



## High Performance Flux Remover

### Cleans All Solder Fluxes, Ionic Contaminants, Particulates

- Drop-in cleaner for existing vapor degreasers
- Removes no-clean, lead-free, and RMA flux residues
- Eliminates white residue

#### Introduction

Tergo High Performance Flux Remover is a patent-pending formulation combining a low boiling, volatile cleaning fluid with a non-volatile cleaning additive. It is designed specifically to remove stubborn white residues and difficult no-clean fluxes that are often left behind during standard printed circuit board cleaning procedures. This advanced cleaning fluid is also highly effective in cleaning aged or partially polymerized fluxes and pastes.

This product bulletin summarizes product properties, applications, use, safety, health, environmental, and regulatory information. Users should also consult the appropriate Safety Data Sheet (SDS) for additional details.

Physical properties of Tergo High Performance Flux Remover are shown in Table 1.

**Table 1:**  
**Physical Properties**

Property <sup>1</sup>	Value
Appearance	Colorless to light
Boiling Point, °C (°F)	38-40 (100-103)
Liquid Density, g/cc (lb/gal)	1.32 (11.0)
Vapor Pressure, mmHg (psia)	262 (5.1)
Surface Tension, dyn/cm	19.4
Freezing Point, °C (°F)	-27 (-17)
Heat of Vaporization (at boiling point), cal/g (Btu/lb)	54 (96)
Flash Point, °C (°F) Closed Cup <sup>2</sup> Open Cup <sup>3</sup>	None 28 (82)
Vapor Flammability in Air, vol% Lower Limit Upper Limit	6.25 14

**Table 2: Density and Vapor Pressure Change with Temperature**

Temperature, °C (°F)	Density, g/cc (lb/gal)	Vapor Pressure, mmHg (psia)
0 (32)	1.39 (11.6)	166 (3.2)
10 (50)	1.36 (11.4)	264 (5.1)
20 (68)	1.34 (11.2)	405 (7.8)
25 (77)	1.33 (11.1)	497 (9.6)
30 (86)	1.32 (11.0)	601 (11.6)
40 (104)	1.30 (10.8)	866 (16.7)
50 (122)	1.27 (10.6)	1,216 (23.5)
60 (140)	1.25 (10.4)	1,668 (32.3)

<sup>1</sup> At 25°C (77°F), except where indicated.

<sup>2</sup> Setaflash Closed Cup Tester (ASTM D 3278)

<sup>3</sup> Tag Open Cup Tester (ASTM D 1310)

## Using Tergo™ High Performance Flux Remover

**Equipment:** *Tergo* High Performance Flux Remover is used in a properly designed, operated and maintained vapor degreaser system with a boiling sump and at least one rinse sump. In addition to the primary condenser coils the vapor degreaser should be equipped with a second set of low-temperature condenser coils or free-board cooling coils.

On start up, the boil sump will be charged with *Tergo* High Performance Flux Remover. *Tergo* High Performance Flux Remover is a blend of the high performance cleaning additives, both volatile and non-volatile. The rinse sump and water separator will be charged with *Tergo* High Performance Flux Remover - Rinse. The *Tergo* High Performance Flux Remover - Rinse contains only the volatile portion of the cleaning agent and acts as a rinse solution. As the cleaning process is utilized, the nonvolatile cleaning agent and soils are concentrated in the boil sump, while the volatile portion circulates by distillation between the boil and rinse sumps. Distillation of the rinse fluid will provide a constant stream of clean solvent for final rinsing.

**Cleaning:** Parts are immersed in the boil sump of the vapor degreaser to dissolve flux residues, white residues, oils, mild oxidation and other undesirable contamination.

**Rinsing:** Parts are then transferred from the boil sump and thoroughly rinsed in the solvent rinse sump to achieve optimal cleaning results. The distilled solvent rinse removes all remaining residues, including particulate or contamination remaining on the part surface, and then evaporates quickly leaving a clean, dry, part.

**Table 3: Plastic Compatibility**

Immersion: 15 Minutes at Room Temperature

Compatible	
Polyethylene	Acetal
Polypropylene	Epoxy
Polyester, PET, PBT	Liquid Crystal Polymer
Polyimide, PI, PEI, PAI	Phenolic
Polyetherketone, PEK	PTFE, ETFE
Polyaryletherketone, PEEK	Polyvinylchloride
Polyarylsulfone, PAS	Ionomer
Polyphenylene Sulfide, PPS	Chlorinated PVC
Polysulfone, PSO	
Incompatible <sup>1</sup>	
Polystyrene	ABS
Cellulosic	Acrylic
Polyphenylene Oxide, PPO	Polycarbonate

**Table 4: Elastomer Compatibility**

Immersion: 15 Minutes at Room Temperature

Compatible	
Buna N, NBR, Nitrile	Buna S, SBR, GRS
Butyl Rubber, IIR	EPM, EPDM, Nordel® Polysulfide
Natural Rubber, Isoprene	Neoprene
Urethane	Viton® B
Silicone	
Incompatible <sup>1</sup>	
Chlorosulfonated PE	

<sup>1</sup> Material composition varies depending upon compounding agents, plasticizers, processing, etc. Specific materials should be tested for compatibility with solvent.

## Plastic and Elastomer Compatibility

Most plastics commonly used on printed wiring board assemblies can be safely cleaned in *Tergo* High Performance Flux Remover. Acrylic, ABS, and polycarbonate parts, particularly if under stress, may show slight stress cracking or crazing damage and should be tested. EPDM, butyl rubber, Buna-S, and neoprene are recommended for elastomeric parts. Elastomer swelling and shrinking will, in most cases, revert to original size after air drying. Swell, shrinkage, and extractables are affected by the compounding agents, plasticizers, and curing used in the manufacture of plastics and elastomers. Therefore, prior in-use testing is particularly important. **Tables 3 and 4** summarize test results on short-term exposures of unstressed plastics and elastomers simulating a typical cleaning cycle.

## Metals and Other Compatibility

Tests confirm that after exposure for two weeks at 36°C (97°F) in sealed tubes, the volatile flux remover and rinse fluid component is compatible with aluminum, copper, and iron, with and without rosin flux present. Large amounts of water may affect cleaning performance. Therefore, users should minimize the introduction of water into the system. It is important to make sure that water condensed and separated in the primary and secondary water separators is allowed to properly drain. An additional water separator is recommended for the low temperature freeboard coils.

Seals and Gaskets recommended for use with *Tergo* High Performance Flux Remover are Teflon (PTFE), PTFE encapsulated Silicone or FEP (Fluorinated Ethylene Propylene).

## Safety/Exposure Limits

Users of *Tergo* High Performance Flux Remover must read and understand the product Safety Data Sheet (SDS). Data from toxicity studies have demonstrated that the components of *Tergo* High Performance Flux Remover have low toxicity and are safe when handled in accordance with *MicroCare* recommendations and when exposures are maintained below recommended exposure limits.

*Tergo* High Performance Flux Remover is a skin and eye irritant and has low acute inhalation toxicity. As with many safely used halocarbon materials, intentional misuse or deliberate inhalation may result in suffocation by oxygen displacement, central nervous system effects or cardiac sensitization effects. Gross over-exposure may be fatal. Refer to the appropriate product SDS for additional details.

## Safety/Flammability

The volatile flux remover and rinse fluid component exhibits no closed cup flash point per the Pensky-Martens Closed Cup Tester (ASTM D93) and is not classified as a flammable liquid by NFPA or DOT. The product does exhibit vapor flammability limits in air, and has the potential to ignite in an open vessel or in the event of a spill, if an ignition source is present. However, laboratory tests with virgin rinse fluid in an open vessel show the fluid does not sustain combustion, and quickly self-extinguishes. Users should clear equipment of all vapors and liquids before performing any maintenance operations that could result in an ignition source.

Flash point data and limits of flammability in air provide the user with additional information that should be used as elements of a fire risk assessment and to determine guidelines for the safe handling of volatile chemicals. Users should assure compliance with NFPA standards and local fire codes.

## Recovery

The volatile flux remover and rinse fluid component in *Tergo* High Performance Flux Remover is easily recoverable by off-line or in-line distillation equipment such as a vapor degreaser or still. The presence of soil, however, may alter the characteristics of the fluid during the recovery operation. Recovery should be closely

monitored to ensure operating levels are maintained. Users should test the “still bottoms” or residue from the distillation process to ensure proper classification for waste disposal.

The non-volatile cleaning additive component of the *Tergo* High Performance Flux Remover is not recoverable, and will remain in the boil sump with the soils. Fresh *Tergo* High Performance Flux Remover should be added to the boil sump when the vapor degreaser is refilled in order to maintain optimum cleaning capabilities.

## Storage/Handling

*Tergo* High Performance Flux Remover is thermally stable and does not oxidize or degrade during storage. Store in a clean, dry area. Protect from freezing temperatures. If stored below  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ), mix prior to use. Do not allow stored containers to exceed  $52^{\circ}\text{C}$  ( $125^{\circ}\text{F}$ ) to prevent leakage or potential rupture of container from pressure and expansion. Stored containers should be allowed 24 hours to equilibrate in temperature for the area where the vapor degreaser is located prior to opening the drum or pail.

Consideration should be given to retrofit of existing, or purchase of new vapor degreasing equipment to provide the most current vapor containment technology that enables safe and economical use. Although *Tergo* High Performance Flux Remover is not classified as a flammable liquid by DOT/NFPA, it does have flammable limits in air. A drum pump is recommended to dispense the product from its container. If an electric drum pump is used, avoid operation near open equipment or when solvent vapors are present. In these cases, consideration should be given to the use of an air-operated or flammable-rated drum pump. If a large release of vapors occurs, such as from a large leak or spill, the vapors may concentrate near the floor or in subfloor areas and displace the oxygen available for breathing, causing suffocation. Evacuate everyone until the area has been well ventilated. Do not re-enter the affected areas without self-contained breathing apparatus unless vapor concentrations are below the AEL.

## Safety/Exposure Limits

All components of the *Tergo* High Performance Flux Remover are listed as accepted by the U.S. Environmental Protection Agency (EPA) under the Significant New Alternatives Policy (SNAP) program, as substitutes for ozone-depleting substances. All components of *Tergo* High Performance Flux Remover are listed in the TSCA inventory. The non-volatile cleaning additive is inherently biodegradable, VOC free, non-flammable, and non-regulated.

## Packaging and Availability

Part Number	Package		Weight	Size
MCC-TFRHPEUP (Boil)	Steel Pail		45 lb (20.41 kg)	5 Gal (18.93 L)
MCC-TFRHPEURIP (Rinse)	Steel Pail		45 lb (20.41 kg)	5 Gal (18.93 L)
MCC-TFRHPEUD (Boil)	Steel Drum		500 lb (226.8 kg)	55 Gal (208.2 L)
MCC-TFRHPEURID (Rinse)	Steel Drum		500 lb (226.8 kg)	55 Gal (208.2 L)

Note: Products sold by weight, not volume.



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