

INTERNATIONAL CO-OPERATION IN THE FIELD OF STANDARDIZATION OF APPARATUS USING RADIOACTIVE SEALED SOURCES

GILBERT BRUHL
CEA/DSNQ/MSN - F 91460 Gif-Sur-Yvette Cedex



XA9848193

Abstract

The use of radioactive sources and equipment or devices emitting ionizing radiation covers a very large field of applications (nuclear and conventional industries, medical purposes) and needs therefore the compliance with a serial of fundamental safety requirements in order to protect the personal and the public.

The detention and the use of radioactive substances and machinery or devices containing radioactive sources are strictly controlled in the most industrial countries.

In order to harmonize the principle of use and the respect of the essential safety requirements, an international co-operation has been established since the last two or three decades in the fields of standardization and regulation implementation. It has effectively been proved that only a comparison at an international level with all of the interested people (manufacturers, safety authorities, end users, test houses, ...) will permit the publication of a set of relevant and coherent recommendations which could be adapted later on in national or international regulations by the different member bodies or international organizations. These regulations will then lead the design, the detention, the use and the elimination of the radioactive sources in an appropriate manner.

France, as well as the most important industrial countries, participates actively to this effort of harmonization of good practices, namely in the field of ISO¹, CEN² and AFNOR³ standardization areas, in the following domains.

1. Domains covered

International Standardization (ISO):

- ISO 3999: « Apparatus for industrial gamma radiography - Design and test criteria ».
- ISO 2919: « Sealed radioactive sources - General requirements and classification ».

National Standardization (AFNOR):

- Norm NF M 62-105: « Industrial accelerators: Installations ».

European Standardization (CEN):

- Draft Standard: « Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery », including three parts:
 - Part 1 - General principles
 - Part 2 - Radiation emission measurement procedure
 - Part 3 - Reduction of radiation by attenuation or screening

2. Interest of this international standardization co-operation

ISO and AFNOR Standardization

Concerning the fields covered by ISO, e.g. radioactive sealed sources and apparatus for gamma radiography, the different standards under preparation by ISO or published by this organization has for main objective to specify the performance criteria for their design, their

¹ ISO: International Standardization Organization

² CEN: European Committee for Standardization

³ AFNOR: Association Française de Normalisation

using and maintenance conditions and if needed their test requirements, in order to ensure safe operation conditions and to control the use of the incorporated radioactive sources, so that persons will be safeguarded when this use is made in conformity with the regulation in force regarding radiation protection point of view.

The french standard concerning industrial accelerators has approximately the same objective, that means to precise the criteria for the design and for the construction of the industrial installations in order to ensure the safety of the operators and the environment against the direct risks or the induced risks linked to the ionizing radiation emissions.

European standardization

The improvement of the serial of standards concerning the assessment of risks arising from radiation emitted by machinery has been undertaken in the frame of the "Machinery Directive" which recommends to the manufacturers and the safety authorities, to quantify if possible in the product standards, the emissions which are detrimental to health, with regard to the following principles:

- to reduce the risks to the lowest possible level (principle of risk reduction to the lowest possible level according to the ALARA principle),
- to inform the user of the existing residual risk (principle of user information).

This quantification enables the manufacturer to assess the state of the art in terms of the risk generated by his product or equipment, to the most suitable measures for reducing the risks and to inform the user of the scale of the remaining risks.

Considering this principle, the experts who have been requested to write this serial of standards referenced here above, have proposed a very original methodology for the assessment and the reduction of the risks arising from radiation emitted by machinery (these radiation could be ionizing radiation or non ionizing) which is based on the categorization of the machines according to the level of the radiation emission and on the inventory of the protection means which could be adopted for the prevention and the reduction of the remaining radiation emission.

Part 2 and 3 of this standard, which complete the main part of the previous standard, specify respectively the procedures for measurement of the radiation emission and a set of appropriate protective measures which lead to prevent and limit the exposure of the people by reduction of the remaining radiation by attenuation or screening or by taking into account complementary protective measures during operation.

Note: For all of the above mentioned standards, the application of the proposed recommendations shall be completed by the obligation of the compliance of the suitable regulations concerning, on one hand, the radiation protection requirements (limitation at the lowest possible level of exposure) and on the other hand, the transport requirements (for example application of the IAEA regulations for the safe transport of radioactive materials).

3. References

- [1] Nuclear and Radiation Protection Standards - Catalogue and Classification - K. Becker and N. Fichtner, Revision 1995, Beuth Verlag GMBH Berlin Köln.
- [2] European « Machinery Directive » published by the CEE Organization (Directive CEE 89/389 and its amendments).
- [3] Annual 1997 Report of ISO/TC 85 « Nuclear Energy », ISO Publication, Geneva/Switzerland.
- [4] Equipements de Travail - Moyens de Protection / Guide Juridique, Tome 1 et 2- Journal Officiel de la République Française, Edition 1997.

MANAGERIAL MEASURES, INCLUDING SAFETY CULTURE, HUMAN
FACTORS, QUALITY ASSURANCE, QUALIFIED EXPERTS, TRAINING
AND EDUCATION

(TECHNICAL SESSION 3)

**NEXT PAGE(S)
left BLANK**