

Dan Eisen: Surveying the solvent alternatives

Recently I was asked by the Bergen Chapter of NCA to make a presentation on alternative solvents. In an endeavor to relate valuable and hands-on experience, I went to various test sites and spent time working with some of the alternative solvents.

We wanted to address some issues that have come up in the past regarding the different solvents. For example, NCA and I felt that much information related about alternative solvents did not clearly spell out the characteristics of the solvent.

I found after working with the alternative solvents that each solvent had unique characteristics. Each solvent presented different characteristics than perc and would require different skills and training to effectively work.

Cleaners today have several choices if they want to try different means of cleaning clothes. The main reason why cleaners are seeking different solvents is to escape the burden of the government regulations heaped upon those who do use perc.

Perc still continues to be the best and most versatile solvent available.

It is also interesting to note that care labeling on garments will be more confusing than ever. For example, "dryclean only" would have to specify whether the solvent used can be:

1. Perc
2. Silicone (Green Earth)
3. Hydrocarbon (Stoddard, 140° F)
4. Hydrocarbon (DF 2000)
5. Glycol Ether (Rynex)

For example, a beaded or trimmed garment would be safe when using hydrocarbon (DF 2000), but not as safe when using hydrocarbon (Stoddard 140°F).

Not only would cleaners require more education, but so too would garment manufacturers when labelling their garment.

This article will discuss the characteristics relating to the following solvents:

1. Silicone (Green Earth)
2. Glycol Ether (Rynex)
3. Hydrocarbon (Petroleum)
4. CO2 (Liquid Carbon Dioxide)
5. Wetcleaning (Water)

Terms to understand

In relating information, it is important to understand terms that relate to cleaning performance and solvent characteristics.

KB Value: Each solvent has a value which relates to its ability to dissolve kauri wax. The higher the number of the KB Value, the more aggressive the solvent is relating to wax or oil. The KB Value does not relate to the cleaning ability to remove soil, grime, dirt or wetside staining. The KB Value, however, in most cases would have an effect on beading, plastic coated fabrics and the ability to remove oil- and grease-based stains. Perc has the highest KB Value.

Density: This is the weight of the solvent. A heavier solvent would create more mechanical action and aid in soil removal. Perc is the heaviest of the solvents, (13.5 pounds per gallon). Some of the alternative solvents have weights similar to the weight of water (8 pounds per gallon). This is the reason why water separation is difficult with some of the alternative solvents.

Surface Tension: This is the wetting characteristics of the solvents. Solvents with a lower surface tension penetrate fabrics easily and remove soil and staining more quickly.

Flash Point: This is the temperature at which vapors become flammable and combustible.

Class II, Flash Point 100 to 139°F.

Class IIIA, Flash Point 140 to 199°F.

Class IIIB, 200°F and higher.

Class IV, No flash point, not flammable.

GreenEarth

GreenEarth has a low KB Value of about 20. GreenEarth, when used with a proper detergent, has cleaning characteristics similar to hydrocarbon DF 2000. You can dryclean almost anything without risk of damage.

Beaded garments will be cleaned without risk and come out with a slight sheen that enhances their appearance. Pigment prints, vinyls and plastics are no problem!

Color classification does not have to be strict because cleaning is relatively safe to colors.

The ability to remove grease and oil-base staining would require more prespotting. Prespotting procedures would require different formulas than they currently use. Paint removers and volatile dry solvents currently used may not readily rinse from the fabrics, unless flashed, and leveled.

GreenEarth requires high heat when drying so prespotting is necessary to avoid setting stains. Drycleaning equipment must be designed for GreenEarth solvent.

GreenEarth requires vacuum distillation and must be designed with safety since this solvent does have a flash point (170°F). This is referred to as a Class IIIA solvent.

Rynex (Glycol Ether)

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Working with Rynex will give the operator certain advantages and disadvantages. In working with the solvent, it becomes clear that Rynex has an advantage in removing a great deal of wetside staining and soil, to a point that is not even possessed by perc.

Dryside staining must be prespotted, but these agents readily rinse from fabrics. Moisture-bearing prespotters also rinse out easily. Rynex does not affect pigment prints or most color on silks. Cotton and most fabrics are safe.

Rynex will affect acetate fabrics or garments with a disperse dye. This means that acetate or blends can bleed, discolor and shrink. Beaded garments can lose coatings and vinyls can stiffen. This would mean the operator would have to do testing of trimmed garments, similar to those used for perc.

Rynex will cause slightly more wrinkling than perc, but the extra time in finishing is offset by the saving in prespotting time. Rynex requires vacuum distillates and is classified as a class IIIB solvent with a flash point higher than 200°F.

Hydrocarbon (DF 2000)

F 2000 solvent has a KB Value of 27, which is lower than other petroleum solvents (which range from 32 to 37). DF 2000 solvent requires longer cleaning cycles to remove soil. Prespotting agents rinse readily from the fabric. More prespotting will be required for soil removal.

Dryside staining requires more use of oily type paint remover since dryside stain removal is limited. Hydrocarbon machinery maintenance schedules must be adhered to. The solvent is classified as a IIIA solvent, which means more safety features are needed (e.g., nitrogen blanketing) for flammability safety.

Proper water separator cleaning is necessary to prevent bacteria and other odors.

CO2 (Carbon Dioxide)

I went to work with a cleaner using equipment designed for CO2. I signed a nondisclosure agreement and can not disclose specifics about the equipment, but only about the solvents. CO2 is liquefied into a solvent under high pressure (500 to 800 pounds).

Many manufacturers developing CO2 are working slowly, making sure equipment and spotting chemicals are compatible with the solvent. CO2, with proper soap addition, does a decent job of cleaning similar to petroleum solvent.

Special prespotting and spotting agents designed for CO2 are used to remove soil and stains. The lack of heat during drying avoids the setting of stains and wetside staining presents no problem in post-spotting.

Garments can also be prespotted with a wetside prespotter but must be thoroughly dry before cleaning. Cleaning of wet garments will result in gray areas as well as redeposition of soil.

Multi-colored and bright print fabrics are safe when cleaned in CO2. Acetate and triacetate garments do bleed and can even shrink in CO2. Some beads do swell and may be affected. These garments must be classified out of the regular load.

Water (Wetcleaning)

Water is listed as an alternative solvent, but is actually used in conjunction with other

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drycleaning solvents. Water, when all testing is properly done, can be used on many fabrics.

With the upgrade of equipment and improvement of wetcleaning chemicals, wetcleaning can be used to process up to 40 percent of garments received by drycleaners.

Wetcleaning can reduce the cost of drycleaning and provide an alternative way of cleaning unserviceable beaded and coated fabrics. It can also provide the skilled operator the ability to provide such services as restoration, water repellency and increased soil and stain removal.

Summary

Today's cleaner must know the pros and cons of all technologies. The lack of regulations on a solvent today does not mean there will be no future regulation of a solvent or the potential of retroactive liability.

Cleaners considering using different solvents in their store must also be aware of the potential of cross-contamination.

The solvent used on a "drycleanable" garment may create a reaction, due to its cleaning properties. A beaded garment with a dryclean-only label may be affected by perc, Rynex, CO₂ or hydrocarbon (Stoddard, 140°F).

A "dryclean-only" label on an acetate may be affected by Rynex and CO₂.

A petroleum solvent will have different effects on dyes and trimming depending on which petroleum solvent you are using. Stoddard 140°F has a different cleaning characteristic than DF 2000 and may affect some beaded garments as well as plastic-coated fabrics. A printed garment may be affected by perc only and not other solvents.

The label "washable" may have different meanings. A garment may be able to withstand water, but only with controlled temperature, the use of neutral detergents and maintaining a controlled mechanical action. A "Professional Wetcleaning" label will be used by some garment manufacturers.

Dan Eisen is chief garment analyst for the Neighborhood Cleaners Association. His book, "The Art of Spotting," is a compilation of many of the articles he has written over years for National Clothesline and NCA, organized and indexed for quick reference. The pages are assembled in a three-ring binder so the book can be opened and laid flat in the work area. For more information contact NCA (212) 967-3002.