

---

---

**Nuclear facilities — Criteria for design  
and operation of confinement systems  
for nuclear worksite and for nuclear  
installations under decommissioning**

*Installations nucléaires — Critères pour la conception et  
l'exploitation des systèmes de confinement des chantiers nucléaires et  
des installations nucléaires en démantèlement*



This document is a preview generated by EMS



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Functions ensured by the confinement</b> .....	<b>4</b>
<b>5 Principles for radioactive substances confinement</b> .....	<b>4</b>
5.1 General principles.....	4
5.2 Risk assessment procedure.....	5
5.3 General requirements.....	6
5.4 Confinement system.....	6
5.4.1 General.....	6
5.4.2 Case of a worksite containment located in an existing "confinement system".....	7
5.4.3 Case of a worksite containment located beyond any "confinement system".....	7
5.4.4 Summary of different natures and levels of confinement.....	7
5.5 Static containment.....	8
5.6 Dynamic confinement.....	9
5.7 Air clean-up modalities before release.....	9
<b>6 Methodology and recommendation for confinement design</b> .....	<b>9</b>
6.1 Classification of the installation into working areas.....	9
6.1.1 General.....	9
6.1.2 Confinement area classification.....	9
6.1.3 Other classifications for areas.....	10
6.2 Static containment design.....	10
6.3 Dynamic confinement design.....	11
6.4 Integrated confinement design (static-dynamic confinement).....	12
6.5 Airtight bag and ventilated airtight bag.....	15
6.6 Protection against weather: sun, rain, wind, snow and extreme temperatures.....	16
6.7 Air-change rate.....	16
6.8 Air inlet filtration and air-transfer between confinement system.....	17
6.9 Air clean-up system design.....	18
6.9.1 Areas not classified under radiological dispersal.....	18
6.9.2 Areas classified under the radiological release.....	18
6.10 Connection to any existing ventilation networks.....	19
6.10.1 General.....	19
6.10.2 Worksite containment located in a building, room or enclosure equipped with a nuclear ventilation.....	19
6.10.3 Worksite containment beyond any nuclear ventilation.....	20
6.10.4 Additional recommendations.....	21
6.11 Recommended ventilation configuration as function of confinement class.....	22
6.12 Worksite containment usually used.....	22
<b>7 Recommendations concerning commissioning, monitoring and operation of containment</b> .....	<b>23</b>
7.1 General.....	23
7.2 Pre-commissioning inspection.....	23
7.3 Monitoring of the confinement.....	24
7.3.1 General.....	24
7.3.2 Monitoring of static containment.....	24
7.3.3 Monitoring of dynamic confinement.....	24
7.3.4 Monitoring of purification systems.....	25
7.3.5 Other monitoring.....	26
7.4 Containment operation.....	26
7.5 Containment disassembly.....	26

<b>8</b>	<b>Considerations about other risks than radiological risks related to confinement</b> .....	<b>27</b>
<b>Annex A</b> (informative)	<b>Example of confinements classification and recommendations on associated equipment</b> .....	<b>28</b>
<b>Annex B</b> (informative)	<b>Examples for the selection of materials constituting worksite containment</b> .....	<b>31</b>
<b>Annex C</b> (informative)	<b>Practical guidance on worksite containment arrangements</b> .....	<b>32</b>
<b>Bibliography</b>	.....	<b>35</b>

This document is a preview generated by EVS

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, SC 2, *Radiological protection*.



# Nuclear facilities — Criteria for design and operation of confinement systems for nuclear worksite and for nuclear installations under decommissioning

## 1 Scope

This document specifies the requirements applicable to the design and use of airborne confinement systems that ensure safety and radioprotection functions in nuclear worksites and in nuclear installations under decommissioning to protect from radioactive contamination produced: aerosol or gas.

The purpose of confinement systems is to protect the workers, members of the public and environment against the spread of radioactive contamination resulting from operations in nuclear worksites and from nuclear installations under decommissioning.

The confinement of nuclear worksites and of nuclear installations under decommissioning is characterized by the temporary and evolving (dynamic) nature of the operations to be performed. These operations often take place in area not specifically designed for this purpose.

This document applies to maintenance or upgrades at worksites which fit the above definition.

**NOTE** The requirements for the design and use of ventilation and confinement systems and for liquid confinement in nuclear reactors or in nuclear installations other than nuclear worksites and nuclear installations under decommissioning are developed in other ISO standards.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16170, *In situ test methods for high efficiency filter systems in industrial facilities*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1 climatic shelter

shelter whose function is to provide suitable protection against the weather (sun, rain, wind, snow and extreme temperatures), usually structurally separated from radiological containment

### 3.2 aerosol

solid particles and liquid droplets of all dimensions in suspension in a gaseous fluid