

A high-speed photograph of water splashing, creating a dynamic and energetic background. The water is captured in various stages of motion, with droplets and larger splashes visible against a light blue background.

Wash in Solvent

Wash in solvents

This kind of wash uses chemical solvents different from water.
It has been developed in order to improve garment cleanliness and hygiene.



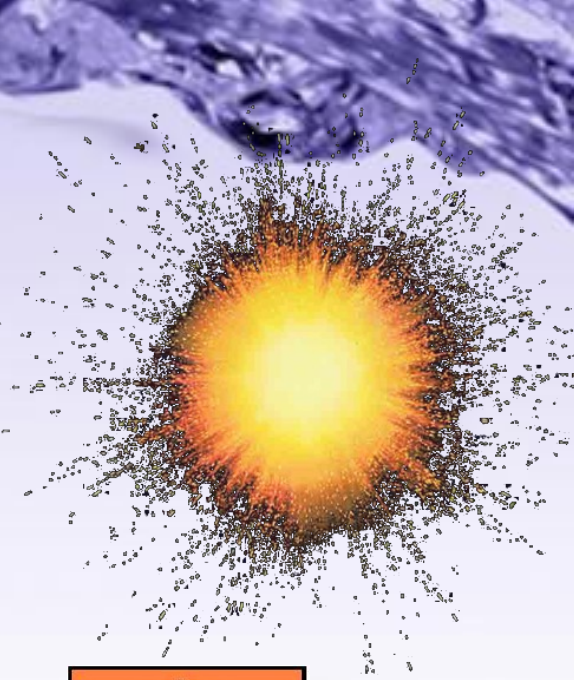
The first evidences of wash with solvents date back to Roman times, where ammonia and clay were used to wash gowns.

Modern dry cleaning was born in France around the middle of XIX century thanks to Jean-Baptiste Jolly, who used a mix of gasoline and kerosene as solvent. Jolly discovered the cleaning properties of these solvents after a fortuitous drop of kerosene onto the tablecloth. He saw that it seemed cleaner after the incident.

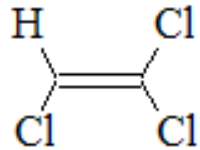


Solvents

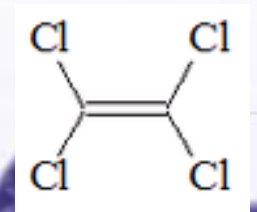
The first solvent used in dry cleaning was a mix of gasoline derivatives but its problem was that it was very flammable and explosive. So they started using chlorinated solvents that were inert and “low dangerous”.



At the beginning they started using Chlorofluorocarbons and then Trilene (trichloroethylene). During the years these solvents were neglected because the first one was considered harmful to ozone layer, while the second one was suspected to cause cancer.



Around 50's started the success of Tetrachloroethylene, also called perc. From then, different machines that exploit the cleaning power of this solvent, have been developed. This molecule is physically inert and **altobollente**.



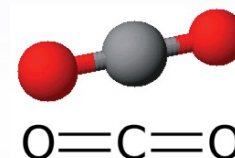
The new Solvents

The doubts on dangerousness and cancerogenity of perc brought to search other solutions:

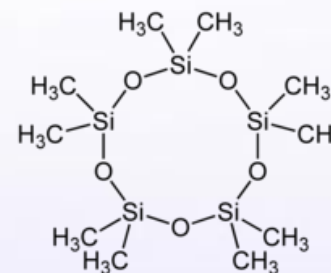
Hydrocarbon (KWL): Mix of paraffin hydrocarbon characterized by a high boiling point and by a delicate action on fibres. One of the problems of these solvents is represented by its flammability.



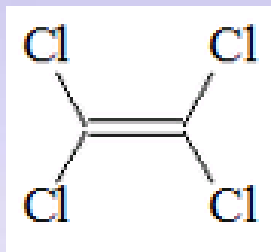
Carbon dioxide: Solvent used in its liquid form (dry ice), it seems to be inert and not dangerous. It has a good degreasing power but it is expensive in the production on the spot.



Silicone Solvents: eco-compatible and completely inert solvents. Composed by Cyclosiloxane. GreenEarthCleaning technology. Good degreasing power but considerable management costs.



Perc



Perc is a chlorured alkene with the following features:

Feature	Water	Perc
Density (g/lt)	1,0	1,62
Steam pressure at 20 °C (hPa)	23,4	18,9
Boiling point (°C)	100	121,1
Molecular weight (g/mol)	18	166
Superficial tension (mN/m) at 25 °C	73	32
Index Kauri-Butanol	-----	90
Explosion lower limit at 20 °C	not flammable	not flammable

Perc classification:



Suspected of causing cancer, Cause skin irritation, May cause an allergic reaction, Toxic to aquatic life with long lasting effects

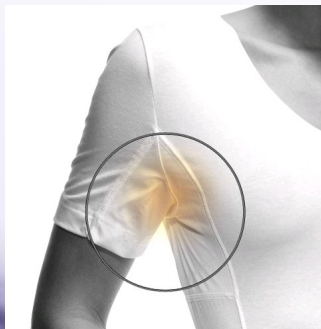
Perc

Perc is a solvent compatible with the majority of garments but it has some problems with some synthetic fibres (such as Polyurethane), because they are soluble in it .

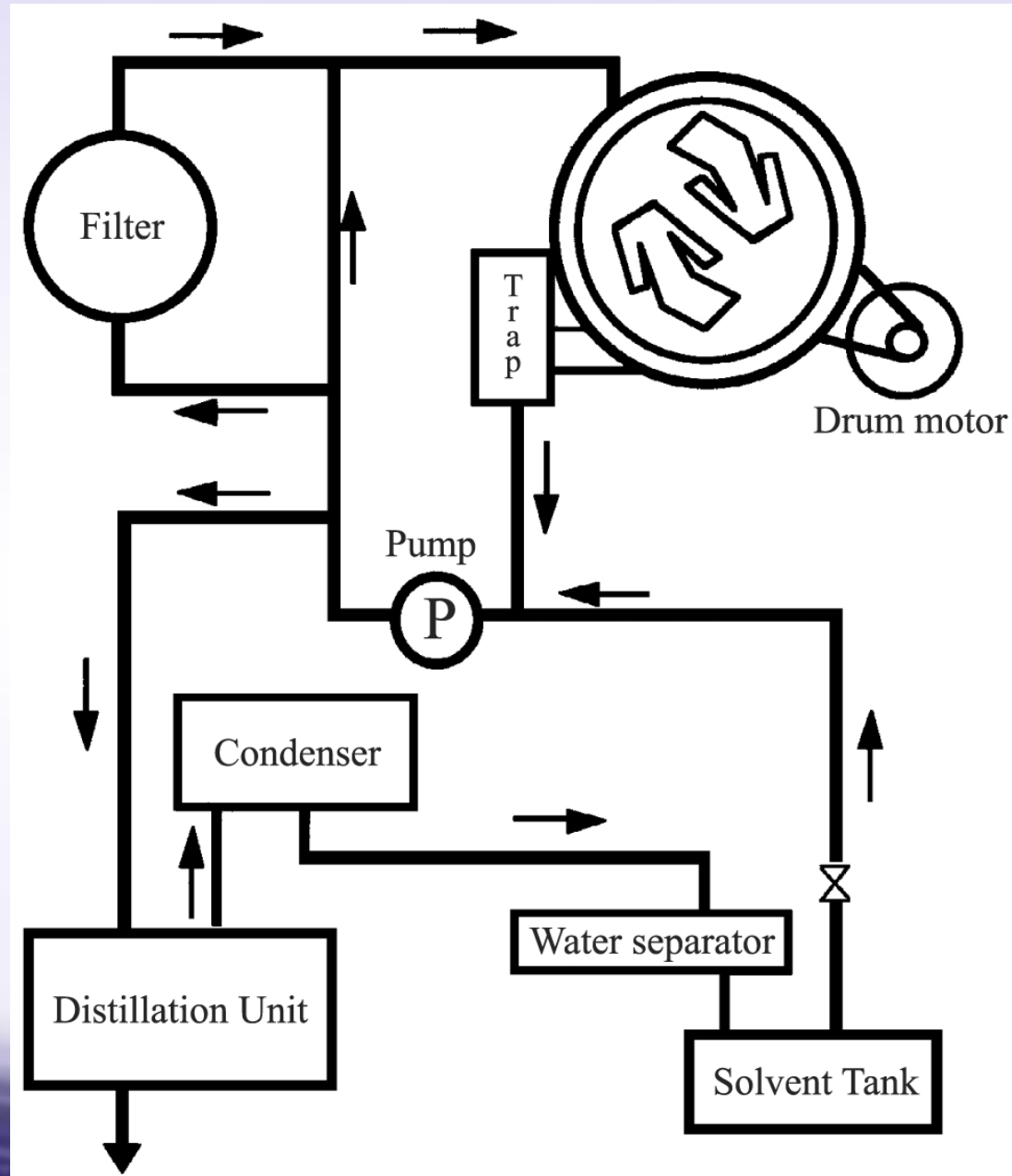
Its chemical features of non polar molecule (apolar) makes it compatible with natural fibres that “are afraid” to laundry such as wool and silk.



Perc has an elevated degreasing power and it is very active on fat stains. But it is not active on non oily stains and on stains soluble in water (sweat, grass, tomatoes etc.). For this reason it needs dry cleaning detergents that can solubilize this kind of molecules.



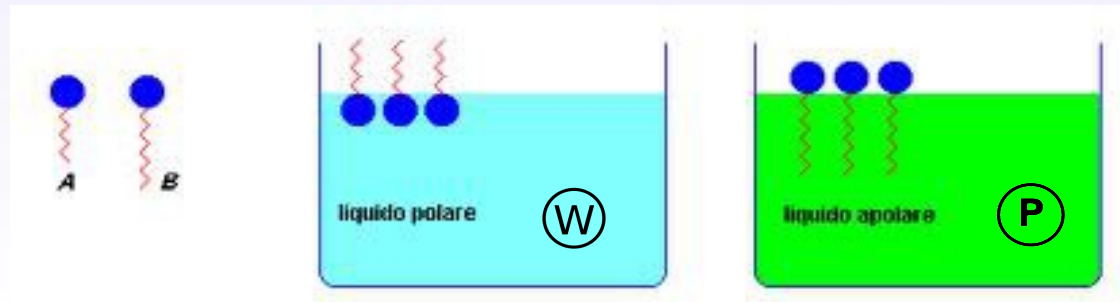
Dry cleaning machine



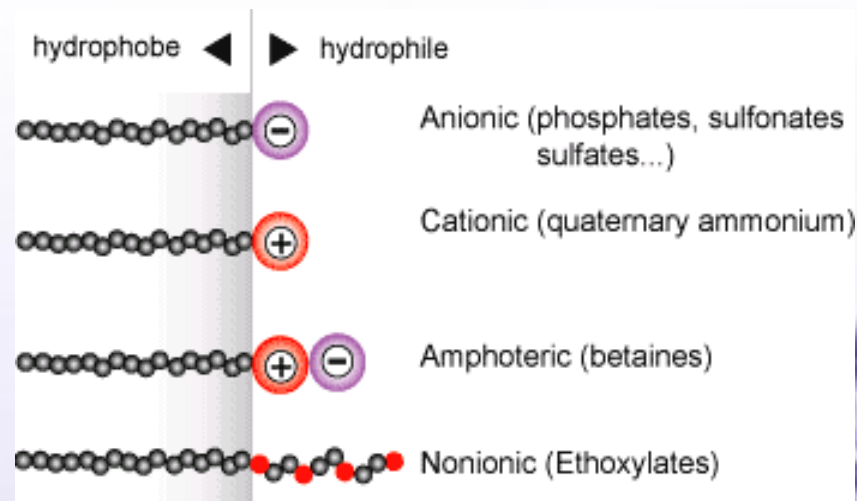
Dry cleaning detergents

Perc dry cleaning detergents are surfactants that work inversely in comparison with their equivalent laundry detergents.

In this solvent, surfactants turn their polar head towards dirty (hydrosoluble dirty) and apolar tails towards perc. For this reason dirty is solubilised.



Surfactants contained in perc dry cleaning detergents are generally anionic surfactants and/or non ionic surfactants.

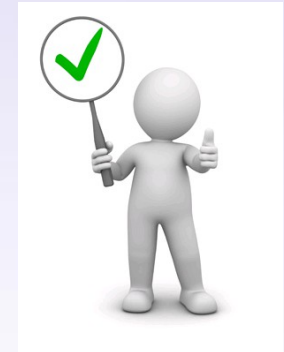


Dry cleaning detergents

Dry cleaning detergents, more than increase cleaning power of wash, have to increase solvent binding power to water.

As complete and super-concentrated dry cleaning detergent

Tintolav suggests → **ACTIV DRY**



Moreover, we have developed a dry cleaning detergent that can highlight the freshness effect after garments wash.

This product is → **ACTIV POWER FRESH**

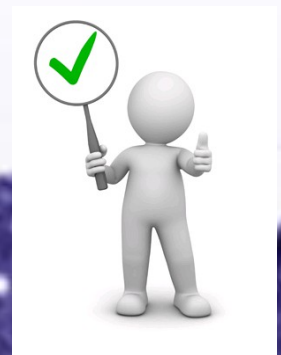


Anti-statics

Perc is a dielectric solvent, this means Non-Conductive. During wash, garment charges negatively and perc is not able to dissipate these charges any more (on the contrary they piling up even more). So while washing wool garments with other normal garments it can happen to see clear down transfers.

For this reason we have to use antistatic products in order to avoid this phenomenon. We could use Cationic surfactants, but in some machines, they can clog filters.

Tintolav developed **ACTIV SUPERSTAT**. Completely with non ionic base, it eliminates static effects and at the same time it softens and deodorize garment!



Pre-brushing

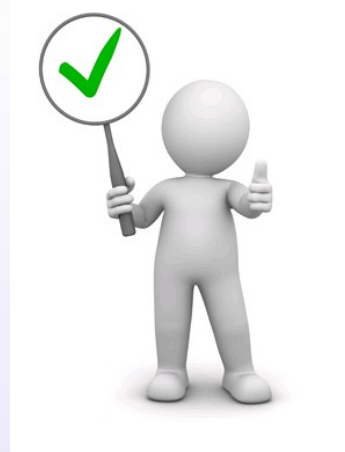
Some stains are difficult for perc, such as non-oily stains, because they have a high solubility towards water.

For this reason we have to add dry cleaning detergents .

In order to eliminate completely this kind of stains it is better to do a pre-brushing with specific products.

It is important that these products are compatible and rinsable in perc.

Tintolav developed two different products for pre-brushing: **JOLLY SMAK** and **PREPERC**



Urine-Sweat stains removal

Urine is a difficult stain to remove in perc.

These stains are very soluble in water and rich of mineral salts. In order to eliminate this kind of stains and its odour we suggest using products rich of surfactants and with molecules that eliminate odours.

For this application Tintolav developed:

TOGLISUDORE

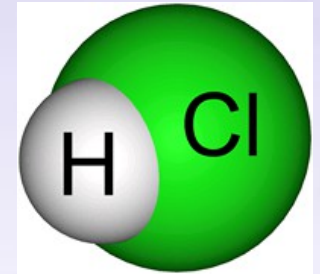


Acid Perc

Usually **perc** has a water extract with a pH around 8.

Sometimes, due to distillation problems (whether the 150°C are exceeded), perc can degrade and develops acidity (on water extract).

Perc degradation usually develops Hydrochloric acid (HCl)



When perc “goes into acid” can cause different problems such as odour on garments or, even worse, it can start damaging metals present into distillation area.

When this problem occurs we can solve it adding: **ANTIACIDIN**.



Suggestion: Do not add this product in a continuous way or in big quantities because we can have the opposite effect and make perc too basic (creating bad odours again during wash)

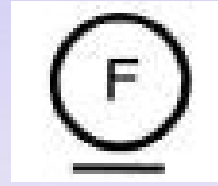
When use wash with perc

When we have to wash delicate garments (such as wool, silk, etc.) perc is ideal for washing. For some synthetic garments perc is the best wash. As first general rule we have to read garments label and see if the producer suggests wash with perc (because only the producer knows all the processes suffered from the garment)



Surely perc wash is indispensable to wash very dirty delicate garments (for example fat and oil stains), because with other kind of washes it should be more difficult to eliminate stains and to preserve the garment at the same time.

Hydrocarbon wash



Hydrocarbon wash is an innovative cleaning process that uses a mix of isoparaffinic hydrocarbon as solvents.

This solvent has a low density in comparison with perc and it is more ecological

The only problem is that it is a flammable solvent.

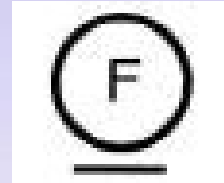


Because it is a flammable hydrocarbon all the machines will have closed circuit and distillation will be done with particular processes to avoid dangers of flammability.

Hydrocarbon machine has a plan more or less similar to the one of perc.



Hydrocarbon wash



Feature	Hydrocarbon	Perc
Density (g/lt)	0,78	1,62
Steam pressure at 20 °C (hPa)	1	18,9
Boiling point (°C)	180-210	121,1
Molecular weight (g/mol)	150-166	166
Superficial tension (mN/m) a 25 °C	25	32
Kauri-Butanol index	25	90
Low limit of explosion at 20 °C	flammable 0,7% vol	non flammable

Hydrocarbon Pros and Cons.

PROS:



- It has a milder action of fibres because it has a low density in comparison with perc, reducing crashes during wash. ***IDEAL for delicate garments and with delicate INSERTS***
- **Less aggressive solvent** on garments, and in particular on plastic inserts
- **Less dangerous for the environment and users**
- **It removes lanolin less** from wool garments, leaving them softer

CONS.:



- **Low degreasing power in comparison with perc**
- “Mild” solvent. It accepts less water presence into dry cleaning detergents and garments in comparison with perc
- **Flammable solvent**

Hydrocarbon wash

It is an ideal wash for very delicate and elaborate garments. Excellent for fur coats and deerskin garments or suede.



Hydrocarbon wash needs the addition of dry cleaning detergents and pre-brushing action because it is less degreasing than perc.

But products used have to be specially studied and developed for this system and they have to be water free.

Wash dry cleaning detergents

These products have to be completely compatible with this solvent and they have to be very concentrated, cause to the less degreasing power of solvent.

Tintolav, as pre-spotting agent for hydrocarbon dry cleaning, developed :
IN CARBON

In order to do a compatible pre-brushing with this system it is possible to use:
PRE CARBON

