ANNEX 1: THE DOSE LIMITS FOR EXPOSURES FROM IONIZING RADIATIONS FOR WORKERS AND THE MEMBERS OF THE PUBLIC – ICRP 103, 2007

General

The limits on effective dose apply to the sum of effective doses from external, as well as internal sources. The limits exclude the exposures due to natural background radiation and medical exposures.

The calendar year shall be used for all prescribed dose limits.

1.0. Occupational dose limits

1.1. Occupational workers

The occupational exposures of any worker shall be so controlled that the following limits are not exceeded:

Employees and trainees of 18 years of age or above

The limit on effective dose for any employee or trainee, being of 18 years of age or above, is 20 mSv in any calendar year.

The limit on equivalent dose for the lens of the eye is 20 mSv in a calendar year.

The limit on equivalent dose for the skin is 500 mSv in a calendar year as applied to the dose averaged over any area of 1 cm^2 regardless of the area exposed.

The limit on equivalent dose for the extremities is 500 mSv in a calendar year.

The limits given above apply to female workers also. However, once the pregnancy is declared the equivalent dose limit to embryo/fetus shall be 1 mSv for the remainder of the pregnancy.

1.2. Trainees aged under 18 years

The occupational exposure of trainees under 18 years of age shall be so controlled that the following limits are not exceeded:

The limit on effective dose for any trainee under 18 years of age is 6 mSv in any calendar year.

The limit on equivalent dose for the lens of the eye is 15 mSv in a calendar year.

The limit on equivalent dose for the skin is 150 mSv in a calendar year as applied to the dose averaged over any area of 1 cm^2 regardless of the area exposed.

The limit on equivalent dose for the extremities is 150 mSv in a calendar year.

2.0. Dose limits for members of the public

An estimated average dose to the members of public shall not exceed 1 mSv in a year.

3.0. Annual limit for intake of (ALI) of important radionuclides

Dose conversion Factors (DCF) and Annual Limits on Intake (ALI) for Common Nuclear substances.

[Source: *DCFs from ICRP-68 and NRPB-W22; ALIs derived from DCFs (ALI = 20 mSv/DCF)*]

Note: ALIs listed are for a particle size (Activity Median Aerodynamic Diameter, AMAD) of 5 µm. The solubility selected from ICRP-68 was that which results in the lowest ALI for each listed radionuclide and intake route (inhalation or ingestion).

Table: DCF and ALI Values for Common Nuclear Substances

Nuclear Substance	DCF (Sv/Bq) Inhalation	ALI (Bq) Inhalation	DCF (Sv/Bq) Ingestion	ALI (Bq) Ingestion
Bismuth 210 (210Bi)	6.0×10^{-08}	3.3×10^{5}	1.3×10^{-09}	1.5×10^{7}
Calcium 45 (45Ca)	2.3×10^{-09}	8.7×10^{6}	7.6×10^{-10}	2.6×10^{7}
Carbon 11 (11C)	2.2×10^{-12}	9.1×10^{9}	2.4×10^{-11}	8.3×10^{8}
Carbon 14 * (14C)	2.0×10^{-11}	1.0×10^{9}	5.8×10^{-10}	3.4×10^{7}

Cesium 137 (137Cs)	6.7×10^{-09}	3.0×10^{6}	1.3×10^{-08}	1.5×10^{6}
Chromium 51 (51Cr)	3.6×10^{-11}	5.6×10^{8}	3.8×10^{-11}	5.3×10^{8}
Cobalt 57 (57Co)	6.0×10^{-10}	3.3×10^{7}	2.1×10^{-10}	9.5×10^{7}
Cobalt 58 (58Co)	1.7×10^{-09}	1.2×10^{7}	7.4×10^{-10}	2.7×10^{7}
Cobalt 60 (60Co)	1.7×10^{-08}	1.2×10^{6}	3.4×10^{-09}	5.9×10^{6}
Copper 64 (64Cu)	1.5×10^{-10}	1.3×10^{8}	1.2×10^{-10}	1.7×10^{8}
Copper 67 (67Cu)	5.8×10^{-10}	3.4×10^{7}	3.4×10^{-10}	5.9×10^{7}
Fluorine 18 (18F)	9.3×10^{-11}	2.2×10^{8}	4.9×10^{-11}	4.1×10^{8}
Gallium 67 (67Ga)	2.8×10^{-10}	7.1×10^{7}	1.9×10^{-10}	1.1×10^{8}
Gallium 68 (68Ga)	8.1×10^{-11}	2.5×10^{8}	1.0×10^{-10}	2.0×10^{8}
Germanium 68 (68Ge)	7.9×10^{-09}	2.5×10^{6}	1.3×10^{-09}	1.5×10^{7}
Gold 198 (198Au)	1.1×10^{-09}	1.8×10^{7}	1.0×10^{-09}	2.0×10^{7}
Hydrogen 3 (HT) (3H)	2.0×10^{-15}	1.0×10^{13}	---	---
Hydrogen 3 (HTO) ** (3H)	2.0×10^{-11}	1.0×10^{9}	2.0×10^{-11}	1.0×10^{9}
Hydrogen 3 (OBT) † (3H)	4.1×10^{-11}	4.9×10^{8}	4.2×10^{-11}	4.8×10^{8}
Indium 111 (111In)	3.1×10^{-10}	6.5×10^{7}	2.9×10^{-10}	6.9×10^{7}
Indium 113m (113mIn)	3.2×10^{-11}	6.3×10^{8}	2.8×10^{-11}	7.1×10^{8}
Indium 114m (114mIn)	1.1×10^{-08}	1.8×10^{6}	4.1×10^{-09}	4.9×10^{6}
Iodine 123 (123I)	2.1×10^{-10}	9.5×10^{7}	2.1×10^{-10}	9.5×10^{7}
Iodine 124 (124I)	1.2×10^{-08}	1.7×10^{6}	1.3×10^{-08}	1.5×10^{6}
Iodine 125 (125I)	1.4×10^{-08}	1.4×10^{6}	1.5×10^{-08}	1.3×10^{6}
Iodine 129 (129I)	9.6×10^{-08}	2.1×10^{5}	1.1×10^{-07}	1.8×10^{5}
Iodine 131 (131I)	2.0×10^{-08}	1.0×10^{6}	2.2×10^{-08}	9.1×10^{5}
Iridium 192 (192Ir)	4.9×10^{-09}	4.1×10^{6}	1.4×10^{-09}	1.4×10^{7}
Iron 55 (55Fe)	9.2×10^{-10}	2.2×10^{7}	3.3×10^{-10}	6.1×10^{7}
Iron 59 (59Fe)	3.2×10^{-09}	6.3×10^{6}	1.8×10^{-09}	1.1×10^{7}
Krypton 85 (gas) Bq/m3 ‡ (85Kr)	2.2×10^{-11}	9.1×10^{8}	---	---
Lead 210 (210Pb)	1.1×10^{-06}	1.8×10^{4}	6.8×10^{-07}	2.9×10^{4}
Molybdenum 99 (99Mo)	1.1×10^{-09}	1.8×10^{7}	1.2×10^{-09}	1.7×10^{7}
Phosphorus 32 (32P)	2.9×10^{-09}	6.9×10^{6}	2.4×10^{-09}	8.3×10^{6}

Potassium 42 (42K)	2.0×10^{-10}	1.0×10^{8}	4.3×10^{-10}	4.7×10^{7}
Radium 223 (223Ra)	5.7×10^{-06}	3.5×10^{3}	1.0×10^{-07}	2.0×10^{5}
Radium 226 (226Ra)	2.2×10^{-06}	9.1×10^{3}	2.8×10^{-07}	7.1×10^{4}
Rhenium 186 (186Re)	1.2×10^{-09}	1.7×10^{7}	1.5×10^{-09}	1.3×10^{7}
Rhenium 188 (188Re)	7.4×10^{-10}	2.7×10^{7}	1.4×10^{-09}	1.4×10^{7}
Rubidium 86 (86Rb)	1.3×10^{-09}	1.5×10^{7}	2.8×10^{-09}	7.1×10^{6}
Scandium 46 (46Sc)	4.8×10^{-09}	4.2×10^{6}	1.5×10^{-09}	1.3×10^{7}
Selenium 75 (75Se)	1.7×10^{-09}	1.2×10^{7}	2.6×10^{-09}	7.7×10^{6}
Sodium 22 (22Na)	2.0×10^{-09}	1.0×10^{7}	3.2×10^{-09}	6.3×10^{6}
Sodium 24 (24Na)	5.3×10^{-10}	3.8×10^{7}	4.3×10^{-10}	4.7×10^{7}
Strontium 89 (89Sr)	5.6×10^{-09}	3.6×10^{6}	2.6×10^{-09}	7.7×10^{6}
Strontium 90 (90Sr)	7.7×10^{-08}	2.6×10^{5}	2.8×10^{-08}	7.1×10^{5}
Sulphur 35 (inorganic) (35S)	1.1×10^{-09}	1.8×10^{7}	1.9×10^{-10}	1.1×10^{8}
Sulphur 35 (organic v) (35S)	1.2×10^{-10}	1.7×10^{8}	7.7×10^{-10}	2.6×10^{7}
Technetium 99m (99mTc)	2.9×10^{-11}	6.9×10^{8}	2.2×10^{-11}	9.1×10^{8}
Thallium 201 (201Tl)	7.6×10^{-11}	2.6×10^{8}	9.5×10^{-11}	2.1×10^{8}
Tin 113 (113Sn)	1.9×10^{-09}	1.1×10^{7}	7.3×10^{-10}	2.7×10^{7}
Xenon 133 (gas) Bq/cm3 ‡ (133Xe)	1.2×10^{-10}	6.7×10^{5}	---	---
Yttrium 90 (90Y)	1.7×10^{-09}	1.2×10^{7}	2.7×10^{-09}	7.4×10^{6}