
**Nuclear facilities — Criteria for the design
and the operation of containment and
ventilation systems for nuclear reactors**

*Installations nucléaires — Critères pour la conception et l'exploitation
des systèmes de confinement et de ventilation des réacteurs nucléaires*



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2010

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions	2
4 Functions ensured by the ventilation system	6
4.1 General	6
4.2 Main functions	7
5 Architecture and description of the different ventilation systems	8
5.1 Ventilation of the volumes within the primary containment envelope	8
5.2 Ventilation of the volumes located within the secondary confinement	10
5.3 Ventilation of the volumes located outside the secondary confinement	10
5.4 Miscellaneous ventilation systems not connected with containment envelopes	11
6 Safety aspects for ventilation systems	11
6.1 General principles	11
6.2 Risk assessment procedure — General.....	12
6.3 Risk assessment procedure for severe accidents.....	14
7 Requirements for the design of ventilation systems.....	15
7.1 Confinement of radioactive material	16
7.2 Filtration	33
7.3 Reactor specificities.....	35
8 Management of specific risks	38
8.1 Control of combustible gases in the reactor building	38
8.2 Management of ambient conditions	39
8.3 Prevention of risks linked to releases of heat, gases or toxic vapours	41
8.4 Prevention of risks linked to the deposition of matter in ventilation ducts	41
8.5 Prevention of fire hazard	42
8.6 Consideration of external hazards	45
9 Dispositions concerning the management and the operation of the ventilation systems.....	46
9.1 Organization and operating procedures	46
9.2 Technical operating instructions	46
9.3 Operational management issues	47
9.4 Test procedures and maintenance	47
9.5 Monitoring of the ventilation system.....	50
9.6 Control of the ventilation system to prevent fire hazards.....	51
10 Control and instrumentation	53
10.1 Control.....	53
10.2 Instrumentation	53
10.3 Alarms.....	54
Annex A (informative) Typical radioactive products in nuclear reactors.....	55
Annex B (informative) Examples of general confinement concepts for nuclear power reactors.....	58
Annex C (informative) Examples of safety classification for nuclear power reactors.....	64
Annex D (informative) Examples of classification of working areas according to radiological contamination hazard	66

Annex E (informative) Example of classification of types of ventilation, according to radiological contamination hazard — Recommended ventilation configurations68

Annex F (informative) Existing requirements for aerosol filters73

Annex G (informative) Examples of loads to consider during the design of NPP ventilation systems.....78

Annex H (informative) Typical values of leaktightness for containment and ventilation systems and periodicities of associated controls79

Annex I (informative) Primary containment envelope status81

Bibliography82

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 26802 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 2, *Radiological protection*.

Introduction

Containment and ventilation systems of nuclear power plants (NPPs) and research reactors ensure the security of such installations in order to protect the workers, the public and the environment from the dissemination of radioactive contamination originating from the operations of these installations.

This International Standard applies specifically to systems of confinement and ventilation systems for the confinement areas of reactors and their specialized buildings (such as command centres and particular areas for air purging and conditioning). This International Standard is complementary to ISO 17873, which applies mainly to nuclear fuel cycle installations (e.g. reprocessing plants, nuclear fuel fabrication and examination laboratories, plutonium handling facilities) and to radioactive waste storage, research facilities and auxiliary buildings of nuclear reactors.

This document is a preview generated by EVS

Nuclear facilities — Criteria for the design and the operation of containment and ventilation systems for nuclear reactors

1 Scope

This International Standard specifies the applicable requirements related to the design and the operation of containment and ventilation systems of nuclear power plants and research reactors, taking into account the following.

For nuclear power plants, this International Standard addresses only reactors that have a secondary confinement system based on International Atomic Energy Agency (IAEA) recommendations (see Reference [10]).

For research reactors, this International Standard applies specifically to reactors for which accidental situations can challenge the integrity or leak-tightness of the containment barrier, i.e. in which a high-pressure or high-temperature transient can occur and for which the isolation of the containment building and the shut-off of the associated ventilation systems of the containment building is required.

For research reactors in which the increase of pressure or temperature during accidental situations will not damage the ventilation systems, the requirements applicable for the design and the use of ventilation systems are given in ISO 17873. However, the requirements of this International Standard can also be applied.

2 Normative references

The following referenced documents are indispensable for the application 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 10648-2, *Containment enclosures — Part 2: Classification according to leak tightness and associated checking methods*

ISO 17873, *Nuclear facilities — Criteria for the design and operation of ventilation systems for nuclear installations other than nuclear reactors*

ICRP 103, *The 2007 Recommendations of the International Commission on Radiological Protection*, ICRP Publication 103, Annals of the ICRP, 37 (2-4), Elsevier