1\) \( 1 \text{ bar} = 10^5 \text{ Pa} \) ("bar" unit used in European directives).
1.4 **CERN Safety Rules and Laws**

This Specific Safety Instruction is supplemented by the documents listed below, where they exist:

- Safety Regulations (SR);
- General Safety Instructions (GSI);
- Specific Safety Instructions (SSI);

and by the relevant provisions of the following Laws:

- EN 13445 – Unfired pressure vessels (Europe).

In the event of any ambiguity or contradiction between the above-mentioned documents, they shall apply in decreasing order of priority, starting from the top.

2 **ADDITIONAL SAFETY REQUIREMENTS COMPARED TO GSI-M-2**

The following additional Safety requirements compared to General Safety Instruction GSI-M-2 shall apply to pressure vessels:

<table>
<thead>
<tr>
<th>Relevant section GSI-M-2</th>
<th>Phase of life cycle</th>
<th>Additional Safety requirements compared to GSI-M-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Design</td>
<td></td>
<td>Pressure vessels designed by CERN shall comply with standard EN 13445.</td>
</tr>
<tr>
<td>2.2 Manufacture</td>
<td></td>
<td>No additional Safety requirement compared to GSI-M-2.</td>
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<tr>
<td>2.3 Procurement or arrival/presence on the CERN site</td>
<td></td>
<td>No additional Safety requirement compared to GSI-M-2.</td>
</tr>
</tbody>
</table>
| 2.4 Installation         |                     | The installation shall allow:  
  • the vessel to be inspected on all sides;  
  • the markings to be clearly visible;  
  • safe control and safe handling. |
| 2.5 Acceptance and commissioning | | Acceptance and commissioning shall be performed in accordance with section 2.5 of GSI-M-2.  
A hydrostatic proof test complying with Annex 1 of Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 shall be carried out; the pressure of the proof test shall be equal to the maximum allowable pressure multiplied by the coefficient 1.43.  
If a hydrostatic proof test would be harmful or impracticable, other proof tests may be carried out, subject to the agreement of the HSE Unit. CE-marked equipment is not tested. |
| 2.6 Use                  |                     | No additional Safety requirement compared to GSI-M-2. |
### Relevant section GSI-M-2

<table>
<thead>
<tr>
<th>Phase of life cycle</th>
<th>Additional Safety requirements compared to GSI-M-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7 Periodic inspections</td>
<td><strong>Periodic inspections of pressure vessels</strong> containing gas</td>
</tr>
<tr>
<td></td>
<td><strong>Group 1</strong></td>
</tr>
<tr>
<td></td>
<td>If $PS \cdot V &gt; 25 \text{ bar} \cdot \text{I}$, inspection as per the criteria in section 2.7 of GSI-M-2 every 40 months.</td>
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<tr>
<td></td>
<td>If $PS \cdot V &lt; 25 \text{ bar} \cdot \text{I}$, no periodic inspection.</td>
</tr>
<tr>
<td></td>
<td><strong>Group 1</strong></td>
</tr>
<tr>
<td></td>
<td>If $PS \cdot V &gt; 50 \text{ bar} \cdot \text{I}$, inspection as per the criteria in section 2.7 of GSI-M-2 every 40 months.</td>
</tr>
<tr>
<td></td>
<td>If $PS &gt; 10 \text{ bar}$ and $PS \cdot V &gt; 10^4 \text{ bar} \cdot \text{I}$, inspection as per the criteria in section 2.7 of GSI-M-2 every 40 months.</td>
</tr>
<tr>
<td></td>
<td>If $PS \cdot V &lt; 50 \text{ bar} \cdot \text{I}$, no periodic inspection.</td>
</tr>
<tr>
<td></td>
<td><strong>Group 1</strong></td>
</tr>
<tr>
<td></td>
<td>If $PS \cdot V &gt; 200 \text{ bar} \cdot \text{I}$, inspection as per the criteria in section 2.7 of GSI-M-2 every 40 months.</td>
</tr>
<tr>
<td></td>
<td>If $PS &lt; 10 \text{ bar}$ or $PS \cdot V &lt; 10^4 \text{ bar} \cdot \text{I}$, no periodic inspection.</td>
</tr>
</tbody>
</table>

**2.8 Maintenance**

No additional Safety requirement compared to GSI-M-2.

**2.9 Recommissioning**

No additional Safety requirement compared to GSI-M-2.

**2.10 Decommissioning/dismantling**

No additional Safety requirement compared to GSI-M-2.

### 3 FINAL PROVISIONS

#### 3.1 Entry into force

This Specific Safety Instruction (version 1) enters into force upon its publication on the CERN website dedicated to the CERN Safety Rules: [https://www.cern.ch/safety-rules](https://www.cern.ch/safety-rules).