

# USER MANUAL

## CARRIERS

### LEA's product code:

- 9ACETEP: concentrated carrier for solutions
- 9ACETEQ: concentrated carrier for multigamma solutions

Each carrier has a dilution environment and it's specific for each radionuclide (annex 1).

### Carriers function and use:

- Carrier ensures solubility and stability of the radionuclide in the solution, therefore to make a dilution, it's necessary to respect 1% of concentrated carrier.
- Carrier avoids the migration of the radionuclide in the inside the surface of the container, so it's necessary to saturate the vial's surface with the diluted carrier minimum for 24h (48h for iodine).
- Special case: For these radionuclides: C-14, I-125, I-129, I-131 and Sr-90, two vials are expected:
  - <sup>90</sup>Sr: SR90-YCl2 and SR90-SrCl2
  - <sup>14</sup>C: C-14- Formaldehyde and C-14- D-glucose
  - <sup>125</sup>I, <sup>129</sup>I or <sup>131</sup>I: I-XXX-NAI and I-XXX-NA2S2O3

### Method:

- Diluted carrier:

The diluted carrier is the concentrated carrier diluted at 1%.

It's necessary to make the dilution in the 100mL flask (class A).

Introduce 1 mL of the concentrated carrier in the flask then bring up the volume to 100mL with the environment dilution (annex). The dilution environment must not be modified.

Shake during 10 minutes with a magnetic stirrer or a manually.

- The dilution of a standard solution:

To dilute a radioactive solution, volume of concentrated carrier added to the solution shall be 1% of the dilution environment volume.

#### Example:

Solution total volume = 10ml

Radioactive solution volume = 0.2ml

Volume of concentrated carrier to add =  $(10-0.2)/100 = 0.098\text{ml}$

Environment dilution volume =  $10-0.2-0.098 = 9.702\text{ml}$

Special case C-14, I-125; I-129, I-131 and Sr-90: insert 1% of a concentrated carrier (2 by Rn) into the added environment dilution.

### Preservation:

Carriers must be kept away from the light and the heat.

The color can change however the efficiency stays the same.

They can be used 6 months after receipt.






























### Container identification:

Flasks are identified by the hazard labels of the dilution environment because it's majority.

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### Annex 1 : Carrier

Radionuclide	Dilution Environment	Carrier salt	Hazards <sup>(1)</sup>
Americium 241	HNO <sub>3</sub> 1N	EuCl <sub>3</sub>	
Silver 110m	NH <sub>4</sub> OH 0,1N	AgCN <sup>(2)</sup> N°CAS : 506-64-9	
Barium 133	HCl 1N	BaCl <sub>2</sub> <sup>(2)</sup> N°CAS : 10326-27-9	
Cadmium 109	HCl 1N	CdCl <sub>2</sub> <sup>(2)</sup> N°CAS : 7790-78-5	
Cesium 134 et 137	HCl 0,1N	CsCl <sup>(2)</sup> N°CAS : 7647-17-8	
Calcium 45	HCl 0,1N	CaCl <sub>2</sub>	
Carbon 14	H <sub>2</sub> O	D-glucose	Not classified
		Formaldehyde <sup>(2)</sup> : N°CAS : 50-00-0	
Cerium 139 et 141	HCl 0,1N	CeCl <sub>3</sub>	
Chlorine 36	H <sub>2</sub> O	NaCl	Not classified
Chromium 51	HCl 0,1N	CrCl <sub>3</sub>	
Cobalt 57 ; 58 ; 60	HCl 0,1N	CoCl <sub>2</sub> <sup>(2)</sup> N°CAS : 7791-13-1	
Tin 113	HCl 6N	SnCl <sub>4</sub>	
Europium 152	HCl 1N	EuCl <sub>3</sub>	
Iron 55	HCl 0,1N	FeCl <sub>3</sub>	
Iron 59	HCl 1N	FeCl <sub>3</sub>	
Iodine 125 ; 129 ; 131	H <sub>2</sub> O	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Not classified
		NaI	
Manganese 54	HCl 0,1N	MnCl <sub>2</sub>	
Nickel 63	HCl 0,1N	NiCl <sub>2</sub> <sup>(2)</sup> N°CAS : 7791-20-0	
Phosphorus 32	HCl 0,1N	Na <sub>2</sub> HPO <sub>4</sub>	
Promethium 147	HCl 0,1N	LaCl <sub>3</sub>	
Sodium 22	HCl 0,1N	NaCl	
Sulfur 35	HCl 0,1N	Na <sub>2</sub> SO <sub>4</sub>	
Strontium 85 ; 89	HCl 0,1N	SrCl <sub>2</sub>	
Strontium 90	HCl 0,1N	SrCl <sub>2</sub> + YCl <sub>3</sub>	
Technetium 99	H <sub>2</sub> O	/	Not classified
Tritium	H <sub>2</sub> O	/	Not classified
Yttrium 88	HCl 0,1N	YCl <sub>3</sub>	
Zinc 65	HCl 0,1N	ZnCl <sub>2</sub>	
Curium 244	HNO <sub>3</sub> 1N	/	
Neptunium 237	HCl 6N	Oxalic acid	
Plutonium 238 ; 239	NHO <sub>3</sub> 3N	/	
Uranium 232 ; 233	HNO <sub>3</sub> 1N	/	


(1): Information given for information only and can be modified with the regulation's evolution.

(2): Candidate substances to authorization: evolution REACH n° 1907/2006/CE. Information is the result of our suppliers, information is subject to exactness collected information.

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### Annexe 2 : Multigamma carriers

Radionuclide	Dilution Environment	Carrier salt	Hazards <sup>(1)</sup>
12ML01	HCl 1N	CdCl <sub>2</sub> <sup>(2)</sup> N°CAS : 7790-78-5 CoCl <sub>2</sub> <sup>(2)</sup> N°CAS : 7791-13-1 EuCl <sub>3</sub> - CeCl <sub>3</sub> CrCl <sub>3</sub> - SnCl <sub>4</sub> YCl <sub>3</sub> - SrCl <sub>2</sub> MnCl <sub>2</sub> - ZnCl <sub>2</sub>	

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