P00093 3048 PDF

2000 Directory of Cleaning Agents for Oxygen Service

Compressed Gas Association, Inc.
1725 Jefferson Davis Highway, Suite 1004
Arlington, VA 22202-4102
Phone: 703.412.0900 ■ Fax: 703.412.0128

International Products Corporation
PO Box 70, Burlington, NJ 08016-0070 USA • Phone: 609-386-8770 • Fax: 609-386-8438
(Quality System ISO9002 Certified)

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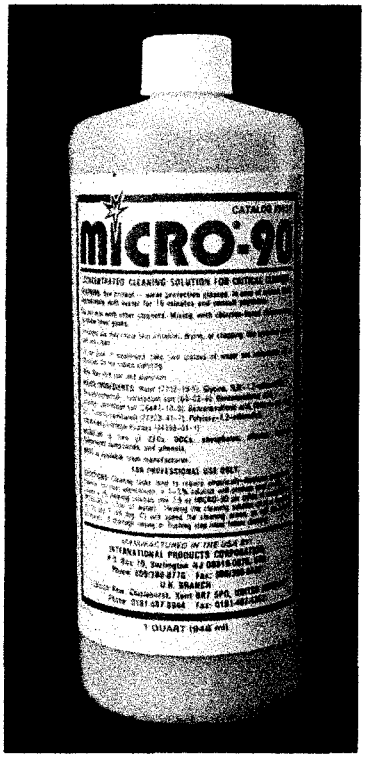

- Micro-90 is an extremely effective industrial and laboratory cleaner formulated to remove a wide range of soils from many different surfaces.
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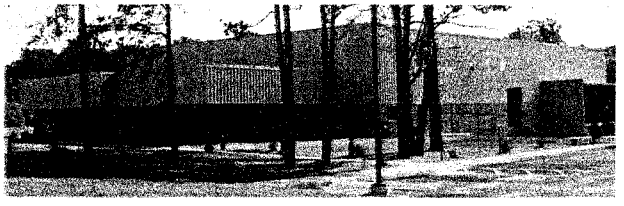
- Micro-90 is a liquid which mixes instantly with water. For most applications a solution of 1–2% Micro-90 in water is recommended.
- Micro-90 is competitively priced AND because it is a concentrate it is even more economical.
- Micro-90 can be used to replace chromic acid and caustics for removing difficult residues.
- Micro-90 rinses clean, has low toxicity and contains NO CFCs, phosphates, glycol ethers, or phenols. It has a pH of 9.5 typically and is ideal for use in ULTRASONIC BATHS.
- Not only is Micro-90 a safe, effective cleaner for compressed gas systems, it also works as a CFC-free degreaser, and a pre-paint aid that is free of hazardous ingredients. Micro-90 effectively cleans electrical components, glass, ceramics, many metals, etc. It is also used to clear blocked waste-water treatment filters.
- Micro-90 comes in many sizes—from quarts to 55 gallon drums.

International Products Corporation is committed to providing the highest level of quality in its products, employees and surrounding environment.



FOR A FREE SAMPLE OF MICRO-90, CALL 609-386-8770 OR FAX 609-386-8438.
Please reference the CGA Directory when you call.

INTERNATIONAL PRODUCTS CORPORATION

Essential Information

Introduction

This directory was developed to provide important information and comparable data to assist in the selection of precision cleaning agents that may be suitable for oxygen service. **The inclusion of any product in this directory is not an endorsement, recommendation, or approval by the Compressed Gas Association of the product for use in any application.**

Comparative Parameters

The directory provides comparative information for both aqueous and solvent cleaners, as provided by the manufacturers, on items such as evaporation rates, corrosivity, pH, residue potential, flammability, health hazards, Threshold Limit Value (TLV) and Permissive Exposure Limit (PEL) factors, ozone depletion rating, EPA Clean Air Act, RCRA Hazardous Waste, and SNAP List Material Compatibility.

Cleaning Efficiency Factor (CEF)

The CEF was determined by testing each cleaning agent at an independent laboratory using ASTM protocols; ASTM G-121, *Practices for Preparation of Contaminated Test Coupons for the Evaluation of Cleaning Agents for Use In Oxygen-Enriched Systems and Components*, and ASTM G-122, *Standard Test Method to Evaluate the Effectiveness of Cleaning Agents.*

Standard Tests

The procedures for the standard CEF test for aqueous cleaners require a concentration of 5 percent at 150 ^{0}F immersed for 10 minutes without agitation. Solvents are tested by immersion for 2 minutes at room temperature without agitation. The manufacturers' recommendations for actual use may vary significantly from this procedure. It is important to understand that the CEF number is a cleaning efficiency factor based only on set parameters for the standard test procedure.

Nonstandard Tests

In addition to the standard test, the opportunity to request a nonstandard test was available to the cleaning agent suppliers to allow the use of alternative procedures and parameters involving concentration, temperature, time, and agitation. Such tests are so identified.

References

Precision cleaning for oxygen service requires many considerations. If you are cleaning equipment for oxygen service, you should be familiar with the following publications:

- CGA G-4.1, *Cleaning Equipment for Oxygen Service*, which is available from the Compressed Gas Association at (703) 412-0900, extension 799,
- ASTM G-127-95, *Standard Guide For the Selection of Cleaning Agents for Oxygen Systems,* and
- ASTM G-93-96, *Standard Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments*, which are available from the American Society for Testing Materials at (610) 832-9585.

Continued on the next page

Published by:

Compressed Gas Association, Inc.

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Arlington, VA 22202
Phone: (703) 412-0900
FAX: (703) 412-0128
E-mail: cga@cganet.com
Web Site: www.cganet.com

Standard CEF Test Procedures

Testing of Cleaning Agents per ASTM G-121 and ASTM G-122

Test Coupons:	Six per test (five plus one control): Coupons are 304 stainless steel in accordance with ASTM G-121, except mill finished instead of glass bead blasted. Coupons shall be used a maximum of 20 tests. Coupons shall be cleaned between tests. 1,1,1-trichloroethane or methylene chloride are acceptable cleaning fluids.
Contaminant:	Hydrocarbon oil (Mobil 600)
Contaminant Level:	1615±538 mg/m^2 applied to one side of the coupon with swabs and/or wipes.
Temperature:	Solvent based = 75±5 °F (23.9±2.8 °C) ; Aqueous based = 150±5 °F (65.6±2.8 °C)
Immersion:	Coupons immersed in individual beakers 500 ml each. To avoid any possibility of cross-contamination, especially with the control coupon, separate 500 ml beakers should be used with each coupon.
Immersion Time:	Solvent based = 2 minutes; Aqueous based = 10 minutes
Rinse:	Solvent based, no rinse. Aqueous based, 5 minute "soak" with ASTM Type II water by immersing in a beaker (no flow).
Dry:	Hang dry

Introduction continued from the previous page

Solvent Evaporation Rate

Each solvent manufacturer has provided a comparative evaporation rate (Butyl Acetate=1.0) if known. The ability of a solvent to evaporate quickly is extremely important in cleaning applications.

Residual Solvents/Cleaners

A cleaning agent remaining in an oxygen system is a severe hazard. It is essential that residual cleaning agent (in hidden areas, crevices, or porous surfaces) **be completely removed.** This factor has equal importance to the CEF.

Selection of Cleaning Agent

The type of cleaning application involved is an important element in selecting the best cleaning agent for the job. We recommend that you contact the cleaning agent suppliers for further details involving performance and application. The suppliers' telephone numbers are available in the directory.

Recommended Practices for the Selection of Cleaning Agents for Equipment in Oxygen-Enriched Service

The following recommended practices address precision final cleaning for oxygen service. For equipment with gross contamination, a precleaning step needs to be done before the final cleaning. Precleaning can be done by mechanical methods such as wire brushing, swabbing, vacuum cleaning, and blasting and/or with more aggressive/corrosive chemical treatments using caustic or acid solutions.

The effectiveness of cleaning methods applied to equipment used in oxygen-enriched service is strongly influenced by:

- the chemical nature of contaminants to be removed;
- the configuration and complexity of equipment to be cleaned;
- the processing parameters such as mechanical/ultrasonic energy, temperature, and concentration of cleaning agents employed for the cleaning operation; and
- the detailed cleaning procedures.

As a result, the cleaning efficiency factors (CEF) published in this *Directory of Cleaning Agents for Oxygen Service* reflect neither the best nor the worst cleaning efficiencies that one may achieve in a cleaning operation. To obtain a representative CEF that is pertinent to the equipment of interest, it is necessary to conduct an evaluation using specific cleaning agents under the environmental conditions expected in actual service in accordance with standard operating procedure. The CEF is only one dimension of the oxygen cleaning process. The following are recommended practices to assist oxygen cleaning practitioners in the selection of suitable cleaning agents for oxygen-enriched service.

- Obtain a copy of the existing cleaning procedures that were developed for either aqueous or nonaqueous cleaning agents. If there are no existing cleaning procedures, efforts should be made to develop a preliminary one, which can then serve as a reference for evaluation of specific cleaning agents. Since drop-in replacements to hydrofluorocarbon cleaning agents such as CFC 113 (1,1,2-trichloro-1,1,2-trifluoroethane) and/or 1,1,1-trichloroethane (methyl chloroform) are yet to be developed and most market-available cleaning agents are generally less tolerant to deviations from their proven cleaning effectiveness test conditions, detailed cleaning procedures need to be developed based on the test results obtained from an evaluation of the cleaning agent. In some cases it is necessary to repeat the cleaning process, which can be time consuming and capital intensive.

- Select nonaqueous or aqueous based cleaning agents based on the chemical nature of the cleaning agents as well as contaminants that might be present; the level of oxygen enrichment that will occur; the complexity of the equipment; the chemical compatibility (such as corrosion) with the equipment; the overall cost of the cleaning agents and peripheral processing accessories; and the personnel training and in-house facility to comply with local environmental, safety, and disposal regulations. Nonaqueous cleaning agents may be more appropriate for equipment configurations such as valves, heat exchangers, compressors, etc. with crevices, intricate passages, and/or inaccessible areas where visual/instrumental inspection and removal of cleaning agents is restricted. In another application, fabrication of process piping can use a high pH value for the aqueous cleaning agent to prevent etching of the pipe material, which can be detrimental to welding quality. For medical, breathing, or USP oxygen piping applications, exercise extreme care in the selection and use of cleaning agents so that there is no inhalation hazard to individuals. Consult NFPA 99, *Standard for Health Care Facilities*, Chapter 4 for guidance.

- Select a cleaning agent with a higher CEF for the evaluation of the cleaning of equipment that is representative of the majority of applications that are expected to be cleaned in the future. The evaluation should be conducted under similar environmental conditions to those expected in actual use in accordance with stan-

Continued on the next page

Recommended practices continued from page 3

dard operating procedures. The results should be evaluated against a measurable contamination concentration (representative of a level of cleanliness) determined and validated by test results.

- If a nonaqueous cleaning agent is used, select one with a low level of nonvolatile residue (NVR) and ensure that all of the cleaning agent has been drained from the system and all remaining traces are thoroughly evaporated to dryness before the introduction of any oxygen-enriched fluids.

- If an aqueous cleaning agent is used, ensure that the cleaning process is followed by a rinsing step using a sufficient quantity of clean, potable or deionized (DI) water. All water must be drained from the system, and all traces must be thoroughly evaporated before introduction of oxygen-enriched fluids. It is important to carry out the rinsing step immediately after the cleaning process and before the cleaning agent has dried since all aqueous cleaners leave NVRs after the contained water evaporates. Potable water will frequently leave "water spots" after rinsing and drying. These mineral deposits are the result of the hardness of the water and are typically harmless in contact with oxygen.

Any residual cleaning agents remaining in a system containing oxygen-enriched fluids could result in serious consequences once oxygen-enriched fluids are reintroduced into the system. Most aqueous and nonaqueous cleaning agents are not compatible with oxygen, or may leave behind an NVR that is not oxygen-compatible. Consult a cleaning agent manufacturer for the compatibility of the cleaning agent with the material to be cleaned as well as with oxygen. It is important to emphasize that the primary consideration for selection of cleaning agents for oxygen service is their effectiveness in removing contaminants from equipment in accordance with a specific cleaning procedure. Since most cleaning agents are not compatible with oxygen, it is necessary to ensure that no residual cleaning agents are left behind in the equipment after the cleaning operation, the equipment is drained and rinsed thoroughly where appropriate to the nature of the cleaning agent, and all traces of the cleaning agent are evaporated to dryness with dry, oil-free compressed air or inert gas stream.

What is CGA?

Since 1913, the Compressed Gas Association has been dedicated to developing and promoting safety standards and safe practices in the industrial gas industry. More than 200 member companies from around the globe work together to develop technical specifications, safety standards, training and educational materials, and promote compliance with these regulations and standards.

Our member companies are manufacturers, distributors, suppliers, and transporters of gases, cryogenic liquids, and related products, including industrial, medical, and specialty gases in compressed or liquefied form, and a range of gas-handling equipment.

For further information or for a free catalog of our safety standards and specifications, call 703-412-0900, visit us at our web site at www.cganet.com.

More Copies

More copies of this directory are available for $26 for CGA members and $48 for nonmembers. Use the order form on page 27 or call CGA's publications line at (703) 412-0900, ext. 799.

Not Listed?

Did your product miss getting included in the directory? Call CGA at (703) 412-0900, ext. 722 for information about having your product tested and listed next year.

Product Listings:

HFE-71DE

Solvent

3M Corporation, 3M Center, Bldg. 236-2B-01, St. Paul, MN 55144-1000
Phone: 651-736-6191, 800-833-5045 Fax: 651-733-4335
Web Site: www.mmm.com/fluids

PROPERTIES

Type of Cleaner:	**Solvent**
Active Ingredient:	$C_4F_9OCH_3$, trans-1,2-Dichloroethylene
CAS Number	**163702-08-7, 163702-07-6, 156-60-5**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** Yes **Wipe:** Yes
Practical Use and Procedure Summary:	Cleaning solvent for broad variety of soils; for metal and plastic components. Use full strength.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1790
Method:	Immersion
Time (minutes):	2 minutes
Cleaning Effectiveness Factor (CEF):	1.00 (Accuracy factor ±.01)

CEF = 1.00

Evaporation Rate Referenced to Butyl Acetate:	Not Determined	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	320	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	N/A	**Flash Point**	None
Residue Potential:	<2.0 ppm	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	1 (HMIS)
Carcinogen:	No
TLV-TWA (ppm):	750 ppm ($C_4F_9OCH_3$), 200 ppm (trans-1,2-DCE)
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	No
OSHA PEL, PPM:	N/A
ACGIH TLV, PPM:	N/A
Acute Derma LD_{50} mg/kg H < 4,300:	N/A
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Not determined (Toxicological data available for individual components.)
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined (Toxicological data available for individual components.)
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	50 wt %
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Yes

OTHER

Storage Period:	No shelf life problem
Ease of Disposal/Recyclable:	Free 3M return program for used fluid
Special Handling:	None
Material Incompatibility:	Strong bases, strong oxidizing agents
Warranty:	N/A
Availability:	Worldwide
Price/Unit:	Available upon request
Additional Information:	

Asahklin AK-225

Solvent

AGA Chemicals, Inc., 2201 Water Ridge Parkway, #400, Charlotte, NC 28262
Phone: 704-329-7613 Fax: 704-329-7613
Web Site: www.AK-225.com

PROPERTIES

Type of Cleaner:		**Solvent**	
Active Ingredient:		$C_3CL_2HF_5$ (Dichloropentafluoro propane)	
CAS Number		422-56-0, 507-55-1	
Cleaning System Options:	**Immersion:** Yes	**Spray Wash :** Yes	**Wipe:** Yes
Practical Use and Procedure Summary:		Direct replacement for CFC-113. Used with similar cleaning procedures implemented for CFC-113. Use full strength.	
Cleaning Ability per Contaminant - Test Method:		ASTM G121/122	
Contaminant:		Mobil 600	
Average Initial Contamination Level (mg/m^2):		1577	
Method:		Immersion	**CEF = 0.99**
Time (minutes):		2 minutes	
Cleaning Effectiveness Factor (CEF):		0.99 (Accuracy factor ±.01)	
Evaporation Rate Referenced to Butyl Acetate:	16.3	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	225	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	N/A	**Flash Point**	None
Residue Potential:	<1.0 ppm	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	2
Carcinogen:	No
TLV-TWA (ppm):	50 ppm AEL, (EEL: 1000ppm 15 minutes)
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	No
OSHA PEL, PPM:	N/A
ACGIH TLV, PPM:	N/A
Acute Derma LD_{50} mg/kg H < 4,300:	No dermal toxicity
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Toxicological data available
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined
Ozone Depleting:	0.03
Global Warming Issue:	0%
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Yes, approved

OTHER

Storage Period:	No shelf life problem.
Ease of Disposal/Recyclable:	Yes
Special Handling:	None
Material Incompatibility:	Strong alkalies
Warranty:	
Availability:	Worldwide
Price/Unit:	Available upon request.

Additional Information: Meets NASA and U.S. military standards for LO_x and GO_x cleaning and verification. Contains no stabilizers.

ABZOL® VG Cleaner

Solvent

Albemarle Corp., 451 Florida St., Baton Rouge, LA 70801
Phone: 800-535-3030 Fax: 504-388-7848

PROPERTIES

Type of Cleaner:		**Solvent**	
Active Ingredient:		*n*-propyl bromide	
CAS Number		**106-94-5**	
Cleaning System Options:	**Immersion:** Yes	**Spray Wash:** Yes	**Wipe:** Yes
Practical Use and Procedure Summary:		Organic cleaner and degreaser – use neat	
Cleaning Ability per Contaminant - Test Method:		ASTM G121/122	
Contaminant:		Mobil 600	
Average Initial Contamination Level (mg/m^2):		1589	**CEF = 0.99**
Method:		Immersion	
Time (minutes):		2 minutes	
Cleaning Effectiveness Factor (CEF):		0.99 (Accuracy factor ±.01)	

Evaporation Rate Referenced to Butyl Acetate:	6.2	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	110.8	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	N/A	**Flash Point**	None
Residue Potential:	<10 ppm	**LEL (%)**	3
		UEL (%)	8

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	2 (HMIS)
Carcinogen:	No exposure
TLV-TWA (ppm):	100 (Albemarle workplace guideline)
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	No
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	LD_{50} 253,000 mg/m^3/30 minutes
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	673 mg/L
Ozone Depleting:	0.006 – 0.027
Volatile Organic Compound (Global Warming Issue):	100%
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	EPA ANPR published in the *Federal Register* February 18, 1999

OTHER

Storage Period:	One year minimum
Ease of Disposal/Recyclable:	Pick-up and disposal included in purchase price in North America
Special Handling:	See MSDS
Material Incompatibility:	Strong alkalies, oxidizers, some plastics and elastomers
Warranty:	
Availability:	North America, Europe, and Asia
Price/Unit:	Available upon request
Additional Information:	

LEKSOL

Solvent

Amity International, Inc., 30285 Bruce Industrial, Suite B, Cleveland, OH 44139
Phone: 440-248-7895 Fax: 440-248-7917

PROPERTIES

Type of Cleaner:		**Solvent**	
Active Ingredient:		n-Propyl Bromide	
CAS Number		**106-94-5**	
Cleaning System Options:	**Immersion:** Yes	**Spray Wash:** Yes	**Wipe:** Yes
Practical Use and Procedure Summary:		Organic cleaner for metal parts. Use neat, cold, or hot in vapor degreasing equipment.	
Cleaning Ability per Contaminant - Test Method:		ASTM G121/122	
Contaminant:		Mobil 600	
Average Initial Contamination Level (mg/m^2):		1590	**CEF = 0.99**
Method:		Immersion	
Time (minutes):		10 minutes	
Cleaning Effectiveness Factor (CEF):		0.99 (Accuracy factor ±.01)	

Evaporation Rate Referenced to Butyl Acetate:	6.2	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	110	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	N/A	**Flash Point**	None
Residue Potential:	Typically less than 10 ppm	**LEL (%)**	3
		UEL (%)	8

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	2 (HMIS)
Carcinogen:	No
TLV-TWA (ppm):	100 ppm Amity recommended
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	LD_{50} 253,000 mg/m^3/30 minutes
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined
Ozone Depleting:	0.006 – 0.027
Volatile Organic Compound (Global Warming Issue):	100%
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Pending approval

OTHER

Storage Period:	Minimum 1 year
Ease of Disposal/Recyclable:	In North America disposal organized by supplier
Special Handling:	See MSDS
Material Incompatibility:	Strong alkalies, oxidizers acids
Warranty:	Certificate or analysis on request
Availability:	Global
Price/Unit:	Available on request
Additional Information:	

Brulin Formula 815GD

Aqueous

Brulin Corporation, PO Box 270, Indianapolis, IN 46206
Phone: 800-776-7149 Fax: 317-925-4596
Web Site: WWW.BRULIN.COM

PROPERTIES

Type of Cleaner:	**Aqueous**
Active Ingredient:	Nonionic surfactants and builders
CAS Number	**None for Mixture**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** No **Wipe:** No
Practical Use and Procedure Summary:	Commonly used at 5% to 20% concentration at 140 °F to 170 °F. Must have a clean water rinse. Agitation increases effectiveness. Best suited for ultrasonic cleaning.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1417
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.99 (Accuracy factor ±.01)

CEF = 0.99

Evaporation Rate Referenced to Butyl Acetate:	N/A	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A (Same as water)	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	12.0	**Flash Point**	None
Residue Potential:	Negligible if rinsed properly	**LEL (%)**	N/A
		UEL (%)	N/A

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	Eye irritant; May irritate skin
Carcinogen:	No
TLV-TWA (ppm):	Not established
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	No specific data, Similar have an LD_{50} > 200 mg/kg
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	No data, Similar products have an LC_{50} > 2 mg/L
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not tested
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	None
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	N/A

OTHER

Storage Period:	1 year
Ease of Disposal/Recyclable:	Readily disposable as an aqueous detergent
Special Handling:	None
Material Incompatibility:	Strong acids and oxidizers
Warranty:	Fully supported
Availability:	Worldwide
Price/Unit:	Available upon request at 800-776-7149
Additional Information:	

Brulin Formula 815GD-Nonstandard

Aqueous

Brulin Corporation, PO Box 270, Indianapolis, IN 46206
Phone: 800-776-7149 Fax: 317-925-4596
Web Site: WWW.BRULIN.COM

PROPERTIES

Type of Cleaner:	**Aqueous**
Active Ingredient:	Nonionic surfactants and builders
CAS Number	**None for Mixture**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** No **Wipe:** No
Practical Use and Procedure Summary:	Commonly used at 5% to 20% concentration at 140 °F to 170 °F. Must have a clean water rinse. Agitation increases effectiveness. Best suited for ultrasonic cleaning.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1751
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	1.00 (Accuracy factor ±.01)

CEF = 1.00

Evaporation Rate Referenced to Butyl Acetate:	N/A	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A (Same as water)	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	12.0	**Flash Point**	None
Residue Potential:	Negligible if rinsed properly	**LEL (%)**	N/A
		UEL (%)	N/A

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	Eye irritant; May irritate skin
Carcinogen:	No
TLV-TWA (ppm):	Not established
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	No specific data, Similar have an LD_{50} > 200 mg/kg
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	No data, Similar products have an LC_{50} > 2 mg/L
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not tested
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	None
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	N/A

OTHER

Storage Period:	1 year
Ease of Disposal/Recyclable:	Readily disposable as an aqueous detergent
Special Handling:	None
Material Incompatibility:	Strong acids and oxidizers
Warranty:	Fully supported
Availability:	Worldwide
Price/Unit:	Available upon request at 800-776-7149

Additional Information: Modifications to standard test procedure include 10% concentration at 170 °F with 5-minute immersion in deionized water.

ChemClean #2011

Aqueous

ChemClean Corporation, 130-45 180th St., Springfield Gardens, NY 11434
Phone: 800-538-2436 Fax: 718-481-6470
Web Site: www.chemclean.com E-mail: Chemclean@chemclean.com

PROPERTIES

Type of Cleaner:	**Aqueous Cleaner/Degreaser**
Active Ingredient:	Dipropylene glycol monomethyl ether; anionic surfactants, builders
CAS Number	**34590-94-8 (solvent)**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** Yes **Wipe:** Yes
Practical Use and Procedure Summary:	Dilute 1 oz to 6 oz per gallon in hot or cold water
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m²):	1530
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.69 (Accuracy factor ±.01)

CEF = 0.69

Evaporation Rate Referenced to Butyl Acetate:	Same as water	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	Same as water	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	12	**Flash Point**	None
Residue Potential:	Negligible if rinsed thoroughly	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	Eye irritant, possible skin irritant 1-0-0 (HMIS)
Carcinogen:	No
TLV-TWA (ppm):	Not established
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	No
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	Not established
Acute Inhalation LD_{50} mg/m³ H < 10,000 PPM:	Not established
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not established
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	50 g/L
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	No

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	Biodegradeable
Special Handling:	None
Material Incompatibility:	Strong acids
Warranty:	N/A
Availability:	Worldwide
Price/Unit:	Available upon request
Additional Information:	

ChemClean #2011 — Nonstandard

Aqueous

ChemClean Corporation, 130-45 180th St., Springfield Gardens, NY 11434
Phone: 800-538-2436 Fax: 718-481-6470
Web Site: www.chemclean.com E-mail: Chemclean@chemclean.com

PROPERTIES

Type of Cleaner:	**Aqueous Cleaner/Degreaser**
Active Ingredient:	Dipropylene glycol monomethyl ether; anionic surfactants, builders
CAS Number	**34590-94-8 (solvent)**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** Yes **Wipe:** Yes
Practical Use and Procedure Summary:	Dilute 1 oz to 6 oz per gallon in hot or cold water
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1629
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.96 (Accuracy factor ±.01)

CEF = 0.96

Evaporation Rate Referenced to Butyl Acetate:	Same as water	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	Same as water	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	12	**Flash Point**	None
Residue Potential:	Negligible if rinsed thoroughly	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	Eye irritant, possible skin irritant 1-0-0 (HMIS)
Carcinogen:	No
TLV-TWA (ppm):	Not established
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	No
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	Not established
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Not established
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not established
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	50 g/L
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	No

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	Biodegradeable
Special Handling:	None
Material Incompatibility:	Strong acids
Warranty:	N/A
Availability:	Worldwide
Price/Unit:	Available upon request

Additional Information: Modifications to standard test procedure include 10% concentration at 75 °F with agitation and wiping.

Vertrel® MCA

Solvent

E.I. DuPont De Nemours & Co., Inc., DuPont Co., CRP-702, Wilmington, DE 19880-0702
Phone: 800-441-9281 Fax: 302-999-4727
Web Site: www.dupont.com/vertrel

PROPERTIES

Type of Cleaner:	**Solvent**
Active Ingredient:	1,1,1,2,3,4,4,5,5,5-Decafluoropentane, trans, 1,2-dichloroethylene
CAS Number	**138495-42-8 156-60-5**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** **Wipe: Yes**
Practical Use and Procedure Summary:	Metal cleaning solvent for common metals. Use full strength.
Cleaning Ability per Contaminant - Test Method:	ASTM G-121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1759
Method:	Immersion
Time (minutes):	2 minutes
Cleaning Effectiveness Factor (CEF):	1.00 (Accuracy factor ±.01)

CEF = 1.00

Evaporation Rate Referenced to Butyl Acetate:	15	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	375 mm	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	7	**Flash Point**	None
Residue Potential:	< 10 ppm	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	1 (HMIS)
Carcinogen:	No
TLV-TWA (ppm):	200 (AEL)
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	No, CAS 156-60-5 Component Only
OSHA PEL, PPM:	N/A
ACGIH TLV, PPM:	N/A
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined*
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Not determined*
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined*
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	38 wt %
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Yes

OTHER

Storage Period:	No shelf life problem
Ease of Disposal/Recyclable:	Yes
Special Handling:	None
Material Incompatibility:	With caustic
Warranty:	Fully supported
Availability:	North America, Europe, and Asia
Price/Unit:	Available upon request
Additional Information:	

* Toxicological data available for individual components

EnSolv

Solvent

Enviro Tech International, 2525 West LeMoyne Ave., Melrose Park, IL 60160
Phone: 708-343-6641 Fax: 708-343-4633
Web Site: www.ensolv.com

PROPERTIES

Type of Cleaner:		**Cleaning Solvent**	
Active Ingredient:		1-Bromopropane	
CAS Number		Mixture	
Cleaning System Options:	**Immersion:** Yes	**Spray Wash:** Yes	**Wipe:** Yes
Practical Use and Procedure Summary:		Direct replacement for 1,1,1-trichloroethane; use same cleaning procedures that were used with 1,1,1-trichloroethane	
Cleaning Ability per Contaminant - Test Method:		ASTM G121/122	
Contaminant:		Mobil 600	
Average Initial Contamination Level (mg/m^2):		1433	
Method:		Immersion	**CEF = 0.99**
Time (minutes):		2 minutes	
Cleaning Effectiveness Factor (CEF):		0.99 (Accuracy factor ±.01)	
Evaporation Rate Referenced to Butyl Acetate:	4.5	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	110	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	6-8	**Flash Point**	None
Residue Potential:	<10 ppm	**LEL (%)**	4.6
		UEL (%)	8.2

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	2
Carcinogen:	No
TLV-TWA (ppm):	Not established (See additional information.)
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	N/A
OSHA PEL, PPM:	Not established
ACGIH TLV, PPM:	Not established
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	LC_{50} 253,000 mg/m^3/30 minutes
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined
Ozone Depleting:	Almost zero
Global Warming Issue:	Almost zero
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Under application

OTHER

Storage Period:	One year
Ease of Disposal/Recyclable:	By law: local, state and federal regulations (40 CFR 260-281)
Special Handling:	See MSDS
Material Incompatibility:	Avoid strong oxidizers and acids; may attack some plastics and rubber
Warranty:	Certificate of analysis available on request
Availability:	North America, South America, Europe, and Asia
Price/Unit:	Priced by container size

Additional Information: Manufacturer's workplace exposure level is 100 ppm averaged over an 8-hour shift. Liquid oxygen and gaseous oxygen system cleaning and verification procedures are available from manufacturer upon request. Available container size are 1, 5, and 55 gallon, totes, tankers and aerosol packages. Conforms to ASTM D-6368-00.

MICRO-90®

Aqueous

International Products Corp., P.O. Box 70, Burlington, NJ 08016-0070
Phone: 609-386-8770 Fax: 609-386-8438
E-mail: mkt@ipcol.com

PROPERTIES

Type of Cleaner:	**Concentrated Aqueous Detergent**
Active Ingredient:	Surfactants
CAS Number	**Mixture**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** No **Wipe:** Yes
Practical Use and Procedure Summary:	Make solutions of 1% to 2% in water, in temperatures from ambient to 150 °F, rinse thoroughly.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1735
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.96 (Accuracy factor ±.01)

CEF = 0.96

Evaporation Rate Referenced to Butyl Acetate:	N/A	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A	**Flammable**	No
Corrosivity (Al, Cu, Fe):	May etch aluminum	**Combustible**	No
pH:	9.5	**Flash Point**	None
Residue Potential:	Negligible if rinsed thoroughly	**LEL (%)**	N/A
		UEL (%)	N/A

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	Eye irritant
Carcinogen:	No
TLV-TWA (ppm):	Not determined
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	Not determined
ACGIH TLV, PPM:	Not determined
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Not determined
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	None
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Yes

OTHER

Storage Period:	1 year
Ease of Disposal/Recyclable:	No restrictions
Special Handling:	Normal handling procedures
Material Incompatibility:	Chlorine-based materials, aluminum, zinc
Warranty:	1 year
Availability:	Worldwide, orders normally shipped within 24 hours
Price/Unit:	Call 609-386-8770
Additional Information:	

MICRO-90® — Nonstandard Test

Aqueous

International Products Corp., P.O. Box 70, Burlington, NJ 08016-0070
Phone: 609-386-8770 Fax: 609-386-8438
E-mail: mkt@ipcol.com

PROPERTIES

Type of Cleaner:	**Concentrated Aqueous Detergent**
Active Ingredient:	Surfactants
CAS Number	**Mixture**
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** No **Wipe:** Yes
Practical Use and Procedure Summary:	Make solutions of 1% to 2% in water, in temperatures from ambient to 150 °F, rinse thoroughly.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1532
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.99 (Accuracy factor ±.01)

CEF = 0.99

Evaporation Rate Referenced to Butyl Acetate:	N/A	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A	**Flammable**	No
Corrosivity (Al, Cu, Fe):	May etch aluminum	**Combustible**	No
pH:	9.5	**Flash Point**	None
Residue Potential:	Negligible if rinsed thoroughly	**LEL (%)**	N/A
		UEL (%)	N/A

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	Eye irritant
Carcinogen:	No
TLV-TWA (ppm):	Not determined
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	Not determined
ACGIH TLV, PPM:	Not determined
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Not determined
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	None
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Yes

OTHER

Storage Period:	1 year
Ease of Disposal/Recyclable:	No restrictions
Special Handling:	Normal handling procedures
Material Incompatibility:	Chlorine-based materials, aluminum, zinc
Warranty:	1 year
Availability:	Worldwide, Orders normally shipped within 24 hours
Price/Unit:	Call 609-386-8770

Additional Information: Test coupons wiped, rinsed with flowing D.I. water, followed by D.I. water immersion.

HyperSolve™ NPB

Solvent

Great Lakes Chemical Corporation, PO Box 2200, West Lafayette, IN 47906
Phone: 800-535-3030 Fax: 504-388-7848
Web Site: www.hypersolve.com

PROPERTIES

Type of Cleaner:		**Solvent**	
Active Ingredient:		*n*-propyl bromide	
CAS Number		**106-94-5**	
Cleaning System Options:	**Immersion:** Yes	**Spray Wash:** Yes	**Wipe:** Yes
Practical Use and Procedure Summary:		Use on oxygen systems the same as 1,1,1-TCA or other solvents. No chlorine in HyperSolve™ NPB	
Cleaning Ability per Contaminant - Test Method:		ASTM G121/122	
Contaminant:		Mobil 600	
Average Initial Contamination Level (mg/m^2):		1589	**CEF = 0.99**
Method:		Immersion	
Time (minutes):		2 minutes	
Cleaning Effectiveness Factor (CEF):		0.99 (Accuracy factor ±.01)	
Evaporation Rate Referenced to Butyl Acetate:	6.0	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	110.8	**Flammable**	No
Corrosivity (Al, Cu, Fe):	<20 mil per year	**Combustible**	No
pH:	N/A	**Flash Point**	None
Residue Potential:	No residue	**LEL (%)**	4.0
		UEL (%)	7.8

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	2
Carcinogen:	No
TLV-TWA (ppm):	100
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	N/A
OSHA PEL, PPM:	N/A
ACGIH TLV, PPM:	N/A
Acute Derma LD_{50} mg/kg H < 4,300:	4,000 mg/Kg
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	253,000 mg/m^3
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not Available
Ozone Depleting:	Almost zero (0.006)
Volatile Organic Compound (Global Warming Issue):	Almost zero (0.001)
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Pending

OTHER

Storage Period:	One year
Ease of Disposal/Recyclable:	Recyclable or incineration
Special Handling:	None
Material Incompatibility:	Avoid strong oxidizers and acids.
Warranty:	Guaranteed Specifications
Availability:	Bulk, drum, and pails
Price/Unit:	Less than $/lb
Additional Information:	

Blue Gold Industrial Cleaner/Degreaser

Aqueous

Modern Chemical, Inc., P.O. Box 368, Jacksonville, AR 72078
Phone: 501-988-1311 Fax: 501-988-2229
Web Site: www.bluegoldcleaner.com

PROPERTIES

Type of Cleaner:	Aqueous cleaner for ferrous and non-ferrous metals—use at 5% to 10% dilution
Active Ingredient:	Diethylene glycol n-butyl ether
CAS Number	112-34-5
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** Yes **Wipe:** Yes
Practical Use and Procedure Summary:	Dilute with water (preferably heated to 140 °F). Must have a clean water rinse. Tested safe and effective also with ASTM G72-82 and ASTM D24076. Agitation makes Blue Gold more effective.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1965
Concentration of Cleaning Agent:	5%
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	1.00 (Accuracy factor ±.01)

CEF = 1.00

Evaporation Rate Referenced to Butyl Acetate: 1 (same as water)		**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	17.5	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	13 in concentrate (normal dilution 11.9)	**Flash Point**	None (will not burn)
Residue Potential:	Negligible if rinsed thoroughly	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	0 = slight (HMIS)
Carcinogen:	No
TLV-TWA (ppm):	N/A
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	Yes (di-ethylene clycol n-butly ether)
OSHA PEL, PPM:	None established due to being a mixture
ACGIH TLV, PPM:	None established due to being a mixture
Acute Derma LD_{50} mg/kg H < 4,300:	Independent testing by Leberco Labs
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Showed no effects on inhalation, ingestion, skin abrasion
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Untested
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	No
EPA Clean Air Act Hazardous Air Pollutant:	No
RCRA Hazardous Waste:	No
On SNAP list:	Yes

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	No environmental problems/biodegradeable
Special Handling:	None
Material Incompatibility:	None known
Warranty:	None
Availability:	Worldwide
Price/Unit:	
Additional Information:	

BLUE GOLD ambeR

Aqueous

Modern Chemical, Inc., P.O. Box 368, Jacksonville, AR 72078
Phone: 501-988-1311 Fax: 501-988-2229
Web Site: www.bluegoldcleaner.com

PROPERTIES

Type of Cleaner:	**Aqueous**
Active Ingredient:	Ethoxylated monylphenol
CAS Number	68412-54-4
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** No **Wipe:** No
Practical Use and Procedure Summary:	This product is specifically designed for spray wash applications with 25 psi to 30psi and heated to 120 °F, it will not foam and will provide optimum cleaning efficiency with only a 2% to 4% dilution.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1650
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.26 (Accuracy factor ±.01)

CEF = 0.26

Evaporation Rate Referenced to Butyl Acetate:	1 (same as water)	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	8.5	**Flash Point**	None-will not burn
Residue Potential:	Per Mil-PRF-87937C conforms to residue rinseability	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	0-slight HMIS
Carcinogen:	None
TLV-TWA (ppm):	N/A
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	None established due to being a mixture
ACGIH TLV, PPM:	None established due to being a mixture
Acute Derma LD_{50} mg/kg H < 4,300:	No effects-Celsis Leberco results available upon request
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	No effects-Celsis Leberco results available upon request
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	No effects-Celsis Leberco results available upon request
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	7.01% by weight
EPA Clean Air Act Hazardous Air Pollutant:	None
RCRA Hazardous Waste:	No
On SNAP list:	No

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	No known environmental problems/biodegradable
Special Handling:	None
Material Incompatibility:	Unknown
Warranty:	None
Availability:	Worldwide
Price/Unit:	Available upon request

Additional Information: A clean, agitated rinse is necessary to ensure no residue.

BLUE GOLD ambeR — Nonstandard Test

Aqueous

Modern Chemical, Inc., P.O. Box 368, Jacksonville, AR 72078
Phone: 501-988-1311 Fax: 501-988-2229
Web Site: www.bluegoldcleaner.com

PROPERTIES

Type of Cleaner:	**Aqueous**
Active Ingredient:	Ethoxylated monylphenol
CAS Number	68412-54-4
Cleaning System Options: **Immersion:** Yes	**Spray Wash:** No **Wipe:** No
Practical Use and Procedure Summary:	This product is specifically designed for spray wash applications with 25 psi to 30 psi and heated to 120 °F, it will not foam and will provide optimum cleaning efficiency with only a 2% to 4% dilution.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1708
Method:	Immersion with agitation
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.94 (Accuracy factor ±.01)

CEF = 0.94

Evaporation Rate Referenced to Butyl Acetate:	1 (same as water)	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	8.5	**Flash Point**	None-will not burn
Residue Potential:	Per Mil-PRF-87937C conforms to residue rinseability	**LEL (%)**	None
		UEL (%)	None

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	0-sight HMIS
Carcinogen:	None
TLV-TWA (ppm):	N/A
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	None
OSHA PEL, PPM:	Not established due to being a mixture
ACGIH TLV, PPM:	Not established due to being a mixture
Acute Derma LD_{50} mg/kg H < 4,300:	No effects-Celsis Leberco results available upon request
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	No effects-Celsis Leberco results available upon request
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	No effects-Celsis Leberco results available upon request
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	7.01% by weight
EPA Clean Air Act Hazardous Air Pollutant:	None
RCRA Hazardous Waste:	No
On SNAP list:	No

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	No known environmental problems/biodegradable
Special Handling:	None
Material Incompatibility:	Unknown
Warranty:	None
Availability:	Worldwide
Price/Unit:	Available upon request

Additional Information: Modifications to standard test include agitation and D.I. water rinse followed by a 5-minute immersion in D.I. water. A clean, agitated rinse is necessary to ensure no residue.

BLUE GOLD Spray Wash

Aqueous

Modern Chemical, Inc., P.O. Box 368, Jacksonville, AR 72078
Phone: 501-988-1311 Fax: 501-988-2229
Web Site: www.bluegoldcleaner.com

PROPERTIES

Type of Cleaner:	**Aqueous**
Active Ingredient:	Diethylene glycol n-butyl ether
CAS Number	112-34-5
Cleaning System Options: **Immersion:** No	**Spray Wash:** Yes **Wipe:** No
Practical Use and Procedure Summary:	This product is specifically designed for spray wash applications with 25 psi to 30 psi and heated to 120 °F, it will not foam and will provide optimum cleaning efficiency with only a 2% to 4% dilution.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1701
Method:	Immersion
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.71 (Accuracy factor ±.01)

CEF = 0.71

Evaporation Rate Referenced to Butyl Acetate:	1 (same as water)	**Flammability**	
Vapor Pressure (mm Hg at 20° C):	N/A	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	13 in concentrate (11.5 @ 4%)	**Flash Point**	None
Residue Potential:	Negligible if properly rinsed	**LEL (%)**	
		UEL (%)	

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	1-slight HMIS
Carcinogen:	None
TLV-TWA (ppm):	N/A
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	Yes, diethylene glycol n-butyl ether
OSHA PEL, PPM:	None established due to being a mixture
ACGIH TLV, PPM:	None established due to being a mixture
Acute Derma LD_{50} mg/kg H < 4,300:	No effects-Celsis Leberco results available upon request
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	No effects-Celsis Leberco results available upon request
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	No effects-Celsis Leberco results available upon request
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	No
EPA Clean Air Act Hazardous Air Pollutant:	None
RCRA Hazardous Waste:	
On SNAP list:	No

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	No known environmental problems/biodegradable
Special Handling:	None
Material Incompatibility:	Strong acids
Warranty:	None
Availability:	Worldwide
Price/Unit:	Available upon request

Additional Information: A clean, agitated rinse is necessary to ensure no residue.

BLUE GOLD Spray Wash – Nonstandard Test

Aqueous

Modern Chemical, Inc., P.O. Box 368, Jacksonville, AR 72078
Phone: 501-988-1311 Fax: 501-988-2229
Web Site: www.bluegoldcleaner.com

PROPERTIES

Type of Cleaner:	**Aqueous**
Active Ingredient:	Diethylene glycol n-butyl ether
CAS Number	112-34-5
Cleaning System Options: **Immersion:** No	**Spray Wash:** Yes **Wipe:** No
Practical Use and Procedure Summary:	This product is specifically designed for spray wash applications with 25 psi to 30 psi and heated to 120 °F, it will not foam and will provide optimum cleaning efficiency with only a 2% to 4% dilution.
Cleaning Ability per Contaminant - Test Method:	ASTM G121/122
Contaminant:	Mobil 600
Average Initial Contamination Level (mg/m^2):	1432
Method:	Immersion with agitation
Time (minutes):	10 minutes
Cleaning Effectiveness Factor (CEF):	0.94 (Accuracy factor ±.01)

CEF = 0.94

Evaporation Rate Referenced to Butyl Acetate:	1 (same as water)	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	N/A	**Flammable**	No
Corrosivity (Al, Cu, Fe):	Not corrosive	**Combustible**	No
pH:	13 in concentrate (11.5 @ 4%)	**Flash Point**	None
Residue Potential:	Negligible if properly rinsed	**LEL (%)**	
		UEL (%)	

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	1-slight HMIS
Carcinogen:	None
TLV-TWA (ppm):	N/A
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	Yes, diethylene glycol n-butyl ether
OSHA PEL, PPM:	None established due to being a mixture
ACGIH TLV, PPM:	None established due to being a mixture
Acute Derma LD_{50} mg/kg H < 4,300:	No effects-Celsis Leberco results available upon request
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	No effects-Celsis Leberco results available upon request
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	No effects-Celsis Leberco results available upon request
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	No
EPA Clean Air Act Hazardous Air Pollutant:	None
RCRA Hazardous Waste:	
On SNAP list:	No

OTHER

Storage Period:	Indefinite
Ease of Disposal/Recyclable:	No known environmental problems/biodegradable
Special Handling:	None
Material Incompatibility:	Strong acids
Warranty:	None
Availability:	Worldwide
Price/Unit:	Available upon request

Additional Information: Modifications to standard test procedure include agitation and D.I. water rinse followed by a 5-minute immersion in D.I. water. A clean, agitated rinse is necessary to ensure no residue.

Beyond 2001® Cleaner/Degreaser

Aqueous

Today & Beyond, P.O. Box 690, Ashland, OH 44805
Phone: 419-945-2628 Fax: 419-945-2513

PROPERTIES

Type of Cleaner:		**Aqueous cleaner utilizing Statistical Process Control with the emphasis on quality control to meet or exceed the cleaning requirements for the aerospace, automotive, marine, military, industrial gases, nuclear, and electronic industries**	
Active Ingredient:		2-(2-Butoxyethoxy) ethanol	
CAS Number		**112-34-5**	
Cleaning System Options:	**Immersion:** Yes	**Spray Wash:** Yes (low psi)	**Wipe:** Yes
Practical Use and Procedure Summary:		When mixed with water at various dilutions, cleaner can be used to clean most items that can come into contact with water.	
Cleaning Ability per Contaminant - Test Method:		ASTM G121/122	
Contaminant:		Mobil 600	
Average Initial Contamination Level (mg/m^2):		1555	
Concentration of Cleaning Agent:		5%	**CEF = 0.98**
Method:		Immersion	
Time (minutes):		10 minutes	
Cleaning Effectiveness Factor (CEF):		0.98 (Accuracy factor ±.01)	
Evaporation Rate Referenced to Butyl Acetate:	< 0.01	**Flammability**	
Vapor Pressure (mm Hg at 20 °C):	< 0.01	**Flammable**	No
Corrosivity (Al, Cu, Fe):	None	**Combustible**	No
pH:	Approximately 13	**Flash Point** °F (Test method C.O.C.)	Not flammable
Residue Potential:	Free rinsing	**LEL (%)**	N/A
		UEL (%)	N/A

ENVIRONMENTAL FACTORS

Health Hazard (MSDS):	May cause eye irritation
Carcinogen:	No
TLV-TWA (ppm):	N/A
Carcinogen per CA Prop 65:	No
Sara Title III Section 313 Toxic:	Glycol ethers 9%
OSHA PEL, PPM:	N/A
ACGIH TLV, PPM:	N/A
Acute Derma LD_{50} mg/kg H < 4,300:	Not determined
Acute Inhalation LD_{50} mg/m^3 H < 10,000 PPM:	Not determined
Fish Toxicity 96 HR LC_{50}, mg/L H, 500 mg/L:	Not determined
Ozone Depleting:	No
Volatile Organic Compound (Global Warming Issue):	85.69 g/L
EPA Clean Air Act Hazardous Air Pollutant:	None
RCRA Hazardous Waste:	No
On SNAP list:	Yes

OTHER

Storage Period:	One year minimum
Ease of Disposal/Recyclable:	No restrictions
Special Handling:	None required: normal handling procedures only
Material Incompatibility:	Strong acids and oxidizers
Availability:	Orders shipped within 24 hours
Price/Unit:	
Additional Information:	

TODAY & BEYOND

P.O. Box 690, Ashland, Ohio 44805, Phone (419) 945-2628, Fax (419) 945-2513

STEP INTO THE FUTURE WITH A UNIQUE SERIES OF STATISTICAL PROCESS CONTROLLED INDUSTRIAL CLEANERS.

THEY ARE SAFE AND THEY WORK!

BEYOND-2001® s a heavy duty ndustrial cleaner legreaser.	BEYOND-2002® is a low foam spray cleaner.	BEYOND-2003® has no SARA-313 listing.	BEYOND-2004™ is formulated without sulfur.	BEYOND-2005™ is formulated without phosphates, with the emphasis on elemental quality control for high tech, precision, and nuclear requirements.	BEYOND-2006™ is a low foam aluminum cleaner designed to remove excessive contaminants without a detrimental effect on the alloy.	BEYOND-2007™ is a low foam nonglycol non-silicated, low pH industrial cleaner, safe enough to clean optics without etching and powerful enough to remove per-fluorinated grease.	BEYOND-2008™ is a cold solvent for removing oils, grease (including fluorinated and silicone), resins, adhesive, fluxes, tar and carbon. This solvent is not considered to be a Hydro-carbon and does not contain Benzene.

The BEYOND series are formulated with the emphasis on quality control. SPC is utilized for product consistency. They have capabilities of performing to the most stringent cleaning requirements for the following industries.

- AEROSPACE
- AIRCRAFT
- AUTOMOTIVE
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- OXYGEN & INDUSTRIAL GASES
- MILITARY
- MARINE
- NUCLEAR
- OPTICS
- COATINGS

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Aqueous
Biodegradable/Concentrated
Non-toxic/Non-corrosive
Free rinsing
Contain no carcinogenic ingredients
No DOT restrictions
No UN number is required
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CVD/PVD &EBPVD

The BEYOND series are capable of removing simple fingerprints to excessive contaminants such as jet engine carbon/coke deposits. TODAY & BEYOND® also manufactures BEYOND-SPOTLESS™, (a rinse aid) BEYOND-TODAY™, (a metal preservative) BEYOND-INHIB™, an inhibitor that is compatible with CVD, PVD, & EBPVD coatings. Two anti foaming agents, FOAM-B-GONE™ and FOAM-B-GONE-NS™. One is silicone free.

March 24, 2000

Compressed Gas Association, Inc.
1725 Jefferson Davis Highway, Suite 1004
Arlington, VA 22202-4102

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1639 MAIL SERVICE CTR
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