Bio-Solv - Chemistry that Works

Cleaning Power of Bio-Solv

The **Kauri-butanol value ("Kb value")** is an international, standardized measure of solvent power for a hydrocarbon solvent, and is governed by an ASTM standardized test, ASTM D1133. The result of this test is a scaleless index, usually referred to as the "Kb value". A higher Kb value means the solvent is more aggressive or active in the ability to dissolve certain materials. Mild solvents have low scores in the tens and twenties; powerful solvents like chlorinated solvents and "High Sol 10" or "High Sol 15" (naphthenic aromatic solvents) have ratings in that are in the low hundreds.

Bio-Solv has a KB Value of 500. A KB Value reference chart (see below) shows how that rating compares with other traditional solvents. Also, Bio-Solv has a pleasant fragrance.

KB VALUES

Product	**Value**
Toluene	105
Xylene	98
Perc	92
Bio-Solv	500
Mineral Spirits	37
Kerosene	34
Stoddard Solvent	33
MEK	N/A
Acetone	N/A

Note: It is not possible to perform the **KB** test on oxygenated compounds, so there is no listed **value** for methyl ethyl ketone (MEK) or acetone.

The environmental movement

In recent years, the environmental movement has gained significant momentum. Federal, state and local government agencies have a clear mission to "improve the environment through regulatory compliance". One issue that has gained tremendous attention is the management and reduction of VOCs. These are defined as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. In simpler terms, this would be something that volatilizes (evaporates or moves to a gaseous state) and shows a propensity to create smog.

It is important to understand that all hydrocarbon solvents are high in VOCs. Aqueous (water based) cleaners are typically low in VOCs however may not be effective in cleaning certain things and since they contain water, may have additional undesirable effects like corrosion and slow drying times.

Is Bio-Solv a VOC? Yes. Is acetone a VOC? Yes.

Exempt VOCs

Some VOCs are exempt from regulation because they are found to produce less ground level ozone therefore contributing less to the creation of smog. Acetone is an exempt VOC because its MIR value (a measure of reactivity with sunlight and ability to create ground level ozone) is below current government limits. This does not mean that acetone does not create ground level ozone but that it is below the current limit. There are discussions about the validity of this limit and whether it will be changed in the future.

Low Vapor Pressure means less VOCs in the air

It is important to understand the relationship between vapor pressure and evaporation rate because the longer a solvent remains a liquid the longer it keeps cleaning and the less VOCs that go into the air compared with solvents that evaporate quickly. Bio-Solv has a vapor pressure of 0.52 MM HG compared with acetone with a vapor pressure of 400 MM HG therefore it volatizes or evaporates much more slowly (5 – 6 times) more slowly than acetone. This means that, for the same cleaning operation, acetone will put 5 – 6 times more VOCs into the air than Bio-Solv.

Although Bio-Solv may have a equal or higher VOC content than other solvents, its low vapor pressure translated to less VOCs into the air.

Low vapor pressure means Bio-Solv can be reused / recycled
Bio-Solv can be filtered easily using polypropylene filters that are inexpensive and readily available in sizes from 100 microns down to 1 micron.

Other Environmental and safety hazards to consider
VOC content is certainly an important issue when considering a solvent. However, we must not overlook other issues like flammability, risk of explosion, carcinogens, worker exposure, hazardous air pollutants, ability to extinguish fires, spill containment regulations and hazmat removal.

Bio-Solv is not considered a flammable liquid and its vapors are not an explosion hazard

Bio-Solv is not a Hazmat
It does not require Hazmat shipping, special handling, special storage, spill containment, or Hazmat removal

A Bio-Solv fire can be extinguished with water.
Acetone, Lacquer thinner and most other petro based solvents require chemical, CO2 or foam extinguishers.

Bio-Solv is Not on Proposition 65 list of chemicals that cause cancer or reproductive toxicity
As an example, California maintains a list of chemicals (California Governors Proposition 65 List) that pose serious health concerns. None of the ingredients of Bio-Solv are on this list.

Low Vapor Pressure means less VOC in the air
San Diego County is in the process of passing a new "rule 66" that required solvents to either have a low VOC or low vapor pressure because they realize the relationship between low vapor pressure and the amount of VOCs going into the air.

No Hazardous Air Pollutants (HAPS)
The EPA maintains a list of Hazardous Air Pollutants

Why not just use an EPA VOC-exempt solvent?
Just because a product has VOC exemption does not mean it is safe to use in all applications.
For example, acetone is a VOC-exempt solvent. Acetone is a petroleum-derived product. Because of its low flash point and its high volatility, it can't be used in many applications.
Also, compatibility concerns with acetone eliminate it from use in many carpet and furniture product formulas.
A chemical can be VOC-exempt and still be on the CA Prop 65 list.
Bio-Solv, on the other hand, is safe for you to work with and is safer for your customers.

Summary - Promoting health
Bio-Solv has many positive attributes:

- It is not carcinogenic or mutagenic.
- It is biodegradable and contains no ozone depleting chemicals.
- It is renewable – Bio-Based, made from plants.
- It is not explosive and can be extinguished with water.
- When flushed with water it hydrolyzes to lactic acid and ethanol which immediately begin to bio-degrade.
- It is generally recognized as safe (GRAS) by the Food and Drug Administration (FDA) and thereby is approved for use in food contact applications.
- It is also approved for us as an inert ingredient by the Environmental Protection Agency (EPA).

Looking at the future
Bio-Solv is a long-term solution for the industry.