

NRRC Specific Regulations

National Radon Reference levels in Dwellings and Public Buildings

NRRC-R-01-SR10



هيئة الرقابة النووية والإشعاعية
Nuclear and Radiological Regulatory Commission

2023

Specific Regulation

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Preamble

In accordance with the provisions of the Radiation Safety Regulation (NRRC-R-01), approved by the NRRC's Board of Directors in resolution No. (R/1/1/2022), dated 20 April 2022, in Chapter (16), Section (105) Article (287), this specific regulation sets the reference levels of radon activity concentration in dwellings and workplaces.

This specific regulation has been prepared on the basis of International Atomic Energy Agency (IAEA) standards, World Health Organization recommendations, as well as the international best practices and the experiences of similar international regulatory bodies, and in accordance with the Kingdom's international commitments, and it has been approved by the NRRC's CEO resolution No. 1148, dated 25/4/2023.



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Chapter 1: Objective, Scope, and Definitions

Section 1: Objective

1. This specific regulation sets the reference levels of radon activity concentration in dwellings and workplaces.

Section 2: Scope

2. This specific regulation shall apply to all type of building including dwellings, schools, and workplaces.
3. This specific regulation does not establish exposure requirements for radon and its progeny in workplaces where occupational exposure to other radionuclides in the ^{238}U decay series or the ^{232}Th decay series is controlled as a planned exposure situation.
4. This specific regulation does not set requirements in case of nuclear and radiological emergency resulted to radioactive contamination of building or its components.

Section 3: Definitions

Alpha particle

Two neutrons and two protons bound as a single particle that is emitted from the nucleus of certain radioactive isotopes in the process of decay.

Exposure Due to Radon

The time integral over the activity concentration of radon for a defined

period. Exposure due to radon is a measurand related to the potential alpha energy exposure with the equilibrium factor taken into account and is, therefore, related to the effective dose.

Radon

A colorless, odorless, naturally occurring, radioactive, inert, gaseous element formed by radioactive decay of radium (Ra) atoms. For the purposes of this specific regulation, radon refers to ^{220}Rn and ^{222}Rn .

Radon Progeny

The short lived radioactive decay products of ^{220}Rn and of ^{222}Rn .

Reference level

For the emergency exposure situation or an existing exposure situation, the level of risk or activity concentration above which it is not appropriate to plan to allow exposures to occur and below which optimization of protection and safety would continue to be implemented.

Dwellings

A self-contained substantial unit of accommodation, such as a house, apartment, building, or part of a building.

Workplaces

A place, such as an office or factory..etc., where people are employed.

Chapter 2: Regulatory Control

Section 4: Reference Levels

5. Reference levels are utilized in order to optimize protection for the current exposure. Priority shall be given to exposures over the reference level during optimization of protection and shall continue to be implemented below the reference level.
6. Considering the occupancy time factors, the reference levels for dwellings and workplaces, for indoor radon activity concentration expressed in terms of the annual average activity concentration in air are indicated on the assumption of an equilibrium factor for radon of 0.4 and annual occupancy rate of 7000 hours for indoor. The reference level is set at order of 10 mSv in terms of annual effective dose.
7. The indoor radon activity concentration for dwellings shall be kept below:
 - a. (300) Becquerel per cubic meter (Bq.m^{-3}) in terms of annual average activity concentration of radon in air for existing buildings.
 - b. (200) Becquerel per cubic meter (Bq.m^{-3}) in terms of annual average activity concentration of radon in air for new buildings.
8. The indoor radon activity concentration for workplaces shall be kept below: (300) Becquerel per cubic meter (Bq.m^{-3}) in terms of annual average activity concentration of radon in air.



Section 5: Measurement Protocols

9. The measurement of indoor radon activity concentration should be performed according to the approved standard methods of measurement, which can be used for concluding whether the reference level is exceeded or not.

Section 6: Obligations of the Responsible Parties

10. The responsible parties shall ensure that an action plan is established comprising coordinated actions to reduce activity concentrations of radon in existing buildings and in future buildings, which includes:
 - a. Reducing activity concentrations of radon and consequent exposures to levels at which protection is optimized;
 - b. Giving priority to actions to reduce activity concentrations of radon in those situations for which such action is likely to be most effective.
11. All responsible parties shall ensure that the indoor radon activity concentration in dwellings is below the reference levels mentioned in article (7) of this specific regulation.
12. For the workplaces, the employer shall ensure that activity concentrations of radon in workplaces are as low as reasonably achievable below the reference level mentioned in article (8) of this specific regulation, and shall ensure that protection and safety is optimized.
13. If, despite all reasonable efforts by the employer to reduce activity concentration of radon, the activity concentration of radon in work-

places remains above the reference level, the relevant requirements for occupational exposure in planned exposure situations shall apply.



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