

Eastman Solvent Reformulation Tool user guide

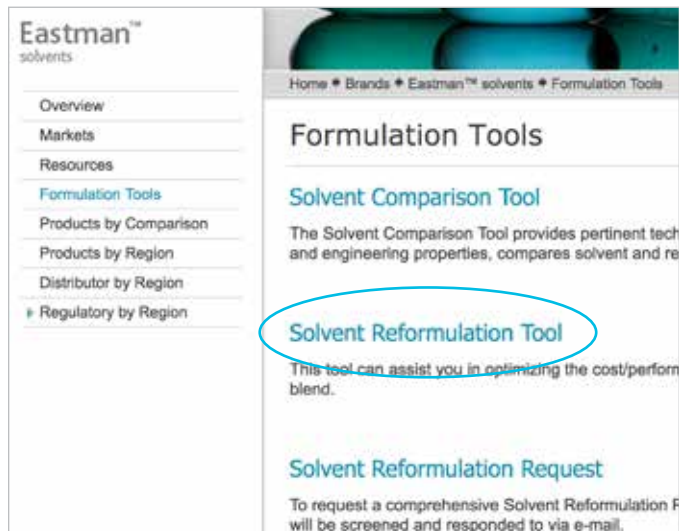
The Eastman Solvent Reformulation Tool can be a useful resource for formulators who have been tasked with solvent reformulation due to regulation, economics, or changes in product availability. Blend properties—such as relative evaporation rate (RER), Hansen solubility parameters (HSP), solvent viscosity, and others—are calculated and displayed to help you during reformulation. The tool also has other useful features that will be highlighted in this guide.

Getting started

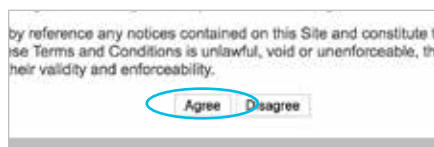
You can access the home page for the tool by visiting www.eastman.com/solventtools.



Once you have navigated to the home page, click on the "Solvent Reformulation Tool" link.



You will be directed to a disclaimer page. Please review and click "Agree."



How to use the Solvent Reformulation Tool

Once you are on the solvent selection page, enter your current information by choosing the specific solvents in your blend in the "Solvent Group" drop-down.



Screenshot of the solvent selection interface. The "Solvent Group" dropdown menu is highlighted with a red circle. The text "Solvent Group: * Select a Solvent Group" is visible. Below it, "Solvent Selection: * Hold CTRL key for multiple selection" is displayed. A "Blend 1" button is located in the top right corner.

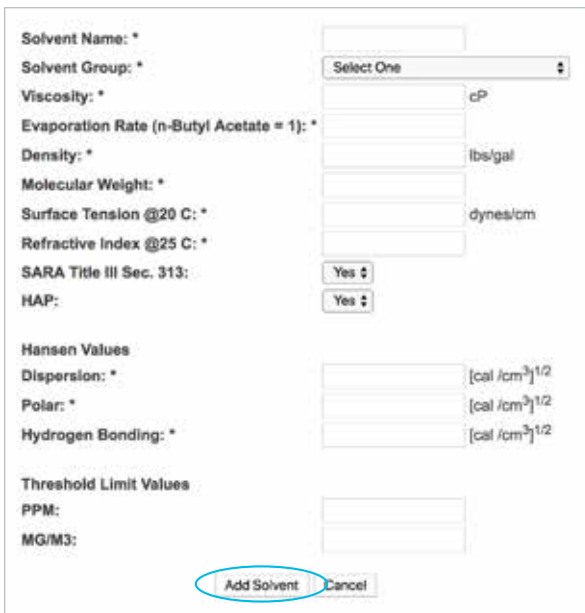
You can select multiple solvents and solvent functionalities to blend at once.

If the solvent you want to assess is not listed, you can add that solvent to the system by selecting "Add Unlisted Solvent."



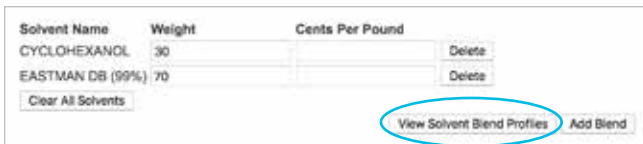
Screenshot of the "Add Selected Solvent(s)" section. The "Add Unlisted Solvent" button is highlighted with a red circle. Other buttons visible include "View Solvent Blend Profiles" and "Add".

You will need to know pertinent information about that solvent to enter it into the system. Once you have filled in the necessary information, click "Add Solvent."



Screenshot of the "Add Solvent" form. The form includes fields for Solvent Name, Solvent Group (dropdown), Viscosity (cP), Evaporation Rate (n-Butyl Acetate = 1), Density (lbs/gal), Molecular Weight, Surface Tension @20 C, Refractive Index @25 C, SARA Title III Sec. 313, HAP, Hansen Values (Dispersion, Polar, Hydrogen Bonding), and Threshold Limit Values (PPM, MG/M3). The "Add Solvent" button is highlighted with a red circle. A "Cancel" button is also present.

When you have made your selections and entered the ratio of each solvent, click "View Solvent Blend Profiles."



Screenshot of the "View Solvent Blend Profiles" section. It displays a table with columns for Solvent Name, Weight, and Cents Per Pound. The table contains two rows: CYCLOHEXANOL (Weight: 30, Cents Per Pound: [input field]) and EASTMAN DB (99%) (Weight: 70, Cents Per Pound: [input field]). Each row has a "Delete" button. Below the table are buttons for "Clear All Solvents", "View Solvent Blend Profiles" (highlighted with a red circle), and "Add Blend".

Solvent Name	Weight	Cents Per Pound	
CYCLOHEXANOL	30	[input field]	Delete
EASTMAN DB (99%)	70	[input field]	Delete

The following data table will appear which contains information about the blend

Blend 1

Normalize Volume / Weight	Solvent Name	SARA	HAP	Volume	Weight	Cents/Pound*	Cents/Kilogram*
Retain Volume / Weight	CYCLOHEXANOL	Y	N	30.186	30	0	0
Simulation Evaporation Profile	EASTMAN DB (99%)	Y	Y	69.814	70	0	0
Escape Coefficient by Type	TOTAL			100	100		
Reformulation Summary	Physical Properties						
Edit Blends	VISCOSITY, cP 5.739						
Download To Spreadsheet	SURFACE TENSION @20 C (dynes/cm) 31.497						
	REFRACTIVE INDEX @25 C 1.442						
	Hansen Solubility Parameters						
	DISPERSION 16.423						
	POLAR 6.125						
	HYDROGEN BONDING 11.475						
	TOTAL HANSEN 20.95						
	Economics Data						
	CENTS/POUND* 0						
	CENTS/KILOGRAM* 0						
	DOLLARS/GAL* 0						
	DOLLARS/LITER* 0						
	POUNDS/GAL 7.919						
	KILOGRAMS/LITER 0.949						
	Evaporation Data						
	TIME ** 105462.822 SEC						
	RELATIVE EVAPORATION RATE (R.E.R) 0.004 (N-BUTYL ACETATE = 1.0)						
	ETHYL ETHER NUMBER (E.E.N) 2752.564 (ETHYL ETHER = 1.0)						
	* The cost values will be displayed only if the cost of the raw material is entered by the user						
	**Based on 488 seconds for 90% of one ml of butyl acetate to evaporate.						

Documents

- [Selecting Effective Xylene Replacements for Protective Coatings](#)
- [Replacing Acetone with Eastman Methyl Acetate, High Purity](#)
- [Suggested Replacements for Toluene](#)
- [A Non-HAP Replacement for Xylene in Solventborne Coatings](#)
- [A Non-HAP Replacement for Toluene in Solventborne Coatings](#)
- [Eastman IBI8 vs PM Acetate in Industrial Wood Coatings](#)
- [Diisobutyl Ketone \(DIBK\) Solvent Substitution Options](#)
- [Solvent Substitution or Replacement Options for MIBK](#)

For more information on blend properties, you can click on one of these headings:

[Normalize Volume / Weight](#)

[Retain Volume / Weight](#)

[Simulation Evaporation Profile](#)

[Escape Coefficient by Type](#)

[Reformulation Summary](#)

[Edit Blends](#)

[Download To Spreadsheet](#)

This will allow you to better understand blend evaporation as well as give you the option to export the blend to Excel.^a

[Normalize Volume / Weight](#)

[Retain Volume / Weight](#)

[Simulation Evaporation Profile](#)

[Escape Coefficient by Type](#)

[Reformulation Summary](#)

[Edit Blends](#)

[Download To Spreadsheet](#)

Clicking "Edit Blends" will take you to the following screen where you can choose to make "Weight" changes or "Delete" a solvent and select a new solvent to compare.

Solvent Name	Weight	Cents Per Pound	
CYCLOHEXANOL	30		Delete
EASTMAN DB (99%)	70		Delete
<input type="button" value="Clear All Solvents"/>			
<input type="button" value="View Solvent Blend Profiles"/> <input type="button" value="Add Blend"/>			

^a "Simulation Evaporation Profile" and "Escape Coefficient by Type" do not indicate the formation of an azeotrope.



Eastman Corporate Headquarters
P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, +(1) 423-229-2000

www.eastman.com/locations

Although the information and recommendations set forth herein are presented in good faith, Eastman Chemical Company ("Eastman") and its subsidiaries make no representations or warranties as to the completeness or accuracy thereof. You must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment, or formulation in conflict with any patent, and we make no representations or warranties, express or implied, that the use thereof will not infringe any patent. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS AND NOTHING HEREIN WAIVES ANY OF THE SELLER'S CONDITIONS OF SALE.

Safety Data Sheets providing safety precautions that should be observed when handling and storing our products are available online or by request. You should obtain and review available material safety information before handling our products. If any materials mentioned are not our products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

© 2018 Eastman. Eastman brands referenced herein are trademarks of Eastman or one of its subsidiaries or are being used under license. The ® symbol denotes registered trademark status in the U.S.; marks may also be registered internationally. Non-Eastman brands referenced herein are trademarks of their respective owners.