13 - Chemicals for microscopy

Chemicals and mixtures offered by Agar Scientific are labelled with the appropriate hazard symbols and risk and safety phrases in accordance with current UK regulations and EC directives. The symbols and basic hazard descriptions are shown below. The absence of symbols or risk and safety phrases should not be taken to indicate that the product is non-hazardous, particularly since new data and legislation requirements are always under review.

Material Safety Data Sheets (MSDS) are available to assist in the safe handling and storage of products, and the completion of any requirements under COSHH. Our catalogue entries indicate the main hazards, providing guidance towards safe handling and storage. One should also bear in mind that sending hazardous materials may also involve special shipping requirements and extra costs.

Our products are intended for use only by qualified personnel in laboratory or industrial conditions. They are not intended for use by private individuals or in any domestic environment.

Hazard symbols

There are many different dangers when handling chemicals. To warn of these our products carry internationally recognised hazard symbols. The list below shows common hazards encountered with chemicals, but not all of our products will have these hazards. Some products can have more than one hazard.

Irritant: may cause irritation to the skin, eyes, mucous membranes or respiratory system.

Flammable: can catch fire easily. There are varying degrees of flammability; some chemicals ignite very easily or even spontaneously in contact with air or water.

Corrosive: may destroy living tissue on contact; may cause burns or severe burns.

Oxidising: gives off a large amount of heat in contact with other substances.

Harmful: may cause minor illness by ingestion, skin contact or inhalation.

Environmental hazard: may damage or pollute the environment.

Toxic: may cause acute illness by ingestion, skin contact or inhalation.

Radioactive: a very limited number of products used in microscopy have low level radioactivity. Such products should be treated as toxic for handling purposes.

Explosive: some of the catalysts used in making resins may have potentially explosive properties. The quantities of such products are small, and often they are supplied in forms which suppress this tendency (eg. they may be water damped).

Risk and safety phrases

To help to understand the risks associated with chemicals and how to handle them more safely, products carry internationally recognised risk (R) and safety (S) phrases. The list of R and S codes, their meanings and full details on chemical hazard symbols can be found at **http://www.hse.gov.uk/chip/phrases.htm**

General guidelines for handling chemicals

All chemical substances should be handled with care by qualified personnel, and we recommend that the following minimum precautions be observed:

1. Do not eat, drink or smoke while handling chemicals or in areas where they are stored.
2. Before opening the container, read the label carefully to ensure it is the correct chemical and take note of hazard indications and/or storage conditions.
3. Always wear the appropriate protective clothing and at least disposable gloves and safety spectacles.
4. Handle chemicals in an approved fume cupboard or hood whenever practicable and certainly when using a chemical with a known significant hazard.
5. Seal containers tightly after use, and store in accordance with any guidelines given.
6. In case of spillages on the skin, wash hands carefully with soap and water.

   In case of contact with eyes, wash with plenty of clean water.

   In case of inhalation of fumes, remove to fresh air as soon as possible.

   Refer to MSDS and seek medical attention in case of any concern. Use appropriate first aid until medical attention is available.
7. Deal with spillages carefully, using precautions and methods appropriate to the nature and scale of the hazards, and dispose of spillages or waste chemicals in accordance with local regulations.

General guidelines for storing chemicals

1. Keep chemical products in a dedicated area, taking account of any specific regulatory requirements and storage recommendations. Segregate stock to reduce hazards.
2. Secure chemicals from unauthorised use, particularly those with severe hazards or covered by any regulations.
3. General chemical storage areas should normally be cool, dry, well ventilated and protected from extremes of temperature and sources of ignition.
4. Examine stock at regular intervals and dispose of out-of-date or deteriorated materials carefully and in accordance with local regulations.

Fixatives

Warning: all fixatives by definition are potentially harmful or toxic. They must always be handled in a fume cupboard since even at room temperature the vapours are dangerous.

Glutaraldehyde

Several grades are available:

Practical grade which is used for general fixation.

EM grade for use in electron microscopy. It is stable for over six months, has a pH 5 - 6 and proves to be an excellent fixative for structural studies. It should also be used in histochemical or immunological reactions.

Double distilled grade which has a very low cation concentration.

Vacuum distilled grade is purified to remove all polymerised material and has no UV absorption at 235 nm. It is packed in neutral glass under nitrogen for best results with enzyme histochemistry. Any distilled glutaraldehyde is relatively unstable and has a high risk of polymerising if it is not handled properly. It is therefore recommended that this grade of material is only purchased for use within a 3 to 4 week period and is carefully stored at 4 °C without continued defrosting and recapping.

R1009	Glutaraldehyde 25 %, practical grade. 500 ml *Toxic*
R1010	Glutaraldehyde 25 %, EM grade. 500 ml *Toxic*
R1011	Glutaraldehyde 25 %, EM grade. 250 ml *Toxic*
R1012	Glutaraldehyde 25 %, EM grade. 100 ml *Toxic*
R1020	Glutaraldehyde 25 %, EM grade. 10 x 10 ml ampoule *Toxic*
R1013	Glutaraldehyde 70 %, double distilled. 5 ml ampoule *Toxic*
R1014	Glutaraldehyde 70 %, double distilled. 2 ml ampoule *Toxic*
R1310	Glutaraldehyde 25 %, vacuum distilled. 500 ml *Toxic*
R1311	Glutaraldehyde 25 %, vacuum distilled. 100 ml *Toxic*
R1312	Glutaraldehyde 25 %, vacuum distilled. 10 x 10 ml *Toxic*
R1313	Glutaraldehyde 50 %, vacuum distilled. 100 ml *Toxic*
R1314	Glutaraldehyde 50 %, vacuum distilled. 10 x 10 ml *Toxic*

Osmium tetroxide

This is more toxic than glutaraldehyde and has a higher vapour pressure. Particular care must be taken to avoid breathing the vapour or allowing it to affect the eyes.
Supplied in sealed ampoules.

R1015 Osmium tetroxide. 10 x 0.1 g ampoules *Toxic*
R1016 Osmium tetroxide. 10 x 0.25 g ampoules *Toxic*
R1017 Osmium tetroxide. 1 g ampoule *Toxic*
R1019 Osmium tetroxide 2 % solution. 100 ml *Toxic*
R1021 Osmium tetroxide 2 % solution. 5 x 2 ml ampoules *Toxic*
R1022 Osmium tetroxide 2 % solution. 5 x 5 ml ampoules *Toxic*
R1023 Osmium tetroxide 4 % solution. 5 x 2 ml ampoules *Toxic*
R1024 Osmium tetroxide 4 % solution. 5 x 5 ml ampoules *Toxic*

Other fixatives

Paraformaldehyde

Paraformaldehyde is polymerised formaldehyde, usually obtained as a white powder. If mixed with water and heated, it depolymerises completely and dissolves in the water to form a solution of formaldehyde or formalin.

R1018 Paraformaldehyde. 500 g *Harmful*

Paraformaldehyde solution (methanol-free)

This is an efficient and rapid penetrant fixative when used in combination with glutaraldehyde. Available in pre-scored ampoules, sealed under inert gas.

R1026 Paraformaldehyde 16 % solution. 10 x 10 ml ampoules *Harmful*

Potassium permanganate

R1215 Potassium permanganate. 100 g *Oxidising, harmful*

Acrolein

This can be beneficial for dense tissue and tissues covered with impermeable substances eg. wax and chitin.

R1151 Acrolein. 5 ml *Very toxic, highly flammable*

Ruthenium tetroxide

0.5 % stabilised aqueous solution. Ruthenium tetroxide is very similar to osmium tetroxide and is used as an EM fixative/stain. It gives excellent staining of saturated and unsaturated polymer materials with improved image contrast. RuO_4 also has a stabilising effect against electron beam damage of material films. Note: penetration of ruthenium tetroxide into tissue is poor. Store at 4 °C.

R1027 Ruthenium tetroxide, 0.5 % solution. 5 x 10 ml *Irritant*

Buffers

Some buffers are toxic and should be handled with the same care as fixatives. For example, sodium cacodylate contains arsenic and is toxic.

R1102 Sodium cacodylate. 500 g *Toxic*
R1103 Sodium cacodylate. 250 g *Toxic*
R1104 Sodium cacodylate. 100 g *Toxic*
R1105 Sodium cacodylate. 25 g *Toxic*
R1106 Trisodium citrate EM. 500 g
R1107 Trisodium citrate EM. 100 g
R1160 TRIS buffer. 500 g
R1161 TRIS buffer. 250 g
R1162 TRIS buffer. 100 g
R1170 Sodium dihydrogen orthophosphate. 500 g
R1172 Disodium hydrogen orthophosphate. 500 g
R1100 s-Collidine. 100 g *Harmful*
R1101 s-Collidine. 25 g *Harmful*
R1120 HEPES (N-2-Hydroxyethylpiperazine-N'-2-ethanesulphonic acid). 10 g
R1121 HEPES (N-2-Hydroxyethylpiperazine-N'-2-ethanesulphonic acid). 25 g
R1125 PIPES (Piperazine-N,N'-bis-2-ethanesulphonic acid). 10 g
R1126 PIPES (Piperazine-N,N'-bis-2-ethanesulphonic acid). 25 g

Dehydrating agents and intermediate solvents

R1080 Propylene oxide. 500 g *Extremely flammable, toxic*
R1098A Xylene. 1 litre *Flammable, harmful*
R1087 Carbowax 400 (polyethylene glycol 400). 500 g
R1099 Carbowax 200 (polyethylene glycol 200). 500 g
R1195 Dimethyl sulphoxide (DMSO). 500 g *Irritant*
R1337 Ethylene dichloride. 500 g *Highly flammable, toxic*

Histo-Clear®

A histological clearing agent which is non-toxic and non-flammable. It can be used as a substitute for xylene or toluene in the preparation and staining of sections for light microscopy. Histo-Clear leaves the tissue less hard and brittle than xylene, so is ideal for cutting thin sections. It is miscible with ethanol, isopropanol, butanol and paraffin-based embedding media, and all permanent mounting media such as Histomount™. Histo-Clear yields excellent results in automated tissue processing.

R1345 Histo-Clear. 3.8 litres *Irritant*

Histo-Clear II

This has all the properties of Histo-Clear with a much reduced citrus odour. It may be substituted for toluene and xylene without any change in protocol.

R1353 Histo-Clear II. 3.8 litres *Irritant*

Embedding kits

JB-4® resin kit

JB-4 is a water-miscible glycerol methacrylate-based embedding medium for the infiltration of histological specimens. Sections 0.5 - 2.0 µm can be prepared with good structural detail. It has been successfully used in enzyme histochemistry, immunocytochemistry, immunofluorescence, auto-radiography and *in situ* hybridisation. Tissue can be fixed in either aqueous or non-aqueous fixatives, dehydrated with either alcohol for routine work, or catalysed monomer to preserve antigenicity or enzyme activity. All processing can be carried out at room temperature or below. Aqueous histological stains may be used.

The kit consists of:

JB-4 solution A. 800 ml *Harmful*

JB-4 solution B. 30 ml *Harmful*

JB-4 catalyst (Benzoyl peroxide, damped). 12 g *Oxidising, irritant*

R1130 JB-4 kit

Further details on request.

JB-4® mini embedding kit

This is a pre-measured, ready-to-use version of the JB-4 kit.

The kit consists of:

JB-4 solution A. 40 ml *Harmful*

JB-4 solution B. 40 ml *Harmful*

JB-4 catalyst (Benzoyl peroxide, damped). 2 x 0.5 g *Oxidising, irritant*

Accelerator. 2 ml

R1138 JB-4 mini kit

Glycol methacrylate resin kit

GMA (2-Hydroxyethyl methacrylate) is useful as an embedding medium for light microscopy studies. It is water-soluble and polymerises at room temperature.

The kit consists of:

GMA (2-Hydroxyethyl methacrylate). 5 x 100 g *Irritant*

2-Butoxyethanol. 100 g *Harmful*

Carbowax 400. 100 g

Benzoyl peroxide, damped. 25 g *Oxidising, irritant*

N,N-Dimethylaniline. 25 g *Toxic*

R1036 GMA kit

Further details on request.

Histocryl resin kit

Histocryl is a hydrophilic acrylic resin of low toxicity which is easy to use and formulated specifically for light microscopy. It permits the use of most routine staining techniques without prior removal or etching of the resin. For those laboratories using other multi-component acrylic systems, no alteration to processing schedules is necessary.

The kit consists of:

Histocryl. 500 g *Irritant*

Catalyst. 50 g *Oxidising, irritant*

Accelerator. 10 ml *Toxic*

R1131 Histocryl kit

Further details on request.

LR White™ resin

This is a hydrophilic acrylic resin of low viscosity (8 cps) available in three grades of hardness. The resin has wide application, being suitable for both light and electron microscopy. With appropriate fixation, the same specimen may be used for both techniques although the soft grade is not recommended for EM use. It may be thermally cured or cold cured using the accelerator. It has been successfully used for immunocytochemical and immunohistochemical techniques but it is not designed to be used at very low temperatures since the components begin to separate out at about -15 °C. Its low viscosity makes it suitable for infiltrating decalcified bone and teeth.

Must be stored at 4 °C (air shipment or courier for export).

Further details on request. Technical data sheets are available.

R1280 LR White, hard grade. 500 g *Irritant*

R1281 LR White, medium grade. 500 g *Irritant*

R1282 LR White, soft grade. 500 g *Irritant*

R1283 Accelerator for LR White. 10 ml *Toxic*

LR Gold™ resin

LR Gold was originally designed primarily for embedding unfixed tissue at low temperature. This enables enzyme histochemistry and immunocytochemistry of many fixation-sensitive and temperature-labile enzymes and antigens to be carried out in 1 - 4 µm resin sections. It is an acrylic resin with low viscosity. The resin may be cured at temperatures down to -25 °C using a visible light curing source and benzil, a light sensitive initiator. It is recommended that polyvinylpyrrolidone (PVP) is used to protect unfixed tissue from osmotic changes during processing. It has also been found to have certain advantages over other resins for use with fixed tissue. It can be used in place of LR White protocols when lower temperatures are required.

R1284 LR Gold. 500 g *Irritant*

R1285 Benzil. 50 g *Irritant*

R1286 Polyvinylpyrrolidone. 100 g

Further details on request.

UNICRYL™ resin

This is a universal acrylic resin from British BioCell International for both EM and LM applications. Semi-thin (1 - 5 µm) or ultra-thin (0.1 µm) sections can be cut. It is suitable for animal, plant and microbiological studies. It gives excellent results in histology and ultrastructure, histochemistry, immunolabelling and *in situ* hybridisation due to its excellent staining and labelling properties. The resin can be polymerised by heat or by UV irradiation at lower temperatures. The sections stain well. It is supplied as a single solution.

A detailed instruction booklet explaining methods for specimen preparation and polymerisation at high and low temperatures is available.

R1039 UNICRYL resin. 250 ml *Flammable, irritant*

Epoxy resin (Araldite® CY212) kit

This epoxy resin is also known as Araldite M. This kit has proved to be extremely reliable and versatile for a range of tissues. It is easy to section. The sections are stable in the electron beam.

The kit consists of:

Epoxy resin (Araldite CY212). 5 x 100 g *Irritant*

DDSA. 5 x 100 g *Irritant*

Dibutyl phthalate. 100 g *Toxic*

BDMA. 50 g *Corrosive*

R1030 Epoxy resin kit

See Glauert, *Practical Methods in Electron Microscopy,* Vol. 17, 1998.

Agar 100 resin kit

Agar 100 resin is made to the same formulation as Epon 812 but it is more closely controlled with respect to viscosity; successive batches have a consistently low viscosity.

The kit consists of:

Agar 100 resin. 5 x 100 g *Irritant*

DDSA. 3 x 100 g *Irritant*

MNA. 3 x 100 g *Corrosive*

BDMA. 50 g *Corrosive*

R1031 Agar 100 resin kit

Please note that both the epoxy resin kit and the Agar 100 resin kit use BDMA as the accelerator rather than DMP-30.
See Glauert, *Practical Methods in Electron Microscopy,* Vol. 17, 1998.

Agar low viscosity resin kit

ERL 4206, the major component of Spurr resin, is no longer available. However, this Agar low viscosity resin has all the same advantages of Spurr resin. It gives rapid penetration, good contrast, ease of sectioning, stability under the electron beam and good staining characteristics. It can be used for both optical and electron microscopy applications. The hardness of the block can be adjusted by changing the ratios of the two hardeners VH1 and VH2. None of the components has the known carcinogenicity of ERL 4206 but, as with the laboratory use of all resins, care should be taken at all stages of handling with the use of gloves and a well ventilated area.

The kit consists of:

Resin. 5 x 100 g *Irritant*

VH1 hardener. 4 x 100 g *Irritant*

VH2 hardener. 2 x 100 g *Corrosive*

Accelerator. 50 g *Corrosive*

R1078 Agar low viscosity resin kit

Pre-mix resin kits

These kits make approximately 500 g of resin and have the advantage that the resin components are already pre-weighed. Each kit comprises five sets of two components plus five ampoules of accelerator. One component is supplied in a 100 ml capacity bottle and the other in a 50 ml bottle. The contents of the small bottle are added to the contents of the large bottle and mixed. An ampoule of accelerator is added and mixed thoroughly. No additional containers are required. This makes approximately 100 g of resin. Any unused resin can be left to gel in the bottle to be discarded.

R1140 Agar 100 pre-mix kit, hard *Irritant*
R1141 Agar 100 pre-mix kit, medium *Irritant*
R1142 Agar 100 pre-mix kit, soft *Irritant*

R1143 Araldite CY212 pre-mix kit, hard *Irritant*
R1144 Araldite CY212 pre-mix kit, medium *Irritant*
R1145 Araldite CY212 pre-mix kit, soft *Irritant*

R1164 Agar LV* pre-mix kit, hard *Irritant*
R1165 Agar LV* pre-mix kit, medium *Irritant*
R1166 Agar LV* pre-mix kit, soft *Irritant*
* Low Viscosity

Lowicryl® resin kits for low temperature embedding

These embedding resins are based on a highly cross-linked acrylate and methacrylate formula developed by Carlemalm *et al* in Professor Kellenberger's laboratory. They have been designed for use over a wide range of embedding conditions and have been formulated to provide low viscosity at low temperature; K4M down to -35 °C and HM20 to -70 °C. K4M is a water compatible polar embedding resin while HM20 is a hydrophobic non-polar resin. Both resins may be polymerised by ultraviolet light (360 nm) at low temperatures or at room temperature. Thermal polymerisation is also possible. Dehydration, infiltration and embedding are carried out at low temperatures reducing the extraction of lipids. These resins permit adequate retention of ultrastructure, together with improved preservation of antigenicity.

K4M kit:

K4M resin (monomer B). 3 x 250 ml

K4M cross-linker (A). 130 ml

K4M initiator (C). 5 g

R1035 Lowicryl K4M kit *Toxic, irritant*

HM20 kit:

HM20 resin (monomer E). 3 x 250 ml

HM20 cross-linker (D). 130 ml

HM20 initiator (C). 5 g

R1034 Lowicryl HM20 kit *Flammable, irritant*

Lowicryl K11M and HM23 kits have similar properties to K4M and HM20 but have been developed for use at significantly lower temperatures. They are based on acrylate and methacrylate esters with freezing points that allow applications down to approx -60 °C and -80 °C for K11M and HM23 respectively. K11M is hydrophilic and HM23 hydrophobic. Both resins have been specifically designed for freeze substitution, together with low temperature embedding. K11M has a lower viscosity than K4M.

K11M kit:

K11M resin (monomer I). 3 x 250 ml

K11M cross-linker (H). 50 ml

K11M initiator (C). 5 g

R1133 Lowicryl K11M kit *Flammable, irritant*

HM23 kit:

HM23 resin (monomer G). 250 ml

HM23 cross-linker (F). 130 ml

HM23 initiator (C). 5 g

(for polymerisation above -50 °C)

HM23 initiator (J). 5 g

(for polymerisation -50 °C and below)

R1134 Lowicryl HM23 kit *Flammable, irritant*

The following data sheets are available: 'Instructions for use' and 'Lowicryl letters 1, 2 and 3'.

Lowicryl MonoStep kits

These pre-mixed, ready-to-use embedding kits save time and minimise chemical contact. They are based on Lowicryl K4M and HM20 formulations for low temperature embedding or freeze substitution.

R1075 Lowicryl K4M, MonoStep. 225 g *Irritant*

R1076 Lowicryl HM20, MonoStep. 225 g *Irritant*

Durcupan® water soluble resin kit

Durcupan A resin is water soluble. It is particularly suitable for histochemical studies where the use of solvents may inactivate the enzymes being studied.

The kit consists of:

Durcupan A resin. 100 ml *Harmful*

DDSA. 100 ml *Irritant*

DMP 30. 20 ml *Harmful*

Dibutyl phthalate. 20 ml *Toxic*

R1037 Durcupan kit

Embedding materials – separate components

Epoxy resins and methacrylates are often harmful. Resin blocks are harmless after curing but, if cured blocks are sawn, make sure that the dust is not inhaled.

Epoxy resins

R1040 Araldite CY212. 500 g *Irritant*
R1041 Araldite CY212. 250 g *Irritant*
R1042 Araldite CY212. 100 g *Irritant*

R1043 Agar 100 resin*. 500 g *Irritant*
R1044 Agar 100 resin*. 250 g *Irritant*
R1045 Agar 100 resin*. 100 g *Irritant*

R1047R ERL 4221 resin***. 225 ml

R1370 Agar LV** resin. 500 g *Irritant*
R1371 Agar LV** resin. 250 g *Irritant*
R1372 Agar LV** resin. 100 g *Irritant*

R1090 Araldite RD-2. 500 g *Harmful*
R1091 Araldite RD-2. 250 g *Harmful*
R1092 Araldite RD-2. 100 g *Harmful*

*Replaces Epon 812 resin now unobtainable. The formulation of Agar 100 resin is the same as Epon, but is less viscous than many samples of Epon 812 and is more closely controlled in its manufacture. Epoxide equivalent between 148 and 150.

**Low Viscosity

***ERL 4221 has replaced ERL4206. It has a higher viscosity (180 cps) than the previously used ERL 4206 (60 cps). Ref: Ellis, E Ann, 'Solutions to the Problem of Substitution of ERL 4221 for Vinylcyclohexene dioxide in Spurr Low Viscosity Embedding Formulations', *Microscopy Today*, Vol 14, No 4, July 2006.

Quetol™ 651

This is an epoxy resin with a viscosity of 15 cps at 25 °C and an epoxy equivalent of 115. It is miscible with water, alcohol and acetone. When used with NSA and DMP-30, it forms a low viscosity mix which penetrates tissue easily.

R1068 Quetol 651. 500 g *Irritant*

Hardeners for epoxy resins

R1051 DDSA EM grade redistilled. 500 g *Irritant*
R1052 DDSA EM grade redistilled. 250 g *Irritant*
R1053 DDSA EM grade redistilled. 100 g *Irritant*

R1054 NSA redistilled. 500 g *Irritant*
R1055 NSA redistilled. 250 g *Irritant*
R1056 NSA redistilled. 100 g *Irritant*

R1081 MNA redistilled. 500 g *Corrosive*
R1082 MNA redistilled. 250 g *Corrosive*
R1083 MNA redistilled. 100 g *Corrosive*

R1373 Hardener for Agar LV* resin VH1. 500 g *Irritant*
R1374 Hardener for Agar LV* resin VH1. 250 g *Irritant*
R1375 Hardener for Agar LV* resin VH1. 100 g *Irritant*

R1376 Hardener for Agar LV* resin VH2. 500 g *Corrosive*
R1377 Hardener for Agar LV* resin VH2. 250 g *Corrosive*
R1378 Hardener for Agar LV* resin VH2. 100 g *Corrosive*

*Low Viscosity

Accelerators for epoxy resins

BDMA is recommended in preference to DMP-30 since it is less viscous and has a longer shelf life. Accelerators should be stored dry in a desiccator, but need not be in a refrigerator. All these materials have a shorter shelf life than the resins and should be discarded after six months.

R1060 BDMA. 500 g *Corrosive*

R1061 BDMA. 250 g *Corrosive*

R1062 BDMA. 100 g *Corrosive*

R1063 DMP-30. 500 g *Harmful*

R1064 DMP-30. 250 g *Harmful*

R1065 DMP-30. 100 g *Harmful*

R1066 S-1 (DMAE). 500 g *Corrosive*

R1067 S-1 (DMAE). 100 g *Corrosive*

R1379 Accelerator for Agar LV* resin. 100 ml *Corrosive*

R1380 Accelerator for Agar LV* resin. 50 ml *Corrosive*

R1381 Accelerator for Agar LV* resin. 5 x 2.5 ml *Corrosive*

*Low Viscosity

Plasticisers

R1070 Dibutyl phthalate. 500 g *Toxic*

R1071 Dibutyl phthalate. 100 g *Toxic*

Additives

R1072 DER 736. 500 g *Irritant*

R1073 DER 736. 250 g *Irritant*

R1074 DER 736. 100 g *Irritant*

R1088 N,N-Dimethylaniline. 100 g *Toxic*

R1089 2-Butoxyethanol. 500 g *Harmful*
Used in glycol methacrylate.

Methacrylates

R1049 Methyl methacrylate. 500 g *Highly flammable, irritant* (stabilised with 60 ppm hydroquinone).

R1050 n-Butyl methacrylate. 500 g *Flammable, irritant* (stabilised with 60 ppm hydroquinone).

R1084 2-Hydroxyethyl methacrylate. 500 g *Irritant*

R1085 2-Hydroxyethyl methacrylate. 250 g *Irritant*

R1086 2-Hydroxyethyl methacrylate. 100 g *Irritant*

Polymerisation catalyst for methacrylates

R1058 Benzoyl peroxide. 100 g *Oxidising, irritant* (damped with 25 % water).

R1059 Benzoyl peroxide. 25 g *Oxidising, irritant* (damped with 25 % water).

Resin solvents

A solvent for unpolymerised or partially polymerised resins and their components. Clean glassware etc. with resin solvent and wash with water. The solvent is water miscible.

R1347 Solvent for unpolymerised resin. 500 ml *Harmful*

An active solvent for polymerised resins.

R1346 Solvent for polymerised resin. 50 ml *Corrosive, harmful*

Stains for electron microscopy

R1155 Ammonium molybdate EM. 100 g *Irritant*
Negative stain.

R1156 Ammonium molybdate EM. 25 g *Irritant*
Negative stain.

R1205 Indium trichloride EM. 10 g *Corrosive*
Metal stain for nucleic acids.

R1207 Lanthanum nitrate EM. 25 g *Oxidising, irritant*
Used to prepare colloidal lanthanum hydroxide-containing fixatives for the demonstration of intercellular spaces.

R1209 Lead acetate EM. 250 g *Toxic*
Metal stain for TEM, used for in-block and thin section staining.

R1210 Lead citrate. 50 g *Toxic*
For the preparation of a simplified lead stain. The most widely used metal stain for ultrathin sections.

R1217 Lead nitrate EM. 500 g *Oxidising, toxic*
Metal stain for ultrathin sections.

R1212 Phosphomolybdic acid EM. 25 g *Oxidising, corrosive*
Positive and negative stain.

R1213 Phosphotungstic acid EM. 25 g *Corrosive*
Positive and negative stain.

R1214 Potassium pyroantimonate. 100 g *Harmful*

R1226 Ruthenium red EM. 1 g
Positive stain.

R1227 Ruthenium red EM. 100 mg
Positive stain.

R1230 Sodium silicotungstate EM. 25 g
Negative stain.

R1260A Uranyl acetate EM. 25 g *Very toxic, radioactive*
Universal stain for thin sections, in-block staining and negative staining.

Methylamine tungstate

Methylamine tungstate is an excellent negative stain. Unlike phosphotungstic acid, it does not damage virus particles and is consequently valuable for staining delicate viruses. Contrast is good, though not as good as that obtained with uranyl stains; the resolution is good, and the material wets grid films and specimens very well.

R1219 Methylamine tungstate. 1 g

See Faberge A.C. and Olivier R.M., *Microscopie 20*, 242, 1974 for application to plant viruses.

Histochemical agents and enzymes

R1200 Ferritin, cadmium free. 100 mg

R1220 Peroxidase grade 1. 10 mg
(activity 250 purpurogallin units/mg, Rz value 3.0).

R1221 Peroxidase grade 2. 100 mg
(activity 150 purpurogallin units/mg, Rz value 2.0).

R1222 Peroxidase grade 2. 10 mg
(activity 150 purpurogallin units/mg, Rz value 2.0).

R1240 Thiocarbohydrazide. 1 g *Very toxic*

R1241 Thiosemicarbazide. 25 g *Very toxic*

R1150 Acriflavin. 25 g *Harmful*

R1153 Adenosine monophosphate. 1 g

R1154 Adenosine triphosphate. 1 g

R1190 Cytochrome C. 25 mg

Chemicals for support films

R1201 Formvar powder (Polyvinyl formal). 100 g

R1202 Formvar powder (Polyvinyl formal). 25 g

R1275 Pioloform powder. 10 g

R1276 Butvar B98. 25 g

R1277 Silicon monoxide. 10 g *Irritant*

Other chemicals

R1348 Periodic acid. 100 g *Oxidising, corrosive*
Used with Schiffs reagent.

R1349 Sodium metaperiodate. 25 g *Oxidising, harmful*
For treating resin prior to immunostaining.

R1278A Indicating silica gel*. 1 kg *Harmful*

R1350 Polyvinyl alcohol (PVA), molecular weight 30,000 - 70,000. 250 g
Used as an alternative to methyl cellulose in cryo-ultramicrotomy.

Tokuyasu, K.T. 'The use of PVA pyrrolidone and PVA for cryo-ultramicrotomy'. *Histochem J. 21*, 163-171. 1989.

*For details of other desiccants, please refer to page 140.

Hexamethyldisilazane (HMDS)

HMDS, $[(CH_3)_3Si]_2NH$, can be used in place of critical point drying for the preparation of soft tissue for SEM examination, for example, of delicate insect tissues. It is faster, preserves surface detail, reduces thermal and pressure stresses, and may also reduce the extraction of cellular components compared with CPD. HMDS can be used to dry specimens such as bacteria on polycarbonate filters.

R1228 Hexamethyldisilazane (HMDS). 100 ml
Highly flammable, corrosive

Bray, D.F. *et al.* 'A comparison of HMDS, Peldri II, and critical drying methods for SEM of biological specimens'. *Micros. Res. And Technique*. 26, 489 - 495. 1993.

Paraffin wax

This clean pelleted wax, suitable for all routine processing and embedding, has a melting point of 56 - 58 °C.

L4132 Pelleted paraffin wax. 1 kg

L4133 Pelleted paraffin wax. 10 kg

Paraplast® Plus

This double filtered paraffin embedding medium contains plastic polymers of regulated molecular weights and a small percentage (0.8 %) of dimethyl sulphoxide (DMSO) to penetrate tissues three times faster than standard media. It melts rapidly at 56 °C, and allows short ribbons of sections cut to 1 µm, and excellent ribbon continuity with 2 µm thicknesses.

L4382 Paraplast Plus. 1 kg

Fibrowax

Fibrowax is a mixture of pure paraffin wax and plastic polymers. Sections of hard or fibrous tissues ribbon easily at 4 µm. Tissue compression is reduced to a minimum. Melting point 56 °C.

L4181 Fibrowax. 1 kg

Polyester wax

Melting point 37 °C.

L4184 Polyester wax. 500 g

OCT Compound (Tissue-Tek®)

Embedding medium for frozen tissue specimens.

R1180 OCT Compound. 125 ml

Adhesives

L4185 Glycerin albumen. 100 ml
L4186 Gelatin. 100 g
R1355 BioBond tissue adhesive. 20 ml

Mountants

R1340 DPX (contains xylene). 500 ml *Toxic, flammable*
R1343 Canada balsam in xylene. 100 ml *Flammable, harmful*
R1344 Euparal. 50 ml *Harmful*
R1344A Euparal. 100 ml *Harmful*
R1344B Euparal thinner. 100 ml *Harmful*
R1339 Eukitt. 100 ml *Flammable*
R1351 Histomount. 100 ml *Flammable, harmful*
R1352 Histomount. 450 ml *Flammable, harmful*
R1357 Omnimount. 100 ml
R1354 Biomount. 100 ml *Flammable, harmful*

L4295 Quick-Stick RI 1.662. 30 ml
L4295-1 Quick-Stick RI 1.539. 30 ml
L4295-2 Quick-Stick RI 1.582. 30 ml
L4295-3 Quick-Stick RI 1.605. 30 ml
L4295-4 Quick-Stick RI 1.686. 30 ml
L4295-5 Quick-Stick RI 1.704. 30 ml

Aqueous mountants

R1329 Aquatex. 50 ml
R1325 PVA solution. 25 ml
R1356 Hydromount. 100 ml

Citifluor mountant media

For details of Citifluor mountant media for immunofluorescence, please refer to section 6, pages 175 - 176.

Immersion oils

L4082 Microil. 100 ml

L4085 Immersion oil in plastic applicator. 50 ml

Citifluor immersion oil

For details of Citifluor immersion oil, please refer to section 6, page 172.

Cargille immersion oils

For details of Cargille immersion oils, please refer to section 6, page 172.

Stains for light microscopy

		CI No.	
R1701	Acridine orange	46005	25 g
R1702	Alcian blue 8GX	74240	25 g
R1729	Alizarin red	58005	25 g *Irritant*
R1703	Aniline blue, alcohol soluble	42775	25 g
R1704	Aniline blue, water soluble	42755	25 g
R1705	Azur II		25 g *Harmful*
R1730	Brilliant cresyl blue	51010	25 g *Harmful*
R1731	Brilliant green	42040	25 g *Harmful*
R1732	Carmine	75470	25 g
R1733	Congo red	22120	25 g *Toxic*
R1708	Crystal ponceau	16250	25 g
R1709	Eosin, yellowish	45380	25 g *Irritant*
R1710	Eosin, spirit soluble	45386	25 g
R1711	Fast green FCF	42053	25 g
R1712	Fluorescein	45350	25 g
R1700	Fuchsin (acid)	42685	25 g *Harmful*
R1706	Fuchsin (basic) for Feulgen	42510	25 g *Toxic*
R1707	Fuchsin (basic) for Schiff	42510	25 g *Toxic*
R1713	Giemsa's stain		25 g *Harmful*
R1714	Haematoxylin	75290	25 g *Irritant*
R1715	Haematoxylin (Delafield)		100 ml *Irritant*
R1716	Light green SF	42095	25 g
R1717	Luxol fast blue MBS		25 g *Harmful*
R1734	Methyl blue	42780	25 g
R1719	Methylene blue	52015	25 g *Harmful*
R1718	Methyl green	42585	25 g *Irritant*
R1720	Neutral red	50040	25 g
R1735	Nigrosine (water soluble)	50420	25 g
R1736	Oil red O	26125	25 g
R1721	Orange G	16230	25 g
R1722	Ponceau xylidine	16150	25 g *Harmful*
R1723	Pyronin Y	45005	10 g
R1724	Safranin O	50240	25 g *Harmful*
R1737	Scarlet R	26105	25 g
R1725	Sudan black B	26150	25 g
R1726	Tartrazine	19140	25 g *Harmful*
R1727	Toluidine blue	52040	10 g *Harmful*
R1728	Van Gieson's stain		500 ml *Toxic, flammable*

Spillage absorption granules

This is a chemically inert porous mineral with high absorbency. It can be used for spillages of most liquids including strong acids, alkalis and organic solvents.

C892 Spillage absorption granules. 1 kg

For details of other spillage products, please refer to pages 413 and 424.