

**<sup>86</sup>Rb**

## Radioisotope Safety Data Sheet

# Rubidium 86

Half life 18.64 days

### Radiations emitted

Radiation	Energy, keV	Yield %
Beta ray	698	9
Beta ray	1774	91
Gamma ray	1077	9

### Safety precautions

<sup>86</sup>Rb is a high energy beta and gamma ray emitter that presents both an internal and external hazard.

Handling tools and standard laboratory PPE (gloves, lab coat, safety glasses) should be used to minimise exposure.

Perspex workstation shielding similar to that used for <sup>32</sup>P will be required for protection from beta radiation. Consideration will need to be given to gamma ray shielding where sources with activities greater than 100 MBq are handled. Wastes stored in the laboratory containing <sup>86</sup>Rb may require shielding with 50 mm lead bricks as well as the perspex box required for beta shielding. Wastes should be monitored with a survey meter to ensure radiation levels are acceptable.

NB radiation levels in controlled areas must not exceed 40 µSv per week, and in areas accessible to non-radiation workers, 10 µSv per week.

### Radiotoxicity data

<sup>86</sup>Rb is classed as being of medium hazard (group 2) according to AS 2243.4.

The Annual Limit on Intake by ingestion (ALI<sub>ing</sub>) is 7.1 MBq and the most restrictive inhalation limit (ALI)<sub>inhal</sub> is 15 MBq.

### Dose rates

The gamma ray dose rate constant for <sup>86</sup>Rb is 14.6 µSv/h/ GBq @ 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm<sup>-2</sup> 1890 µSv h<sup>-1</sup>

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 1230 µSv h<sup>-1</sup>

### Shielding

Half value layer (HVL) for the 1077 keV gamma ray = 11 mm lead

Total absorption of beta radiation is achieved with 6.3 mm perspex or 3.4 mm glass. Maximum range in air: 7.5 m. There is significant potential for bremsstrahlung production from interaction with high atomic number materials such as thin steel or lead sheets.

### Licensing requirements

Under the *Radiation Safety Regulation 2010* a licence is required to possess <sup>86</sup>Rb sources with concentrations equal to or greater than 100 Bq per gram and with activities of 100 kBq or greater.

In the University, individual user licences are required for persons who use licensable sources for research purposes.

### Disposal data

The maximum concentration of <sup>86</sup>Rb in aqueous wastes released to a sewerage system is given in the 1999 Radiation Safety Regulation as 489 kBq per m<sup>3</sup> i.e. 489 Bq per litre.

The concentration of <sup>86</sup>Rb in solid wastes disposed of to either the general or pathology waste streams must be less than 50 Bq per gram (50 kBq per kg) – i.e. half the concentration limit for licensing.

### Radiation detection and monitoring

A large diameter end window or pancake type GM tube contamination monitor is the most suitable type of meter for contamination control. TLD dosimeters are recommended for whole body personal monitoring. (For details see the Personal Radiation Monitoring Safety Guideline).

### Laboratory requirements

Low level lab maximum activities Bench: 600 kBq Fume cupboard: 6 MBq

Medium level lab maximum activities Bench: 2 MBq Fume cupboard: 20 MB