



# VertecBio ELSOL™ - NMPR

Patented Blend of Biobased Solvents

- Biobased Replacement for NMP (N-methyl pyrrolidone)
- Ideal for Cleaning Polyurethanes
- Sweet Pleasant Fragrance
- Flash Point Over 140°F
- Moderate Drying Time, No Film Residue
- Not Listed as ODC, HAP or SARA Reportable
- Excellent Solvency for Paints, Coatings and Resins
- Low Vapor Pressure and High Loading Capacity
- Easy and Inexpensive to Distill/Recycle
- For use in Formulating Isocyanate Cure Systems
- No Environmentally Hazardous Ingredients
- Non-Hazardous under RCRA
- 100% Biodegradable, Safe, Non-carcinogenic
- No ODC's---No Ozone Depleting Chemicals
- No HAP's---No Hazardous Air Pollutants
- Non SARA 313 Reportable
- No Global Warming Compounds

## TECHNICAL DATA

Flash Point...147°F ASTM D93 closed cup  
Vapor Pressure.....0.54 mmHg @ 68 F  
Specific Gravity.....0.963  
Evaporation Rate.....0.12  
Vapor Density..... 4.5  
Boiling Point..... 300°F

9/15/08





**Replace SARA Reportable N-methyl pyrrolidone (NMP) in your solvent blends and formulations**

**VertecBio ELSOL™ - NMPR**

**Property Comparison:**

	<b>VertecBio ELSOL™ NMPR</b>	<b>N-methyl pyrrolidone (NMP)</b>
<b>SOLVATING</b>		
Kauri Butanol (KB) Value	>600	350
<b>Solubility Parameters</b>		
Hildebrand	20.1	23.1
Hansen		
Disperse	7.7	8.8
Polar	2.9	6.0
Hydrogen	5.4	3.5
Solubility	Miscible in Water and Hydrocarbons 50% Soluble in Water	Miscible in Water and Hydrocarbons
<b>OTHER PROPERTIES</b>		
Boiling Point	149°C (300°F)	202°C (396°F)
Viscosity (CP)	2.4	1.65
Surface Tension (Dyne/cm)	27	40
Evaporation Rate (NBAC=1)	0.12	0.03
Flash Point	147°F	187°F

**Compare the Environmental & Regulatory Benefits:**

EPA SARA Reportable	No	Yes
EPA TRI Reportable	No	Yes
California Proposition 65	None	Developmental & reproductive toxicity
Executive Order (EO13134)	Biobased	Petroleum based



## Vertec BioSolvents ELSOL™ - NMPR Performance Sheet

### Suggested Replacement for NMP (N-methyl pyrrolidone)

#### Introduction

NMP's largest use is in industrial coatings applications and industrial cleaning and surface preparation applications. For coatings formulators looking to replace petroleum based solvents with a biobased, sustainable, carbon neutral alternative, Vertec BioSolvents blend is an ideal replacement for NMP in a wide array of coatings formulations and cleaning applications.

Vertec BioSolvents suggests a replacement blend with renewable, carbon neutral biobased solvents. These biobased solvents are derived from corn, soybeans, citrus fruits and other renewable feedstocks, and have a reduced toxicity profile.

#### Reformulation Solvents

Hazardous Solvents	NMP (N-methyl pyrrolidone)
BioBased Replacements	ELSOL™ - NMPR

The solvent blends shown are only suggested starting points for developing alternative systems. All blends should be thoroughly evaluated to determine suitability for specific applications

	Relative Evaporation Rate	Hansen Solubility Parameters				Total
		Dispersion	Polar	H Bonding		
ELSOL NMPR	.12	7.7	2.9	5.4	9.8	
NMP	.03	8.8	6.0	3.5	11.2	

#### Reformulation Solvents Typical Properties

Blend	Environmental	Uses	Comments
ELSOL	Non Hap	Paint, coatings	Renewable, carbon neutral
	Non SARA reportable	cleaners, adhesives	Reduced toxicity profile

#### Conclusion

Formulators and applicators are looking for alternatives to hazardous solvents as more regulations are enforced. This can be seen in many industries including paint and coatings, adhesives and inks. Formulators are not only feeling the pressures at the federal and state level, but abroad as well. The suggested replacements using the sustainable, carbon neutral, biobased solvents above should assist in meeting your requirements and the regulatory challenges.

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## NMP Replacement

### Specifications

Item	Unit	Specification
Appearance		Free From Insoluble and Haze
Specific Gravity	20/20° C	0.963
Acidity	Wt % as Acetic Acid, Max.	0.05
Purity	Wt % Min.	99.5
Water Content	Wt % Max.	0.20
Viscosity	cps @ 20° C	2.4
Color	APHA, Max	10

### Physical Properties

Item	NMPR
Molecular Weight	124.80
Specific Gravity 20/20° C	0.963
Boiling Point	300°F
Flash Point	147°F
Viscosity @ 20°C (cps)	2.4
Evaporation Rate	0.12
Vapor Pressure, mm Hg, @20°C	0.54