

Cadmium - 109

¹⁰⁹Cd₄₈


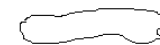

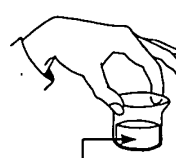

Half life: 462.6 days
 Specific activity: 9.58E+13 Bq.g⁻¹

Risk group: 3
 Risk colour: Yellow


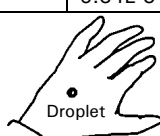
Main emissions (keV)								
	Gamma or X		Beta (E _{max})		Electrons		Alpha	
	E	%	E	%	E	%	E	%
E1	22	83			63	41		
E2	25	15			84	45		
E3	88	4			87	10		
% omitted	2.7				0			

Exemption levels	
Quantity (Bq)	1E+06
Concentration (Bq.g ⁻¹)	1E+04

Transport (TBq)	
IAEA ST1 A ₁ value	3E+1
IAEA ST1 A ₂ value	2E+0

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
				
<i>Betas, electrons (skin dose)</i>	<i>Betas, electrons (skin)</i>			
0.00E+0	10 cm 0.0E+00 1 m 0.0E+00	100 cm 3.44E-6	9.18E-3	1.22E-1
<i>Gammas, X rays (deep tissue dose)</i>	<i>Photons (skin)</i>			
2.09E-4	10 cm 8.0E-04 1 m 4.3E-04			
	<i>Photons (deep dose)</i>			
	10 cm 5.6E-04 1 m 3.0E-04			

The values above do not include Bremsstrahlung radiation.

CONTAMINATION												
Contamination skin dose (mSv.h⁻¹)	Detection	Derived limits (Bq.cm⁻²)										
Uniform deposit (1kBq.cm ⁻²) 5.41E-1	<table border="1"> <tr><th colspan="2">Recommended probes*</th></tr> <tr><td>Alpha</td><td></td></tr> <tr><td>Beta</td><td>+</td></tr> <tr><td>Gamma</td><td></td></tr> <tr><td>X rays</td><td>++</td></tr> </table>	Recommended probes*		Alpha		Beta	+	Gamma		X rays	++	Removable contamination
Recommended probes*												
Alpha												
Beta		+										
Gamma												
X rays	++											
0.05 ml droplet (1 kBq) 6.34E-3		6E+1										
		Fixed contamination										
		3E+3										
* 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	0.2	
Gamma and X rays (half and tenth value thickness)		
	1/2	1/10
Lead	< 1	< 1
Steel	< 1	< 1

INTERNAL EXPOSURE FOR WORKERS				
COMMITTED EFFECTIVE DOSE PER UNIT INTAKE (Sv.Bq ⁻¹)				
Ingestion	f_i		Inhalation	
			1 μm	5 μm
All inorganic compounds	0.050	2.0E-09	All unspec. comp. & metallic Ag	F 8.1E-09 9.6E-09
			Sulphides, halid. & nitrat.	M 6.2E-09 5.1E-09
			Oxid. & hydrox.	S 5.8E-09 4.4E-09
Highest dose organ	Kidneys	20 mSv A_{LI}	20 mSv A_{LI}	
		1.0E+07 (Bq)	2.1E+06 (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
All compounds	0.01	6E+05	6E+06	2E+06	2E+07	2E+09