

Tritium



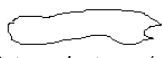
Half life: 12.3 years
Specific activity: $3.59\text{E}+14 \text{ Bq.g}^{-1}$

Risk group: 5
Risk colour: Blue

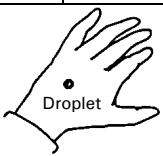
Main emissions (keV)						
	Gamma or X		Beta (Emax)	Electrons	Alpha	
	E	%	E	%	E	%
E1			19	100		
E2						
E3						
% omitted			0			

Exemption levels	
Quantity (Bq)	1E+09
Concentration (Bq.g ⁻¹)	1E+06

Transport (TBq)	
IAEA ST1 A1 value	4E+1
IAEA ST1 A2 value	4E+1

EXTERNAL EXPOSURE (mSv.h ⁻¹) for an activity of 1 MBq or 1 MBq.m ⁻² (as appropriate)				
Point source (30 cm)	Infinite plane source	10 ml glass vial	Contact with 50 ml glass beaker	Contact with 5 ml plastic syringe
				
Betas, electrons (skin dose)	Betas, electrons (skin)			
0.00E+0	10 cm 0.0E+00 1 m 0.0E+00			
	Photons (skin)			
	10 cm 0.0E+00 1 m 0.0E+00			
Gammas, X rays (deep tissue dose)	Photons (deep dose)	100 cm		
0.00E+0	10 cm 0.0E+00 1 m 0.0E+00	Brem. Rad.	Brem. Rad.	Brem. Rad.

The values above do not include Bremsstrahlung radiation. Brem. Rad. indicates that it may be significant.

CONTAMINATION		
Contamination skin dose (mSv.h ⁻¹)	Detection	Derived limits (Bq.cm ⁻²)
Uniform deposit (1kBq.cm ⁻²) 0.00E+0	Recommended probes*	Removable contamination
0.05 ml droplet (1 kBq) 0.00E+0	Alpha	2E+4
	Beta	Fixed contamination
	Gamma	2E+6
	X rays	
* If no probes are indicated the recommended technique is to use a wipe test in association with a probe or liquid scintillation technique		

SHIELDING (mm)		
Betas and electrons (Total absorption)		
Glass	<0.1	
Plastic	<0.1	
Gamma and X rays (half and tenth value thickness)		
	½	1/10
Lead	-	-
Steel	-	-

INTERNAL EXPOSURE FOR WORKERS				
COMMITTED EFFECTIVE DOSE PER UNIT INTAKE (Sv.Bq ⁻¹)				
Ingestion	f ₁	Inhalation (for soluble and reactive gases and vapours)		
Tritiated water	1.000	1.8E-11	Elemental hydrogen	1.8E-15
Organically bound tritium	1.000	4.2E-11	Tritiated water	1.8E-11
			Organically bound tritium	4.1E-11
Highest dose organ	Whole body	20 mSv ALI _{ingestion}	4.8E+08 (Bq)	20 mSv ALI _{inhalation}
				4.9E+08 (Bq)
				Gaseous form 1.1 E+13 (Bq)

MAXIMUM RECOMMENDED ACTIVITIES IN LOW LEVEL OR INTERMEDIATE LEVEL LABORATORIES (Bq)						
PHYSICOCHEMICAL STATE	Subject to external exposure requirements which may be more restrictive					
	Volatility factor (k)	Supervised area		Controlled area		
		Bench	Fume hood	Bench	Fume hood	Glove box
Tritiated water	0.01	3E+06	3E+07	1E+07	1E+08	1E+10
Elemental hydrogen	1E+00	Forbidden	2E+08	Forbidden	5E+08	5E+10