

## Spurr's Epoxy Embedding Medium

Spurr's **Low Viscosity** embedding mixture is recommended because of its excellent penetration qualities, which provide good and rapid infiltration of tissues. It is easy to prepare, and mixes rapidly by shaking and swirling.

The hardness is adjusted by changing the amount of the flexibilizer, **DER 736**; the blocks have good trimming and sectioning qualities and the sections are tough under the electron beam. (Grids, without supporting membranes, can be used.)

### INGREDIENTS:

**ERL 4206 – vinyl cyclohexene dioxide (VCD)** is a cycloaliphatic diepoxide, with a m.w. of 140.18 and epoxide equivalent of 74-78. Its viscosity is 7.8 cP, lower than the other epoxy resin embedding media such as Epon 812, Maraglas and Araldite.

**DER 736 – diglycidyl ether** of polypropylene glycol, a flexibilizer to control the hardness of the polymerized block. It is used because of its low viscosity of 30-60 cP at 25°C. It has a m.w. of 380 and an epoxy equivalent of 175-205.

**NSA – nonenyl succinic anhydride**, a hardener with a relatively low viscosity of 117 cP at 25°C, and a m.w. of 224. It is regarded as non-toxic. A minimum exposure to air is recommended to avoid hydrolysis.

**DMAE – dimethylaminoethanol (S-1)** an accelerator, used because of its low viscosity and results in blocks with less color. In addition, it induces rapid cure when the temperature is elevated to 70°C. It is effective in a very low concentration. (Less than 1.0%)

	<u>MODIFICATIONS</u>				
	A	B	C	D	E
	FIRM (standard)	HARD	SOFT	RAPID CURE	LONGER POT LIFE LOWER VISCOSITY
<b>ERL 4206</b>	10.0 g	10.0 g	10.0 g	10.0 g	10.0 g
<b>DER 736</b>	6.0 g	4.0 g	8.0 g	6.0 g	6.0 g
<b>NSA</b>	26.0 g	26.0 g	26.0 g	26.0 g	26.0 g
<b>DMAE</b>	0.4 g	0.4 g	0.4 g	1.0 g	0.2 g
<b>Cure time at 70°C (hours)</b>	8	8	8	3	16
<b>Pot life (days)</b>	3-4	3-4	3-4	2	7

### PROCEDURE

The gravimetric method has been found more precise than volumetric to measure viscous materials.

Add each component in turn to a disposable plastic beaker. An exact weight is recommended, and care must be used in dispensing the final amounts of each component so that no excess is added.

The catalyst (**DMAE**) should be added last, after gently mixing the three other components.

The complete formula should be mixed thoroughly and bubbles may be drawn off with a gentle vacuum.

The complete mixture with the hardener can be used immediately for infiltration, and then for embedding; leftover material stored in a disposable syringe, well capped and with no air, in a freezer can be stored for several months, thawed and reused.

### **DEHYDRATION – INFILTRATION AND POLYMERIZATION**

This embedding media is compatible with all dehydrating agents: acetone, dioxane, ethanol, hexyleneglycol, isopropyl alcohol, propylene oxide, tert-butyl alcohol. The schedule and concentration can be established by the investigator. Dehydration is generally done at room temperature.

The embedding media is completely compatible with ethanol in all concentrations. Thus, it does not require a change to propylene oxide prior to infiltration as is true for other epoxy resin mixtures.

The infiltration can be started by adding the embedding media to an equal quantity (1:1) of the dehydrating fluid left in the vial with the tissue. Swirl the mixture and let sit from 30 to 60 minutes. Add the same amount of embedding media to the existing infiltration media swirl, and let sit for another 30 minutes. Pour and drain the mixture and add more embedding media. A second change can be made before the final embedding. Polymerization takes 8 hours at 70°C. (The mixture can be left in an oven overnight.)