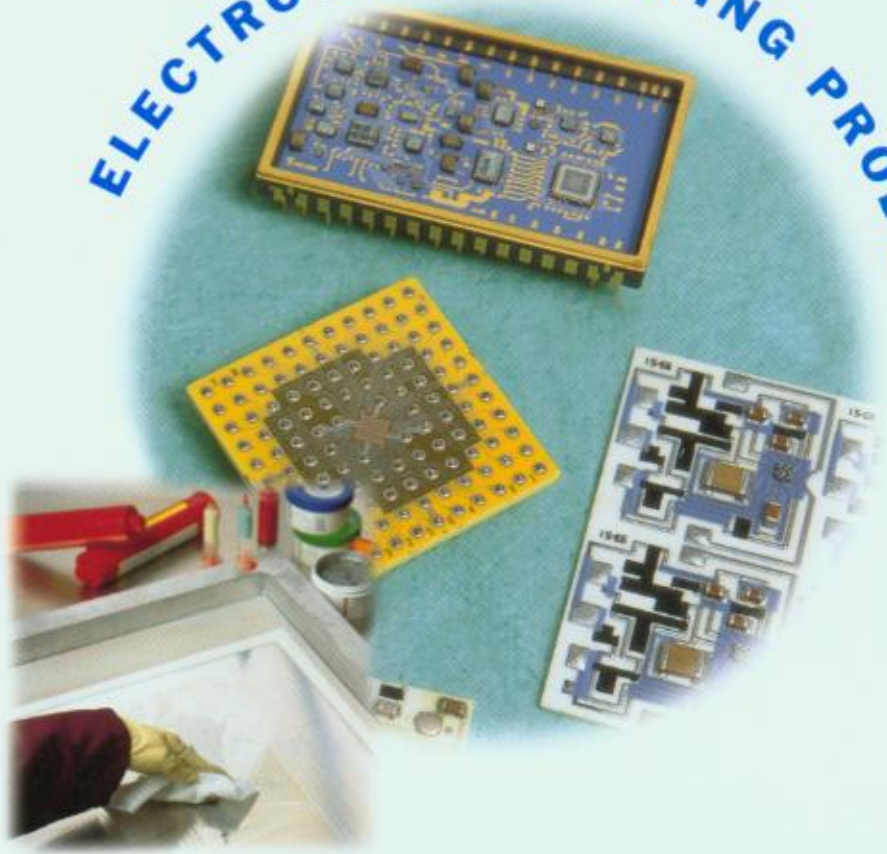


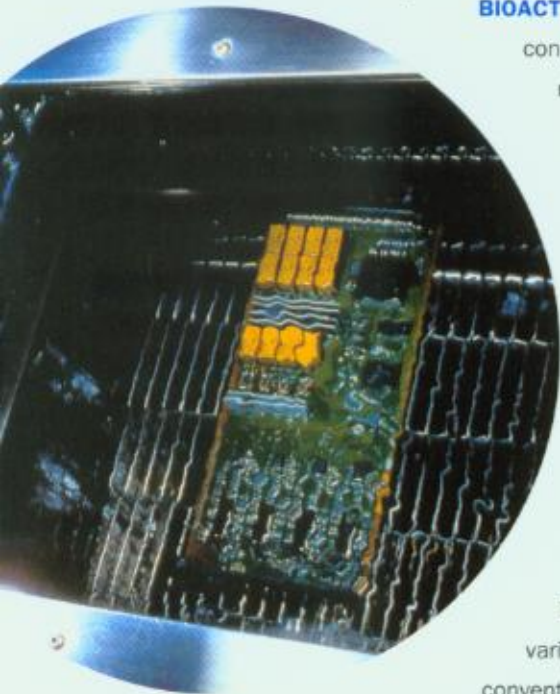
BIOACT

ELECTRONICS CLEANING PRODUCTS



Petroferm

SEMI-AQUEOUS DEFLUXING



BIOACT EC-7™ Defluxer was the world's first semi-aqueous defluxer. The product is used concentrated for cleaning rosin flux and reflowed rosin solder paste residues. It also removes SA, OA and many no-clean flux residues. EC-7 Defluxer is **ideal for batch semi-aqueous operations and those applications requiring easy rinsing**. EC-7 Defluxer is a certified California *Clean Air Solvent* when used at appropriate dilutions in water (contact Petroferm for details).

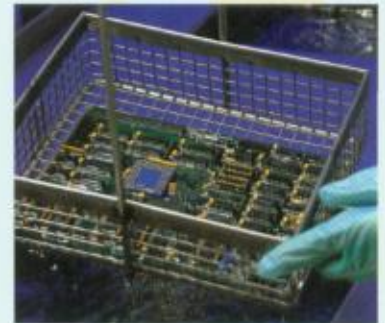
BIOACT EC-7R™ Defluxer is the most widely used semi-aqueous product in the electronics industry due to its **easy rinse water recycling or disposal**. It is effective in removing all rosin and water-soluble flux and solder paste residues as well as most no-clean flux. EC-7R Defluxer has the fastest and most complete separation from water of any semi-aqueous defluxer.

BIOACT EC-15™ Defluxer is a high performance semi-aqueous cleaning product specially designed for removing rosin and no-clean solder paste residues after **high temperature reflow**. EC-15 Defluxer's advanced formula removes a wide variety of stubborn, baked-on solder paste and flux residues from ceramic and conventional substrates.

BIOACT EC-ULTRA® Defluxer has the **lowest odor of any semi-aqueous defluxer**. The product effectively removes rosin flux and solder paste residues. EC-ULTRA Defluxer is the best semi-aqueous choice for odor-sensitive workspaces and VOC-sensitive areas. The product also separates from water, allowing it to be used in most rinse water recycling systems.

EMULSION DEFLUXING

BIOACT SC-22 Cleaner can be used in emulsion (dilution) to remove rosin, water-soluble and no-clean flux residues. This product is typically diluted to 20%-25% concentration in water. Since SC-22 Cleaner is solvent-based, it is usually more effective than saponifiers on no-clean residues. Emulsions of SC-22 Cleaner can be used in most metal and polypropylene aqueous cleaning equipment.



VAPOR DEGREASING



VaporEdge™ 1000 is a *n*-Propyl Bromide/IPA azeotrope specially formulated to remove polar and non-polar residues from printed circuit assemblies. **It removes most rosin and no-clean flux and paste residues as well as ionic contamination from printed circuit assemblies in vapor degreasing equipment**. It has physical properties and solvency similar to 1,1,1-trichloroethane (TCA). Vapor degreasers operating with halogenated solvents such as HCFC-141b and HCFC-225 can be easily converted to operate with VaporEdge 1000. The VaporEdge cleaning process is ideal for defluxing flip chips, BGAs and other complex microelectronics where water washing and/or rinsing is an issue.

MANUAL DEFLUXING

BIOACT EC-7M™ Defluxer is an aggressive cold cleaning solvent designed to remove most flux residues, including no-clean flux residues, after touch-up and rework applications. EC-7M Defluxer is an ultra-high purity terpene solvent with a reduced citrus odor and very low non-volatile residue, making it suitable for manual cleaning without water rinsing. EC-7M Defluxer is a stronger, more aggressive product than SC-10 Cleaner. EC-7M Defluxer is applied concentrated at ambient temperature by hand, immersion or by the Trigger Grip™ dispensing system from Micro Care®.

BIOACT SC-10 Cleaner quickly dissolves a wide variety of no-clean, water-soluble and rosin flux residues. SC-10 Cleaner has **faster evaporation and less citrus odor** than EC-7M Defluxer. Its higher flash point (105°F, 41°C) and excellent solvency properties make it safer and more effective than IPA. SC-10 Cleaner is applied concentrated at ambient temperature by hand or immersion.



STENCIL/MISPRIINT CLEANING

BIOACT SC-10 Cleaner was formulated to replace or “boost” IPA, which is commonly used in removing solder paste residues and SMD adhesives from stencils and misprinted circuit assemblies. Even though SC-10 Cleaner is more aggressive than IPA, it has excellent compatibility with stencil and PWB materials. SC-10 Cleaner is approved for use in certain screen printer underwipe systems. The product is also approved for use in certain Austin American Technology and EMC Global Technologies stencil cleaning systems. It is available in bulk liquid and pre-saturated wipes. Add IPA to SC-10 Cleaner for faster drying.

BIOACT SC-10E Cleaner is a slightly higher flash point (126°F, 52°C) product specially formulated for use in non-aqueous stencil cleaning equipment such as the SabreMax™ Stencil Cleaner and the Systronic 152 Stencil Cleaner. **The product removes most types of solder paste, including new solder paste/epoxy products such as the Alpha AP 4000, as well as SMD adhesives.** **BIOACT SC-10E PLUS Cleaner** is available in Europe for customers who require a product with an A3 Classification (flash point > 55°C).

BIOACT SC-22 Cleaner can also remove difficult solder paste and SMD adhesives from stencils and misprints where SC-10E Cleaner and SC-23 Cleaner performance and/or properties are not suitable. SC-22 Cleaner can be used concentrated or diluted in water.

BIOACT SC-23 Cleaner was recently developed for use in non-aqueous stencil cleaning equipment. **It is the product of choice for odor-sensitive workplaces and applications that require a higher flash point (136°F, 58°C).** SC-23 Cleaner can effectively remove both rosin and no-clean solder paste as well as SMD adhesives from stencils and misprints. SC-23 Cleaner is not recommended for removing water-soluble pastes from stencils and is not available in Europe.



TYPICAL PROPERTIES

SEMI-AQUEOUS DEFLUXING

Product	Solvent Base	Odor	Flash Point (PMCC)	Process	Operating Temperature	Water Separation	Phase 2 Approved
EC-7 Defluxer	Terpenes	Citrus	117°F (47°C)	Semi-aqueous, emulsion	75°-100°F (24°-38°C)	No	Yes
EC-7R Defluxer	Esters and terpenes	Citrus	117°F (47°C)	Semi-aqueous, emulsion	75°-100°F (24°-38°C)	Excellent	Yes
EC-15 Defluxer	Alcohols and esters	Mild	>250°F (>121°C)	Semi-aqueous	140°-180°F (60°-82°C)	Fair	Not tested
EC-ULTRA Defluxer	Esters	Almost none	285°F (140°C)	Semi-aqueous, emulsion	120°-180°F (49°-82°C)	Good	Yes

EMULSION DEFLUXING

Product	Solvent Base	Odor	Flash Point (PMCC)	Process	Operating Temperature	Operating Concentrations	Phase 2 Approved
SC-22 Cleaner	Alcohols	Ether	144°F (62°C)	Aqueous emulsion	120°-130°F (49°-54°C)	5% – 25%	Not tested

VAPOR DEGREASING

Product	Solvent Base	Flash Point (PMCC)	Boiling Point	Evaporation Rate (TCA=1)	Atmospheric Lifetime	Mfg. Recommend PEL
VaporEdge 1000	n-Propyl Bromide, alcohol, and stabilizers	None	154°F (68°C)	0.96	2 to 3 weeks	100 ppm

MANUAL DEFLUXING

Product	Solvent Base	Odor	Flash Point (PMCC)	Evaporation Rate (IPA=1)	Process	Packaging
EC-7M Defluxer	Ultra-high purity terpenes	Mild citrus	117°F (47°C)	0.06	Cold cleaning	Bulk liquid, Micro Care Trigger Grip system
SC-10 Cleaner	Alcohols, hydrocarbons, and terpenes	Slight citrus and alcohol	105°F (41°C)	0.15	Cold cleaning	Bulk liquid

STENCIL/MISPRINT CLEANING

Product	Solvent Base	Odor	Flash Point (PMCC)	Evaporation Rate (IPA=1)	Process	Packaging
SC-10 Cleaner	Alcohols, hydrocarbons, and terpenes	Slight citrus and alcohol	105°F (41°C)	0.15	Cold cleaning	Bulk liquid, pre-saturated wipes
SC-10E / SC-10E PLUS Cleaner	Alcohols, hydrocarbons, and terpenes	Slight citrus and alcohol	126°F (52°C) / 136°F (58°C)	Equipment dependent, drying stage required	Cold cleaning	Bulk liquid
SC-22 Cleaner	Alcohols	Mild Alcohol	144°F (62°C)	Equipment dependent, drying stage required	Cold cleaning, aqueous emulsion	Bulk liquid
SC-23 Cleaner	Alcohols, hydrocarbons	Essentially none	136°F (58°C)	Equipment dependent, drying stage required	Cold cleaning	Bulk liquid

ENVIRONMENTAL PROPERTIES AND REGULATORY STATUS

BIOACT Products	Ozone Depletion Potential (ODP)	Global Warming Potential (GWP)	Significant New Alternatives Program (SNAP)	Hazardous Air Pollutant (HAP)	National Emission Standards for Hazardous Air Pollutants (NESHAP)	Superfund Amendments and Reauthorization Act (SARA)	Resource Conservation and Recovery Act (RCRA)
EC-7 Defluxer	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
EC-7R Defluxer	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
EC-15 Defluxer	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
EC-ULTRA Defluxer	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
VaporEdge 1000	0.0006 – 0.027*	Low	Pending**	No	Not regulated	Not regulated	Not regulated
EC-7M Defluxer	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
SC-10 Cleaner	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
SC-10E/ SC-10E PLUS Cleaner	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
SC-22 Cleaner	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated
SC-23 Cleaner	Zero	Low	Approved	No	Not regulated	Not regulated	Not regulated

* Official ozone depletion potential not yet determined by EPA.

** n-Propyl Bromide is expected to be SNAP-approved for electronics and precision cleaning applications.

ALPHA METALS

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www.petroferm.com

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