

Phosphorus - 33

³³P₁₅

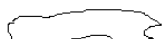
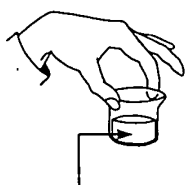
Half life: 25.6 days
Specific activity: 5.72E+15 Bq.g⁻¹

Risk group: 5
Risk colour: Blue

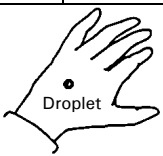
Main emissions (keV)				
	Gamma or X	Beta (Emax)	Electrons	Alpha
	E %	E %	E %	E %
E1		249 100		
E2				
E3				
% omitted		0		

Exemption levels	
Quantity (Bq)	1E+08
Concentration (Bq.g ⁻¹)	1E+05

Transport (TBq)	
IAEA ST1 A1 value	4E+1
IAEA ST1 A2 value	1E+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 4.9E-02 1 m 0.0E+00			
	<i>Photons (skin)</i>			
	10 cm 0.0E+00 1 m 0.0E+00			
<i>Gammas, X rays (deep tissue dose)</i>	<i>Photons (deep dose)</i>	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) 8.65E-1	Recommended probes*	Removable contamination
0.05 ml droplet (1 kBq) 1.38E-1	Alpha	2E+2
	Beta + +	Fixed contamination
	Gamma	2E+4
	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		0.3
Plastic		0.5
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	1 µm	5 µm
All compounds	0.800	2.4E-10	All unspec. compounds	F	9.6E-11 1.4E-10
			Some phosphat. det. by comb. cation	M	1.4E-09 1.3E-09
				S	
Highest dose organ	Lungs	20 mSv ALL _{ingestion}	8.3E+07 (Bq)	20 mSv ALL _{inhalation}	1.4E+07 (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
All compounds	0.01	4E+06	4E+07	1E+07	1E+08	1E+10