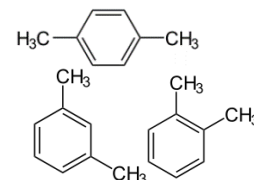




# VIRENT BioForm MIX™ Xylenes



## Overview

The BioForming® process converts plant-derived feedstocks into a BioFormate® product that is analogous to petroleum reformat. Similarly to conventional petroleum reformat, Virent's Bioreformat 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, benzene and Aromatic 100.

## 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.

### Low Ethylbenzene

BioForm MIX has a high xylene content with an ethylbenzene level significantly below that found most commercial products, which can approach 20% or more.

### 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.

## Applications

Mixed xylenes is 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).

Property	Method	Typical Industry Specification	VIRENT	
			Specification	Typical <sup>(2)</sup>
<b>Total C8 Aromatics</b>	ASTM D4492 <sup>(2)</sup>	>95.5 – 98.5%	<b>&gt; 98.5%</b>	<b>99.7%</b>
<b>Ethylbenzene</b>	ASTM D4492 <sup>(2)</sup>	≤ 20% <sup>(3)</sup>	≤ 1%	<b>0.02%</b>
<b>Toluene</b>	ASTM D4492 <sup>(2)</sup>	≤0.5%	≤ 0.5%	<b>0.2%</b>
<b>Benzene</b>	ASTM D4492 <sup>(2)</sup>	≤ 0.01% <sup>(4)</sup>	≤ 0.01%	<b>Not detected</b>
<b>C9+ Aromatics</b>	ASTM D4492 <sup>(2)</sup>	≤0.5 – 2%	<b>&lt;1.0%</b>	<b>0.03%</b>
<b>Nonaromatic hydrocarbons</b>	ASTM D4492 <sup>(2)</sup>	≤0.3 – 1.5%	≤ 0.3 %	<b>0.1%</b>
<b>Sulfur</b>	ASTM D5453	< 10 ppm <sup>(3)</sup>	<b>&lt; 1 ppm</b>	<b>Pass<sup>(5)</sup></b>
<b>Appearance</b>	ASTM D2090	Clear and sediment-free	<b>Clear and sediment-free</b>	<b>Pass</b>
<b>Color, maximum</b>	ASTM D1209 Pt-Co Scale	20	<b>20</b>	<b>&lt; 5</b>
<b>Mean Biobased Content</b>	C-14	N/A	<b>&gt; 99%</b>	<b>100%<sup>(6)</sup></b>

(1) Method modification available upon request  
(2) Production Lot C0301D-OP2798-32  
(3) If specified. Not included in many published specifications.  
(4) Most stringent common specification.  
(5) Estimated based on feedstock and conversion products.  
(6) Based on paraxylene analysis.

### For additional information:

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