

# RADIATION PROTECTION (STANDARDS) REGULATIONS, 1986

## ARRANGEMENT OF REGULATIONS

[Rev. 2012]

### *Regulation*

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1. Citation.
  2. Interpretation.
  3. Dose equivalent limits.
  4. Dose equivalent limits for radiation workers.
  5. Occupational exposure of women of reproductive capacity.
  6. Annual limit of intake of radionuclides.
  7. Planned special exposures.
  8. Personal monitoring.
  9. Dose equivalent limits for individual members of the public.
  10. Dose equivalent limits for student in educational institutions.
  11. Dose equivalent limits for teaching staff and technicians in the education institutions.
  12. Medical exposure.
  13. Schedules.
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## RADIATION PROTECTION (STANDARDS) REGULATIONS, 1986

[L.N. 54/1986.]

### 1. Citation

These Regulations may be cited as the Radiation Protection (Standards) Regulations, 1986.

### 2. Interpretation

In these Regulations, unless the context otherwise requires—

“**personnel monitoring**” means measurement of a dose with a device such as a film badge, pocket ionization chambers, or thermoluminescent dosimeters, worn on an individual;

“**dose equivalent**” means the product of absorbed dose and the weighting factors;

“**sieved**” means an international standard unit of measurement equal to the absorbed dose multiplied by a weighting factor, a distribution factor or any other modifying factors;

“**absorbed dose**” means the amount of energy deposited by ionizing radiation per mass of the material;

“**radionuclide**” means a radioactive substance characterized by its atomic nucleus;

“**threshold dose**” means the minimal absorbed dose that will produce a detectable degree of any given effect;

“**reproductive capacity**” means the period in women commencing with the onset of menarche and ending with menopause.

### 3. Dose equivalent limits

(1) The dose equivalent limits specified in these Regulations are based on the exposure received over a period of one year, without regard to the rate of dose accumulation, except in the case of women of reproductive capacity in which the time-distribution of dose equivalent shall be taken into account.

(2) The annual dose equivalent limits shall comprise the sum of the annual dose equivalent arising from external exposure due to external sources or ionizing radiation and internal exposure due to the intake of radionuclides.

(3) Dose equivalent limits shall not include contributions from natural background radiation or from medical exposure of patients to ionizing radiation.

(4) The stochastic and non-stochastic effects shall be considered in setting dose equivalent limits.

(5) For the purposes of these Regulations “**stochastic effects**” means the manifestations whose probability of occurrence in a population exposed to ionizing radiation, rather than severity in an affected individual, may be a direct function of dose, whose effects shall be regarded as having no threshold while heredity effect and some somatic effects such as carcinogenesis shall be regarded as stochastic and the severity of stochastic effect, if it occurs, shall be independent of the size of the dose responsible for its induction; and

“**non-stochastic effects**” means the manifestations whose severity of effect varies with dose, and for which a threshold dose may therefore occur but below which the effects are not detectable at all such as cataract induction, non-malignant damage to skin, hematologic deficiencies and impairment of fertility.

#### **4. Dose equivalent limits for radiation workers**

(1) Dose equivalent limits for radiation workers are specified in these Regulations with the aim of preventing occurrence of nonstochastic effects in any individual tissue and for limiting the occurrence of stochastic effects and; they the upper limits which should not be exceeded under normal conditions of exposure.

(2) To prevent non-stochastic effects, the dose equivalent limit for radiation workers shall be 0.5 Sv per year in any tissue except the lens of the eye, and 0.15 Sv per year in the lens of the eye.

(3) To prevent the occurrence of stochastic effects the dose equivalent limits for radiation workers in uniform exposure to ionizing radiation shall be 50 mSv per year.

(4) Effective dose equivalent is computed by summing up the product on individual tissue doses and multiplying it with the weighting factors set for the different tissues in the First Schedule.

(5) When the tissues of the body are irradiated non-uniformly the equivalent stochastic risk may be estimated from the effective dose equivalent.

(6) The weighting factors for the computation of the effective dose equivalent shall be as specified in the First Schedule.

(7) The feet, ankles, the skin and the lens of the eye shall not be included in the computation of effective dose equivalent but the relevant dose equivalent limits given in regulation 4(2) shall apply to these tissues.

(8) The effective dose equivalent for radiation workers shall not exceed 50 mSv per year.

(9) The dose equivalent limit for radiation workers shall be the non-stochastic limit given in regulation 4(2) or the stochastic limit given in regulation 4 (8) whichever is the lower.

#### **5. Occupational exposure of women of reproductive capacity**

(1) In women of reproductive capacity, pregnancy and the possibility of early unrecognized pregnancy should be taken into account before exposure to ionizing radiation.

(2) For women of reproductive capacity the embryo should not receive more than 5 mSv during the first two months of pregnancy.

(3) In women of reproductive capacity, regard shall be paid to the time-distribution of doses received and the doses should as far as possible be distributed evenly throughout the year.

(4) When pregnancy is diagnosed, the dose received by the foetus throughout the pregnancy shall not exceed 10 mSv.

#### **6. Annual limit of intake of radionuclides**

(1) The contribution of internal exposure to the dose equivalent, of annual limits intake of radionuclides by the workers shall not exceed the annual dose limits set out in regulation 4(3) to 4(7), provided there is no contribution from external exposure.

(2) The value of annual limits of intake for single radionuclides and the corresponding derived air concentration are set in the Third Schedule.

(3) When there is an intake of more than one radionuclide during a working year, the sum of the weighted contributions of the various radionuclides to the dose equivalent shall not exceed the limits set out in regulation 4(3) to 4(7).

(4) When a worker who is exposed through intake or to radionuclides is also exposed externally, the provisions of regulation 4(3) shall be observed.

#### **7. Planned special exposures**

(1) The planned special exposure, hereafter referred to as emergency operations for radiation workers, referred to in recommendations of the International Commission of Radiological Protection shall not be permitted under these Regulations.

(2) Workers involved in emergency operations shall be informed by the owner of the involved radiation facility about the nature of the risks and must consent to such exposures before undertaking the special operations.

(3) Following the exposure, every effort shall be made to estimate the dose equivalent received by the workers involved and expert medical advice shall be sought.

#### **8. Personal monitoring**

(1) Dose equivalent received by radiation workers shall be assessed through personal monitoring.

(2) Personal monitoring for radiation workers shall be carried out over regular intervals of at least once every month.

#### **9. Dose equivalent limits for individual members of the public**

(1) Dose equivalent limits to members of the public shall be used in the planning of radiation facilities.

(2) Dose equivalent limits for individual members of the public shall in all cases be one-tenth of those for radiation workers set under regulation 4.

(3) Doses received by members of the public need not be regulated through personal monitoring.

#### **10. Dose equivalent limits for student in educational institutions**

The authorized dose equivalent limits for students in educational institutions shall be as set out in the Second Schedule.

#### **11. Dose equivalent limits for teaching staff and technicians in the education institutions**

Dose equivalent limits for teaching staff, instructors technicians and laboratory assistants at all educational institutions shall in all cases be the same as those for radiation workers.

#### **12. Medical exposure**

(1) Medical exposure is the intentional exposure of patients for diagnostic and therapeutic purposes under the supervision of authorized medical personnel, and the exposure resulting from the artificial replacement of body organs or functions.

(2) No dose equivalent limits are set for medical exposure, but medical personnel should adhere to the basic principles in radiation protection of the patient, that is—

- (a) unnecessary exposures should be avoided;
- (b) necessary exposures should be justifiable in terms of benefits that would not otherwise have been received;
- (c) the dose actually administered should be limited to the minimum amount consistent with the medical benefit to the individual patient.

### 13. Schedules

The Schedules to these Regulations shall be the “**Schedules to the Radiation Protection (Standards) Regulations**” published by the Government Printer which shall be construed as one with these Regulations.

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