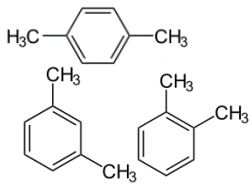
VIRENT BioForm MIX™ *Xylenes*



Overview

The BioForming® process converts plant-derived feedstocks into a BioFormate® product that is analogous to petroleum reformate. Similarly to conventional petroleum reformate, Virent's Bioreformate product can be used as a gasoline blendstock or processed to high purity aromatic chemicals using conventional aromatics processing technology. Virent's products are indistinguishable from the petrochemical analogs, except for C-14 dating for bio-content. Using conventional aromatics processing Virent has produced renewable paraxylene, mixed xylenes, toluene, and benzene.

Key Properties

Composition

BioForm MIX™ xylenes meets or exceeds typical industry specifications for xylenes. Common impurities are present at levels at or below those in conventional petrochemical xylenes.

Interchangeable

BioForm MIX is a direct drop-in replacement for petrochemical xylenes and can readily be interchanged with conventional petrochemical xylenes in most applications.

Green House Gas (GHG) Reduction

BioForm MIX helps meet sustainability goals. Depending on the feedstock used to produce BioForm MIX, it will reduce the GHG up 70% versus petrochemical xylenes. Results from radio carbon dating of paraxylene produced from the BioForm MIX confirm the carbon is bio-based.

TSCA Listing

The components present in BioForm MIX are TSCA listed. Product registrations in other regions, including REACH, will be obtained prior to commercialization. Consult the SDS for additional information.

Property	Method	Typical Industry Specification	VIRENT Typical
Total C8 Aromatics	ASTM D4492	> 95.5 – 98.5%	**> 97%**
Ethylbenzene	ASTM D4492	≤ 20%	**13 – 19%**
Toluene	ASTM D4492	≤0.5%	**< 0.5%**
Benzene	ASTM D4492	≤ 0.01%	**≤ 0.01%**
C9+ Aromatics	ASTM D4492	≤ 0.5 – 2%	**< 1.0%**
Nonaromatic hydrocarbons	ASTM D4492	≤ 0.3 – 1.5%	**< 1.5%**
Sulfur	ASTM D5453	< 10 ppm	**< 1 ppm**
Appearance	ASTM D2090	Clear and sediment-free	**Clear and sediment-free**
Mean Biobased Content	C-14	N/A	**> 99%**

Applications

Mixed xylenes are directly used as a solvent for paints, paint thinners, inks, adhesives, lacquers, and other applications. However, the vast majority of mixed xylenes are separated into the individual isomers such as paraxylene, a key building block for the production of many polyesters including polyethylene terephthalate (PET).

For additional information:
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