

	<b>GreenEarth GreenEarth Cleaning</b>	<b>Hydrocarbon R.R Street &amp; Co.</b>	<b>SolvonK4 Kreussler</b>	<b>Perc Dow</b>	<b>Rynex Adco</b>	<b>GenX Caled</b>
Cycle Length (Minutes)	60	2 Bath - 55-65 1 Bath - 50-60	2 Bath - 70 min 1 Bath - 62 min	45	74	55-60
Wash Time (Minutes)	17	18-20	7- 10	15-20	7.5	4-8
Drying Time (Minutes)	35	28	48 w/cool down	30-35	60	25-30
Is a Specific Machine Required?	Class IIIA	Class IIIA	Class IIIA vacuum still	Class IV	K Series Class IIIA	Class IIIA
Fees/Licenses	\$2,500 – Annual	No	No	No	No	No
Proprietary products Required?	Many approved products available. Top Brands	No	Yes. Kreussler Products	No	Booster Sizing	No
Average Cost Per Gallon	\$21-\$24	\$13.95	\$30.70	\$25	\$36	\$29.41
Average Solvent Mileage (Pounds cleaned per Gallon)	1,500	1,500 to 1,800 Standard Class IIIA  4,000 K Series Class IIIA	4,500 minimum of .5% weight of load	750 to 1,000	3,000+	800 to 1,100
Recommended Waste Disposal*	Licensed waste hauler	Appropriate waste hauler	Licensed waste hauler	Licensed waste hauler	Regular waste hauler	Non-hazardous municipal waste
Number of Machines in U.S.	More than 900 U.S. 1,700 global	10,000+ U.S.	200 U.S. 450 global	36,000 U.S.	10 U.S. 13 global	800 U.S. 1,000 global
Any Major Issues?	None	None	None	Proper handling and disposal; Restrictions on location; Special reporting & Permitting	Residual solvent signature after drying	None
Rumors or Misconceptions	1. Does not clean 2. Banned in Canada	1. Does not clean	1.Odor of the solvent will be a problem	1. Banned 2. Unavailable 3. Stabilizer disappears when distilled	None	1.Doesn't need detergent
Top 3 Benefits	1. Favorable Regulatory Profile  2. Garment Manufacturers' Recommendations  3. Landlord Specified Locations	1. Cost effective  2. Virtually odorless  3. Ease of transition & ongoing operations	1. Exceptional Cleaning Performance  2. Unmatched solvent mileage  3. Environmental & occupational safety for the clients, staff, landlords & drycleaners	1. Safety  2. Proven performance  3. Economical	1. Better soil removal  2. Less re-runs  3. Great solvent mileage	1. Better performance for oil & water stain removal  2. Cheaper Spotting labor & chemical cost  3. Faster cleaning with no harsh smell

\*If there are any federal, state, or local regulation you must comply to them.

Some of the answers in this chart have been abbreviated. See additional handouts for the complete answers or consult your solvent representative.

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### Alternative Solvents: Which is Best for You?

*NOTE: As new cleaning technologies develop so do the questions, comments, and rumors. DLI approached several solvent manufacturers and asked them to answer some of these questions and dispel common misconceptions.*

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#### GenX - Caled

**Q** What is the average total cycle length for a standard dark load?

**A** 45-55 minutes.

**Q** How much of that is the wash time?

**A** 4-8 minutes.

**Q** How much of that is the drying time?

**A** 25-30 minutes.

**Q** Is a specific drycleaning machine required to use the solvent?

**A** Any Class IIIA machine.

**Q** Are there fees required to use the solvent?

**A** No fees. All consumer advertising tools are free.

**Q** Are any proprietary products or supplies required?

**A** No, but Caled products use half the amount.

**Q** What is the average cost of the solvent per gallon?

**A** \$29.41 per gallon in 55 pack.

**Q** What is the average solvent mileage? (Pounds of clothes cleaned per gallon consumed)

**A** It depends on the machine. We are seeing as high as 1,400 lbs. per gallon and as low as 800 lbs. per gallon. On an average, with a new machine the dry cleaner can expect 1,100 lbs. per gallon.

**Q** What is recommended for waste disposal?

**A** Non-hazardous municipal waste.

**Q** How many machines are currently using the solvent in the U.S.?

**A** 800-1,000

**Q** What are some of the major legitimate issues concerning the use of the solvent?

**A** GenX is combustible, rated as a Class IIIA fluid.

**Q** What are the biggest rumors or misconceptions about the solvent?

**A** Rumor: "GenX cleans so good it doesn't need detergent."

**Q** What are the top 3 benefits of using the solvent?

- A**
1. Better - Performance for Oil and Water Stain Removal.
  2. Cheaper - Spotting Labor and Chemical Additive Cost.
  3. Faster - Cleaning with no harsh smell, with cycle times under 55 minutes.

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#### GreenEarth – GreenEarth Cleaning

**Q** What is the average total cycle length for a standard dark load?

**A** 60 minutes

**Q** How much of that is the wash time?

**A** 17 minutes

**Q** How much of that time is the drying time?

**A** 35 minutes

**Q** Is a specific drycleaning machine required to use the solvent?

**A** Most Class IIIA machines have been approved for use.

**Q** Are there fees/licenses required to use the solvent?

**A** Yes, there is a standard annual Affiliation Fee of \$2,500 to license the Intellectual Property (Patents, Systems, Technical Information, Marks, Brands, and Marketing Materials) associated with the GreenEarth Cleaning System.

**Q** Are any proprietary products or supplies required?

**A** GreenEarth has approved a number of products manufactured by a variety of Vendor Partners representing the top brands in the textile cleaning industry. All are readily available through typical dry cleaning distribution channels.

**Q** What is the average cost of the solvent per gallon?

**A** \$21 - \$24 per gallon

**Q** What is the average solvent mileage? (Pounds of clothes cleaned per gallon consumed)

**A** Usage rates vary depending on factors such as maintenance and configuration of equipment being used. Our best estimate from reports by Affiliates would be approximately 1,500 pounds per gallon.

**Q** What is recommended for waste disposal?

**A** GreenEarth recommends that Affiliates adhere to municipal, state, and local regulations. The silicone product licensed for use in the GreenEarth System is not regulated by the US EPA. Many Affiliates have reported receiving dispensation from local and state regulators for solid residue from the system to be treated as standard refuse. Where that dispensation has not been granted, GreenEarth's recommendation is to have waste removed by a licensed waste disposal company.

**Q** How many machines are currently using the solvent in the United States?

**A** There are more than 900 machines operating in the United States. There are approximately 1,700 GreenEarth machines licensed in 44 countries around the world.

**Q** What are some of the major legitimate issues concerning the use of the solvent?

**A** There are no major issues associated with the use of GreenEarth Cleaning System. GreenEarth silicone has no odor, and is not regulated by the US EPA. It is not a HAP, TAC, or VOC. It has the highest flashpoint (170°F/76°C) of the Class IIIA solvent options and can be used in co-locations.

**Q** What are the biggest rumors or misconceptions about the solvent?

**A** Rumor: GreenEarth doesn't clean.

Despite the fact that more than 1,700 machines are in operation with dry cleaners around the world, there remain operators of other solvent systems who maintain that GreenEarth doesn't clean due to the relatively low KB Value of the silicone fluid used in the GreenEarth Cleaning System. The scientific data supporting the role of low surface tension in relation to excellent cleaning performance (as reported in the 2002 IFI Fellowship) seems at times, to fall on deaf ears.

Rumor: Canada is going to ban GreenEarth.

Canada is definitely not going to ban the GreenEarth silicone fluid. As a matter of fact, Environment Canada announced over a year ago that "D5 silicone does not pose a danger to the environment or its biological diversity" and furthermore, that "the projected future use of Siloxane D5 will not pose a danger."

**Q** What are the top 3 benefits of using the solvent?

**A** 1. Favorable Regulatory Profile – International Regulators (including Canada and the UK) have conducted recent exhaustive scientific studies and have concluded that the GreenEarth silicone solvent is environmentally non-toxic.

2. Garment Manufacturers' Recommendations – Given its low aggressivity, garment manufacturers recognize that a wide range of garments (including sequins, beads, vinyl, trims, etc.) can be cleaned safely, with no odor, a soft hand, and easy finishing. Care labels recommending GreenEarth are sewn into garments on retail racks around the world.

3. Landlord Specified Locations – Given its safety and elimination of environmental liability, more and more landlords are insisting that the GreenEarth Cleaning System be used by their dry cleaning tenants.

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#### Hydrocarbon – R. R. Street & Co.

**Q** What is the average total cycle length for a standard dark load?

**A** Single Bath program – 50 to 60 min depending on configuration of machine  
Double Bath program – 55 to 65 min depending on configuration of machine

**Q** How much of that is the wash time?

**A** 18 – 20 minutes

**Q** How much of that is the drying time?

**A** 28 minutes – average

**Q** Is a specific drycleaning machine required to use to solvent?

**A** Class IIIA machine

**Q** Are there fees/licenses required to use the solvent?

**A** No

**Q** What is the average cost of the solvent per gallon?

**A** \$13.95 per gallon (55 gallon drum)

**Q** What is the average solvent mileage? (Pounds of clothes cleaned per gallon consumed)

**A** 1,500 to 1,800 lbs./gal- Standard Class IIIA machine      4,000+ lbs./gal – K Series Class IIIA machine

**Q What is recommended for waste disposal?**

**A** Process waste disposal must be in accordance with federal, state, and local regulations through an appropriate licensed waste hauler. In any event DO NOT dispose in sewers.

**Q How many machines are currently using the solvent in the United States?**

**A** 10,000 plus machines in over 8000 plants in the United States

**Q What are some of the major legitimate issues concerning the use of the solvent?**

**A** While not considered “Major “issues, there are items that must be addressed with respect to using High Flash Hydrocarbon Solvents:

Fire Codes - over the last several years, the standard for Class IIIA drycleaning plants, both NFPA 32 and IFC, have been relaxed due to improvements in Class IIA drycleaning machines and the safety technologies employed.

Permits – the “Authority Having Jurisdiction” i.e. Fire Marshall, must approve the construction and/or operation of a hydrocarbon drycleaning facility in most areas. Note this is true for all drycleaning plants. Air emission permits may be required in certain locations.

Safety Handling Practices- safe handling practices must be employed and adhered to, specific to the solvent in use. Note this is true for any chemical.

**Q What are the biggest rumors or misconceptions about the solvent?**

**A** The biggest misconception surrounding High Flash Hydrocarbon Solvents is that they do not clean garments as effectively as other solvents in the marketplace.

This misconception is directly related to insufficient wash times and little to no use of additives, (detergent). For the record, this is true of all the drycleaning solvents in use today. Without sufficient wash time and proper use of additives, none of the solvents, including water, will clean garments effectively. High Flash Hydrocarbon Solvents have proven to be as effective, and in some cases more effective, than other solvents in use in the industry today when run properly; 18 to 20 minutes of wash time, and the proper use of additives.

The recent use of heated High Flash Hydrocarbon’s (110°F/43°C maximum) has demonstrated even better cleaning performance.



**Q** What are the top 3 benefits of using the solvent?

**A** 1. Costs effectively

2. Virtually odorless cleaning

3. Ease of transition and ongoing operation

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#### Perc – Dow

**Q** What is the average total cycle length for a standard dark load?

**A** There will be some variation, based on the machine capabilities and features, but the average total cycle length for a typical load, using perchloroethylene solvent, is about 45 minutes.

**Q** How much of that is the wash time?

**A** The wash time during a typical cycle may be on average 15 – 20 minutes, depending on the soil or size of the load.

**Q** How much of that time is the drying time?

**A** The extraction/drying time during the cycle is about 30 – 35 minutes.

**Q** Is a specific drycleaning machine required to use the solvent?

**A** Perc dry cleaning machines do not require special components for optimum performance. A fourth generation or newer machine provides the technology to remove vapors prior to opening the machine which enhances worker safety. New models of perc machines may offer enhanced features to improve programming flexibility, maintenance, and/or energy savings.

**Q** Are there fees/licenses required to use the solvent?

**A** Dow is not aware of special licenses or franchise fees required by perc manufacturers or perc machine manufacturers in order to use this solvent for dry cleaning.

**Q Are any proprietary products or supplies required?**

**A** No, there is not a need for specific or proprietary supplies. DOWPER™ Dry Cleaning Solvent already contains a stabilizer to help maintain the solvent. Dry cleaners are free to use a variety of pre-spotters and detergents of their choice to enhance the removal of difficult soils.

**Q What is the average cost of the solvent per gallon?**

**A** Virgin dry cleaning grade perc typically costs around \$25/gallon. Additional taxes may be applied and vary by region.

**Q What is the average solvent mileage? (Pounds of clothes cleaned per gallon consumed)**

**A** Dry cleaners using perc can probably expect solvent mileage levels between 750 to more than 1000 lbs. clothes cleaned per gallon of perc, with the highest values likely achieved using the latest machine technology and solvent management principals. Solvent mileage can be greatly affected by the size of the loads, the types of clothes cleaned, size and type of machine technology used, and the cleaner's practices to purify and recycle their solvent. Dowper™ solvent is engineered to accommodate extremely high levels of recycle and reuse.

**Q What is recommended for waste disposal?**

**A** The waste removed from perchloroethylene dry cleaning machines must be handled and disposed of as a hazardous waste in compliance with all federal, state and local regulations. Licensed hazardous waste handling companies are available to provide this service to perc users.

**Q How many machines are currently using the solvent in the United States?**

**A** The commercial dry cleaning industry in the United States consists of approximately 36,000 shops. Approximately 85% of dry cleaning shops in the U.S. use perchloroethylene as their primary solvent. (REF: NIOSH <http://www.cdc.gov/niosh/topics/dryclean/>)

**Q What are some of the major legitimate issues concerning the use of the solvent?**

**A** Since perc has been studied extensively, the potential issues associated with perc in dry cleaning are well-understood. These may include restrictions on location (which may vary depending on your state and local areas), and special reporting or permitting. Due to the inherent toxicological properties of the solvent, proper handling and disposal are essential. Employees should be trained on the proper use, operation and maintenance of the equipment.

**Q What are the biggest rumors or misconceptions about the solvent?**

**A** Rumor 1: “Perc will be banned for use in dry cleaning.” - The use of modern equipment and safe handling and disposal practices have shown that this solvent can be used safely and successfully for the long-term.

We encourage Perc users to join with industry alliances to educate and advocate for its continued use at the local and state level.

Rumor 2: “Perc will no longer be produced for dry cleaning.” - US perchloroethylene suppliers have publically stated their commitments to providing long-term supply and support to the dry cleaning industry, as long as there is a market for perc into dry cleaning. They will also continue to work with the HSIA (Halogenated Solvents Industry Association) to promote the safe use, handling and disposal of perchloroethylene.

Over 800 million pounds per year of perc are produced and consumed on a global basis. The vast majority of that perc is used as a ‘feedstock’ to make refrigerants that are used in homes, cars, etc. However, perc is also used around the world for numerous ‘solvent’ uses, and one of the main solvent uses is in dry cleaning.

Rumor 3: “The stabilizer in perc disappears when it gets distilled.” – Perc products are differentiated by their stabilizer packages. We can only comment on the product we manufacture, which is DOWPER™ Solvent. Dow has chosen a stabilizer package that distills along with the solvent and remains with the product in either liquid or vapor form to maintain the alkalinity of the solvent. This same stabilizer is included in perchloroethylene products for metal cleaning/vapor degreasing applications, which are typically much harsher on the solvent than dry cleaning applications.

**Q What are the top 3 benefits of using the solvent?**

- A**
1. Safety – perc is not flammable or combustible, and has no flash point or flammability limits. There are little to no emissions with modern equipment and safe handling practices.
  2. Proven performance – efficient cleaning for multiple soils and fabrics.
  3. Economical – easily separated from water and recyclable. Delivers high performance at a reasonable cost.

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#### Rynex - Adco

**Q** What is the average total cycle length for a standard dark load?

**A** 74 minutes

**Q** How much of that is the wash time?

**A** 7.5 minutes

**Q** How much of that time is the drying time?

**A** 60 minutes

**Q** Is a specific drycleaning machine required to use the solvent?

**A** Yes. K Series machine

**Q** Are there fees/licenses required to use the solvent?

**A** No

**Q** Are any proprietary products or supplies required?

**A** Booster & sizing

**Q** What is the average cost of the solvent per gallon/liters?

**A** \$36.00

**Q** What is the average solvent mileage? (Pounds of clothes cleaned per gallon consumed)

**A** 3000 plus

**Q** What is recommended for waste disposal?

**A** Regular waste hauler

**Q** How many machines are currently using the solvent in the United States?

**A** 10 in USA, 3 in Canada plus Europe

**Q** What are some of the major legitimate issues concerning the use of the solvent?

**A** After drying the solvent leaves a residual solvent signature

**Q** What are the biggest rumors or misconceptions about the solvent?

**A** None that we know of

**Q** What are the top 3 benefits of using the solvent?

**A** Better soil removal-

1. Testing done in Europe shows Rynex cleans better than perc in some areas and is second to perc in all the rest.
2. Less re-runs.
3. Great solvent mileage
4. Removes grease and oils better than some of the other alternative solvents

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#### SolvonK4 – Kreussler Inc

**Q** What is the average total cycle length for a standard dark load?

**A** 2 Bath - 70 minutes

1 Bath - 62 minutes

**Q** How much of that is the wash time?

**A** 2 Bath - 3 minutes prewash/6-7 minutes main wash

1 Bath - 7 minutes main wash

**Q** How much of that time is the drying time?

**A** 48 minutes drying and cool down

**Q** Is a specific drycleaning machine required to use the solvent?

**A** Class IIIA machine with vacuum distillation, preferably one that is designed and optimized for SystemK4 to include efficient drying and stronger cooling capacities.

**Q** Are there fees/licenses required to use the solvent?

**A** No

**Q** Are any proprietary products or supplies required?

**A** Yes, only Kreussler products designed for SolvonK4 are allowed.

Clip K4 (detergent)

Prenett K4 (pre-spotter)

Peramon (still additive)

**Q** What is the average cost of the solvent per gallon/liters?

**A** Suggested list price is \$30.70 per gallon

**Q** What is the average solvent mileage? (Pounds of clothes cleaned per gallon consumed)

**A** 4,500 lbs per gallon, minimum of .5% weight of the load.

**Q** What is recommended for waste disposal?

**A** Waste collection by a licensed hauler.

**Q** How many machines are currently using the solvent in the United States?

**A** 200 US, 450 global

**Q** What are some of the major legitimate issues concerning the use of the solvent?

**A** There are no major issues with using SystemK4, it is a Class IIIA solvent and local and federal codes must be followed for use.

**Q** What are the biggest rumors or misconceptions about the solvent?

**A** Rumor: The odor of the solvent will be a problem for the staff and clients.

No one using SystemK4 has found the odor of the solvent to be a problem for their staff or clients. The cleaned garments, after unloading, have a very faint smell and after finishing the textiles have a neutral smell. Kreussler GmbH installed air quality control measuring in our own plant and in several production plants operating with SystemK4. The concentration of SolvonK4 as a non-hazardous solvent was measured within an 8 hour shift concentration with less than 5 mg/m<sup>3</sup> in the air.

**Q** What are the top 3 benefits of using the solvent?

**A** 1. Exceptional cleaning performance.

2. Unmatched solvent mileage.

3. Environmental and occupational safety for the clients, staff, landlords and last but not least, the drycleaners themselves.