

## Butachem™ (Renewable n-Butanol)

### What is Butachem™?

Butachem™ is 100 % renewable n-butanol produced through fermentation of C<sub>5</sub> and C<sub>6</sub> sugars by Green Biologics' proprietary *Clostridium* microbial biocatalysts. As our n-butanol is selectively produced by bacteria, and not by processing crude petroleum distillates, we are capable of providing higher quality material that contains none of the common contaminants of traditional routes (i.e. isobutanol and aldehydes) as well as low water content (< 100 ppm).

### n-Butanol Basics

Molecularly identical to petro-butanol, Butachem™ is a four-carbon alcohol that is a clear, colourless, flammable and neutral liquid with a characteristic banana-like odour. The medium volatility and restricted miscibility in water of n-butanol make it useful as both a solvent and a formulated ingredient in cosmetic and personal care products.

### Applications

The robust solvent properties of n-butanol make it a versatile oxo-chemical with several direct applications such as extractions and flavour additives. Additionally, n-butanol is a valuable feedstock for the production of higher value chemicals, chiefly ethers and esters. Aside from its use as a solvent, alcohol plasticizer, and additive in formulated consumer products, n-butanol is commonly used for the manufacturing of esters utilised for fragrance and skin care in personal care goods. Cosmetic products that utilise n-butanol in their formulations include eye makeup, foundations, lipsticks, nail care products, personal hygiene products, shaving creams, and moisturizers.

### Specifications

Property Tested	Value or Range	Test Method
Total purity	> 99.8 %	GC
Isobutanol	0 ppm	GC
Di-n-butyl ether	0 ppm	GC
Aldehydes	0 ppm	GC
Water	< 100 ppm	ASTM D1064
Acidity (as Acetic Acid) wt %	< 0.005	ASTM D1613
Color (APHA; Pt/Co)	5	ASTM D1209
Appearance	Clear; Colorless	ASTM D4176 and visual
Nonvolatile matter wt%	< 0.005	ASTM D1353
Specific gravity @ 20/20C	0.808 - 0.812	ASTM D1298/D4062
Distillation range	≤ 1.0 °C	ASTM D1078
Renewable Carbon wt %	100%	ASTM D6866