

LENIUM™

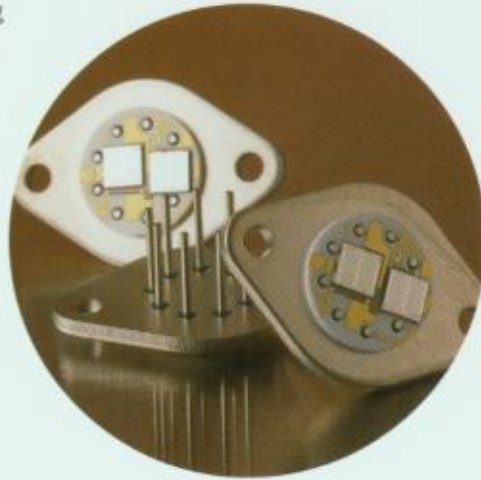
ELECTRONICS & PRECISION CLEANING PRODUCTS



**Petroferm**

## VAPOR DEGREASING WITH LENIUM PRODUCTS

Vapor degreasing has long been the preferred method for cleaning sophisticated electronic and precision parts. Its high performance cleaning capability, fast cycle times and small equipment footprint are ideal for most manufacturers. A vapor degreaser is simple to operate and its convenient solvent recycling feature makes it easy to maintain. Vapor degreasing is a waterless system; therefore eliminating the need for high quality water and rinse water treatment and requiring less energy to operate. Petroferm offers a range of vapor degreasing products and technologies designed for use in new or existing equipment. Our most popular vapor degreasing products are described below.



## PRECISION CLEANING



**LENIUM ES** is a binary azeotrope of *n*-Propyl Bromide and isopropanol which is excellent for removing contaminants such as oils, greases, adhesives, resins and waxes from metal substrates. **It is a direct replacement for 1,1,1-trichloroethane, HCFC-141b, HCFC-225, hydrofluorocarbons and methylene chloride in vapor degreasers.**

**LENIUM GS** is a stabilized *n*-Propyl Bromide formulation specially designed to remove contaminants such as oils, greases, adhesives, resins and flux residues from metal substrates. The fluid has physical properties and solvency characteristics that are similar to chlorinated solvents such as 1,1,1-trichloroethane and trichloroethylene. **It is typically chosen over LENIUM ES when a higher operating temperature or different solubility is required.**

## ELECTRONICS CLEANING

**LENIUM ES** is expressly formulated to remove both polar and non-polar soils from circuit assemblies and components. The product quickly cleans solder flux, paste and ionic residues from such substrates as flip chips, BGAs and other microelectronic devices. The fluid has physical and behavioral properties similar to 1,1,1-trichloroethane.

LENIUM ES has the chemical characteristics needed to penetrate under low clearance devices to reach unwanted residues. Once under components, LENIUM ES quickly dissolves rosin, no clean and water-soluble paste residues. Fresh LENIUM ES easily rinses the dissolved contaminants from beneath the complex geometries leaving a clean, residue-free surface.



# SENSITIVE PLASTICS AND MEDICAL DEVICE APPLICATIONS

**LENIUM CP** is a ternary azeotrope of 3M™ Novec™ Engineered Fluid HFE 7100, *n*-Propyl Bromide and isopropanol. The product is ideal for removing oils, silicones, particulate, fingerprints and light ionic residues from parts made with sensitive plastics as well as medical device components. **The physical properties, compatibility and solvency of LENIUM CP are substantially similar to those of CFC-113.**

LENIUM CP is also used for precision cleaning of metal components and can be used to replace HCFC-141b, 1,1,1-trichloroethane, CFC-113 and other regulated solvents in both vapor degreasing and cold cleaning applications.



## ADVANTAGES WITH LENIUM PRODUCTS

Petroferm provides the highest level of customer and technical support when customers convert from another solvent or start up a new vapor degreasing process. We provide our customers with an operator manual, acid acceptance test procedures and kit, and *n*PB Stabilizer Booster to keep their cleaning process operating effectively and efficiently. We also help customers to monitor workplace solvent exposure and detect costly solvent leaks.

## LENIUM CLEANING PRODUCTS

Product	Base Chemistry	Process	Flash Point (PMCC)	Boiling Point	Exposure Limit (Components, ppm)*	Specific Gravity (g/ml@25°C)
<b>LENIUM ES</b>	Alcohol, <i>n</i> -Propyl Bromide	Vapor degreasing	None	154°F (68°C)	400/25	1.25
<b>LENIUM GS</b>	<i>n</i> -Propyl Bromide	Vapor degreasing	None	160°F (71°C)	25	1.35
<b>LENIUM CP</b>	Alcohol, 3M™ HFE-7100, <i>n</i> -Propyl Bromide	Vapor degreasing	None	130°F (54°C)	400/750/25	1.43

\* *n*PB exposure limit not established. Manufacturer recommended exposure limit only.

## ENVIRONMENTAL AND REGULATORY PROPERTIES

Product	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)
<b>LENIUM ES</b>	0.006 - 0.027**	Low	Pending	No	Not regulated	Not regulated	Not regulated
<b>LENIUM GS</b>	0.006 - 0.027**	Low	Pending	No	Not regulated	Not regulated	Not regulated
<b>LENIUM CP</b>	Essentially zero	Low	Pending	No	Not regulated	Not regulated	Not regulated

\*\* Final ozone depletion potential for *n*PB not yet determined by EPA.

# SOLVENT COMPARISON

PHYSICAL & ENVIRONMENTAL PROPERTIES	SOLVENTS	LENIUM ES	1,1,1-TCA	TCE	METHYLENE CHLORIDE	HCFC-141B	HCFC-225 CA/CB	3M™ Novec™ HFE-7100	HFC-4310
Flash Point (TCC)		None	None	None	None	None	None	None	None
Boiling Point		154°F (68°C)	165°F (74°C)	189°F (87°C)	104°F (40°C)	90°F (32°C)	129°F (54°C)	140°F (60°C)	130°F (55°C)
Specific Gravity @25°C		1.25	1.32	1.46	1.33	1.24	1.55	1.52	1.58
Surface Tension (dynes/cm)		25.9	25.6	26.4	28.2	19.3	16.2	14.0	14.1
Vapor Pressure @20°C		110.8 mm Hg	128 mm Hg	57.8 mm Hg	349 mm Hg	593 mm Hg	283 mm Hg	210 mm Hg	226 mm Hg
Specific Heat @25°C		0.27	0.25	0.22	0.28	0.30	0.25	0.28	0.27
Heat of Vaporization		58.8 cal/g	57.5 cal/g	57.2 cal/g	78.7 cal/g	52.3 cal/g	33 cal/g	30 cal/g	31 cal/g
Solubility in Water		<100 ppm	70 ppm	110 ppm	140 ppm	180 ppm	330 ppm	<20 ppm	140 ppm
Solubility of Water		2,500 ppm	500 ppm	300 ppm	6 ppm	420 ppm	300 ppm	95 ppm	490 ppm
Flammability Limits (vol%)		4-7.8	7-13	8-10.5	14-22	7.1-18.6	None	None	None
Kauri Butanol (KB) Value		>150	124	129	136	56	31	10	14
Atmospheric Lifetime		15 days	5.4 years	<1 year	<1 year	9.4 years	2.5/6.6 years	2 years	17.1 years
Exposure Limit AEL/TLV		400/25 ppm*	350 ppm	50 ppm	25 ppm	500 ppm	50 ppm	750 ppm	200 ppm
Ozone Depletion Potential		0.006-0.027**	0.1	0	0	0.11	0.03	0	0
Global Warming Potential		0	110	0	0	630	170/530	500	1300

\*nPB exposure limit not established. Manufacturer recommended exposure limit only.

\*\*Final ozone depletion potential for nPB not yet determined by EPA.

## CUSTOMER ASSISTANCE

For further product information, recommendations, samples or technical service, contact your Petroferm representative or Petroferm's Cleaning Products Division.

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