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.

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.”

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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.

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**Hydrocarbons**

(Contain C, H only)

**Saturated**

- Alkanes (Paraffins)
  - Linear or Normal Alkanes (Normal Paraffins) (e.g., hexane, heptane)
  - Branched or Isoalkanes (Isoparaffins) (e.g., EcoSolv drycleaning solvent)

**Unsaturated**

- Alkenes (Olefins)
  - Linear or Normal Alkenes (Normal Paraffins) (e.g., ethylene, propylene)
  - Branched or Isoalkenes (Isoparaffins) (e.g., neohexene)
- Alkynes (E.g., Acetylene)
  - Cyclic Alkenes (E.g., Cyclohexene)

**Aromatics**

- Alkylaromatics (E.g., Toluene, Xylene)
  - Cyclic Alkanes (Cyloparaffins e.g., methylcyclohexane)
- Benzene

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