Texan Minerals and Chemicals LLC

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Product Data Sheet

Bio Paraffin Solv

Introduction

A green solvent, terpene, derived from natural and renewable sources has been utilized as an alternative to the conventional solvents for wax remediation. Terpene is abundant in renewable sources from pine plant and orange peels (d-limonene). Terpene has low toxicity, is less flammable, is rapidly biodegradable, and has high solvency for an organic deposit comparable to aromatic solvents. Terpene is a good surfactant that is environmentally friendly. Terpene can be blended with other co-solvents. Comparatively, terpene possesses good solvency and is biodegradable, less toxic, and less flammable compared to xylene, toluene, or naphthalene.

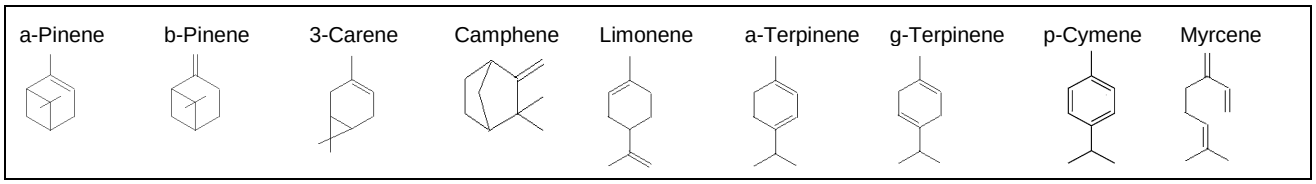
Description:

Bio Paraffin Solv is a specialty solvent blend of Terpene Hydrocarbons that have been sourced from 100% renewable processes. The composition has been formulated to match or exceed the solvency of d-Limonene while also possessing a mild Orange/Citrus fragrance. Combining dl-Limonene with several of its isomers, enhances the solvency for paraffin wax. Due to the structural similarity to Limonene, the Hansen Solubility Parameters are close to those of Limonene, which eliminates the need for significant changes to cleaner formulations. BHT, an anti-oxidant is added to stabilize the blend against oxidation.

Chemistry

Terpenes are naturally occurring 10-carbon organic molecules manufactured in nature by green plants. They are the raw materials for many of the flavors and fragrances enjoyed by man. Most terpenes are designated GRAS (Generally Recognized As Safe) by the FDA and FEMA (Flavor Extracts Manufacturing Association) and are approved for human consumption in foods.

Typical Terpene Hydrocarbons



Sources of Terpenes

The pine tree is the world's largest commercial source of terpenes. Turpentine, the volatile oil from the tree, is the largest volume essential oil found in nature..

The second largest source of terpenes is citrus oil (primarily d-limonene from orange oil) which is produced as a by-product of orange juice production. Citrus Terpenes have found use in many industrial and consumer cleaning products worldwide.

Texan Minerals & Chemicals is an expert at optimizing the effectiveness, availability and economy of solvents and cleaners produced from these other natural resources.

Performance Comparison

Bio Paraffin Solv has a higher non-polar solvency and a broader range of solvency than many other common solvents. Unlike glycol ethers they are predominantly non-polar and therefore have a high affinity for the dissolution of paraffin wax. For this reason it is frequently formulated into cleaning compounds with surfactants, builders, polar co-solvents and occasionally water.

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Physical Properties

The Hansen Solubility Parameters of Bio Paraffin Solv have been estimated using the QSAR functionality found in Version 5.0 of HSPiP. For comparison purposes, they are shown below relative to the parameters generated for Limonene using the same model.

Solvent	δd	δp	δh
d-Limonene	16.60	1.69	3.68
Bio Paraffin Solv	17.41	1.75	3.59

	Kauri-Butanol Value	Relative Degreasing Performance
Bio Paraffin Solv	~100	Excellent
d-Limonene	67	Excellent

Specifications	Bio Paraffin Solv
Appearance	Clear, Colorless Liquid
Odor	Citrus Odor
Chemical Family	Hydrocarbons, Terpenes
Cas Number	68956-56-9
UN Number	UN2319
Specific Gravity @ 25°C	0.87
Pounds/Gallon @ 25°C	7.26
Evaporation Rate (n-BuAc = 1)	0.2
Vapor Pressure (mmHg @ 20°C)	2.0
Surface Tension (dynes/cm @ 25°C)	27
Flash Point	47.0 °C (117°F)
Initial Boiling Point, °C (@ 760 mmHg)	170
Freezing Point, °C	< -80
Viscosity, cps, @ 25°C	1.5
Solubility in Water, %	<0.2
Non-Volatile Residue (@ 105°C)	< 0.5
Kauri-Butanol Value (KB)	~100
Resistivity (Megohms/cm)	2.6 X 106
Dielectric Breakdown, KV (ASTM D877)	30
Color, APHA (Typical)	<30

Regulatory Advantages of Terpenes

Because Bio Paraffin Solv is a blend of terpenes, it is non-toxic, biodegradable, and contains no dangerous chemicals or additives. Bio Paraffin Solv, for instance, contains no chlorinated components and therefore does not affect the Earth's ozone layer and is not regulated under the Montreal Protocol. In addition, Bio Paraffin Solv product data sheet contains no components that are classified as Hazardous Air Pollutants (HAPS) by the Clean Air Act Amendments. Because terpenes are naturally occurring and safe, the EPA has endorsed terpenes as replacements for hazardous solvents like 1,1,1-trichloroethane and CFC-113 under the Significant New Alternatives Policy (SNAP) program.

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The table below compares the regulatory status of several traditional industrial solvents with Bio Paraffin Solv:

Solvent Regulatory Status Comparison

	SARA Title III Section 313 Toxic	Clean Air Act Hazardous Air Pollutant	Ozone Depleting	California Proposition 65 Carcinogen
Bio Paraffin Solv	No	No	No	No
1,1,1-Trichloroethane	Yes	Yes	Yes	No
Methyl Ethyl Ketone	Yes	Yes	No	No
Mineral Spirits	No	No	No	No
Trichloroethylene	Yes	Yes	No	Yes
Perchloroethylene	Yes	Yes	No	Yes
Xylene	Yes	Yes	No	No
Glycol Ether EB	Yes	Yes	No	No

Terpene Vapor Emissions and Odor

Since terpene odors are easily detectable, it is sometimes thought that terpenes rapidly vaporize, leading to high vapor concentrations in the air. This is because the odor threshold (level at which terpenes can be detected by smell) can be as low as 1 part-per-million (ppm). This is much lower than many traditional industrial solvents. However, Bio Paraffin Solv has a very low volatility which means very low vapor concentrations occur during use. Despite this fact, adequate ventilation is always required in the workplace.

An indication of the relative vapor exposure hazard of a solvent is a ratio called the Inhalation Hazard Index (IHI). This parameter is defined as the ratio of the saturated vapor concentration at 20ºC to the American Conference of Industrial Hygienists (ACGIH) TLV-TWA. The higher the ratio, the quicker the vapor concentration will approach the maximum safe concentration, at which point it can become a potential health risk. The following table compares the IHI for several common solvents. Note that Bio Paraffin Solv, has a lower (safer) value than other high performance industrial solvents:

Inhalation Hazard Index for Industrial Solvents

	Vapor Pressure (mmHg @ 20°C)	TLV-TWA (ppm)	Inhalation Hazard Index	Odor Threshold (ppm)
Bio Paraffin Solv	2	100	25	1
Mineral Spirits	2	100	25	800
Glycol Ether EB	0.9	25	46	20
Xylene	9.5	100	125	20
Perchloroethylene	13	50	342	50
1,1,1-Trichloroethane	100	350	376	400
Methyl Ethyl Ketone	85	200	559	25
Trichloroethylene	59	50	1552	250

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Toxicity

Most terpenes are non-toxic by OSHA standards. Many have been extensively tested by the Flavor Extracts Manufacturers Association (FEMA) and other groups. Refer to the SDS for current data.

Product Packaging / Container Suitability

Terpenes are very aggressive solvents and care must be taken in choosing containers for terpene products.

Polyethylene bottles typically do not perform well with terpenes. Although the polyethylene is not weakened, the terpene solvents diffuse through the sides of the container. High density polyethylene (HDPE) bottles, which have been fluorinated, may be used.

PVC or PET bottles perform well for cleaners containing terpene solvents but they will still show some permeation over long storage periods.

Contact your container supplier for more information.

Safe Handling of Terpene-Soaked Rags

It is widely known that oily rags may spontaneously combust when placed in containers. Terpene-soaked rags are no exception. To prevent this, terpene-soaked rags should be washed or submerged in water (a small amount of soap or detergent added will cause the rags to wet more easily).

Flash Point and Safety

Most terpene solvents are considered flammable or combustible. However, unlike traditional flammable solvents like MEK and acetone, their flash points are sufficiently high enough to permit safe use in most applications. OSHA regulations require that solvents in artificially heated dip tanks be maintained at a maximum temperature 50°F below their flash points. Please refer to SDS.