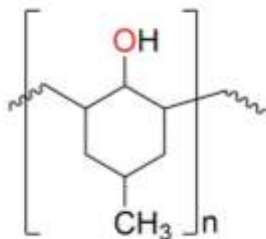


BM1746 Technical Note – Solubility Data



BM1746
Poly(4-methylcyclohexanol) resin
Molecular Formula: (C₈H₁₄O)_n
MW: approx. 600

Product Description

MS3 (BM1746) is a speciality resin uniquely developed for art conservation and cultural heritage applications.

Specifications

| | |
|--------------------|-----------------------|
| Appearance: | White to yellow solid |
| ¹ H NMR | Conforms |
| IR | Conforms |
| Mn by GPC | Mn = 520 to 700 |
| Water content | Report result |
| Hydroxyl number | > 190 mg KOH/g |
| Acid number | < 4 mg KOH/g |

Storage

Store at ≤ 25 °C. Recommended retest date is 6 years.

DISCLAIMER – only solubility studies were performed. The impact of these added solvents on the desired application was not tested and remains unknown.

Solubility studies

In collaboration with the National Gallery of Victoria in Melbourne, Boron Molecular has undertaken solubility studies to aid art conservation applications. Specifically, we were investigating if the addition of a co-solvent (test solvent) to mineral spirits or D40 solvent would improve the solubility of MS3 resin for typical spray varnish (12 wt% resin) or brush-applied (32 wt% resin) compositions.

Recommended solvent systems

Results:

At spray varnish concentrations (12 wt%), the incorporation of 10 wt% of propylene carbonate, ethanol, PMA, or cyclohexanol to D40 led to complete dissolution of the MS3 resin. For mineral spirits, only ethanol was appropriate.

At brush applied concentrations (32 wt% resin), 10 wt% of ethanol, PMA, or cyclohexanol to D40 led to complete dissolution. For mineral spirits, ethanol was still appropriate.

MS3 resin was not fully dissolved in mineral spirits or D40 at spray varnish or brush-applied concentrations.

Recommendation: Isopropanol can also be used in place of ethanol to achieve solubility.

Summary table for solubility:

| Spray-varnish composition | Test solvent | | | | |
|---------------------------|--------------|---------------------|---------|-----|--------------|
| | Control | Propylene carbonate | Ethanol | PMA | Cyclohexanol |
| D40 | ✗ | ✓ | ✓ | ✓ | ✓ |
| Mineral spirits | ✗ | ✗ | ✓ | ✗ | ✗ |

| Brush-applied composition | Test solvent | | | | |
|---------------------------|--------------|---------------------|---------|-----|--------------|
| | Control | Propylene carbonate | Ethanol | PMA | Cyclohexanol |
| D40 | ✗ | ✗ | ✓ | ✓ | ✓ |
| Mineral spirits | ✗ | ✗ | ✓ | ✗ | ✗ |

DISCLAIMER – only solubility studies were performed. The impact of these added solvents on the desired application was not tested and remains unknown.

Experimental details

Chemical list:

| Item | Supplier | CAS No. | Role |
|--|-------------------------------------|------------|-----------------------------------|
| MS3 resin | Boron Molecular, Batch M17462210 | - | Analyte for solubility studies |
| Solvent D40 | Hilditch Oilchem Pty Ltd | 64742-48-9 | Main solvent |
| Mineral Spirits, odourless, contains ~25ppm BHT | Sigma Aldrich | 64741-65-7 | Main solvent |
| Propylene carbonate | Alfa Aesar | 108-32-7 | Test solvent |
| Ethanol | ACB Group | 64-17-5 | Test solvent |
| Propylene Glycol Methyl Ether Acetate (PMA) | Sigma Aldrich | 108-65-6 | Test solvent |
| Cyclohexanol | Oakwood Products Inc | 108-93-0 | Test solvent |

Method: Resin was weighed in a conical flask, solvents added by weight, stoppered, and stirred overnight at room temperature.

A) Composition: Spray varnish concentrations (12 wt % of resin)

| Item | Description | Weight (g) |
|---|---|------------|
| Resin | MS3 resin | 0.6 |
| Main solvent | Mineral spirits, or D40 | 3.96 |
| Test solvent (10 wt% of total solvent) | Propylene carbonate, ethanol, PMA, or cyclohexanol | 0.44 |

Results:

| | | Test solvent | | | |
|-----------------|--------------------|---------------------|----------------|--------------------|--------------------|
| | Control* | Propylene carbonate | Ethanol | PMA | Cyclohexanol |
| D40 | Undissolved solids | Clear solution | Clear solution | Clear solution | Clear solution |
| Mineral spirits | Undissolved solids | Undissolved solids | Clear solution | Undissolved solids | Undissolved solids |

*Mineral spirits or D40, 4.4g

DISCLAIMER – only solubility studies were performed. The impact of these added solvents on the desired application was not tested and remains unknown.

B) Composition: brush-applied concentrations (32 wt % of resin)

| Item | Description | Weight (g) |
|---|---|------------|
| Resin | MS3 resin | 1.6 |
| Main solvent | Mineral spirits, or D40 | 3.06 |
| Test solvent (10 wt% of total solvent) | Propylene carbonate, ethanol, PMA, or cyclohexanol | 0.34 |

Results:

| | | Test solvent | | | |
|-----------------|--------------------|---------------------|----------------|--------------------|--------------------|
| | Control* | Propylene carbonate | Ethanol | PMA | Cyclohexanol |
| D40 | Undissolved solids | Undissolved solids | Clear solution | Clear solution | Clear solution |
| Mineral spirits | Undissolved solids | Undissolved solids | Clear solution | Undissolved solids | Undissolved solids |

*Mineral spirits or D40, 4.4g

Contacts

For ordering and technical information, contact sales@boronmolecular.com