# Product Information Manual

# RST-5

V.408


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## Contents:

# 1 Introduction

As you are aware, cleaning processes using organic solvents involve serious risks for our environment and our health. A drastic reduction in VOC emissions has long been overdue and is now required by law. At the same time the industry is looking to increase safety and health conditions for their working staff.

## 1.1 'Volatile Solvents'

Volatile solvents (VOC's) such as toluene, acetone are primarily used for cleaning tools such as rollers, brushes, moulds and other equipment which has been in contact with resin and other polymers. Even hands are still being cleaned using solvents!! These solvents do not only enter the body via the respiratory tract, but to a much greater extent trough the skin. Over time this causes severe diseases. After use the solvents must be recycled trough distillation in order to be used again. This process is expensive and potentially explosive!

## 1.2 'Green' Natural Solvents

A group of "green" solvents has recently come onto the market. These so-called natural solvents are made from fruit-peels of oranges and lemons.
These Natural Solvents are less harmful than the conventional VOC group, but they still are solvents. The resin once cleaned of the tools will remain dissolved in the cleaner, transforming the once valuable cleaner into chemical waste. The disposal cost will be high. So they may not really be such a good alternative cleaning system after all!

## 1.3 Aqueous Cleaners

Several aqueous cleaners are offered as a replacement for volatile solvents. Some will simply not work at all. Some will have one or more of these negatives.

**highly alkalised ( pH > 10)**
**very toxic**
**contain solvents**

## 1.4 RST-5 (patent pending) is none of the above and does the job well

RST-5 is a universal-cleaning agent deluded in water. It is today's most environmentally sound alternative for all who wish to strike a healthy balance between ecology and economics when it comes to cleaning surfaces and tools. RST-5 is a revolutionary soap that is:

- free of solvents
- non flammable
- pH neutral to the skin (pH 8.2- 10.5)
- low cost, it can be re-used and does not evaporate
- harmless to humans and environment
- self separating, resin particles separate from cleaner

## 1.5 Departure from Solvents

A growing number of companies are looking for alternatives to solvents. The main reasons are:

- health awareness
- consideration with the environment
- governmental and community restrictions on solvents
- lower cost, 30% plus
- cost-reduction in safety measures
- increasing duties on solvents
- lack of availability of solvents

Working with alternative cleaners differs from working with solvents. In most cases water is involved. Water is considered to be an unwelcome element in GRP-production plants. Several steps have to be taken, before water based cleaners replace solvents.

- Convince workforce first. Don't spring it on them.
- Look for volunteers and start with one production unit.
- Tools have to be allowed to dry, extra sets may be needed.

# 2 RST-5 – The friendly Cleaner!

## 2.1 Production

RST-5 is produced by ICT Ecotech International Cleaning Technologies in the Netherlands. The company exists since 1999 and achieves increasingly good results with several special cleaners. Marketing and sales of RST-5 has been outsourced, as ICT strictly concentrates its efforts on production and new development.

From fall 2005 RST-5 is also be produced under the auspice of ICT in the United States by The Soap Factory, Ft. Lauderdale.

It is scheduled to have a production of RST-5 started up in Thailand in the first half of 2008. From here the Asian market will be supplied.

## 2.2 Distribution

The international distribution for RST-5 is handled by exclusively Mulder-Hardenberg GmbH, located near Frankfurt in Germany. The Mulder-Hardenberg Group has its own offices in the Netherlands, Belgium, Germany and the United States.

Since this is a innovative product, we are looking for skilled distributors who recognise the potential value RST-5 has as a solvent replacement system in the FRP industry.

# 3 Product application

## 3.1 Instructions on how to use RST-5

Shake well before use.
RST-5 is delivered as a concentrate, **Mix 1 part RST-5 with 20 parts of water.**
In order to save time you could use warm water from the tap instead of waiting for the heater to heat up the cleaning tank. Heat-up the cleaner to around 40 degrees Celsius.
Only uncured resins can be cleaned! Don't let the resin cure on your tools; RST-5 will not get them clean once the resin has cured.

Due to evaporation, water has to be added regularly. Depending on the intensity of use of the cleaner (the amount of resin being washed out), RST-5 concentrate must be added from time to time.

### Re-use of RST-5:

It was noted lately that after having used the cleaner over a longer period, the pH drops below the scale 7.0 and will not rise even by adding RST-5 concentrate. The main reason for this is that the washed out resins contain acids which stay in the water. Acid influences the cleaner negatively! We therefore suggest regularly cleaning the complete unit and exchanging the water.

### Reduce temperature:

RST-5 can also be used at lower temperatures! This depends on the type of resin being used. If you want to experiment with different temperatures, go ahead, but please begin the test with water heated to 40 degrees Celsius or higher.

### Use of a time switch:

When using a heating unit a time switch is recommend, which can automatically turn off the electricity when production stops (nighttime). It is recommended to place a lid on the cleaning unit, if not in use, in order to keep the heat inside and reduce evaporation.

The water temperature will drop a few degrees over the night time, but within a short period of time it raises.

### 3.2 Simple test

Use a small a small bowl or glass. Dilute your sample of RST-5 with 20 parts of warm water (40 degrees C).Immerse a small brush with your resin in the cleaner. Hold it still for 1 or 2 seconds and wash of the resin by stirring. The resin will detach itself from the tool and quickly settle on the bottom. RST-5 is completely safe to the skin, since it has a pH of around 8.5.

### 3.3 How does RST-5 work?

RST-5 is soap not a solvent! Rather than dissolving the resins, RST-5 simply washes uncured resins from tools, brushes, rollers, moulds etc. The RST-5 concentrate is mixed with 95 % water so it acts more or less like dishwashing soap. When dishwashing by hand you need warm water, soap and a brush to achieve good results. The same goes for RST-5.

The ideal temperature for the removal of resins is about 40 degrees Celsius (110 degrees Fahrenheit). Another important aspect is active cleaning, such as using a scrubbing brush. You cannot just dump tools in a bucket of non-solvent cleaner in the hope to pick them up later, all clean and shiny.

In the RST-5 (Resin Separation Technology) cleaning process the resins, which are removed, will disperse and sink to the bottom. They dispersed resin can be removed and if dried, can be disposed of as ordinary waste. The cleaner can be reused and kept active by occasionally adding RST-5 concentrate.

## 4 Field of application

### 4.1 GRP-Industries

RST-5 was originally designed for the GRP-industry, in particular for the open mould manufacturers. Machines such as spray-guns, injectors etc. can be cleaned using RST-5. Right now, several leading toolmanufacturers are testing RST-5 on their equipment.

### 4.2 Metal- , surface degreaser

RST-5 can also be used as a degreaser. The principle is the same, the only difference is that grease will float to the surface. With a skimmer you can easily remove the grease!

### 4.3 Printing Industries

Printing presses are cleaned using enormous amounts of solvents. Manufacturers are looking for alternatives and are testing RST-5. In America the Environmental Protection Agency as well as manufacturers of printing presses are currently testing RST-5 and other aqueous cleaners for the purpose of replacing solvents in that industry.

### 4.4 Industrial Filter Cleaning

Special coated industrial filters can easily be cleaned with RST-5 without damaging the coating.

### 4.5 Hobby and DIY Market

RST-5 can perfectly remove paints and greases. They are easy to clean with warm water.

### 4.6 General Cleaning

RST-5 can be used in many fields that we did not mention here! It is not aggressive and will not damage washers, gaskets, seals etc.

# 5 Cleaning Technology

## 5.1 Washing units


Since RST-5 disperses resins into little particles, it is advisable to use **sufficiently high cleaning tanks or buckets** in order to create a still and motionless water-layer which allowing the resin particles to sink to the bottom of the container and stay there! A scrub board or grid is needed to avoid cleaning in your own dirt.

We offer three standard washing units; a 220 litre PP-cleaning unit with splash guard walls, a 100 litre PP-drum on wheels and a 200 litre GRP-unit on wheels. When designing own units, please keep in mind that a grid should be placed around 10 cm below water level.
The holes in the GRP-grid should be wide enough (20 mm x 22 mm), allowing a fast exchange of water and also avoiding that tools drop to the bottom!
PP (polypropylene) is ideal because dirt does not adhere to it and it has good heat insulating characteristics so that less energy is needed to keep the contents of the tank at the right temperature. Alternatively you could use a standard steel barrel or even a large bucket.

**Please consult our website for further information on tanks and heaters!**

## 5.2 Heating units

It is essential that the cleaner is heated to approx. 40 degrees Celsius (110 degrees Fahrenheit). It is a pleasant working temperature and the cleaning result is far better than if you used cold water! A large variety of heaters is available on the market. In our program we offer a heater with a variable temperature range and an Auto-Shut-off-System that monitors the fluid level in the tank.
**Important:** In case you make use of the NÜGA Heating unit in our programme, please make sure that before taking it out, it should be disconnected and cool off for approx. 30 minutes! Otherwise the unit will be damaged.

## 5.3 Spinning tool

Rather than trying to clean the resin soaked lambswool roller in the cleaner, a specially designed spinning tool has been developed, in order to clean and dry these types of rollers efficient and fast, without using up too much cleaner! Most of the resins are collected outside the cleaner by using the spinning force of air. The resin is thrown out and the waste collected separately. Only after this process the roller can be cleaned in the cleaning unit. One more spin and the roller is clean and dry. Small rollers can be cleaned in 30 seconds, the bigger ones in 50 seconds.

A similar process can be done for brushes. A centrally fixed air driven drill with a conical pin on which the brushes are attached achieves the same result.

Make sure that all parts are dried properly. Don't bring the parts to dry in contact with metal, as otherwise corrosion starts immediately. The use of compressed air and/or hot air is strongly recommended.

# 6 Waste Disposal

## 6.1 Cleaning procedure

Depending on the intensity of cleaning, the unit should be cleaned from time to time. Large production facilities using 200 litre drums do so once a week.

**How much waste will be produced?**
A rule of thumb says that about 5 % of the resin in production is turned into waste. Since each production unit varies in size, a one-week test at one ordinary workstation will give you a good insight as to how often the tank will have to be cleaned.

**How to remove the sediments?**
If there is a heating unit in the tank remove it and store it safely, it will be hot for quite some time. You may then want to stir in a flocculent. This will induce the resin particles to bind together like snowflakes and form a compacter mass, this will facilitate filtering later on.
Whether you used flocculent or not, the next step is to remove the sediment or sludge from the tank. There are several ways to do this. You could place an extra drum, tank or bucket next to the cleaning station and pump or pour the clear RST-5 water-mix into it until only the sludge is left. Remove the sludge and pour or pump the clean RST-5 mix back into your cleaning tank. After adding some water and RST-5 and replacing the heater, you are ready for the next production run.

We strongly suggest the use of a PP-BigBag, which fits into a IBC 1000 litre container. Cut out the plastic top completely, have 4 poles (metal) placed to each corner with a total height of around 2.00 meters. On the top of the pole there should be 4 hooks, to which the BigBag can be attached. The water drips through the PP-material in the container and can be disposed of separately. Once the PP-BigBag is completely full with sludge, you should hang it outside, preferably under a roof. After a while it will be an inert dry powder.

Extra heat will severely reduce the sludge layer at the bottom. Before sludge removal, some of our customers, turn up the heat to 70 or 80 degrees Celsius, before turning of the heating unit and remove the sludge. The extra heat may reduce the sludge layer to 30 percent of its original thickness.

If you are not familiar with Big Bag's, have a look at the website http://www.ligtermoet.nl
Big Bags are cheap and can be rigged over a collection tank. If you deposit the sludge from your cleaning tank into a BB you can re-use the water dripping out of the bottom. In order for the BB option to function properly you need to have used flocculent powder during the separation. Depending on weather circumstances, the sludge in the BB will quickly turn into inert powder.

## 6.2 Re-use the water

You will continue to use the water that you used to remove resin, grease or other polymers, it should not be necessary to dispose of it. Our customers re-use the water and only dispose of the sludge that has formed on the bottom, either in dried form or in the form of resin-mud with their other industrial waste.

**Important:** It was noticed lately that after having used the cleaner over a longer period, the pH drops below the scale 7.0 and will not rise even by adding RST-5 concentrate. The main reason for this is that the washed out resins contain acids which stay in the water. Acid influences the cleaner negatively! We therefore suggest regularly cleaning the complete unit and exchanging the water.

## 6.3 How to use RST-5 Flocking Liquid step by step

**Step 1:** Remove the grid from the cleaning unit.

**Step 2:** Add 0,125 litre (one quart of this bottle) RST-5 flocking liquid for every 100 litres of RST-5 waste water

**Step 3:** Stir the RST-5 flocking liquid during ½ minute slowly, after approx. 2 hours you will see completely clear thin layer on top of the unit.

**Step 4:** Rise the temperature up to 70 Celsius. The remains of the sludge will now break down and go to the bottom of the cleaning unit.

**Step 5:** Shut down the electricity and give the heating unit time to cool down (min 20 minutes), then take it out and remove the grid & holder.

**Step 6:** The complete contents of the cleaning unit can now be poured through a large filter, for instance a cheap bigbag.

**Step 7:** Let the complete sludge dry (it still contains 80% water!) and it will be normal industrial waste, instead of chemical waste.

**Step 8:** The filtered waste water can be disposed of through the drainage or is reusable (please the check pH is not lower 7!).

**Important: Without flocking liquid you will not be able to filter the resin sludge.**

# 7 If RST-5 doesn't work properly!

## 7.1 Warm water

Are you using cold or warm water? RST-5 doesn't work well with cold water and needs the comfortable temperature of 40 degrees Celsius (110 degrees Fahrenheit). Please keep in mind that it is soap and not a solvent. In closed systems you can heat-up the cleaner to extra high temperatures and achieve an even faster and better cleaning result!

## 7.2 Scrub or washboard / grid

Since RST-5 doesn't dissolve, you will need the use of a scrub, washboard and/or grid to clean the tools properly.

## 7.3 Incompatible resins

Some resins cure quickly (Epoxy) when they come in contact with (warm) water. Try one of the other RST-5 versions. We are constantly improving our product range.

**Fillers -** Some customers have also noticed that some fillers absorb water and swell very fast in the cleaner. Immediate separation after cleaning is recommended.

## 7.4 Concentration

Have you added any RST-5 concentration lately? If the cleaner gets sticky and doesn't clean the way it did before, you must add some concentrate. Should you overdose the cleaner with concentrate the cleaning result will NOT improve.

## 7.5 Correct pH? > 7,0

It was noted lately that after having used the cleaner over a longer period, the pH drops below the scale 6.8 and will not rise even by adding RST-5 concentrate. The main reason for this is that the washed out (polyester) resins contain acids which stay in the water. Acid influences the cleaner negatively! We therefore suggest regularly cleaning the complete unit and exchanging the water.