

HYDROCARBON SOLVENT SOLUTIONS

by Nancy Eilerts, Ph.D.

Hydrocarbon Solvents for the Drycleaner

Not all hydrocarbons are created equal. The hydrocarbon solvents that are most familiar to drycleaners are those that had a low flash point and were strongly discouraged from use in the drycleaning industry beginning in the late 1940s. The term low flash point means that if solvent vapor, oxygen, and an ignition source were present in the drying tumbler, a mild explosion and fire could result. An ignition source could be anything from a lighter or a metal object left in a pocket to even a metal button. Because of this safety concern, these low flash point solvents have been banned from most new installations for many years.

A lot has been written and published about the make-up of a high flash point drycleaning solvent. I would like to show how these solvents are unique among petroleum products and why they should be your solvent of choice.

Hydrocarbons: Choosing the right solvent for drycleaning

Consider the definition of hydrocarbon as listed in the Chambers Dictionary of Science and Technology¹:

Hydrocarbons (Chem): A general term for organic compounds which contain only carbon and hydrogen. They are divided into saturated and unsaturated hydrocarbons, aliphatic (alkane or fatty) and aromatic (benzene) hydrocarbons. Crude oil is essentially a complex mixture of hydrocarbons.

The dictionary definition of hydrocarbons tells only part of the story. The important part of this definition is that hydrocarbon is a general term. Some hydrocarbons are considered hazardous, while we use other hydrocarbons every day in items such as car polish, makeup, and hand cleaners. The only way to know which hydrocarbons are safe for personal care or other uses is to consult with a scientist familiar with the different types of hydrocarbons and the hazards associated with them.

General properties of hydrocarbons:

- **Hydrocarbons contain only hydrogen and carbon.** The name hydrocarbon comes from combining the words hydrogen and carbon. The name hydrocarbon is often used with other words that indicate that other elements besides hydrogen and carbon are present. Halogenated hydrocarbons, for example, refer to a hydrocarbon to which is attached a halogen atom. Halogens include chlorine, bromine, fluorine, or iodine. Methylene chloride and trichloroethylene would be examples of halogenated hydrocarbons. For drycleaning purposes, a solvent that is a true hydrocarbon should be chosen: one that is made up of hydrogen and carbon only.
- **Hydrocarbons can be either saturated or unsaturated.** You've probably heard about saturated fats and unsaturated fats. Unsaturated fats are converted to saturated fats by a process called hydrogenation. Hydrogenation adds hydrogen atoms to the molecule until the molecule can hold no more. Solvents can also be hydrogenated, and the hydrogenated products are then called saturated hydrocarbons, alkanes, or paraffins. A hydrogenated solvent will develop fewer odors over time than will an unsaturated hydrocarbon.
- **Within a specific class of hydrocarbons, different arrangements of the carbon atoms result in different types of shapes.** Let's consider the example of saturated hydrocarbons as outlined in the diagram. If all the carbon atoms are arranged in a straight line, the hydrocarbon is considered "normal" or "linear." If the carbon atoms are arranged in a ring, the hydrocarbon is considered "cyclic."

Continued on back page



Hydrocarbon Solvents for the Drycleaner (continued)

Finally, if the carbon atoms are arranged such that they make branches like a tree branch, they are called “isoalkanes” or “isoparaffins.” High quality drycleaning solvents, such as EcoSolv® fluid and HC-DCF™ Low Flash solvent from Chevron Phillips Chemical Company LP or DF-2000 from ExxonMobil are isoalkanes or isoparaffins.

The chart below shows the breakdown of all types of hydrocarbons into their respective families.

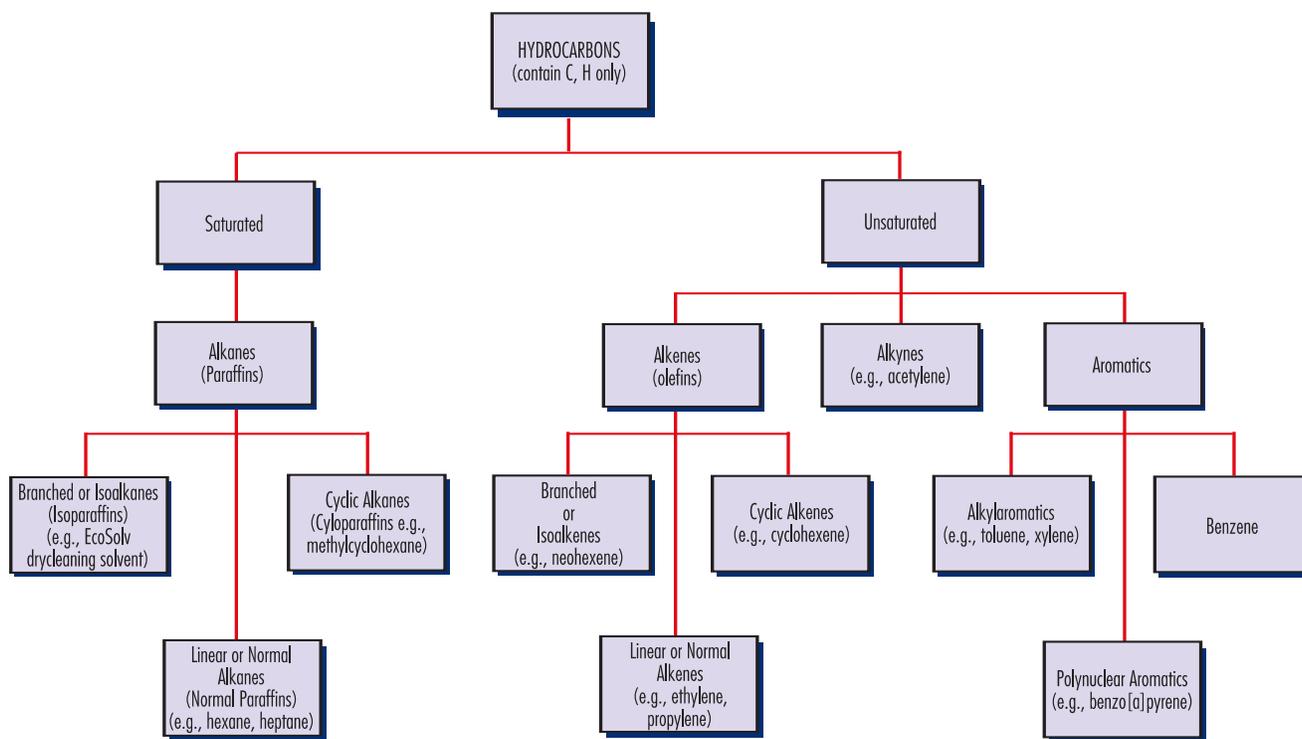
Summary: Isoparaffins or isoalkanes are the type of hydrocarbon solvent you should choose for drycleaning. Check the information sheet on the product you’re considering and be

sure that the aromatic content is as low as possible. Be sure that the product is completely hydrogenated. If you choose EcoSolv drycleaning solvent from Chevron Phillips Chemical Company LP, you can rest assured that you’re using a low aromatic, completely hydrogenated isoparaffin solvent that will perform best in your drycleaning operation.

¹Prof. Peter M.B. Walker, ed., Chambers Dictionary of Science and Technology, Chambers Harrap, Edinburgh, 1999.

The author wishes to thank Everett Childers for reviewing this article and for providing the historical perspective on the use of hydrocarbons in drycleaning.

About the author: Nancy Eilerts, Ph.D., is the New Product and Technology Director for Chevron Phillips Chemical Company LP.



cpchem.com/specialtychem • 800-858-4327

Before using this product, the user is advised and cautioned to make its own determination and assessment of the safety and suitability of the product for the specific use in question and is further advised against relying on the information contained herein as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is applicable to the user's specific application. Chevron Phillips Chemical Company LP does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein or the product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself. Further, information contained herein is given without reference to any intellectual property issues, as well as federal, state or local laws which may be encountered in the use thereof. Such questions should be investigated by the user.