MALCOLM PIRNIE

1999 AIR EMISSIONS INVENTORY UPDATE WATERVLIET ARSENAL, Watervliet, New York

Baltimore Corps of Engineers
Baltimore, Maryland

US Army Corps of Engineers
Baltimore District
DRIVEN BY A VISION...to be the BEST

Prepared by:

Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, New York 10602

July 1999
0285-610

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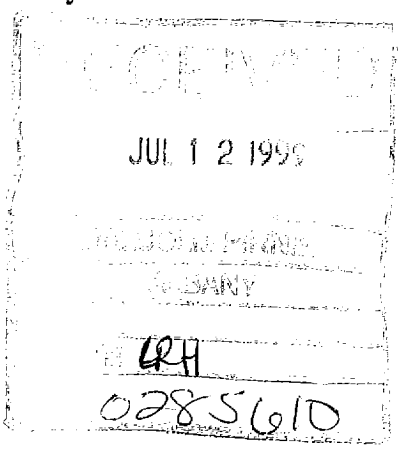
MALCOLM PIRNIE, INC.
ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

July 8, 1999

by FEDERAL EXPRESS



Phil Scarito
HTRW Engineering Branch
Military Management Section
CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21203-1715

Re: Final Copy of the 1999 Emissions Inventory Update
Watervliet Arsenal
Delivery Order No. 0151

Dear Mr. Scarito:

Enclosed are three (3) copies of the Final 1999 Emissions Inventory Update for Watervliet Arsenal. Simultaneously, we are sending five (5) copies of the document to Ms. Maira Senick for distribution at the Arsenal. This final draft incorporates the comments provided after review of the draft version of the document. This submittal completes the Scope of Work for updating Watervliet Arsenal's Emissions Inventory under the above-referenced Delivery Order.

If you have any questions, please call me at (914) 641-2653.

Very truly yours,

MALCOLM PIRNIE, INC.

Marc Karell

Marc Karell, P.E.
Project Manager

Enclosure

c: Ms. Maira Senick, Watervliet Arsenal (5 copies)

104 CORPORATE PARK DRIVE BOX 751 WHITE PLAINS, NY 10602-0751 914-694-2100 fax 914-694-9286

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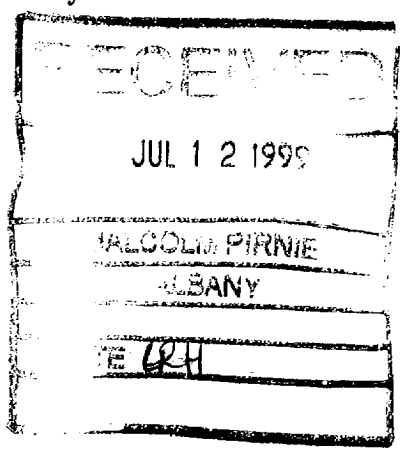

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers, Baltimore District (USACE) retained Malcolm Pirnie, Inc. to update the Air Emissions Inventory for Watervliet Arsenal (WVA) dated September 1997, representing field work performed in 1996. Personnel at Watervliet Arsenal surveyed the permitted air emission sources to identify those which have undergone changes since the 1996 field work. These changes included documented equipment modifications, relocation, process changes, production rates changes, as well any new sources. From this list, Malcolm Pirnie developed a list of critical air emission sources to be concentrated on for the update. An experienced Malcolm Pirnie Air Quality Engineer paid a field visit, interviewed the operators of the listed equipment, and reviewed support documents, such as manufacturing records and MSDS sheets.

After the field visit, Malcolm Pirnie determined whether the revised operating information resulted in changes to emission rates for each listed source. Malcolm Pirnie determined whether the change for each source indicated an increase or decrease in the pollutant emission rate. The summary tables in the original inventory were then updated to reflect the changes made to WVA since 1996. Lastly, a regulatory evaluation was performed to whether the changes to the pollutant emissions had any air regulatory effects on the source or the WVA facility.

The evaluation indicates that a number of sources have revised emission rates. In general, the emission rates were lower due to decreased utilization of equipment. WVA does not need to install controls or perform any other changes as a result of these revised emission rates. In addition, the current air permitting status of the facility, Registration, does not change and no additional regulatory requirements must be met as a result of the revised emission rates.

1.0 INTRODUCTION

Watervliet Arsenal (WVA) is the oldest, continuously active arsenal in the United States. It is located in Watervliet, New York approximately 10 miles north of Albany. In addition to the many fabrication and manufacturing activities which take place on-site, it is also home to the Army's Benet Laboratories whose mission includes the research and development of Arsenal products and technologies.

2.0 PROJECT OBJECTIVES

Malcolm Pirnie, Inc. (Malcolm Pirnie) and URS Consultants, Inc. completed a comprehensive Air Emissions Inventory of WVA (Inventory) in June 1996 for the U.S. Army Corps of Engineers, Baltimore District (USACE). Since the completion of the Inventory, many changes have occurred at WVA, including the addition of new sources, the relocation of existing sources, and the modification of existing sources, including changes in method of operation and chemical/raw material usage. The USACE has retained Malcolm Pirnie to update the Inventory for WVA. The objective of this project is to:

- include new sources of emissions;
- review the estimates of a small number of existing sources; and
- assess the impacts of any new air regulations on the facility.

3.0 BACKGROUND

The WVA Air Emissions Inventory (Inventory) contained calculations of air emissions from 121 emission points identified during site visits in June 1996. The Inventory was finalized in September 1997. Since the completion of the Inventory, many changes have occurred at the facility, including the addition of new sources, the relocation of existing sources, and modifications, including changes in method of operation and chemical/raw material usage.

WVA filed for a New York State Department of Environmental Conservation (NYSDEC) Facility Registration in November 1998. A Facility Registration is required for sources with potentials-to-emit of all regulated pollutants of less than half the applicable major source thresholds. Listed thresholds are based on a facility's location. WVA is located in an area "in attainment" with all criteria pollutants. However, WVA is in the Northeast Ozone Transport Region.

For WVA, the pollutants which are most likely to exceed 50 percent of their thresholds are volatile organic compounds (VOCs), Hazardous Air Pollutants (HAPs), and oxides of nitrogen (NO_x). These major source thresholds are:

100 tons per year (tpy) of NO_x
50 tpy of VOCs
25 tpy of combined HAPs
10 tpy of any individual HAP

The Inventory indicated that WVA had the potential-to-emit less than half of these major source thresholds based on installed control equipment and restrictions on operations. One of the specific goals of the 1999 Update is to confirm that their plant-wide air emissions have not changed significantly to affect this permitting classification.

4.0 APPROACH / SELECTION OF EMISSION POINTS

Malcolm Pirnie reviewed selected emission points within the inventory to verify that the documented emissions accurately reflect the actual emissions. Emission points reviewed included:

1. Existing emission points that have undergone documented modification or relocation;
2. New emission points as indicated by WVA staff;
3. Existing, unmodified emission points representative of major activities at the WVA; and
4. Existing, unmodified emission points which emit a major fraction of the total WVA air emissions.

For each existing source selected, Malcolm Pirnie re-confirmed the following information:

1. the location and stack configuration;
2. the raw material/chemical lists;
3. the usages/production rates;
4. the emission factors to see if any updates are available; and
5. the emission calculations.

Malcolm Pirnie made any necessary changes to the emission calculation worksheets and/or background information developed in the Inventory. All changes made to the document reflect the original Inventory format.

For each new source, Malcolm Pirnie calculated the emissions of each expected pollutant. All calculations are consistent with up-to-date methods, and were based on available information provided to Malcolm Pirnie by WVA staff, such as production data, MSDSs, emission factors, stack testing, etc.

Table 1 presents the list of emission points reviewed by Malcolm Pirnie.

Table 1 - List of Selected Sources

Emission Point	Location/Description	Rational
3 *	Bldg. 125 / Solvent Dip Tank	Representative emission point
4A *	Bldg. 125 / Electric Curing Oven	Representative emission point
180 *	Bldg. 125 / Resin Dip Tank	Representative emission point
24A	Bldg. 125 / Chromium Electroplating	Representative emission point
44A	Bldg. 44 / Hot Plastic Coating	Representative emission point
95G	Building 136 / Boiler No. 7	New source
100A	Bldg. 135 South / Plasma Spray System	Representative emission point
120	Major Chrome Plating Facility	New scrubber being installed
130	Major Chrome Plating Facility	Change in equipment
155	Minor Chrome Plating Facility	Replaced scrubbers, Merged w/ EP145.
165-I01	Bldg. 35 / Lead Furnace	Representative emission point
165-I02	Bldg. 35 / Quench	Representative emission point
165-I03	Bldg. 35 / Salt Furnace	Representative emission point
171	Bldg. 35 / Dry Film Coating Spray Booth	
177	Bldg. 125 / Metal Cutting	Representative emission point
185	Bldg. 110 / Paint Spray Booth	Representative emission point
186	Bldg. 110 / Paint Spray Booth	Representative emission point
187	Bldg. 110 / Paint Bake Oven	Representative emission point
198	Bldg. 36 / Polyelectrolytic mixing tank	Representative emission point
200	Bldg. 40 / Photopolymer resin curing	New chemical
211	Bldg. 135 / Stereolithography Unit	Representative emission point
217	Bldg. 114 / Chrome Scrubber	New source
218	Bldg. 114 / Caustic Scrubber	New source
NP-44	Bldg. 135 / Navy Shaft Line	New process

Note:
* Emission Point Nos. 3, 4A, and 180 exhaust through Emission Point No. 22

5.0 METHODOLOGY

The Update project was divided into five stages:

Field visit. Mr. Peter Glus, an air project engineer from Malcolm Pirnie, spent two days at the WVA site. During the field visit, the operator of each emission point was interviewed by Ms. Maira Senick of WVA and Mr. Peter Glus. Questions regarding physical, operational, and usage changes were discussed and recorded. Each emission point was also physically inspected by Mr. Peter Glus.

Compilation of Information/Assessment of Changes on Air Emissions. Malcolm Pirnie compiled the information gathered during the site visit and summarized the information in a Site Visit Summary. At the end of each Site Visit Summary, an assessment was made for each existing source as to whether the information gathered during the site visit would result in more, less or the same rate of air emissions. The assessment was primarily based on (i) changes in the method of operation, (ii) changes in raw material usage, and (iii) revisions/updates to emission calculations.

Development of Revised Emission Calculations. For existing sources shown to have changes in their air emissions (i.e., more or less), a revised calculation sheet was developed based on the format in the Inventory. Similarly, for new sources, a revised calculation sheet was developed based on the format in the Inventory.

Revision of Inventory Tables. All revised air emission calculations and supporting information would be reflected in the various summary documents and tables of the Inventory.

Evaluation of Regulatory Impact. Malcolm Pirnie evaluated the impact of the revised plant-wide air emissions on WVA's permitting and compliance status. The evaluation will include any revisions to Federal and NYSDEC regulations since the Inventory.

6.0 RESULTS

6.1 Air Emission Changes

Table 2 summarizes the changes which have taken place between the 1996 inventory and the 1999 Update.

Table 2 - Summary of Air Emissions Changes

Emission Point	Location/Description	Change in Emissions
3 [1]	Bldg. 125 / Solvent Dip Tank	None
4A [1]	Bldg. 125 / Electric Curing Oven	None
180 [1]	Bldg. 125 / Resin Dip Tank	None
24A	Bldg. 125 / Chromium Electroplating	None (currently decommissioned)
44A	Bldg. 44 / Hot Plastic Coating	Decrease
95G	Bldg. 136 / Boiler No. 7	New EP, but net decrease [2]
100A	Bldg. 135 South / Plasma Spray System	Decrease
120	Major Chrome Plating Facility	None (currently decommissioned)
130	Major Chrome Plating Facility	Decrease [3]
155	Minor Chrome Plating Facility	Decrease [3]
165-I01	Bldg. 35 / Lead Furnace	None
165-I02	Bldg. 35 / Quench	None [4]

165-I03	Bldg. 35 / Salt Furnace	None [4]
171	Bldg. 35 / Dry Film Coating Spray Booth	None
177	Bldg. 125 / Metal Cutting	None
185	Bldg. 110 / Paint Spray Booth	Decrease
186	Bldg. 110 / Paint Spray Booth	Decrease
187	Bldg. 110 / Paint Bake Oven	Decrease [5]
198	Bldg. 36 / Polyelectrolytic mixing tank	Decrease
200	Bldg. 40 / Photopolymer resin curing	Increase
211	Bldg. 135 / Stereolithography Unit	Decrease
217	Bldg. 114 / Chrome Scrubber	Increase
218	Bldg. 114 / Caustic Scrubber	Increase
NP-44	Bldg. 135 / Navy Shaft Line	Increase

Notes:
(1) Emission Point Nos. 3, 4A, and 180 exhaust through Emission Point No. 22.
(2) Although Boiler No. 7 is new, its efficient design coupled with its ability to handle the entire heating load at WVA will result in a net decrease of air emissions from the facility.
(3) The decrease in emissions can be attributed to the representative stack testing results, which are less conservative than the emission factors used in the original update.
(4) The type of pollutants changed, but the emission rates remain unchanged.
(5) The Paint Bake Oven is currently used as a staging area.

6.2 Regulatory Impacts

No federal or New York State rulemaking has occurred between the original emissions inventory (in 1996) and this update that requires Watervliet Arsenal to modify any of the listed processes.

Watervliet Arsenal is subject to Maximum Achievable Control Technology requirements for its hard chromium electroplating operations (40 CFR Part 63, Subpart N). Watervliet Arsenal has been in compliance with these requirements, including removing units from operation which, when tested, do not comply with the emissions standard. The NYSDEC has an air toxics guidance containing health-based guideline concentrations of air toxics, called Air Guide-1. The NYSDEC has the option to enforce or not enforce these guidelines. The NYSDEC is considering incorporating Air Guide-1 into existing 6NYCRR Part 212, making it enforceable. The NYSDEC has stated that draft rulemaking of this type will not be released for public comment until late 1999 at the earliest. In so doing, the NYSDEC may modify Air Guide-1 to exempt MACT sources from its requirements.

Watervliet Arsenal's new boiler (Boiler No. 7; E.P. # 95G) is subject to the New Source Performance Standards for Large Industrial Steam Generating Units (40 CFR Part 60, Subpart Db). The boiler was designed to operate low NO_x burners to ensure compliance with the standards.

6.3 Permitting Impacts

Watervliet Arsenal submitted an application for Registration in November 1997 in compliance with 6NYCRR Part 201. Although potential emissions of several applicable pollutants exceed major thresholds, actual emissions are well below these levels. Watervliet Arsenal is bound to limit its actual emissions of subject pollutants to less than 50% of their major thresholds in order to stay as a Registered source. Although Malcolm Pirnie did not review plant data listing actual emissions from all equipment, based on this emissions inventory update, there is no indication that emissions of any regulated pollutant at Watervliet Arsenal has exceeded 50% of its major threshold.

However, non-major sources are still required to submit a Title V Operating Permit application if it is subject to a MACT standard listed in 6NYCRR Part 201, Appendix A. Such sources are deferred from submitting the application until December 9, 2000. Hard chromium electroplating is a MACT standard listed in Appendix A. However, in advance of future rulemaking, the USEPA wrote a letter to the state regulatory agencies in April 1999 allowing states to extend the deferral for such sources by five additional years to December 9, 2005. Although no confirmation has been obtained, it is expected that New York State will allow non-major sources with equipment subject to Appendix A requirements the additional deferral to 2005.

Therefore, Watervliet Arsenal now has until December 9, 2005 to submit a Title V Operating Permit application.

ATTACHMENT 1

REVISED TABLES FROM SEPTEMBER 1997 INVENTORY

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 6: URS Calculated Basis for Emissions by Source

Emission Point #	Building Number	Contaminant Name	Contaminant C.A.S. No.	Operating Time (hr/day)	Hourly E.R.P. (lb/hr)	Actual Hourly Emissions (lb/hr)	Annual Actual Emissions (lbs)	Potential to Emit (PTE)	
								(lb/yr)	(tons/yr)
3	125	Aliphatic Hydrocarbons	NY550000	1	0.811	0.811	202.7	7104	3.55
4A	125	VOCs		1	0.004	0.004	1.06	35.04	0.018
4A		Methanol	67561		0.001	0.001	0.28	8.76	0.004
4A		Acetophenone	98862		0.0003	0.0003	0.08	2.63	0.001
13	25	Particulates	NY075000	12	0.08	0.008	24	70.08	0.035
15	125	Particulates	NY075000	4	0.40	0.036	36.0	315	0.158
17	125	THIS SOURCE SHARES A COMMON STACK WITH EMISSION POINT 15							
24A	35	Chromium Compounds	7440473	24	1.89	0.003	18.4	26.28	0.013
24A		PM-10			3.93	0.006	38.7	52.56	0.026
26A	36	Sulfur Dioxide	7446095	24	1.3	1.3	1044	11388	5.69
26B	36	Sulfur Dioxide	7446095	24	1.3	1.3	1044	11388	5.69
36	40-5	THIS SOURCE HAS BEEN REMOVED							
37	40-5	THIS SOURCE HAS BEEN REMOVED							
38	40-5	THIS SOURCE HAS BEEN REMOVED							
44A	44	Aliphatic Hydrocarbons	NY550000	8	0.360	0.360	720	3154	1.58
44A		Aliphatic Hydrocarbons	NY550000		0.516	0.516	1032.1	4520	2.26
44A		Aliphatic Hydrocarbons	NY550000		0.087	0.087	173.1	762	0.381
45A	44	Aliphatic Hydrocarbons	NY550000	8	0.12	0.12	240	1051	0.526
49A		COMBINED WITH EMISSION POINT 91B							
57A	125	Chromium Compounds		9	1.03	0.002	0.192	17.52	0.009
57A		PM-10			2.14	0.004	0.402	35.04	0.018
75	115	Oil Mist	NY090000	0.25	0.026	0.026	0.078	228	0.114
76	115	Oil Mist	NY090000	0.25	0.026	0.026	0.078	228	0.114
77	115	Oil Mist	NY090000	0.25	0.026	0.026	0.078	228	0.114
79A	115	Aliphatic Hydrocarbons	NY550000	5	-	0.3	15	2628	1.31
80A	35	Aliphatic Hydrocarbons	NY550000	2	0.2	0.2	19.5	1752	0.88
82	35	Particulates	NY075000	4	4.00	0.200	200	1752	0.876
91B	125	PM-10		18	0.0024	0.0000243	0.109	0.213	0.0001
91B		Chromium	7440473		0.0041	0.0000411	0.185	0.360	0.0002
91B		Nickel As Metal	7440020		0.0095	0.0000946	0.426	0.829	0.0004
91B		Manganese	7439965		0.0032	0.0000324	0.146	0.284	0.0001

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 6: URS Calculated Basis for Emissions by Source

Emission Point #	Building Number	Contaminant Name	Contaminant C.A.S. No.	Operating Time (hr/day)	Hourly E.R.P. (lb/hr)	Actual Hourly Emissions (lb/hr)	Annual Actual Emissions (lbs)	Potential to Emit (PTE)	
								(lb/yr)	(tons/yr)
95A	125	THIS SOURCE HAS BEEN REMOVED							
95B	136	THIS SOURCE HAS BEEN REMOVED							
95C(FO)	136	VOCs		23	0.030	0.030	66.8	1766	0.88
95C(FO)		Total Particulates	NY079000		0.242	0.242	527.2	14016	7.01
95C(FO)		PM-10			0.121	0.121	263.6	7008	3.50
95C(FO)		Sulfur Dioxide	7446095		2.44	2.44	5315.6	248784	124.39
95C(FO)		Carbon Monoxide			0.605	0.605	1318.1	35040	17.52
95C(FO)		Oxides of Nitrogen	NY210000		11.2	11.2	24407.0	98112	49.06
95C(NG)	136	VOCs		16	0.104	0.104	302.5	1359	0.68
95C(NG)		Total Particulates	NY079000		0.370	0.370	1072.8	4818	2.41
95C(NG)		PM-10			0.370	0.370	1072.8	4818	2.41
95C(NG)		Sulfur Dioxide	7446095		0.044	0.044	128.7	578	0.29
95C(NG)		Carbon Monoxide			2.96	2.96	8582.7	38544	19.27
95C(NG)		Oxides of Nitrogen	NY210000		8.00	8.00	23184.0	70080	35.04
95D(FO)	136	VOCs		1.5	0.059	0.059	3.28	1766	0.883
95D(FO)		Total Particulates	NY079000		0.47	0.47	26.1	14016	7.01
95D(FO)		PM-10			0.235	0.235	13.0	7008	3.50
95D(FO)		Sulfur Dioxide	7446095		4.73	4.73	262.7	248784	124.39
95D(FO)		Carbon Monoxide			1.17	1.17	65.2	35040	17.52
95D(FO)		Oxides of Nitrogen	NY210000		13.7	13.7	760.4	120012	60.01
95E(FO)	136	VOCs		5.8	0.014	0.014	5.85	1766	0.883
95E(FO)		Total Particulates	NY079000		0.110	0.110	46.5	14016	7.01
95E(FO)		PM-10			0.055	0.055	23.2	7008	3.50
95E(FO)		Sulfur Dioxide	7446095		1.11	1.11	458.5	248784	124.39
95E(FO)		Carbon Monoxide			0.27	0.27	116.2	35040	17.52
95E(FO)		Oxides of Nitrogen	NY210000		1.10	1.10	464.7	140160	70.08
95E(NG)	136	VOCs		1.7	0.087	0.087	16.8	779	0.390

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 6: URS Calculated Basis for Emissions by Source

Emission Point #	Building Number	Contaminant Name	Contaminant C.A.S. No.	Operating Time (hr/day)	Hourly E.R.P. (lb/hr)	Actual Hourly Emissions (lb/hr)	Annual Actual Emissions (lbs)	Potential to Emit (PTE)	
								(lb/yr)	(tons/yr)
95E(NG)		Total Particulates	NY079000		0.431	0.431	82.8	3840	1.92
95E(NG)		PM-10			0.431	0.431	82.8	3840	1.92
95E(NG)		Sulfur Dioxide	7446095		0.019	0.019	3.63	168	0.08
95E(NG)		Carbon Monoxide			1.10	1.10	211.5	9811	4.91
95E(NG)		Oxides of Nitrogen	NY210000		4.40	4.40	846.2	39245	19.62
95G(FO)	136	VOCs		8	0.004	0.004	8.35	2049	1.025
95G(FO)		Total Particulates	NY079000		0.032	0.032	66.2	16268	8.13
95G(FO)		PM-10			0.016	0.016	33.1	8134	4.07
95G(FO)		Sulfur Dioxide	7446095		0.32	0.32	667.8	288767	144.38
95G(FO)		Carbon Monoxide			0.08	0.08	165.6	40671	20.34
95G(FO)		Oxides of Nitrogen	NY210000		0.16	0.16	324.6	79716	39.86
95G(NG)	136	VOCs		8	0.3	0.3	624.7	3165	1.583
95G(NG)		Total Particulates	NY079000		1.48	1.48	3078.4	15601	7.80
95G(NG)		PM-10			1.48	1.48	3078.4	15601	7.80
95G(NG)		Sulfur Dioxide	7446095		0.065	0.065	134.82	683	0.34
95G(NG)		Carbon Monoxide			3.78	3.78	7864.5	39858	19.93
95G(NG)		Oxides of Nitrogen	NY210000		7.56	7.56	15729	79716	39.86
97	123	Xylene,M,O&P Mixt.	1330207	8	0.0063	0.0063	12.5560	55.19	0.028
97		Trivalant Chromium	7440473		0.0211	0.0211	4.2260	185	0.092
97		Hexamethylene Diisocyanate	822060		0.0001	0.0001	0.2954	0.876	0.0004
97		Toluene	108883		0.0137	0.0137	27.489	120	0.060
97		Methylethyl Ketone	78933		0.0103	0.0103	20.617	90.23	0.045
97		VOCs			0.2429	0.2429	485.7291	2128	1.06
97		Particulates	NY075000		0.0742	0.0074	14.832	64.82	0.032
100A	115	Particulates	NY075000	1.5	0.33	0.003	0.060	26	0.013
100A		Cobalt	7440484		0.08	0.001	0.015	8.76	0.004
100A		Oxides of Nitrogen	NY210000		0.001	0.001	0.4	8.76	0.004
100A		Total Aliphatic Hydrocarbons	NY799000		1.04	1.04	416	9110	4.56

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 6: URS Calculated Basis for Emissions by Source

Emission Point #	Building Number	Contaminant Name	Contaminant C.A.S. No.	Operating Time (hr/day)	Hourly E.R.P. (lb/hr)	Actual Hourly Emissions (lb/hr)	Annual Actual Emissions (lbs)	Potential to Emit (PTE)	
								(lb/yr)	(tons/yr)
100A		Misc Organics	NY997000		-	-	Trace		
107	132	Triclopyr	57213691	0.2	0.2788	0.2788	11.15	2442	1.22
107		2,4-D	94757		0.6273	0.6273	25.09	5495	2.75
107		Methanol	67561		0.0679	0.0679	2.71	595	0.297
107		Glycophosphate	524308AA		1.2609	1.2609	50.44	11045	5.52
107		Oryzalin	1471133		1.3046	1.3046	52.18	11428	5.71
107		Benzimidazolecarbamate	359361		0.00146	0.00146	0.0584	12.79	0.006
107		Pyrethrins	4816353		0.00025	0.00025	0.0100	2.19	0.001
111A	20	Miscellaneous Organics	NY990000	2	-	0.44	44	3854	1.93
113	40-5	THIS SOURCE HAS BEEN REMOVED							
119	120	Particulates	NY075000	1	48.0	0.048	12.0	420	0.210
120	35	THIS SOURCE HAS BEEN REMOVED							
121	35	VOCs		24	0.012	0.012	70.1	105	0.053
122	15 & 25	PM-10		2	0.0026	0.0026	0.26	22.78	0.011
122		Chromium	7440473		0.0000005	0.0000005	0.00005	0.004	0.000002
122		Manganese	7439965		0.000159	0.000159	0.0159	1.39	0.001
122		Nickel	7440020		0.0000005	0.0000005	0.00005	0.004	0.000002
124	40-5	Manganese	7439965	8	0.0043	0.0043	1.25	37.67	0.019
124		Chromium	7440473		0.0069	0.0069	2.00	60.44	0.030
124		Nickel	7440020		0.0017	0.0017	0.50	14.89	0.007
124		Cobalt	7440484		0.0069	0.0069	2.00	60.44	0.030
127	35	Fuel oil #1 and #2	68476302	1	-	-	-		
128	35	Fuel oil #1 and #2	68476302	24	-	-	-		
129	35	Fuel oil #1 and #2	68476302	1	-	-	-		
130 (a)	35	Chromium Compounds	7440473	24	0.2328	0.0019	2.376	16.64	0.008
130 (a)		PM-10			3.930	0.014	82.376	123	0.061
151	35	THIS SOURCE HAS BEEN REMOVED							
152	35	THIS SOURCE HAS BEEN REMOVED							
153	35	Acid Mist NEC	NY103000	8	-	0.002	0.16	18	0.01
153		Basic Mist NEC	NY104000		-	0.09	7.52	788	0.39
153		Miscellaneous Organics	NY900000		-	0.02	1.6	175	0.09

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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								(lb/yr)	(tons/yr)
154	35	THIS SOURCE SHARES A COMMON STACK WITH E.P. 155							
154									
155	35	Chromium Compounds	7440473	24	0.2328	0.00035	0.473	3.07	0.002
155		PM-10			0.61	0.011	64.04	96	0.048
156	35	PM-10		5	0.015	0.015	3.72	131	0.066
157	35	Nitric Acid Mist	7697372	8	-	0.01	2.5	87.60	0.044
158	35	Sodium Hydroxide	1310732	24	-	0.11	88	964	0.482
158		Basic Mist NEC	NY104000		-	0.038	32	333	0.166
158		Acid Mist NEC	NY104000		-	0.001	0.8	9	0.004
158		Acid Mist NEC	NY104000		-	0.001	0.8	9	0.004
159	35	Chromium Compounds	7440473	24	0.000173	0.000173	1.0	2	0.001
159		PM-10			0.00036	0.00036	2.16	3	0.002
160	35	Acid Mist NEC	NY103000	24	-	0.001	3	9	0.0044
160		Base Mist NEC	NY104000		-	0.022	145	193	0.10
161	35	Acid Mist NEC	NY103000	24	-	0.14	924	1226	0.61
162	35	Manganese	7439965	1	0.013	0.00013	0.0065	1.14	0.001
162		Particulates	NY075000		1.0	0.01	0.5	87.6	0.0438
163	35	Manganese	7439965	8	0.04875	0.0004875	0.975	4.27	0.002
163		Particulates	NY075000		3.75	0.0375	75	329	0.164
165A-I01	35	Lead	7439921	1	0.1875	0.00563	304	49.32	0.025
165A-I02	35	Mineral Oil		3	0.0645	0.0019	1.45	16.64	0.008
165A-I03	35	Sodium Chloride	7647-14-5	3	0.3467	0.0104	7.8	91	0.046
		Potassium Chloride	7447-40-7	3	0.3467	0.0104	7.8	91	0.046
167	35	Oil Mist	NY090000	2	0.027	0.027	2.68	237	0.118
170	35	Total Aliphatic Acid	NY699000	24	-	0.001	6.6	8.76	0.004
171	35	VOCs		24	0.0922	0.0922	553.24	808	0.404
171		Particulate	NY075000		0.02238	0.000448	2.685	3.92	0.002
171		Antimony Trioxide	7440360		0.000025	0.0000005	0.003	0.004	0.000002
172	110	PM-10		2	0.0026	0.0026	1.3	22.78	0.011
172		Chromium	7440473		0.0000005	0.0000005	0.00025	0.004	0.000002

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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								(lb/yr)	(tons/yr)
172		Manganese	7439965		0.000159	0.000159	0.0795	1.39	0.001
172		Nickel	7440020		0.0000005	0.0000005	0.00025	0.004	0.000002
173	110	PM-10		2	0.0026	0.0026	1.3	22.78	0.011
173		Chromium	7440473		0.0000005	0.0000005	0.00025	0.004	0.000002
173		Manganese	7439965		0.000159	0.000159	0.0795	1.39	0.001
173		Nickel	7440020		0.0000005	0.0000005	0.00025	0.004	0.000002
174	110	PM-10		2	0.0026	0.0026	1.3	22.78	0.011
174		Chromium	7440473		0.0000005	0.0000005	0.00025	0.004	0.000002
174		Manganese	7439965		0.000159	0.000159	0.0795	1.39	0.001
174		Nickel	7440020		0.0000005	0.0000005	0.00025	0.004	0.000002
175	110	PM-10		2	0.0026	0.0026	1.3	22.78	0.011
175		Chromium	7440473		0.0000005	0.0000005	0.00025	0.004	0.000002
175		Manganese	7439965		0.000159	0.000159	0.0795	1.39	0.001
175		Nickel	7440020		0.0000005	0.0000005	0.00025	0.004	0.000002
176	123	Xylene,M,O&P Mixt.	1330207	8	0.0063	0.0063	12.5560	55.19	0.028
176		Trivalant Chromium	7440473		0.0211	0.0211	4.2260	185	0.092
176		Hexamethylene Diisocyanate	822060		0.0001	0.0001	0.2954	0.876	0.0004
176		Toluene	108883		0.0137	0.0137	27.489	120	0.060
176		Methylethyl Ketone	78933		0.0103	0.0103	20.617	90.23	0.045
176		VOCs			0.2429	0.2429	485.7291	2128	1.06
176		Particulates	NY075000		0.0742	0.0074	14.832	64.82	0.032
177	125	VOCs	8042475	2	0.632	0.632	63.24	5536	2.77
178	120	PM-10		2	0.0026	0.0026	1.3	22.78	0.011
178		Chromium	7440473		0.0000005	0.0000005	0.00025	0.004	0.000002
178		Manganese	7439965		0.000159	0.000159	0.0795	1.39	0.001
178		Nickel	7440020		0.0000005	0.0000005	0.00025	0.004	0.000002
179	25	VOCs		2	0.0256	0.0256	2.56	224	0.112
180	125	VOCs		1	0.000528	0.000528	0.0528	4.63	0.002
180		Methanol	67561		0.00014	0.00014	0.014	1.23	0.001
180		Acetophenone	98862		0.00004	0.00004	0.004	0.350	0.0002
181	130	THIS SOURCE HAS BEEN REMOVED							

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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								(lb/yr)	(tons/yr)
182	130	THIS SOURCE HAS BEEN REMOVED							
183	130	THIS SOURCE HAS BEEN REMOVED							
184	135	Particulate	NY075000	8	1.0103	0.0303	60.6	265.43	0.133
185	110	Xylene,M,O&P Mixt.	1330207	14	0.0063	0.0063	22.1000	55.19	0.028
185		Trivalant Chromium	7440473		0.0086	0.0086	29.9000	75	0.038
185		Hexamethylene Diisocyanate	822060		0.0006	0.0006	2.1	5.256	0.0026
185		Toluene	108883		0.016	0.016	55.8	140	0.070
185		Methylethyl Ketone	78933		0.0205	0.0205	71.5	179.58	0.090
185		Methanol	67-56-1		0.0001	0.0001	0.33	0.88	0.0004
185		Methyl Isobutyl ketone	108-10-1		0.0005	0.0005	1.7	4.38	0.002
185		Cobalt	7440-48-4		0.0006	0.0001	0.21	0.88	0.0004
185		VOCs			0.2075	0.2075	726.1	1818	0.91
185		Particulates	NY075000		0.0375	0.0038	13.13	33.29	0.017
186	110	Xylene,M,O&P Mixt.	1330207	14	0.0063	0.0063	22.1000	55.19	0.028
186		Trivalant Chromium	7440473		0.0086	0.0086	29.9000	75	0.038
186		Hexamethylene Diisocyanate	822060		0.0006	0.0006	2.1	5.256	0.0026
186		Toluene	108883		0.016	0.016	55.8	140	0.070
186		Methylethyl Ketone	78933		0.0205	0.0205	71.5	179.58	0.090
186		Methanol	67-56-1		0.0001	0.0001	0.33	0.88	0.0004
186		Methyl Isobutyl ketone	108-10-1		0.0005	0.0005	1.7	4.38	0.002
186		Cobalt	7440-48-4		0.0006	0.0001	0.21	0.88	0.0004
186		VOCs			0.2075	0.2075	726.1	1818	0.91
186		Particulates	NY075000		0.0375	0.0038	13.13	33.29	0.017
187	110	THIS SOURCE HAS BEEN REMOVED							
188	35	Hydrogen	1333740	20	0.05896	0.05896	28.3	516	0.258
188		Nitrogen	7727379		0.33875	0.33875	162.6	2967	1.48
189	35	Hydrogen	1333740	20	0.048	0.048	2.4	420	0.210
189		Nitrogen	7727379		0.270	0.270	13.5	2365	1.18
192	36	Particulate	NY075000	1	0.150	0.150	7.5	1314	0.657
193	36	Hydrogen Sulfide	7783064	12	0.0027	0.0027	9.775	23.65	0.012
194	36	Hydrogen Sulfide	7783064	24	0.0158	0.0158	133	138	0.069
195	36	Hydrogen Sulfide	7783064	24	0.0158	0.0158	114	138	0.069
196	36	Hydrogen Sulfide	7783064	2	0.0068	0.0068	4.07	59.57	0.030
197	36	Particulate	NY075000	3	0.072	0.004	3.22	35.04	0.018

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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								(lb/yr)	(tons/yr)
198	36	VOCs		1	0.18	0.18	55	1577	0.79
198		Particulate	NY075000		0.0018	0.0018	0.55	15.77	0.008
199	36	Hydrogen Sulfide	7783064	12	0.0027	0.0027	9.775	23.65	0.012
200	40-5	VOCs		1.5	0.025	0.025	9.5	219	0.110
202	110-D	VOCs		24	0.2675	0.2675	963.27	2343	1.17
203	110-D	VOCs		24	0.2675	0.2675	963.27	2343	1.17
204	110-C13	VOCs		5	0.31358	0.31358	156.792	2747	1.37
205	110-C17	Particulate	NY075000	4	1	1	40	8760	4.38
206	110E-15,16,17	Particulate	NY075000	24	0.0015	0.000015	0.03	0.131	0.0001
207	110	THIS SOURCE CANNOT BE USED DUE TO ROOM LIMITATIONS; PARTS ARE TO HEAVY TO BRING INTO ROOM							
208	110	VOCs		8	3.9	3.9	7806.2	34164	17.08
209	110-E15	VOCs		1	0.007	0.007	1.7375	61.32	0.031
210	110-E15	VOCs		1	0.007	0.007	1.7375	61.32	0.031
211	135 A Bay	VOCs	-	0.5	0.01449	0.01449	1.44	127	0.063
212	135	Particulates	-	8	0.0005	0.0005	0.08	4.38	0.002
212		Carbon Monoxide	-		0.000625	0.000625	0.10	5.48	0.003
212		VOCs	-		0.000225	0.00025	0.036	2.19	0.001
212		Oxides Of Nitrogen	-		0.000025	0.000025	0.004	0.219	0.0001
213	125	Titanium	7440326	8	0.0000003	0.0000003	0.0005	0.003	0.000001
213		VOCs			0.00025	0.0000025	0.005	0.022	0.00001
214	135	VOCs		8	0.01	0.01	20	87.60	0.044
215	110	Particulates	NY07500	9	6.11	0.0006	1.21	5.256	0.003
216	112	Methylene Chloride	75092	4	0.100	0.100	2.0	876	0.44
216		Methylethyl Ketone	78933		0.080	0.080	16.0	701	0.35
216		Phenol	108952		-	trace	trace		
NP-1		Oxides of Nitrogen	NY210000	20.7	0.627	0.627	1453.2	24528.00	12.264
NP-1		VOCs			0.012	0.012	28.9	487.06	0.244
NP-1		Carbon Monoxide			0.157	0.157	363.3	6132.00	3.066
NP-1		Sulfur Dioxide	7446095		0.003	0.003	6.23	105.12	0.053
NP-1		PM-10			0.061	0.061	142.2	2400.24	1.200
NP-1		Particulate	NY075000		0.061	0.061	142.2	2400.24	1.200

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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								(lb/yr)	(tons/yr)
NP-2	35	Oxides of Nitrogen	NY210000	24	0.062	0.062	372.5	543.12	0.272
NP-2		VOCs			0.004	0.004	23.8	35.04	0.018
NP-2		Carbon Monoxide			0.080	0.08	481.8	700.80	0.350
NP-2		Sulfur Dioxide	7446095		0.0003	0.0003	1.97	2.63	0.001
NP-2		PM-10			0.006	0.006	36.6	52.56	0.026
NP-2		Particulate	NY075000		0.006	0.006	36.6	52.56	0.026
NP-3	132	VOCs		18	0.0002	0.0002	0.72	4.90	0.002
NP-3		Oxides of Nitrogen	NY210000		0.009	0.009	25.9	175.20	0.088
NP-3		Carbon Monoxide			0.002	0.002	6.47	43.80	0.022
NP-3		Sulfur Dioxide	7446095		0.009	0.009	26.1	311.00	0.156
NP-3		PM-10			0.0005	0.0005	1.40	9.5	0.005
NP-3		Particulate	NY075000		0.001	0.001	2.59	17.50	0.009
NP-4	145	VOCs		18	0.0027	0.0027	7.84	23.70	0.012
NP-4		Oxides of Nitrogen	NY210000		0.097	0.097	282.0	852.50	0.426
NP-4		Carbon Monoxide			0.024	0.024	70.5	213.10	0.107
NP-4		Sulfur Dioxide	7446095		0.098	0.098	284.3	1513.20	0.757
NP-4		PM-10			0.0053	0.0053	15.2	46.0	0.023
NP-4		Particulate	NY075000		0.010	0.010	28.2	85.20	0.043
NP-5	125	Particulate	NY075000	1	0.022	0.00002	0.0055	0.18	0.0001
NP-6	125	Particulate	NY075000	1	0.20	0.01	2.50	87.6	0.044
NP-7	125	Particulate	NY075000	1	0.20	0.01	2.50	87.6	0.044
NP-8	40-5	Particulate	NY075000	1	0.20	0.01	2.50	87.6	0.044
NP-9	36	Total Acid		1	0.0025	0.0025	0.74	21.90	0.011
NP-9		Total Base			0.0016	0.0016	0.47	14.02	0.007
NP-9		VOCs			0.00083	0.00083	0.25	7.27	0.004
NP-9		Particulate	NY075000		0.0000025	0.0000025	0.00075	0.02	0.00001
NP-10	40-3	Nitric Acid	76797372	1	0.044	0.044	6.6	385.44	0.193
NP-10		Ethanol	64175		1.14	1.14	170.6	9960.12	4.980
NP-11	112								

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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								(lb/yr)	(tons/yr)
NP-12	112	Carbon Monoxide		1	0.8	0.8	1.6	7008.00	3.504
NP-13	115	Nickel	7440020	4	0.04	0.04	1.91	350.40	0.175
NP-13		Sulfuric Acid	7664939		0.008	0.008	0.405	70.08	0.035
NP-13		Boric Acid	10043353		0.011	0.011	0.529	96.36	0.048
NP-13		Phosphoric Acid	7664382		0.008	0.008	0.377	70.08	0.035
NP-13		Ethyl Alcohol	64175		0.004	0.004	0.174	35.04	0.018
NP-14	115	Lead	7439921	1	0.025	0.025	2.5	219.00	0.110
NP-14		Zinc Chloride	7440666		0.004	0.004	0.41	35.04	0.018
NP-15	115								
NP-16	115	Nitric Acid	76797372	4	0.0006	0.0006	0.331	5.256	0.003
NP-16		Hydrochloric Acid	7647010		0.0004	0.0004	0.26	3.50	0.002
NP-17	115	Nitric Acid	76797372	4	0.009	0.009	0.8260	78.84	0.039
NP-17		Hydrochloric Acid	7647010		0.068	0.068	6.5	595.68	0.298
NP-18	115								
NP-19	120	PM10		24	0.000786	0.000786	0.0377	6.89	0.003
NP-19		Chromic Acid	7440473		0.000377	0.000377	0.0181	3.30	0.002
NP-19									
NP-20	120	Chromic Acid	7440473	8	0.1719	0.1719	68.7	1505.84	0.753
NP-20		Hydrochloric Acid	7647010		0.0006	0.0006	0.260	5.26	0.003
NP-20		Sulfuric Acid	7664939		0.001	0.001	0.405	8.76	0.004
NP-20		Phosphoric Acid	7664382		0.0009	0.0009	0.367	7.88	0.004
NP-20		Nitric Acid	7697372		0.0008	0.0008	0.331	7.01	0.004
NP-20		Ammonia	7664417		0.0007	0.0007	0.289	6.13	0.003
NP-21	115	Particulate	NY075000	1	0.0096	0.0096	0.250	84.10	0.042
105	135	Oxides of Nitrogen	NY210000	12	1.619	1.619	1399.0	51018.24	25.509
105		VOCs			0.032	0.032	27.8	1013.08	0.507
105		Carbon Monoxide			0.405	0.405	349.8	12754.56	6.377
105		Sulfur Dioxide	7446095		0.0069	0.0069	6.00	218.65	0.109
105		PM-10			0.158	0.158	136.90	4992.50	2.496
105		Particulate	NY075000		0.158	0.158	136.90	4992.50	2.496
NP-22	141	VOCs		24	0.00000022	0.00000022	0.002	0.002	0.000001

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

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Emission Point #	Building Number	Contaminant Name	Contaminant C.A.S. No.	Operating Time (hr/day)	Hourly E.R.P. (lb/hr)	Actual Hourly Emissions (lb/hr)	Annual Actual Emissions (lbs)	Potential to Emit (PTE)	
								(lb/yr)	(tons/yr)
NP-23	145	Biphenyl	92524	24	0.000000001	0.000000001	0.000012	8.8E-06	4.38E-09
NP-23		Naphthalene	91203		0.00000011	0.00000011	0.00094	0.00094	0.00000047
NP-23		Toluene	108883		0.0000015	0.0000015	0.013	0.013	0.0000065
NP-23		Xylene	1330207		0.0000026	0.0000026	0.023	0.023	0.0000115
NP-23		VOCs			0.000026	0.000026	0.23	0.23	0.000115
NP-24	135	VOCs		24	0.0000013	0.0000013	0.00049	0.0114	0.000005694
NP-25	115	VOCs		24	0.00000017	0.00000017	0.000061	0.0015	7.446E-07
NP-26	110	VOCs		24	0.00000007	0.00000007	0.00061	0.00061	0.000000305
NP-27	110	VOCs		24	0.00000007	0.00000007	0.00061	0.00061	0.000000305
NP-28	44	VOCs		24	0.00000007	0.00000007	0.00061	0.00061	0.000000305
NP-29	15	VOCs		24	0.000000014	0.000000014	0.00012	0.00012	0.00000006
NP-30	15	VOCs		24	0.018	0.018	154.92	154.92	0.07746
NP-30		Benzene	71432		0.000029	0.000029	0.25	0.25	0.000125
NP-30		Cumene	98828		0.0000018	0.0000018	0.015	0.015	0.0000075
NP-30		Ethylbenzene	100414		0.0000088	0.0000088	0.077	0.077	0.0000385
NP-30		n-Hexane	110543		0.00029	0.00029	2.57	2.57	0.001285
NP-30		Toluene	108883		0.000064	0.000064	0.56	0.56	0.00028
NP-30		Xylene	1330207		0.000016	0.000016	0.14	0.14	0.00007
NP-31	35	VOCs		24	0.00000017	0.00000017	0.0015	0.0015	0.00000075
NP-32	20/25	VOCs		24	0.00000033	0.00000033	0.0029	0.0029	0.00000145
NP-33	132	Biphenyl	92524	24	1.1E-10	1.1E-10	0.000001	0.000001	5E-10
NP-33		Naphthalene	91203		0.000000009	0.000000009	0.000077	0.000077	3.85E-08
NP-33		Toluene	108883		0.00000012	0.00000012	0.0011	0.0011	0.00000055
NP-33		Xylene	1330207		0.00000022	0.00000022	0.0019	0.0019	0.00000095
NP-33		VOCs			0.0000022	0.0000022	0.019	0.019	0.0000095
NP-34	35	VOCs		24	0.00000007	0.00000007	0.00061	0.00061	0.000000305
NP-35	36	VOCs		24	0.00000042	0.00000042	0.0037	0.0037	0.00000185
NP-36	116	Biphenyl	92524	24	1.5E-09	1.5E-09	0.000013	0.000013	6.5E-09
NP-36		Naphthalene	91203		0.00000011	0.00000011	0.001	0.001	0.0000005
NP-36		Toluene	108883		0.0000016	0.0000016	0.014	0.014	0.000007
NP-36		Xylene	1330207		0.0000028	0.0000028	0.024	0.024	0.000012
NP-36		VOCs			0.000028	0.000028	0.25	0.25	0.000125

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 6: URS Calculated Basis for Emissions by Source

Emission Point #	Building Number	Contaminant Name	Contaminant C.A.S. No.	Operating Time (hr/day)	Hourly E.R.P. (lb/hr)	Actual Hourly Emissions (lb/hr)	Annual Actual Emissions (lbs)	Potential to Emit (PTE)	
								(lb/yr)	(tons/yr)
NP-37	147	Biphenyl	92524	24	0.00000019	0.00000019	0.0017	0.0017	0.00000085
NP-37		Naphthalene	91203		0.000015	0.000015	0.13	0.13	0.000065
NP-37		Toluene	108883		0.00021	0.00021	1.8	1.8	0.0009
NP-37		Xylene	1330207		0.00036	0.00036	3.14	3.14	0.00157
NP-37		VOCs			0.0036	0.0036	31.53	31.53	0.015765
NP-38	147	Biphenyl	92524	24	0.00000014	0.00000014	0.0013	0.0013	0.00000065
NP-38		Naphthalene	91203		0.00000079	0.00000079	0.0069	0.0069	0.00000345
NP-38		Toluene	108883		0.000095	0.000095	0.83	0.83	0.000415
NP-38		Xylene	1330207		0.00017	0.00017	1.48	1.48	0.00074
NP-38		VOCs			0.0018	0.0018	15.55	15.55	0.007775
NP-39	147	Biphenyl	92524	24	0.00000012	0.00000012	0.00105	0.00105	0.000000525
NP-39		Naphthalene	91203		0.00000066	0.00000066	0.0057	0.0057	0.00000285
NP-39		Toluene	108883		0.000079	0.000079	0.69	0.69	0.000345
NP-39		Xylene	1330207		0.00014	0.00014	1.23	1.23	0.000615
NP-39		VOCs			0.0015	0.0015	12.95	12.95	0.006475
NP-40	116	VOCs		24	0.0000029	0.0000029	0.026	0.026	0.000013
NP-41	116	VOCs		24	0.0000021	0.0000021	0.018	0.018	0.000009
NP-42	116	VOCs		24	0.0000021	0.0000021	0.018	0.018	0.000009
NP-43	136	Cresol	1319773	24	0.000000052	0.000000052	0.00046	0.00046	0.00000023
NP-43		Naphthalene	91203		0.000000154	0.000000154	0.0013	0.0013	0.00000065
NP-43		Xylene	1330207		0.00000938	0.00000938	0.082	0.082	0.000041
NP-43		VOCs			0.00012	0.00013	1.15	1.15	0.000575
NP-44	135	VOCs		8	0.8	0.8	63.9	0.018	0.000009

"-" denotes the block on the permit had no value or data

U - denotes contaminant is based on emission inventory; contaminant is not specified on existing permit

NP - Non-permitted emission point

PTE: (lb/yr) = Actual Hourly Emissions (lb/hr) × 8,760 (hr/yr); (tons/yr)=PTE (lb/yr)/2000 lbs/ton unless otherwise noted

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 7: Summary of Criteria and Hazardous Air Pollutants

Emission Point #	CRITERIA POLLUTANTS					HAZARDOUS AIR POLLUTANTS	
	NOx	SO2	VOCs	Particulates	CO	THRESHOLD (Tons/Year)	
	THRESHOLD (Tons/Year)					Single/Total Contaminants (10/25)	
	100	100	50	100	100	Contaminant	Total Tons/Year
3			3.552				
4A			0.018			Methanol	0.004
						Acetophenone	0.001
13				0.035			
15				0.158			
17	THIS SOURCE SHARES A COMMON STACK WITH EMISSION POINT 15						
24A				0.026		Chromium Compounds	0.013
26A		5.694					
26B		5.694					
36	THIS SOURCE HAS BEEN REMOVED						
37	THIS SOURCE HAS BEEN REMOVED						
38	THIS SOURCE HAS BEEN REMOVED						
44A			4.218				
45A			0.526				
49A	COMBINED WITH EMISSION POINT 91B						
57A				0.018		Chromium Compounds	0.009
75			0.114				
76			0.114				
77			0.114				
79A			1.314				
80A			0.880				
82				0.876			
91B				0.0001		Chromium	0.0002
						Nickel As Metal	0.0004
						Manganese	0.0001
95A	THIS SOURCE HAS BEEN REMOVED						
95B	THIS SOURCE HAS BEEN REMOVED						
95C	49.100	124.400	0.883	7.010	19.272		
95D	60.006	124.392	0.883	7.01	17.520		
95E	70.100	124.400	0.883	7.010	19.600		
95G	39.900	144.400	1.580	8.130	20.300		
97			1.06	0.032		Xylene,M,O&P Mixt.	0.028
						Trivalant Chromium	0.092
						Hexamethylene Diisocyanate	0.0004
						Toluene	0.060
						Methylethyl Ketone	0.045
100A	0.004		4.556	0.013		Cobalt	0.004
107			15.484			2,4-D	2.748
						Methanol	0.297
111A			1.927				
113	THIS SOURCE HAS BEEN REMOVED						
119				0.210			
120	THIS SOURCE HAS BEEN REMOVED						
121			0.053				
122				0.011		Chromium	0.00000219
						Manganese	0.0007

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 7: Summary of Criteria and Hazardous Air Pollutants

Emission Point #	CRITERIA POLLUTANTS					HAZARDOUS AIR POLLUTANTS	
	NOx	SO2	VOCs	Particulates	CO	THRESHOLD (Tons/Year)	
	THRESHOLD (Tons/Year)					Single/Total Contaminants (10/25)	
	100	100	50	100	100	Contaminant	Total Tons/Year
						Nickel	0.00000219
124						Manganese	0.019
						Chromium	0.030
						Nickel	0.007
						Cobalt	0.030
127							
128							
129							
130 (a)				0.061		Chromium Compounds	0.008
151	THIS SOURCE HAS BEEN REMOVED						
152	THIS SOURCE HAS BEEN REMOVED						
153			0.088				
154	THIS SOURCE SHARES A COMMON STACK WITH E.P. 155						
155				0.048		Chromium Compounds	0.002
156				0.066			
157							
158							
159				0.002		Chromium Compounds	0.0008
160							
161							
162				0.044		Manganese	0.001
163				0.164		Manganese	0.002
165A-I01						Lead	0.025
165A-I02							
165A-I03							
167			0.118				
170							
171			0.404	0.002		Antimony Trioxide	0.00000219
172				0.011		Chromium	0.00000219
						Manganese	0.0007
						Nickel	0.00000219
173				0.011		Chromium	0.00000219
						Manganese	0.0007
						Nickel	0.00000219
174				0.011		Chromium	0.00000219
						Manganese	0.0007
						Nickel	0.00000219
175				0.011		Chromium	0.00000219
						Manganese	0.0007
						Nickel	0.00000219
176			1.06	0.032		Xylene,M,O&P Mixt.	0.028
						Trivalant Chromium	0.092
						Hexamethylene Diisocyanate	0.0004
						Toluene	0.060
						Methylethyl Ketone	0.045
177			2.768				
178				0.011		Chromium	0.00000219
						Manganese	0.0007
						Nickel	0.00000219

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 7: Summary of Criteria and Hazardous Air Pollutants

Emission Point #	CRITERIA POLLUTANTS					HAZARDOUS AIR POLLUTANTS	
	NOx	SO2	VOCs	Particulates	CO	THRESHOLD (Tons/Year)	
	THRESHOLD (Tons/Year)					Single/Total Contaminants (10/25)	
	100	100	50	100	100	Contaminant	Total Tons/Year
179			0.112				
180			0.002			Methanol	0.0006
						Acetophenone	0.0002
181	THIS SOURCE HAS BEEN REMOVED						
182	THIS SOURCE HAS BEEN REMOVED						
183	THIS SOURCE HAS BEEN REMOVED						
184				0.133			
185			0.91	0.017		Xylene,M,O&P Mixt.	0.028
						Trivalant Chromium	0.038
						Hexamethylene Diisocyanate	0.0026
						Methanol	0.0004
						Methyl Isobutyl Ketone	0.0020
						Toluene	0.070
						Cobalt	0.000
						Methylethyl Ketone	0.090
186			0.91	0.017		Xylene,M,O&P Mixt.	0.028
						Trivalant Chromium	0.038
						Hexamethylene Diisocyanate	0.0026
						Methanol	0.0004
						Methyl Isobutyl Ketone	0.0020
						Toluene	0.070
						Cobalt	0.000
						Methylethyl Ketone	0.090
187	THIS SOURCE HAS BEEN REMOVED						
188							
189							
190	THIS SOURCE HAS BEEN REMOVED						
192			0.657	0.657			
193						Hydrogen Sulfide	0.012
194						Hydrogen Sulfide	0.069
195						Hydrogen Sulfide	0.069
196						Hydrogen Sulfide	0.030
197				0.018			
198			0.790	0.008			
199						Hydrogen Sulfide	0.012
200			0.110				
202			1.172				
203			1.172				
204			1.373				
205				4.380			
206				6.57E-05			
207	THIS SOURCE CANNOT BE USED DUE TO ROOM LIMITATIONS; PARTS ARE TO HEAVY TO BRING INTO ROOM						
208			17.082				
209			0.031				
210			0.031				
211			0.063				

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 7: Summary of Criteria and Hazardous Air Pollutants

Emission Point #	CRITERIA POLLUTANTS					HAZARDOUS AIR POLLUTANTS	
	NOx	SO2	VOCs	Particulates	CO	THRESHOLD (Tons/Year)	
	THRESHOLD (Tons/Year)					Single/Total Contaminants (10/25)	
	100	100	50	100	100	Contaminant	Total Tons/Year
212	0.0001		0.001	0.002	0.003		
213			1.10E-05	1.31E-06			
214			0.044				
215				0.003			
216						Methylene Chloride	0.438
						Methylethyl Ketone	0.350
						Phenol	trace
NP-1	12.264	0.053	0.244	1.200	3.066		
NP-2	0.272	0.001	0.018	0.026	0.350		
NP-3	0.088	0.156	0.002	0.005	0.022		
NP-4	0.426	0.757	0.012	0.023	0.107		
NP-5				8.76E-05			
NP-6				0.044			
NP-7				0.044			
NP-8				0.044			
NP-9			0.004	1.10E-05			
NP-10			4.980				
NP-11							
NP-12					3.504		
NP-13			0.018			Nickel	0.175
NP-14						Lead	0.110
NP-15							
NP-16						Hydrochloric Acid	0.002
NP-17						Hydrochloric Acid	0.298
NP-18							
NP-19						Chromic Acid	0.0000091
NP-20						Chromic Acid	0.753
						Hydrochloric Acid	0.003
NP-21				0.042			
105	25.509	0.109	0.507	2.496	6.377		
NP-22			1.00E-06				
NP-23			0.0001			Biphenyl	4.38E-09
						Naphthalene	0.00000047
						Toluene	0.0000065
						Xylene	0.0000115
NP-24			5.69E-06				
NP-25			7.45E-07				
NP-26			3.05E-07				
NP-27			3.05E-07				
NP-28			3.05E-07				
NP-29			6.00E-08				
NP-30			0.077			Benzene	0.000125
						Cumene	0.0000075
						Ethylbenzene	0.0000385
						n-Hexane	0.0013
						Toluene	0.0003
						Xylene	0.00007

WATERVLIET ARSENAL
AIR EMISSIONS INVENTORY

TABLE 7: Summary of Criteria and Hazardous Air Pollutants

Emission Point #	CRITERIA POLLUTANTS					HAZARDOUS AIR POLLUTANTS	
	NOx	SO2	VOCs	Particulates	CO	THRESHOLD (Tons/Year)	
	THRESHOLD (Tons/Year)					Single/Total Contaminants (10/25)	
	100	100	50	100	100	Contaminant	Total Tons/Year
NP-31			7.50E-07				
NP-32			1.45E-06				
NP-33			9.50E-06			Biphenyl	5E-10
						Naphthalene	3.85E-08
						Toluene	0.00000055
						Xylene	0.00000095
NP-34			3.05E-07				
NP-35			1.85E-06				
NP-36			0.0001			Biphenyl	6.5E-09
						Naphthalene	0.0000005
						Toluene	0.000007
						Xylene	0.000012
NP-37			0.016			Biphenyl	0.00000085
						Naphthalene	0.000065
						Toluene	0.0009
						Xylene	0.0016
NP-38			0.0078			Biphenyl	0.00000065
						Naphthalene	0.00000345
						Toluene	0.0004
						Xylene	0.0007
NP-39			0.006			Biphenyl	0.000000525
						Naphthalene	0.00000285
						Toluene	0.0003
						Xylene	0.0006
NP-40			1.30E-05				
NP-41			9.00E-06				
NP-42			9.00E-06				
NP-43			0.001			Cresol	0.00000023
						Naphthalene	0.00000065
						Xylene	0.000041
NP-44			9.000E-06				
TOTAL[1]	257.669	530.055	71.368	40.174	90.121		6.448

Note:

(1) The toal for each pollutant includes the worst-case PTE for each boiler regardless of the fuel type (95 C,D,E, & G)

ATTACHMENT 2

SITE VISIT SUMMARIES, SOURCE EMISSION CALCULATIONS, MATERIAL SAFETY DATA SHEETS, AND OTHER BACKGROUND INFORMATION

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 3
2. Building/Location 125
3. Description Solvent dip tank

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

New MSDS, but no change in physical components.

7. Additional Comments

None

8. Changes to Air Emissions [No] More Less

MATERIAL SAFETY DATA SHEET
(ESSENTIALLY SIMILAR TO OSHA FORM 20, COMPLIES WITH 29CFR 1910.1200)

HAZARD RATING: HEALTH - 2, FIRE - 1, REACTIVITY - 0
MINIMAL - 0 SLIGHT - 1 MODERATE - 2 SERIOUS - 3 SEVERE - 4

SECTION I: GENERAL INFORMATION

MANUFACTURED FOR: DYNASTY CHEMICAL CORP
ADDRESS: 962 BROADWAY
ALBANY, NY 12204
TELEPHONE NUMBER: 1-518-463-1146
DATE ISSUED/REVISED: AUGUST 17, 1995
EMERGENCY RESPONSE NUMBER: 800-255-3924

FORMULA NO.: C-27
PRODUCT NAME: CITRUS KLEEN
CHEMICAL FAMILY: LIQUID DEGREASER

HAZARDOUS MATERIAL DESCRIPTION
(PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101)
NONE

SECTION II: HAZARDOUS INGREDIENTS
AS LISTED IN EPA 40CFR PARTS 261 & 116 AND/OR MASS. DEQE CMR 670.00

CHEMICAL NAME	CAS NO.	% BY WEIGHT	HAZARD DATA

CONTAINS NO INGREDIENT THAT IS LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN BY IARC, NTP, OR OSHA.

SECTION III: PHYSICAL DATA

BOILING POINT/RANGE (F): 325
SPECIFIC GRAVITY: .858 (WATER=1)
% VOLATILE BY VOLUME: 90%
EVAP. RATE (BUAC=1): COMP. TO WATER (SLOWER)
WEIGHT/GALLON: 7.15# (WATER=8.33#)
SOLUBILITY IN WATER: DISPERSIBLE (FORMS EMULSION)
VAPOR PRESSURE (MM/HG): NA
PHYSICAL STATE: CLEAR, THIN, LIGHT ORANGE LIQUID
VAPOR DENSITY (AIR=1): COMP. TO WATER (HEAVIER)
ODOR: CITRUS ORANGE

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): 122°F (TCC) D-LIMONENE
FLAMMABLE LIMITS: LEL: .70 UEL: 6.1
FIRE EXTINGUISHING MEDIA: WATER FOG, FOAM, GAS (CO2/HALON), DRY CHEMICAL
SPECIAL FIRE FIGHTING PROCEDURES: PROTECTIVE CLOTHING & NIOSH/MSHA PRESSURE, DEMAND, SELF-CONTAINED BREATHING APPARATUS. UNOPENED CONTAINERS SHOULD BE KEPT COOL WITH WATER SPRAY OR REMOVED FROM THE FIRE AREA IF POSSIBLE AND KEPT COOL.
UNUSUAL FIRE AND EXPLOSION HAZARDS: PRODUCT IS A COMBUSTIBLE LIQUID. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME. THERMAN DECOMPOSITION OR BURNING MAY PRODUCE CARBON MONOXIDE.

SECTION V: HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: NOT ESTABLISHED
PRIMARY ROUTES OF ENTRY: SKIN ABSORPTION, INHALATION
EFFECTS OF OVEREXPOSURE:
...ACUTE - CAN CAUSE SKIN AND EYE IRRITATION. DERMATITIS THROUGH DEFATTING OF SKIN. MAY CAUSE CONJUNCTIVITIS OF THE EYE. HARMFUL IF SWALLOWED.
...CHRONIC - PROLONGED EXCESSIVE INHALATION OF VAPORS CAN CAUSE EYE, NASAL, AND RESPIRATORY TRACT IRRITATION.
EMERGENCY AND FIRST AID PROCEDURES:
...INHALATION - REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IF STOPPED, GIVE ARTIFICIAL RESPIRATION. GET IMMEDIATE MEDICAL ATTENTION.
...EYES - IMMEDIATELY FLUSH THOROUGHLY WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES, KEEPING LIDS APART. GET MEDICAL ATTENTION.
...SKIN - WASH WITH PLENTY OF SOAP AND WATER. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION. REMOVE CLOTHING IF CONTAMINATED.
...INGESTION - DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LARGE QUANTITY OF WATER. GET IMMEDIATE MEDICAL ATTENTION FROM PHYSICIAN OR HOSPITAL.

SECTION VI: REACTIVITY DATA

STABILITY: STABLE
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: EXTREME HEAT, CONTACT WITH OPEN FLAME, HOT SURFACES, SPARKS, ETC.
MATERIALS TO AVOID: DO NOT MIX WITH OTHER CHEMICALS, INCLUDING STRONG OXIDIZING AGENTS.
HAZARDOUS DECOMPOSITION PRODUCTS: MAY PRODUCE CARBON MONOXIDE UPON DECOMPOSITION AT HIGH TEMPERATURES.

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
... CONTAIN THE SPILL. WEAR EYE AND SKIN PROTECTION AND ENSURE ADEQUATE VENTILATION. ABSORB WITH FLOOR ABSORBENT, SAND, DIRT, ETC. PLACE IN CLOSED CONTAINER. RINSE AREA THOROUGHLY WITH WATER.
WASTE DISPOSAL:
...DISPOSE OF ACCORDING TO LOCAL REGULATIONS FOR HAZARDOUS WASTE.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NONE REQUIRED IF ADEQUATE VENTILATION. IF HIGH CONCENTRATIONS, USE NIOSH/MSHA APPROVED RESPIRATOR FOR ORGANIC VAPOR.
VENTILATION TYPE: LOCAL EXHAUST ADEQUATE.
PROTECTIVE GLOVES: SOLVENT RESISTANT GLOVES
EYE PROTECTION: SAFETY GLASSES, GOGGLES, OR FULL FACE SHIELD.
OTHER PROTECTIVE EQUIPMENT: SOLVENT RESISTANT APRON, CLOTHING, BOOTS.

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
...STORE IN A COOL AREA. DO NOT GET ON SKIN, EYES, OR CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. USE WITH ADEQUATE VENTILATION. IF SPILLED ON CLOTHING, REMOVE CLOTHING AND FLUSH OFF EXPOSED SKIN WITH SOAP AND WATER. AVOID BREATHING VAPORS. DO NOT TAKE INTERNALLY. USE PROPER PROTECTIVE EQUIPMENT.
OTHER PRECAUTIONS:
...AVOID CONTACT WITH OPEN FLAMES, HOT SURFACES, SPARKS, ETC. KEEP OUT OF THE REACH OF CHILDREN.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 4A
2. Building/Location 125
3. Description Electric curing oven

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

New MSDS. No change in emission estimate since based on analysis of decomposition products which has remained unchanged.

7. Additional Comments

None

8. Changes to Air Emissions [No] More Less

ALL CHEMTREC FOR EMERGENCY INFORMATION-24 HOURS 1-800-424-9300

MATERIAL SAFETY DATA SHEET

TELEPHONE 908-329-2333

SECTION I

MANUFACTURER'S NAME: JOHN C. DOLPH COMPANY

DATE PREPARED: 1/29/97

STREET ADDRESS: BOX 267, NEW ROAD, MONMOUTH JUNCTION, NEW JERSEY 08852

TSCA INFO. ☒ MIXTURE* ☐ CHEM. SUB CAS #

CHEMICAL FAMILY	MANUFACTURER'S PRODUCT NO.	TRADE NAME
Polyester Resin	CC-1105	DOLPHON

SECTION II — HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT BY WEIGHT	TLV PPM	TLV mg/m³	CAS #	VAPOR PRESSURE mm Hg
NONE This product does not contain ingredients subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and 40 CFR 372.					

SECTION III — PHYSICAL DATA

BOILING RANGE	SOLUBILITY IN WATER	APPEARANCE & ODOR
322°F @ 4 mm Hg	0.6% @ 77°F	Liquid, light straw in color

VAPOR DENSITY	EVAPORATION RATE	% VOLATILE BY VOLUME	WEIGHT PER GALLON	SPECIFIC GRAVITY
☒ HEAVIER ☐ LIGHTER THAN AIR	☐ FASTER ☒ SLOWER THAN ETHER	<5%	10.0	1.200

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): SETA CC >200°F

FLAMMABLE LIMITS: LEL N/A UEL N/A

EXTINGUISHING MEDIA

☒ WATER-FOG ☐ FOAM ☐ OTHER

☒ CARBON DIOXIDE ☒ DRY CHEMICAL

UNUSUAL FIRE AND EXPLOSION HAZARDS

Fumes of allylic compounds

SPECIAL FIRE FIGHTING PROCEDURES

Self contained respiratory equipment.

SECTION V — REACTIVITY DATA

STABILITY: ☐ UNSTABLE ☒ STABLE

CONDITIONS TO AVOID

INCOMPATABILITY (MATERIALS TO AVOID): Strong oxidizers and their derivatives

HAZARDOUS DECOMPOSITION PRODUCTS: At 527°F, possible decomposition products are allyl alcohol phthalic anhydride and their derivatives. Also CO and CO_2

HAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☐ WILL NOT OCCUR

CONDITIONS TO AVOID: UV light exposure-temperature over 200°F

N/A—NOT APPLICABLE

* COMPONENTS IN TSCA INVENTORY

SECTION VI — HEALTH HAZARD DATA

CC-1105

THRESHOLD LIMIT VALUE

N/A

SYMPTOMS OF EXPOSURE

INHALATION: Moderately hazardous, respiratory irritation.
EYES: Mild irritant, acute exposure can cause corneal burns.
SKIN: Moderate irritant, can cause rash.
INGESTION: Slightly hazardous LD_{50} Rats = 896 mg/Kg

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove to fresh air. Call a physician. May require oxygen.
EYES: Immediately flush with water. Get medical attention.
SKIN: Wash with soap and warm water. Remove contaminated clothing.
INGESTION: Induce vomiting. Get medical attention.

SECTION VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on inert material.

WASTE DISPOSAL METHOD

Dispose of in accordance with local, state and federal regulations.

SECTION VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

In high temperature conditions, use a NOISH approved self contained breathing apparatus.

VENTILATION

Exhaust fan.

PROTECTIVE GLOVES Neoprene rubber.
EYE PROTECTION Safety goggles or face shield
OTHER PROTECTIVE EQUIPMENT Eye wash fountain, safety shower.

SECTION IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not store with oxidizing materials.
Store at ambient temperature (75°F) away from heat.

OTHER PRECAUTIONS

This material does have vapor pressure and will emit vapor. Ventilation of dip and vacuum tanks should be used.

CC-1105

SHIPPING INFORMATION

PROPER SHIPPING NAME	HAZARD CLASS	UN #	PACKING GROUP
RESIN COMPOUND	NONE	NONE	NA

REQUIRED LABELS: NONE

EMERGENCY RESPONSE GUIDE NUMBER; NA

Dolphis
EST. 1910

John C. Dolph Company
320 New Road
P.O. Box 267
Monmouth Junction, N.J. 08852
Tel: 908-329-2333
Fax: 908-329-1143

TO: File

FROM: Dr. Angelo Battisti

SUBJECT: TECHNICAL REPORT: WHITE SMOKE ANALYSIS; DOLPHON CC-1105; DOLPHON CC-1305

An independent laboratory has completed an analysis of the decomposition products generated during the cure of CC-1105 and CC-1305. The results of this test are shown in Table I. The total volatile loss was 2.13%. The major decomposition products are identified as carbon dioxide, methanol, diallyl phthalate, acetophenone and methane.

Carbon dioxide is a naturally occurring gas accounting for approximately 0.03% of the earth's atmosphere. It is used to carbonate beverages, as a propellant in aerosol cans, as dry ice for refrigeration, in fire protection (CO_2 fire extinguisher), to produce harmless smoke or fumes during stage productions and is even a component of the air we exhale with every breath.

Methyl alcohol or methanol is one of the largest volume industrial organic solvents produced in the world. In fact, approximately 4 billion kilograms are produced each year in the United States. There is more methanol produced than xylene. It is used as a antifreeze in gasoline and diesel oil, as an octane booster for gasoline, as a fuel for picnic stoves and soldering torches, and as a solvent for polymers and pharmaceutical manufacture.

Diallyl phthalate presence in the white smoke, evolved during cure, is a result of atomization of the liquid DAP by the carbon dioxide gas. Diallyl phthalate is the monomer used in DOLPHON CC-1105 and CC-1305.

Acetophenone and methane are decomposition products of the catalyst dicumyl peroxide. Acetophenone or phenyl methyl ketone is used in perfumery to impart an orange blossom-like odor. It also finds utility as a catalyst for the polymerization of olefins and in organic syntheses as a photo sensitizer.

Methane is a naturally occurring gas used in cooking, lighting and heating applications. Although methane is flammable, it is not considered poisonous.

TABLE I

DOLPHON CC-1105 & CC-1305 OFF-GAS ANALYSIS

OFF-GAS PRODUCT	CONFIRMED BY	WT % OF TOTAL
Carbon Dioxide	IR	1.08
Methanol	IR, NMR, GC	0.56
Diallyl Phthalate	IR, NMR	0.31
Acetophenone	NMR, GC	0.16
Methane	IR	0.02

EXPERIMENTAL

100 grams of resin was heated at 150°C for 30 minutes. During this time, the white off-gas was passed through an NMP trap (100 grams). The weight loss of the reaction flask was 2.13 grams.

CONCLUSION

Although the total quantity of volatile emissions resulting from the cure of Dolphon CC-1105 and CC-1305 is very small, it is good workplace practice to use adequate ventilation in the curing oven.

Angelo Battisti

Angelo J. Battisti
Technical Director

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 24A
2. Building/Location
3. Description 8" Chromium electroplating

Unit is currently decomissioned.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point	44A
2. Building/Location	44
3. Description	Solvent cleaner/hot plastic coating for preservation of precision metal standards

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Decreased usage of plastic coating compound by 50 percent. Annual usage in 1998 is approximately 1,200 gallons per year. MSDS's are up-to-date.

7. Additional Comments

None

8. Changes to Air Emissions No More Less

Source Emissions Calculation

EMISSION POINT 44A

UNIT: Solvent Cleaner
Hot Plastic Coating

SOURCE DATA
Operating Schedule

8	hr/day
5	days/wk
250	days/yr
2000	hr/yr

MATERIAL DATA

Plastic coating compound (plastic)	1200	lbs/year
140 solvent 66/3 (solvent)	165	gal/year
Finger print remover (remover)	25	gal/year

POLLUTION CONTROL EQUIPMENT
None — Efficiency: 0 %

Material	Pollutant	EMISSIONS				
		ERP	ACTUAL			
		lb/hr	lb/hr	lb/day	lb/yr	ton/yr
plastic	aliphatic hydrocarbons	0.360	0.360	2.88	720.0	0.360
solvent	aliphatic hydrocarbons	0.516	0.516	4.13	1032.1	0.516
remover	aliphatic hydrocarbons	0.087	0.087	0.692	173.1	0.087

EMISSIONS CALCULATIONS

ERP (lb/hr)plastic = (lb/yr plastic x PLF)/(hrs/yr)
ERP (lb/hr)solvent = (gal/yr solvent x SG x 8.34lb/gal x PLF)/(hrs/yr)
ERP (lb/hr)remover = (gal/yr remover x SG x 8.34 lb/gal x PLF)/(hrs/yr)
ACTUAL (lb/hr) = ERP x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

plastic	PLF=60%
solvent	PLF=100%, SG=0.75
remover	PLF=95%, SG=0.874

Assumed PLFs of existing permit. Total plastic coating used at both EP 44A and EP 45A is 1600 lbs; assumed 1200 lbs is used at EP 44A and 400 lbs at EP 45A.
Quantity of materials emitted to the air is based on inventory data sheet, interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 95G
2. Building/Location 136
3. Description Boiler No. 7

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

New equipment.

5. Changes to operating procedures since 1996

Not applicable.

6. Changes in raw materials/chemical usage since 1996

Not applicable.

7. Additional Comments

Boiler No. 7 will be used as the primary operational boiler. It is capable of singly handling the total steam load at WVA in the foreseeable future.

8. Changes to Air Emissions No [More] Less

NOx, CO, SO2, VOC EMISSION RECORDKEEPING
WATERVLIET ARSENAL

Comb.	January		February		March		April		May		June		July
Source	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel
Boil. 3		3.77E+07		28457000		31062000		23142000		3228000			
Boil. 4	2,086	-	25,902	-	2,334	-	566	-		-		-	
Boil. 5		2.73E+06		3.61E+06		2.39E+06		3.00E+04		6.00E+03			
Boil. 6	-		-		-		-		-	3.29E+06	-	2.64E+06	-
Boil. 7	-		-		-		-		-		-		-
105	-	4.20E+04	-	1.14E+06	-	1.58E+06	-	3.13E+05	-		-	2.47E+05	-

SO2 (lb	January	February	March	April	May	June	July
26A	1,553	1,718	2,812	2,793	2,713	2,618	2,678
26B	1,553	1,718	2,812	2,793	2,713	2,618	2,678

Comb.	August		September		October		November		December		Total U
Source	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel	Nat. Gas	#2 Fuel
Boil. 3						10395000		28702000		37170000	0
Boil. 4		-		-		-		-	2,230	-	33118
Boil. 5										3.40E+06	0
Boil. 6	-	1.88E+06	-	2.26E+03	-	2.13E+06	-		-		0
Boil. 7	-		-		-		-		-		
105	-	4.18E+05	-	1.99E+06	-	5.12E+05	-	4.34E+05	-	1.86E+06	0

O2 (lbs	August	September	October	November	December	Total Usag
26A	1,158	1,878	2,680	1,780	1,603	25983
26B	1,158	1,878	2,680	1,780	1,603	25983

Source	issions	NOx	CO	SO2	VOCs
Boil. 3	(tpy)	16.42	3.50	0.06	0.14
Boil. 4		0.41	0.08	0.59	0.00
Boil. 5		0.85	0.21	0.00	0.01
Boil. 6		0.88	0.22	0.00	0.01
Boil. 7					
26A		-	-	0	-

	NOx	CO	SO2
Totals (tpy)	**19.23**	**4.18**	**0.95**
NY Cap by Rule Threshold (tpy)	**50**	**50**	**50**
% of Threshold	**38.5%**	**8.4%**	**1.9%**

26B	-	-	0	-
105	0.68	0.17	0.00	0.01

Nat. Gas

-

2.57E+06

1.14E+06

age

Nat. Gas

2.00E+08
0.00E+00
1.22E+07
1.25E+07

9.67E+06

VOCs

0.17

25

0.7%

Source Emissions Calculation

EMISSION POINT: 95G UNIT: Boiler #7

Operating Schedule

8	hr/day
5	days/wk
260	days/yr
2080	hrs/yr

COMBUSTION DATA

Fuel Type: No. 2 Fuel Oil

Annual Use = 33118 gal/yr 15.9 gal/hr

Heat Input = 130 MM Btu/hr

POLLUTION CONTROL EQUIPMENT

None Efficiency: 0 %

Pollutant	Emission Factor	Emission Factor Units	EMISSIONS				
			ERP	ACTUAL			
			lb/hr	lb/hr	lb/day	lb/yr	ton/yr
VOC	0.252	lb/1000gal	0.004	0.004	0.032	8.35	0.004
NOx	9.8	lb/1000gal	0.16	0.16	1.25	324.6	0.162
CO	5	lb/1000gal	0.08	0.08	0.64	165.6	0.083
SO2	20.164	lb/1000gal	0.32	0.32	2.57	667.8	0.334
PM10	1	lb/1000gal	0.016	0.016	0.127	33.1	0.017
Total PM	2	lb/1000gal	0.032	0.032	0.255	66.2	0.033

EMISSIONS CALCULATIONS

ERP (lb/hr) = FACTOR x FUEL USE (gal/hr)
ACTUAL (lb/hr) = ERP x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr / 2000 lb/ton

COMMENTS

Sulfur content (S) = 0.142%
SO2 EF = 142 x S
142 x S= 20.164
Operation hours and fuel use is based on 1998 calculation page provided by WVA
References:
AP-42, Fifth Edition, Tables 1.3-2, 1.3-4, 1.3-7 and manufacturer's data for Nox
Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. New in 1999.

Source Emissions Calculation

EMISSION POINT: 95G UNIT: Boiler #7

Operating Schedule

8 hr/day
5 days/wk
260 days/yr
2080 hrs/yr

COMBUSTION DATA

Fuel Type Natural Gas

Annual Use = 224.7 MMCF 0.10803 MMCF/hr

POLLUTION CONTROL EQUIPMENT

None Efficiency: 0 %

Pollutant	Emission Factor	Emission Factor Units	EMISSIONS				
			ERP	ACTUAL			
			lb/hr	lb/hr	lb/day	lb/yr	ton/yr
NOx	70	lb/MMCF	7.56	7.56	60.50	15729.0	7.865
VOC	2.78	lb/MMCF	0.300	0.300	2.403	624.7	0.312
CO	35	lb/MMCF	3.78	3.78	30.25	7864.5	3.932
SO2	0.6	lb/MMCF	0.065	0.065	0.519	134.82	0.067
PM10	13.7	lb/MMCF	1.480	1.480	11.840	3078.4	1.539
Total PM	13.7	lb/MMCF	1.480	1.480	11.840	3078.4	1.539

EMISSIONS CALCULATIONS

ERP (lb/hr) = FACTOR x FUEL USE (MMCF/hr)
ACTUAL (lb/hr) = ERP x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr / 2000 lb/ton

COMMENTS

PM10 emission factor = filterable + condensible emission factor
Total PM equals PM10
References:
AP-42, Fifth Edition, Tables 1.4-1, 1.4-2 and manufacturer's data for Nox
Operation hours and fuel use is based on 1998 calculation page provided by WVA
Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. New in 1999.

Source Emissions Calculation
Potential to Emit

EMISSION POINT: 95G UNIT: Boiler #7

Operating Schedule

24 hr/day
7 days/wk
365 days/yr
8760 hrs/yr

COMBUSTION DATA
Fuel Type No. 2 Fuel Oil
Maximum Fuel Use = 928.6 gal/hr
Heat Input = 130 MM Btu/hr

Pollutant	Emission Factor	Emission Factor Units	POTENTIAL EMISSIONS			
			lb/hr	lb/day	lb/yr	ton/yr
VOC	0.252	lb/1000gal	0.234	5.62	2049.8	1.025
NOx	9.8	lb/1000gal	9.10	218.4	79716.0	39.9
CO	5	lb/1000gal	4.64	111.4	40671.4	20.3
SO2	35.5	lb/1000gal	33.0	791.1	288767.1	144.4
PM10	1	lb/1000gal	0.929	22.3	8134.3	4.07
Total PM	2	lb/1000gal	1.86	44.6	16268.6	8.13

EMISSIONS CALCULATIONS

(lb/hr) = FACTOR x FUEL USE (gal/hr)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr / 2000 lb/ton

COMMENTS

Sulfur content (S) = 0.25%
SO2 EF = 142 x S
142 x S= 35.5
References:
AP-42, Fifth Edition, Tables 1.3-2, 1.3-4, 1.3-7
Potential to emit is based on 8760 hrs/yr of operation

Source Emissions Calculation
Potential to Emit - Natural Gas

EMISSION POINT:	95G	UNIT: Boiler #7
Operating Schedule		
	24	hr/day
	7	days/wk
	365	days/yr
	8760	hrs/yr
COMBUSTION DATA		
Fuel Type	Natural Gas	
Heat Value=	1000	Btu/scf
um Heat Input =	130	MM Btu/hr
Heat Input / Heat Value=	0.13	MMscf/hr

Pollutant	Emission Factor	Emission Factor Units	POTENTIAL EMISSIONS			
			lb/hr	lb/day	lb/yr	ton/yr
NOx	70	lb/MMCF	9.1	218.40	79716.0	39.858
VOC	2.78	lb/MMCF	0.4	8.67	3165.9	1.583
CO	35	lb/MMCF	4.6	109.20	39858.0	19.929
SO2	0.6	lb/MMCF	0.1	1.87	683.3	0.342
PM10	13.7	lb/MMCF	1.8	42.74	15601.6	7.801
Total PM	13.7	lb/MMCF	1.8	42.74	15601.6	7.801

EMISSIONS CALCULATIONS

(lb/hr) = FACTOR x HEAT INPUT / HEAT VALUE
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr / 2000 lb/ton

COMMENTS

Assumed uncontrolled emission factor for CO
Assumed the highest emission factor for PM10
Assumed scf = cf
Total PM equals PM10
References:
AP-42, Fifth Edition, Tables 1.4-1, 1.4-2
Potential to emit is based on 8760 hrs/yr of operation

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 100A
2. Building/Location 135
3. Description Plasma spray system

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Decreased usage to approximately 6 lbs per year. New MSDS.

7. Additional Comments

Have not purchased tungsten carbide cobalt powder in last two years, maybe more.

8. Changes to Air Emissions No More Less

MATERIAL SAFETY DATA SHEET 17-JUN-1999

MSDS Number: __5261 Status: PENDING Revision Date: 17-JUN-1999
PRODUCT NAME: TUNGSTEN CARBIDE WITH COBALT BINDER

Part Number: NOT GIVEN
Specification: NOT GIVEN
Stock Item Numbers: 343900X810002
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Formula: MIXTURE
Keyword: NOT GIVEN

Manufacturer:
KENNAMETAL, INC.
P.O. BOX 231
LATROBE, PA 15650
Phone: (419) 539-5157
Emergency Phone: ( ) -

Supplier:
KENNAMETAL, INC.
P.O. BOX 231
LATROBE, PA 15650
Phone: (419) 539-5157
Emergency Phone: ( ) -

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	EQ ___5198 deg. F	2870'C
Melting Point:	EQ ___2723 deg. F	1495'C
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	BT ____9.5 & ___15.5 (Water = 1)	NG
Vapor Pressure:	NG	NG
pH:	NG	NG
Vapor Density:	N*	Not measurable
Evaporation Rate:	N*	Not measurable
% of Volatiles:	NE	Negligible
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: WATER & SOLVENT SOLUBILITY: Practically insoluble
Odor/Appearance/Other Characteristics: Gray powder or solid

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	ND	Not determinable.
Open Cup Flash:	ND	Not determinable.
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NG	NG
Upper Explosion Limit:	NG	NG

SHIPPING REGULATIONS:

UN/NA Number:	NG
DOT Hazard Class:	NG
DOT Label:	NOT GIVEN
Proper Shipping Name:	NOT GIVEN

PREPARER/CONTACT INFORMATION: Corporate EHS, 412-539-5631

MSDS Number: __5261 Status: PENDING Revision Date: 17-JUN-1999
PRODUCT NAME: TUNGSTEN CARBIDE WITH COBALT BINDER

Date Prepared/Revised: 1-APR-1996

COMPONENTS:

TUNGSTEN CARBIDE
OSHA PEL: 5 MG/M3 ACGIH TLV: 5 MG/M3 Other Limits: NOT GIVEN
BT _30.0 _97.7 % of product. CASRN: 12070-12-1

COBALT
OSHA PEL: 0.05 MG/M3 ACGIH TLV: 0.02 MG/M3 Other Limits: NOT GIVEN
BT __2.0 _25.0 % of product. CASRN: 7440-48-4

TANTALUM CARBIDE
OSHA PEL: 5 MG/M3 ACGIH TLV: 5 MG/M3 Other Limits: NOT GIVEN
BT __0.1 _15.0 % of product. CASRN: 12070-06-3

TITANIUM CARBIDE
OSHA PEL: 5 MG/M3 ACGIH TLV: NE Other Limits: NOT GIVEN
BT __0.1 _15.0 % of product. CASRN: 12070-08-5

*TLV: NONE ESTABLISHED
)SHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

NIOBIUM CARBIDE
OSHA PEL: 5 MG/M3 ACGIH TLV: 5 MG/M3 Other Limits: NOT GIVEN
BT __0.1 __5.0 % of product. CASRN: 12069-94-2

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IDENTIFICATION

----------Last change: 2-JUL-1997

PRODUCT NAME: K1, K2S, K2S-M, K4H, K4H-M, K400, K5H, K6, K6-M, K600, KMN-10, K21, K21-M, K2885, K29, K40, K45, K45-M, K68, K84, K86, K90, K91, K91-M, K92, K94, K95, K96, K96-M, K400, K420, K600, K640, K2884, K2885, K3055D, K8735, KC210, KC250, KC600, KC800, KC801, KC810, KC820, KC850, KC910, KC950, KC9010, KC9025, KC9040, KD050, KD081, KT101, K-ALL, KM, KWH, KWH-M, HG-100, PLTSEXP, PLTS001, thru PLTS027, SP139, SP145 pins, SP240, SP266, SP278, SP291, SP316, Cycloid, Grinding Media, Kengrit, S Pellets, TS181B, X122, X165

CHEMICAL NAME: Tungsten Carbide with Cobalt binder

CHEMICAL FAMILY: Refractory Metal Carbide

SYNONYMS: Hard Metal, Cemented WC, Tungsten Carbide

LECULAR FORMULA: Mixture

MSDS Number: __5261 Status: PENDING Revision Date: 17-JUN-1999
PRODUCT NAME: TUNGSTEN CARBIDE WITH COBALT BINDER

DATE OF ISSUE: 4/96
SUPERCEDES: 11/95
DATE PREPARED: 10/85

EMERGENCY PHONE NUMBERS: CHEM-TEL INC 1-800-255-3924

MANUFACTURER'S NAME AND ADDRESS:

KENNAMETAL, INC.
P.O. BOX 231
LATROBE, PA 15650
412-539-5000

==========

INGREDIENTS

----------Last change: 23-JUL-1997

ERIAL	CAS NUMBER	% BY WEIGHT	OSHA PEL-TWA (MG/M3)
Tungsten Carbide	12070-12-1	30.0-97.7	5
*Cobalt	7440-48-4	2.0-25.0	0.05
Tantalum Carbide	12070-06-3	0.1-15.0	5
Titanium Carbide	12070-08-5	0.1-15.0	5
Niobium Carbide	12069-94-2	0.1-5.0	5

MATERIAL	ACGIH TLV-TWA (MG/M3)	NFPA HAZARD RATING SCALE 0 - 4 HEALTH	FIRE	REACTIVITY
Tungsten Carbide	5	No NFPA Rating	0	0
*Cobalt	0.02	1	3	0
Tantalum Carbide	5	No NFPA Rating	0	0
Titanium Carbide	None Established	No NFPA Rating	0	0
Niobium Carbide	5	No NFPA Rating	0	0

* IDENTIFIES SUBSTANCES THAT ARE SUBJECT TO THE REQUIREMENTS OF SECTION 313 OF TITLE III OF SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

MSDS Number: __5261 Status: PENDING Revision Date: 17-JUN-1999
PRODUCT NAME: TUNGSTEN CARBIDE WITH COBALT BINDER

==========

PHYSICAL DATA

----------Last change: 23-JUL-1997

DESCRIPTION: Gray powder or solid

SPECIFIC GRAVITY (H2O=1): 9.5 to 15.5

SOLVENT SOLUBILITY: Practically insoluble

BOILING POINT: 2870'C (5198'F)

VAPOR DENSITY (AIR = 1) AT AMBIENT TEMP.: Not measurable

PERCENT VOLATILES BY VOLUME: Negligible

MELTING POINT: 1495'C (2723'F)

SOLUBILITY IN WATER: Practically insoluble

EVAPORATION RATE: Not measurable

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FIRE AND EXPLOSION HAZARD DATA

----------Last change: 2-JUL-1997

FIRE AND EXPLOSION HAZARDS: Finely divided tungsten carbide powder or dust from grinding is expected to be a fire explosion hazard when exposed to high temperatures or ignition sources. Particle size and dispersion in air determine reactivity. Tungsten carbide product, except as a powder or dust, is not a fire hazard.

FLASH POINT: Not determinable.

FIREFIGHTING MEDIA: For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash.

SPECIAL FIREFIGHTING PROCEDURES: Move container from fire area if possible. Cool containers exposed to flame with water from side until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; or withdraw and let fire burn.

void breathing fumes from burning material.
Firefighting personnel must use proper respiratory protection.

MSDS Number: __5261 Status: PENDING Revision Date: 17-JUN-1999
PRODUCT NAME: TUNGSTEN CARBIDE WITH COBALT BINDER

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REACTIVITY
----------Last change: 2-JUL-1997

STABILITY: Stable under normal temperatures and pressure.

INCOMPATIBILITIES:

TUNGSTEN CARBIDE WITH:

Chlorine Trifluoride: Reacts with a flame.

Fluorine: Incandesces.

Nitrogen Dioxide, Nitrous Oxide: Burns with incandescence if heated to dull red.

Iodine Pentafluoride, Lead Oxide: Violent reaction.

COBALT WITH:

Ammonium Nitrate + Metals or Bromine Pentafluoride: Reacts violently and sometimes explosively.

Hydrazinium Nitrate: Decomposes explosively upon rapid heating.

Nitryl Fluoride, Acetylene: Reacts incandescently.

DECOMPOSITION: Thermal decomposition may release acrid smoke and irritating fumes.

POLYMERIZATION: Not known to occur.

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TOXICITY
----------Last change: 2-JUL-1997

WARNING: Overexposure to this material in the form of metallurgical powder, dust or mist from grinding or sweeping is hazardous to health. May cause eye, skin, and mucous membrane irritation. May cause temporary or permanent respiratory disease.

Permanent respiratory disease can lead to disability or death. Certain pulmonary and skin conditions may be aggravated by exposure. Preexisting pulmonary and skin conditions such as emphysema, asthma, bronchitis, and

dermatitis may be aggravated by exposure to this material.

Carcinogenic Status: this material has not been identified as a known or suspected carcinogen.

Tungsten Carbide: Toxicity has not been quantified. May cause pulmonary and skin sensitization in dust form.

Cobalt: 1500 mg/kg Oral-rat LDLo; 250 mg/kg Intraperitoneal-rat LDLo; 100 mg/kg Intravenous-rat LDLo; 20 mg/kg oral-rabbit LDLo; 100 mg/kg Intratracheal-rabbit LDLo.

Cobalt fumes or dust may cause pulmonary, skin, or eye irritation. Cobalt may be a sensitizing agent for skin and respiratory system. Chronic exposure may affect the heart, pancreas, thyroid gland, or bone marrow.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: May cause mucous membrane irritation.

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ROUTES OF EXPOSURE/HEALTH EFFECTS/FIRST AID

----------Last change: 2-JUL-1997

*HEALTH EFFECTS LISTED FOR EXPOSURE TO METALLURGICAL POWDERS, DUST, OR MIST FROM GRINDING. NO HEALTH EFFECTS HAVE BEEN REPORTED FOR EXPOSURE TO THIS MATERIAL IN SOLID FORM.

INHALATION:

Irritant/Sensitizer: Inhalation may cause irritation of the nose and throat. 20 mg (Co)/m3 is immediately dangerous to life and health.

ACUTE OVEREXPOSURE:

Tungsten Carbide: May cause coughing, dyspnea, soreness in the chest, weight loss, hemoptysis, bronchitis, and asthma.

May also cause pulmonary fibrosis. Radiological changes may be noted in the lungs.

Cobalt: May cause shortness of breath, asthma, dyspnea on exertion, wheezing, interstitial pneumonitis, and/or lung densities.

Tantalum Carbide: None reported in humans.

inhalation or prolonged contact.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: None reported in humans.

FIRST AID: If irritation or rah occurs, remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of material remains (approximately 15-20 minutes). Get medical attention immediately.

EYE CONTACT: Irritant

ACUTE OVEREXPOSURE:

Tungsten Carbide, Cobalt: May cause irritation with redness, pain and itching.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: May cause irritation.

CHRONIC OVEREXPOSURE:

Tungsten Carbide, Cobalt, Tantalum Carbide, Titanium Carbide, Niobium Carbide: May cause conjunctivitis.

FIRST AID: If irritation occurs, wash eyes immediately with large amounts o water, occasionally lifting upper and lower lids, until no evidence of material remains (approximately 15-20 minutes). Get medical attention immediately.

INGESTION: Irritant: In the form of metallurgical powder, dust, or mist from grinding.

ACUTE OVEREXPOSURE:

Tungsten Carbide: May cause gastrointestinal irritation. Large doses may cause diarrhea.

Cobalt: May cause hypotension, pain, vomiting, and sensations of hotness or nausea. Severe exposure may cause pericardial effusion, convulsions, or enlargement of the thyroid.

Niobium Carbide, Tantalum Carbide, Titanium Carbide: Systemic poisoning not known to occur.

CHRONIC OVEREXPOSURE:

Tungsten Carbide: None reported in humans.

Cobalt: May adversely affect the pancreas, thyroid gland, heart, or bone marrow.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: None reported in humans.

FIRST AID: If this material has been swallowed and person is conscious, immediately give person large amounts of water. After water has been swallowed, induce vomiting. Do not attempt to make an unconscious person drink or vomit. Get medical attention immediately.

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SPILL AND LEAK PROCEDURES

----------Last change: 2-JUL-1997

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Sweep up with a minimum of dust generation and place into suitable clean, dry containers for reclamation or later disposal. Residue should be cleaned up using high-efficiency particulate filter vacuum or wet clean up. Use appropriate respiratory protection.

WASTE DISPOSAL METHOD: This is a valuable material that should be sent to an appropriate reclamation facility if available. If material cannot be sent to a reclamation facility, disposal should be made in compliance with federal, state, and local environmental regulations.

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CONTROL MEASURES AND PROTECTIVE EQUIPMENT

----------Last change: 2-JUL-1997

VENTILATION: Provide local exhaust ventilation or general dilution ventilation to maintain exposure levels below TLV-TWA.

RESPIRATORY PROTECTION:

0.05 mg(Co)/m3: Single use approved dust and mist respirator.

0.5 mg(Co)/m3: Dust mask, except single-uses respirator.

1 mg(Co)/m3: Dust mask, except single-use and quarter-mask respirator. Fume of high efficiency particulate respirator.

5 mg(Co)/m3: High-efficiency particulate respirator with a full facepiece. Supplied-air respirator with a full facepiece, helmet or hood. Self-contained breathing apparatus with a full facepiece.

20 mg(Co)/m3: Powered air-purifying respirator with a high-efficiency filter with a full facepiece. Type "C" supplied-air respirator with a full facepiece operated in pressure-demand or other positive-pressure mode.

FIREFIGHTING: Self-contained breathing apparatus with a full facepiece, operated in pressure-demand or other positive-pressure mode.

CLOTHING: Employee must wear appropriate protective clothing and equipment to prevent repeated or prolonged skin contact with this substance. Soiled clothing should be laundered separately.

GLOVES: Employee must wear appropriate protective gloves or barrier creams to prevent contact with this substance.

EYE PROTECTION: Safety glasses with side shields or goggles are recommended. Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye-wash fountain within the immediate work area for emergency use. Contact lenses should not be worn when using or reprocessing these materials.

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SPECIAL PRECAUTIONS

----------Last change: 2-JUL-1997

HANDLING AND STORAGE: Minimize free fall of powder and avoid dispersion of dust in air. Finely divided particles, dust, or fumes may be flammable or explosive. Keep away from sparks or ignition sources. Contents should be stored in a clean, dry, cool area.

OTHER PRECAUTIONS: Wash hands thoroughly after handling, before eating or smoking. Do not shake clothing or other items to remove dust. Dust should be removed by washing or vacuuming. Periodic examinations are recommended for individuals regularly exposed to dust or mist.

ALTHOUGH KENNAMETAL, INC. HAS ATTEMPTED TO PROVIDE CURRENT AND ACCURATE INFORMATION HEREIN, KENNAMETAL, INC. MAKES NO REPRESENTATIONS REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND ASSUMES NO LIABILITY FOR ANY LOSS, DAMAGE, INJURY OF ANY KIND MAY RESULT FROM OR ARISE OUT OF THE USE OF RELIANCE ON THE INFORMATION BY ANY PERSON.

FOR FREE POWDER HANDLING OR METALCUTTING SAFETY BOOKLETS WRITE: KENNAMETAL

MSDS Number: __5261 Status: PENDING Revision Date: 17-JUN-1999
PRODUCT NAME: TUNGSTEN CARBIDE WITH COBALT BINDER

INC. ATTN: EHS COORDINATOR, P.O. BOX 231, LATROBE, PA 15650-0231.

FOR ADDITIONAL INFORMATION CONTACT CORPORATE EHS: 412-539-5631 OR FAX: 412-539-5372.

This MSDS has NOT been reviewed by the Hazardous Materials Committee

End of Report

» «

Titanium Carbide: May be considered a nuisance dust and may result in dust accumulation in the lungs.

Niobium Carbide: May cause respiratory irritation.

CHRONIC OVEREXPOSURE:

Tungsten Carbide: MAy cause "hard metal lung" with symptoms as described in acute overexposure. Previously exposed individuals may be at increased risk.

Cobalt: May cause pneumoconiosis, sensitization of the respiratory tract, obstructed airways syndrome, interstitial lung disease, and density of the lung with symptoms as described in acute exposure.

Tantalum Carbide: None reported in humans. Has been demonstrated to be physiologically inert in animals.

Titanium Carbide: May cause fibrosis or pneumoconiosis.

Niobium Carbide: None reported in humans.

FIRST AID: If symptoms of pulmonary involvement develop (coughing, wheezing, shortness of breath) remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention immediately.

SKIN CONTACT:

Irritant/Sensitizer: In the form of metallurgical powder, dust or mist from grinding.

ACUTE OVEREXPOSURE:

Tungsten Carbide: May cause irritation with dermatitis, eczema, and itching. May also cause sensitization dermatitis if previously exposed.

Cobalt: Sensitization dermatitis may occur in persons who are previously exposed. A rash may develop, usually in the flexor areas of the elbow, neck and face.

Tantalum Carbide, Titanium Carbide, Niobium Carbide: None reported in humans.

CHRONIC OVEREXPOSURE:

Tungsten Carbide: May cause contact dermatitis.

Cobalt: May cause contact dermatitis. Sensitization dermatitis may follow

Source Emissions Calculation

EMISSION POINT	100A		UNIT: Plasma Spray System
SOURCE DATA			
Operating Schedule			1.5 hr/day
			days/wk
			12 days/yr
			18 hr/yr
MATERIAL DATA			
Tungsten Carbide Cobalt Powder			6 lbs/year
POLLUTION CONTROL EQUIPMENT			
Absolute Filter	Efficiency	99 %	

Pollutant	EMISSIONS				
	ERP	ACTUAL			
	lb/hr	lb/hr	lb/day	lb/yr	ton/yr
particulates	0.33	0.003	0.005	0.060	3.00E-05
HAPs					
cobalt	0.08	0.001	0.001	0.015	7.50E-06

EMISSIONS CALCULATIONS

ERP (lb/hr) = (lb/yr x PLF)/(hrs/yr)
ACTUAL (lb/hr) = ERP x (1-CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

PLF (particulates) = 100 %
PLF (cobalt) = 25 %
Particulates include HAPs.
Quantity of materials emitted to the air is based on inventory data sheet, Interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 120
2. Building/Location 35
3. Description Major chromuim electroplating, 120 mm cannons

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

New MSDS (switched from powder to liquid mix).

7. Additional Comments

Unit has been off-line for the past 5 years.

8. Changes to Air Emissions [No] More Less

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: NOT GIVEN Keyword: NOT GIVEN
Stock Item Numbers: 681000X980015
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
ATOTECH USA INC.
1750 Overview Drive Phone: ( ) -
Rock Hill, SC 29731-2000 Emergency Phone: (803) 817-3500

Supplier:
ATOTECH USA INC.
1750 Overview Drive Phone: ( ) -
Rock Hill, SC 29731-2000 Emergency Phone: (803) 817-3500

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	EQ ___-212 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	LT _____50 deg. F	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ ___-1.3 (Water = 1)	NG
Vapor Pressure:	NG	@ 20 DEG. C.
pH:	LT _____2	NG
Vapor Density:	NA	NG
Evaporation Rate:	NA	Butyl Acetate = 1
% of Volatiles:	NA	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: Complete.
Odor/Appearance/Other Characteristics: No odor given/ red-brown liquid.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	NA	NG
Open Cup Flash:	NA	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NA	NG
Upper Explosion Limit:	NA	NG

SHIPPING REGULATIONS:
UN/NA Number: UN 2922
DOT Hazard Class: 8
DOT Label: CORROSIVE/TOXIC
Proper Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S.

PREPARER/CONTACT INFORMATION: PRODUCT SAFETY DEPARTMENT (PSD)

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Date Prepared/Revised: 24-FEB-1998

COMPONENTS:

CHROMIC ACID
OSHA PEL: .5 MG/M3 ACGIH TLV: .05 MG/M3 Other Limits: 1 MG/10M3
BT ___14 ___40 % of product. CASRN: 7738-94-5

ACGIH - CHROMIUM, WATER-SOLUBLE CR VI COMPOUNDS, NOC.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PEL - CHROMIUM, SOL. CHROMIC, CHROMOUS SALTS (AS CR).
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

OTHER - ACCEPTABLE CEILING CONCENTRATION. OSHA TABLE Z-2 (29 CFR 1910.1000).
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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)DUCT INFORMATION
----------Last change: 24-AUG-1998
NAME USED ON LABEL: Liquid Chromic Acid

CHEMICAL NAME (if single substance): Chromic Acid

MANUFACTURER:

Atotech USA Inc.
1750 Overview Drive
P.O. Box 12000
Rock Hill, S.C. 29731-2000

EMERGENCEY TELEPHONE NUMBER 8:00 AM - 5:00 PM: (803)817-3500

CHEMTREC (24 HOURS): 1-800-424-9300

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HAZARDOUS INGREDIENTS
----------Last change: 24-AUG-1998

IDENTITY	CAS NO.	%	EXPOSURE LIMITS
omic Acid	7738945	15-40	ACGIH-TWA (1): 0.05 mg/m3 OSHA-PEL (2): 0.5 mg/m3 OSHA-C (3): 1 mg/10m3

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

(1) Chromium, water-soluble Cr VI compounds, NOC.
(2) Chromium, Sol. Chromic, Chromous salts (as Cr).
(3) Acceptable ceiling concentration. OSHA Table Z-2 (29 CFR 1910.1000).

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PHYSICAL DATA

----------Last change: 24-AUG-1998

BOILING POINT: -212 F.

FREEZING POINT: <50 F.

SPECIFIC GRAVITY: -1.30

VAPOR PRESSURE @ 20 C: N/A

VAPOR DENSITY (AIR=1): N/A

SOLUBILITY IN WATER: Complete

% VOLATILE: N/A

EVAPORATION RATE (Butyl Acetate=1): N/A

pH: <2.0

APPEARANCE: Red-brown liquid.

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FIRE AND EXPLOSION DATA

----------Last change: 24-AUG-1998

FLASH POINT (Test Method): N/A

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LTS.: LEL: N/A UEL: N/A

EXTINGUISHING MEDIA: Water fog, dry chemical, or carbon dioxide may be used in areas where product is stored.

SPECIAL FIRE FIGHTING PROCEDURES: Do not get material on skin or clothing. Avoid inhalation of fumes or mists. Stay upwind, out of low areas, and ventilate closed spaces before entering. Cool containers from the side with water until fire is out. Use water spray to reduct vapor; do not put water directly on leak or spill area. Keep combustibles away from spilled material. Self-containe breathing apparatus (SCBA) and chemical-protective clothing can be worn but may not provide adequate thermal protection for chemical fire unless stated by the manufacturer. Structural fire fighter's protective clothing may not be effective. Move containers from fire area, if sible to do so without risk.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Can accelerate the burning of

combustible materials.

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HEALTH HAZARD DATA

----------Last change: 24-AUG-1998

EYE CONTACT: Corrosive. Causes severe burns to the eyes and surrounding areas characterized by redness, swelling, tearing, blurred vision, and pain. May cause permanent eye damage.

SKIN CONTACT: Corrosive. Toxic. May be harmful if obsorbed through skin. Causes severe burns to the skin characterized by redness, swelling, and pain. Repeated contact may cause an allergic dermatitis.

INHALATION: Causes severe irritation to the respiratory passages, including the nose, airway, and lungs characterized by sore throat, chest pain, caugh, dizziness, headache, nausea, and shortness of breath. May cause fluid to collect in lungs (pulmonary edema) causing a decrease inlung function - may be delayed.

INGESTION: Corrosive. Toxic. May be harmful if swallowed. Causes severe burns to the mouth, throat, and stomach characterized by abdominal pain, headache, sore throat, burning sensation, nausea, and vomiting. Causes kidney damage.

CHRONIC TOXICITY: Prolonged or repeated contact may cause conjunctivitis, "chrome sores" (deep penetrating ulcers) on skin, especially broken skin, or ulceration and perforatin of the nasal septum.

CARCINOGENICITY:

NTP: Yes IARC: Yes OTHER: Yes

The National Toxicology Program (NTP) has designated Hexavalent Chromium compounds as Known Human Carcinogens. The International Agency for Research on Cancer (IARC) has identified Hexavalent Chromium Compounds as Probable Human Carcinogens. The American Conference of Governmental Industrial Hygienists (ACGIH) has identified Water-Soluble Hexavalent chromium compounds as Confirmed Carcinogen.

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GESTED FIRST AID

----------Last change: 24-AUG-1998

EYES: Immediately flush eyes with flowing water for at least 15 minutes

while holding eyelids away from eyes. Seek medical attention.

SKIN: Wash exposed areas thoroughly with soap and flowing water, while removing contaminated clothing and shoes. Discard footwear which cannot be decontaminated. Seek medical attention.

INHALATION: Remove exposed individual from source of exposure. If breathing is difficult, oxygen may be administered by certified persons only. Artificial respiration may be performed only if exposed individual is not breathing. Seedk medical attention.

INGESTION: Give large quantities of water or milk. Never give anything by mouth to an unconscious or convulsing person. DO NOT INDUCE VOMITING! If vomiting occurs spontaneously, keep airway clear and give more water. SEEK MEDICAL ATTENTION IMMEDIATELY. Accident victims may be given 5-10 grams of ascorbic acid (not effervescent tablets) dissolved in water.

NOTES TO PHYSICIAN: Massive overexposure of this product could lead to kidney failure and death. Death has been avoided in several cases of similar overexposures though the use of early renal dialysis. It has been reported that there is little value from chelating agents, however, ascorbic acid administered intravenously is an effective antidote in preventing renal failure. Skin ulcers may be treated by removal from exposure, daily cleansing and debridement and application of antibiotic cream and dressing.

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REACTIVITY DATA

---------- Last change: 24-AUG-1998

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Heat

INCOMPATIBILITY (Material to Avoid): Reducing agents, bases, easily combustible materials (e.g., greases, oils, paper, wood), cyanides, sulfides.

NAME USED ON LABEL: Liquid Chromic Acid

HAZARDOUS DECOMPOSITION PRODUCTS: Contact with metals may liberate flammable hydrogen gas.

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MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

SPECIAL PROTECTION INFORMATION
----------Last change: 24-AUG-1998
VENTILATION: Local exhaust or an enclosed handling system ishighly recommended. Mechanical (general) ventilation is required.

RESPIRATORY PROTECTION: Use NIOSH/MSHA-approved respiratory protection if ventilation is inadequate.

EYE AND FACE PROTECTION: Chemical splash goggles & face shield. DO NOT WEAR CONTACT LENSES!

OTHER PERSONAL PROTECTION: Butyl rubber or neoprene gloves, boots, apron, and sleeves. An impervious coverall may be substituted for the apron and sleeves when additional protection is needed. An emergency eyewash and drench shower should be available in the immediate work area. Launder contaminated clothing before reuse.

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ECIAL PRECAUTIONS
----------Last change: 24-AUG-1998
HANDLING: Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapor. Do not take internally. use only with adequate ventilation. Wash throughly after handling. Avoid contact with easily combustible materials. Avoid contact with reducing compounds. Emptied container retains vapor and product residue - Observe all label safeguards until container is cleaned, reconditioned or destroyed. Keep container tightly closed in an upright position.

STORAGE: Protect from Freezing - Store above 10 F. Keep away from cyanides and sulfides. Product is corrosive to common metals and mild steel.

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ENVIRONMENTAL INFORMATION
----------Last change: 24-AUG-1998
SPILL RESPONSE: Wear NIOSH/MSHA-approved respiratory protection and appropriate personal protective clothing to minimize skin & eye contact when cleaning spill. Do not get spilled material on skin or clothing; stop leak if you can do so without risk. Remove ignition sources from area where flammable/combustible vapors may exist. if necessary, dike area of spill to prevent spreading. If spill is large, cover liquid pools with foam to
trol vapors, pump liquid into a salvage tank, and retain for evaluation and/or disposal. Remaining material or small spills should be covered with sand, clay, or other noncombustible absorbent material. Transfer absorbed

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

material to a suitable container for disposal. CAREFULLY flush area where spill has occurred with water. Retain this water/residue mixture for evaluation and/or disposal. NOTE: Discharge to a public sewerage authority should coincide with all applicable local permits and notification requirements. May be hazardous to aquatic life if released to open waters.

RECOMMENDED DISPOSAL: Disposal of waste material from the use of this product may be subject to federal, state, and local regulations. Refer to Part 261 of 40 CFR for the applicability of federal regulations. Consult with your state and local governments for additional regulatory requirements. Disposal of this material must be in a manner compliant with all federal, state, and local regulations.

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TRANSPORATION

----------Last change: 24-AUG-1998

HAZARDOUS MATERIAL/DANGEROUS GOODS SHIPMENT IS INDICATED BY (X) BELOW:

(X) Department of Transportation (DOT/HM-181)
(X) International Air Transportation Association (IATA) 37th Ed.
(X) International Maritime Organization (IMO/IMDG) Amdt. 27-94

SHIPPING INFORMATION:

UN (NA) Number	HAZARD CLASS	SUBSID. RISK	LABELS	MARK (IMO)	PACKING GROUP
UN2922	8	6.1	CORROSIVE TOXIC	NONE	II

SHIPPING NAME:

DOT - RQ, CORROSIVE LIQUID, TOXIC, N.O.S.
(contains CHROMIC ACID)

IATA - Same

NAME USED ON LABEL: LIQUID CHROMIC ACID

IMO - Same

DOT QUANTITY LIMITS:

'assenger Air or Rail - 1 L Cargo Air Only - 30 L

Packaging Authorization - 49 CFR 173.202, 243

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Special Provisions - B3, T18, T26

NOTES: IMO Stowage Loaction 'B'.

IATA PACKAGING:

Passenger Aircraft (PA)	Cargo Aircraft Only (CAO)
PkgInst - 808 Max/Pkg - 1 L	PkgInst - 812 Max/Pkg - 30 L

NOTES: (PA) Single packagings are not permitted.

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MISCELLANEOUS

----------Last change: 24-AUG-1998

EPA/DOT - REPORTABLE QUANTITY (RQ) FOR HAZARDOUS SUBSTANCES:

(X) RQ OF 10 lb / 4.54 Kg for Chromic Acid

EPA - Any release of hazardous substance(s) in a quantity equal to or exceeding the RQ in any 24-hour period requires the immediate notification of the National Response Center in Washington, D.C. at (800)424-8802. Other notification requirements, such as state and local governments, may apply.

DOT - Any package containg a hazardous substance in a quantity equal to or exceeding the RQ is regulated as a hazardous material.

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ADDITIONAL INFORMATION

----------Last change: 24-AUG-1998

RATINGS:

HMIS:	F: 0	H: 3*	R: 0	PPE: X	SPEC HAZ: N/APP
NFPA	F: 0	H: 3	R: 0	PPE: N/APP	SPEC HAZ: OX

F = Flammability H = Health R = Reactivity

PPE = Personal Protection Equipment Spec Haz = Special Health Hazards

W = Water Reactive OX = Oxidizer * = Chronic Hazard

*N/A = Not Available
**N/APP = Not Applicable

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

***N/E = Not Established

NAME USED ON LABLE: LIQUID CHROMIC ACID

SARA TITAL III CLASSIFICATONS:	YES	NO
Immediate (Acute) Health	X	
Delayed (Chronic) Health	X	
Sudden Release of Pressure		X
Reactive		X
Fire		X

Components of this product are identified below if they are present in excess of de minimus reporting levels. Components that are not required to be identified by specific chemical name may have a generic description.

SARA Title III Section 302 Extremely Hazardous Substances: None.

SARA Tital III Section 313 Toxic Chemicals: Chromium (VI) Compounds 15-40 %wt

STATE RIGHT-TO-KNOW:

Components of this product which are specifically identified in the ingredients section of this MSDS may be listed as hazardous by these and/or other states: California, Massachusetts, New Jersey, Pennsylvania, Florida, New York, Michigan, Connecticut, Louisiana, North Carolina, Illinois, Kentucky, Rhode Island, Indiana.

ATTENTION: This product contains a chemical(s) known to the State of California to cause cancer, birth defects, or other reproductive harm.

CAREFULLY READ THE FOLLOWING:

The identificationof ingredients in this document meets or exceeds the requirements set forth in 29 CFR, 40 CFR, et al. at the date of publication. Ingredients present in a mixture or sulution which are generically identified or not referenced in this document are not regulatorily required to be specifically identified or referenced. The information contained herein should be provided to all those who will use, handle, store, transport, or may otherwise be exposed to this product.

ATOTECH USA certifies that all ingredients, whether identified in this MSDS or not, are on the TSCA inventory (for USA manufacture and/or sales only).

THE INFORMATION CONTAINED HEREIN, TO THE BEST OF OUR KNOWLEDGE, IS CONSIDERED TO BE ACCURATE, SUCH INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION, AND WE DO NOT SUGGEST OR GUARANTEE THAT ANY PRECAUTIONS, PROCEDURES, RECOMMENDATIONS ETC. ARE PREFERRED OR UNIQUE. ATOTECH USA INC. MAKES NOT WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE USE OF THIS INFORMATION OR THE USE OF MATERIAL INDENTIFIED HEREIN, IN COMBINATION WITH ANY OTHER MATERIAL OR PROCESS, AND ASSUMES NO RESPONSIBILITY THEREFORE. THIS DOCUMENT WAS DEVELOPED UNDER THE REQUIREMENTS OF THE UNITED STATES, AND AS SUCH MAY NOT SATISFY OTHER STATE OR REGIONAL REQUIREMENTS.

Prepared by the Product Safety Department (PSD)

ISSUED: 02/24/1998 SUPERSEDES: 08/14/1996

End of Report

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 130
2. Building/Location 35
3. Description Major chromium electroplating, 130 mm cannons

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

Rebuilt scrubber.

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

New MSDS (switched from powder to liquid mix).

7. Additional Comments

Emissions will be based on latest stack test performed during October 1996.

8. Changes to Air Emissions No More Less

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Part Number: NOT GIVEN
Specification: NOT GIVEN
Stock Item Numbers: 681000X980015
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Formula: NOT GIVEN
Keyword: NOT GIVEN

Manufacturer:
ATOTECH USA INC.
1750 Overview Drive
Rock Hill, SC 29731-2000
Phone: ( ) -
Emergency Phone: (803) 817-3500

Supplier:
ATOTECH USA INC.
1750 Overview Drive
Rock Hill, SC 29731-2000
Phone: ( ) -
Emergency Phone: (803) 817-3500

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	EQ ___-212 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	LT _____50 deg. F	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ ___-1.3 (Water = 1)	NG
Vapor Pressure:	NG	@ 20 DEG. C.
pH:	LT _____2	NG
Vapor Density:	NA	NG
Evaporation Rate:	NA	Butyl Acetate = 1
% of Volatiles:	NA	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: Complete.
Odor/Appearance/Other Characteristics: No odor given/ red-brown liquid.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	NA	NG
Open Cup Flash:	NA	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NA	NG
Upper Explosion Limit:	NA	NG

SHIPPING REGULATIONS:
UN/NA Number: UN 2922
DOT Hazard Class: 8
DOT Label: CORROSIVE/TOXIC
Proper Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S.

PREPARER/CONTACT INFORMATION: PRODUCT SAFETY DEPARTMENT (PSD)

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Date Prepared/Revised: 24-FEB-1998

COMPONENTS:

CHROMIC ACID
OSHA PEL: .5 MG/M3 ACGIH TLV: .05 MG/M3 Other Limits: 1 MG/10M3
BT ___14 ___40 % of product. CASRN: 7738-94-5

ACGIH - CHROMIUM, WATER-SOLUBLE CR VI COMPOUNDS, NOC.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PEL - CHROMIUM, SOL. CHROMIC, CHROMOUS SALTS (AS CR).
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

OTHER - ACCEPTABLE CEILING CONCENTRATION. OSHA TABLE Z-2 (29 CFR 1910.1000).
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

==========

PRODUCT INFORMATION

Last change: 24-AUG-1998

NAME USED ON LABEL: Liquid Chromic Acid

CHEMICAL NAME (if single substance): Chromic Acid

MANUFACTURER:

Atotech USA Inc.
1750 Overview Drive
P.O. Box 12000
Rock Hill, S.C. 29731-2000

EMERGENCEY TELEPHONE NUMBER 8:00 AM - 5:00 PM: (803)817-3500

CHEMTREC (24 HOURS): 1-800-424-9300

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HAZARDOUS INGREDIENTS

Last change: 24-AUG-1998

IDENTITY	CAS NO.	%	EXPOSURE LIMITS
C. omic Acid	7738945	15-40	ACGIH-TWA (1): 0.05 mg/m3 OSHA-PEL (2): 0.5 mg/m3 OSHA-C (3): 1 mg/10m3

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

(1) Chromium, water-soluble Cr VI compounds, NOC.
(2) Chromium, Sol. Chromic, Chromous salts (as Cr).
(3) Acceptable ceiling concentration. OSHA Table Z-2 (29 CFR 1910.1000).

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PHYSICAL DATA

Last change: 24-AUG-1998

BOILING POINT: -212 F.

FREEZING POINT: <50 F.

SPECIFIC GRAVITY: -1.30

VAPOR PRESSURE @ 20 C: N/A

VAPOR DENSITY (AIR=1): N/A

SOLUBILITY IN WATER: Complete

% VOLATILE: N/A

EVAPORATION RATE (Butyl Acetate=1): N/A

pH: <2.0

EARANCE: Red-brown liquid.

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FIRE AND EXPLOSION DATA

Last change: 24-AUG-1998

FLASH POINT (Test Method): N/A

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LTS.: LEL: N/A UEL: N/A

EXTINGUISHING MEDIA: Water fog, dry chemical, or carbon dioxide may be used in areas where product is stored.

SPECIAL FIRE FIGHTING PROCEDURES: Do not get material on skin or clothing. Avoid inhalation of fumes or mists. Stay upwind, out of low areas, and ventilate closed spaces before entering. Cool containers from the side with water until fire is out. Use water spray to reduct vapor; do not put water directly on leak or spill area. Keep combustibles away from spilled material. Self-containe breathing apparatus (SCBA) and chemical-protective clothing can be worn but may not provide adequate thermal protection for chemical fire unless stated by the manufacturer. Structural fire fighter's tective clothing may not be effective. Move containers from fire area, if possible to do so without risk.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Can accelerate the burning of

combustible materials.

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HEALTH HAZARD DATA

Last change: 24-AUG-1998

EYE CONTACT: Corrosive. Causes severe burns to the eyes and surrounding areas characterized by redness, swelling, tearing, blurred vision, and pain. May cause permanent eye damage.

SKIN CONTACT: Corrosive. Toxic. May be harmful if obsorbed through skin. Causes severe burns to the skin characterized by redness, swelling, and pain. Repeated contact may cause an allergic dermatitis.

INHALATION: Causes severe irritation to the respiratory passages, including the nose, airway, and lungs characterized by sore throat, chest pain, caugh, dizziness, headache, nausea, and shortness of breath. May cause fluid to collect in lungs (pulmonary edema) causing a decrease inlung function - may delayed.

INGESTION: Corrosive. Toxic. May be harmful if swallowed. Causes severe burns to the mouth, throat, and stomach characterized by abdominal pain, headache, sore throat, burning sensation, nausea, and vomiting. Causes kidney damage.

CHRONIC TOXICITY: Prolonged or repeated contact may cause conjunctivitis, "chrome sores" (deep penetrating ulcers) on skin, especially broken skin, or ulceration and perforatin of the nasal septum.

CARCINOGENICITY:

NTP: Yes IARC: Yes OTHER: Yes

The National Toxicology Program (NTP) has designated Hexavalent Chromium compounds as Known Human Carcinogens. The International Agency for Research on Cancer (IARC) has identified Hexavalent Chromium Compounds as Probable Human Carcinogens. The American Conference of Governmental Industrial Hygienists (ACGIH) has identified Water-Soluble Hexavalent chromium compounds as Confirmed Carcinogen.

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SUGGESTED FIRST AID

Last change: 24-AUG-1998

EYES: Immediately flush eyes with flowing water for at least 15 minutes

while holding eyelids away from eyes. Seek medical attention.

SKIN: Wash exposed areas thoroughly with soap and flowing water, while removing contaminated clothing and shoes. Discard footwear which cannot be decontaminated. Seek medical attention.

INHALATION: Remove exposed individual from source of exposure. If breathing is difficult, oxygen may be administered by certified persons only. Artificial respiration may be performed only if exposed individual is not breathing. Seedk medical attention.

INGESTION: Give large quantities of water or milk. Never give anything by mouth to an unconscious or convulsing person. DO NOT INDUCE VOMITING! If vomiting occurs spontaneously, keep airway clear and give more water. SEEK MEDICAL ATTENTION IMMEDIATELY. Accident victims may be given 5-10 grams of ascorbic acid (not effervescent tablets) dissolved in water.

NOTES TO PHYSICIAN: Massive overexposure of this product could lead to kidney failure and death. Death has been avoided in several cases of similar overexposures though the use of early renal dialysis. It has been reported that there is little value from chelating agents, however, ascorbic acid administered intravenously is an effective antidote in preventing renal failure. Skin ulcers may be treated by removal from exposure, daily cleansing and debridement and application of antibiotic cream and dressing.

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REACTIVITY DATA

---------- Last change: 24-AUG-1998

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Heat

INCOMPATIBILITY (Material to Avoid): Reducing agents, bases, easily combustible materials (e.g., greases, oils, paper, wood), cyanides, sulfides.

NAME USED ON LABEL: Liquid Chromic Acid

HAZARDOUS DECOMPOSITION PRODUCTS: Contact with metals may liberate flammable hydrogen gas.

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MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

SPECIAL PROTECTION INFORMATION
----------Last change: 24-AUG-1998
VENTILATION: Local exhaust or an enclosed handling system ishighly recommended. Mechanical (general) ventilation is required.

RESPIRATORY PROTECTION: Use NIOSH/MSHA-approved respiratory protection if ventilation is inadequate.

EYE AND FACE PROTECTION: Chemical splash goggles & face shield. DO NOT WEAR CONTACT LENSES!

OTHER PERSONAL PROTECTION: Butyl rubber or neoprene gloves, boots, apron, and sleeves. An impervious coverall may be substituted for the apron and sleeves when additional protection is needed. An emergency eyewash and drench shower should be available in the immediate work area. Launder contaminated clothing before reuse.

==========
SPECIAL PRECAUTIONS
----------Last change: 24-AUG-1998
HANDLING: Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapor. Do not take internally. use only with adequate ventilation. Wash throughly after handling. Avoid contact with easily combustible materials. Avoid contact with reducing compounds. Emptied container retains vapor and product residue - Observe all label safeguards until container is cleaned, reconditioned or destroyed. Keep container tightly closed in an upright position.

STORAGE: Protect from Freezing - Store above 10 F. Keep away from cyanides and sulfides. Product is corrosive to common metals and mild steel.

==========
ENVIRONMENTAL INFORMATION
----------Last change: 24-AUG-1998
SPILL RESPONSE: Wear NIOSH/MSHA-approved respiratory protection and appropriate personal protective clothing to minimize skin & eye contact when cleaning spill. Do not get spilled material on skin or clothing; stop leak if you can do so without risk. Remove ignition sources from area where flammable/combustible vapors may exist. if necessary, dike area of spill to vent spreading. If spill is large, cover liquid pools with foam to control vapors, pump liquid into a salvage tank, and retain for evaluation and/or disposal. Remaining material or small spills should be covered with sand, clay, or other noncombustible absorbent material. Transfer absorbed

material to a suitable container for disposal. CAREFULLY flush area where spill has occurred with water. Retain this water/residue mixture for evaluation and/or disposal. NOTE: Discharge to a public sewerage authority should coincide with all applicable local permits and notification requirements. May be hazardous to aquatic life if released to open waters.

RECOMMENDED DISPOSAL: Disposal of waste material from the use of this product may be subject to federal, state, and local regulations. Refer to Part 261 of 40 CFR for the applicability of federal regulations. Consult with your state and local governments for additional regulatory requirements. Disposal of this material must be in a manner compliant with all federal, state, and local regulations.

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TRANSPORATION

----------Last change: 24-AUG-1998

HAZARDOUS MATERIAL/DANGEROUS GOODS SHIPMENT IS INDICATED BY (X) BELOW:

(X) Department of Transportation (DOT/HM-181)
(X) International Air Transportation Association (IATA) 37th Ed.
(X) International Maritime Organization (IMO/IMDG) Amdt. 27-94

SHIPPING INFORMATION:

UN (NA) Number	HAZARD CLASS	SUBSID. RISK	LABELS	MARK (IMO)	PACKING GROUP
UN2922	8	6.1	CORROSIVE TOXIC	NONE	II

SHIPPING NAME:

DOT - RQ, CORROSIVE LIQUID, TOXIC, N.O.S.
(contains CHROMIC ACID)

IATA - Same

NAME USED ON LABEL: LIQUID CHROMIC ACID

IMO - Same

DOT QUANTITY LIMITS:

assenger Air or Rail - 1 L Cargo Air Only - 30 L

Packaging Authorization - 49 CFR 173.202, 243

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Special Provisions - B3, T18, T26

NOTES: IMO Stowage Loaction 'B'.

IATA PACKAGING:

Passenger Aircraft (PA)	Cargo Aircraft Only (CAO)
PkgInst - 808 Max/Pkg - 1 L	PkgInst - 812 Max/Pkg - 30 L

NOTES: (PA) Single packagings are not permitted.

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MISCELLANEOUS

----------Last change: 24-AUG-1998

EPA/DOT - REPORTABLE QUANTITY (RQ) FOR HAZARDOUS SUBSTANCES:

X) RQ OF 10 lb / 4.54 Kg for Chromic Acid

EPA - Any release of hazardous substance(s) in a quantity equal to or exceeding the RQ in any 24-hour period requires the immediate notification of the National Response Center in Washington, D.C. at (800)424-8802. Other notification requirements, such as state and local governments, may apply.

DOT - Any package containg a hazardous substance in a quantity equal to or exceeding the RQ is regulated as a hazardous material.

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ADDITIONAL INFORMATION

----------Last change: 24-AUG-1998

RATINGS:

HMIS:	F: 0	H: 3*	R: 0	PPE: X	SPEC HAZ: N/APP
NFPA	F: 0	H: 3	R: 0	PPE: N/APP	SPEC HAZ: OX

F = Flammability H = Health R = Reactivity

PPE = Personal Protection Equipment Spec Haz = Special Health Hazards

W Water Reactive OX = Oxidizer * = Chronic Hazard

*N/A = Not Available
**N/APP = Not Applicable

MSDS Number: 9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

***N/E = Not Established

NAME USED ON LABLE: LIQUID CHROMIC ACID

SARA TITAL III CLASSIFICATONS:

	YES	NO
Immediate (Acute) Health	X	
Delayed (Chronic) Health	X	
Sudden Release of Pressure		X
Reactive		X
Fire		X

Components of this product are identified below if they are present in excess of de minimus reporting levels. Components that are not required to be identified by specific chemical name may have a generic description.

SARA Title III Section 302 Extremely Hazardous Substances: None.

SARA Tital III Section 313 Toxic Chemicals: Chromium (VI) Compounds 15-40 %wt

STATE RIGHT-TO-KNOW:

Components of this product which are specifically identified in the ingredients section of this MSDS may be listed as hazardous by these and/or other states: California, Massachusetts, New Jersey, Pennsylvania, Florida, New York, Michigan, Connecticut, Louisiana, North Carolina, Illinois, Kentucky, Rhode Island, Indiana.

ATTENTION: This product contains a chemical(s) known to the State of California to cause cancer, birth defects, or other reproductive harm.

CAREFULLY READ THE FOLLOWING:

The identificationof ingredients in this document meets or exceeds the requirements set forth in 29 CFR, 40 CFR, et al. at the date of publication. Ingredients present in a mixture or sulution which are generically identified or not referenced in this document are not regulatorily required to be specifically identified or referenced. The information contained herein should be provided to all those who will use, handle, store, transport, or may otherwise be exposed to this product.

ATOTECH USA certifies that all ingredients, whether identified in this MSDS or not, are on the TSCA inventory (for USA manufacture and/or sales only).

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MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

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Prepared by the Product Safety Department (PSD)

ISSUED: 02/24/1998 SUPERSEDES: 08/14/1996

End of Report

0285669

GALSON

November 15, 1996

Mr. Lee Harrison
Malcolm Pirnie, Inc.
4 Corporate Plaza
Washington Ave. Ext.
Albany, New York 12203

Re: Source Emission Testing
Watervliet Arsenal Chrome MACT Test Program
Galson Project No. 96447201

#130

Dear Mr. Harrison:

Enclosed please find Tables 1 through 7 summarizing the results of the source emission test program conducted during the week of October 28, 1996 at the U.S. Army, Watervliet Arsenal (WVA) in Watervliet, New York. The purpose of the testing was to evaluate the compliance status of three scrubber exhausts with respect to Federal Chromium Maximum Achievable Control Technology (MACT) standards as outlined in 40 CFR Part 63, Subpart N. In addition, scrubber inlet testing was conducted to generate emissions data for use in evaluating scrubber performance. A brief outline of the scope of work and discussion of test results is presented below.

Scope of Work

Source emission testing was conducted on the exhausts of the EP 130, 154, and 155 Scrubbers at the WVA facility to determine emissions of total chromium. In addition, testing was conducted at the inlet of the three scrubbers to determine chromium inlet loadings and evaluate scrubber performance. Testing of the EP 130 scrubber was also conducted at two operating loads. All testing was conducted during the week of October 28, 1996. Specific test times and dates are included on the summary of result tables for each emission point.

With one exception, testing of the scrubber exhausts were conducted in accordance with the source test protocol prepared by Galson and dated August 19, 1996. The one protocol revision involved the duration of the EP 155 Scrubber exhaust test runs which were extended following the discovery of an additional ambient air intake to the scrubber.

During the testing of each scrubber, facility personnel monitored process and scrubber operating data every 15 minutes. These data included scrubber pressure drops and inlet velocity pressures, plating loads, and tank amperage and temperature. A summary of the facility operating data can be found in Attachment 1.

GALSON CONSULTING • GALSON/LOZIER ENGINEERS • GALSON LABORATORIES
6601 Kirkville Road • East Syracuse, New York 13057 • Phone (315) 432-0506 • FAX (315) 437-0509

Results

Tables 1 through 7 present the results of the source testing. Supporting field data and calculations can be found in Attachment 2. Laboratory analytical results can be found in Attachment 3.

EP 130 Scrubber

A review of Table 1 indicates that chromium mass emission rates for the EP 130 Scrubber during low load conditions ranged from 473.9 milligrams per hour (mg/hr) to 529.0 mg/hr, and averaged 510.4 mg/hr, or approximately 84 percent of the emission standard. The chromium concentration standard for large, hard chromium facilities is 0.015 mg/dscm. However, there are several nonaffected sources ducted to the scrubber, therefore the emission standard is corrected for ambient air and is based on a mass emission rate (mg/hr). A spreadsheet containing the emission standard calculations can be found in Attachment 2.

Table 2 presents results of the high load testing of the EP 130 Scrubber. Chromium emissions were significantly higher than those observed under low load conditions with mass emission rates ranging from 809.7 to 920.3 mg/hr averaging 870.5 mg/hr or approximately 146 percent of the emission standard. Chromium inlet test results are outlined in Table 3. Inlet loadings showed significant variability with mass rates ranging from 40,540 to 197,353 mg/hr. A review of the process data collected provides no insight as to the cause of the variability. Scrubber removal efficiency based on these data (excluding Test Run 2) was approximately 98.5 percent.

EP 154 Scrubber

A review of Table 4 indicates that chromium mass emission rates for the EP 154 Scrubber ranged from 551.6 to 606.2 mg/hr, and averaged 587.6 mg/hr, or approximately 134 percent of the calculated emission standard. EP 154 Scrubber inlet test results are outlined in Table 5. Inlet loadings were fairly uniform with mass rates ranging from 7,546 to 15,772 mg/hr, averaging 11,630 mg/hr. Resulting scrubber removal efficiency was approximately 94.9 percent.

EP 155 Scrubber

A review of Table 6 indicates that chromium mass emissions for the EP 155 Scrubber ranged from 285.3 to 350.6 mg/hr, and averaged 311.1 mg/hr, or approximately 166 percent of the calculated emission standard. EP 155 Scrubber inlet test results outlined in Table 7 indicate a lower chromium loading than to the EP 154 Scrubber as there is only one plating tank in operation. Inlet loadings ranged from 1,476 to 1,807 mg/hr, averaging 1,638 mg/hr. Resulting scrubber removal efficiency was approximately 81.0 percent.

In general, all testing proceeded smoothly with no process or sampling problems encountered. Isokinetic sampling rates were maintained within established parameters during all test runs. Post-test leak checks for each test run were also within established criteria.

Please feel free to contact me at 315/432-0506, ext. 253 if you have any questions on this report, or require additional information.

Sincerely,

Galson Environmental Measurements

David Ostaszewski, P.E.
Senior Project Manager

Attachments

/deo

Table 1
Summary of Chromium Results - EP 130 Scrubber Exhaust (Low Load)
U.S. Army, Watervliet Arsenal
Watervliet, New York

Test ID	Date (Time)	Flow Rate (dscfm)	Concentration (mg/dscm)	Emission Rate (mg/hr)	Percent of Standard(%)[a]
1	10/28/96 (1000 - 1318)	37,104	0.008	473.9	78
2	10/28/96 (1345 - 1959)	37,160	0.008	528.2	87
3	10/28/96 (1730 - 2045)	37,311	0.008	529.0	86
Average	---	37,192	0.008	510.4	84

[a] Calculated emission standards are 609.0, 609.9 and 612.4 mg/hr for runs 1, 2, and 3, respectively. See text for details of emission rate limit calculations.

Table 2
Summary of Chromium Results - EP 130 Scrubber Exhaust (High Load)
U.S. Army, Watervliet Arsenal
Watervliet, New York

Test ID	Date (Time)	Flow Rate (dscfm)	Concentration (mg/dscm)	Emission Rate (mg/hr)	Percent of Standard(%)[a]
1	10/31/96 (0915 - 1230)	36,164	0.014	881.5	149
2	10/31/96 (1315 - 1633)	36,140	0.013	809.7	136
3	10/31/96 (1700 - 2016)	36,906	0.015	920.3	152
Average	---	36,403	0.014	870.5	146

[a] Calculated emission standards are 593.6, 593.2 and 605.8 mg/hr for runs 1, 2, and 3, respectively. See text for details of emission rate limit calculations.

Table 3
Summary of Chromium Results - EP 130 Scrubber Inlet
U.S. Army, Watervliet Arsenal
Watervliet, New York

Test ID	Date (Time)	Flow Rate (dscfm)	Concentration (mg/dscm)	Inlet Loading Rate (mg/hr)
1	10/31/96 (0915 - 1227)	38,492	1.21	78,872
2	10/31/96 (1315 - 1627)	38,466	3.02	197,353
3	10/31/96 (1705 - 2017)	38,445	0.62	40,540
Average	---	38,468	1.62	105,588

ONGOING COMPLIANCE STATUS REPORT

Applicable Rule:

40 CFR Part 63, Subpart N - National Emissions Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title: U.S. Department of the Army

Street Address: Broadway

City: Watervliet State: New York Zip Code: 12189-4050

Plant Name: Watervliet Arsenal (WVA)

Plant Contact/Title: James Kardas, P.E., Environmental Engineer(518)266-5716/ Philip Darcy, Environmental Engineer (518)266-4534

2. Complete the following table.

Tank ID #	Type of tank	Type of control technique	Control system ID #	Acceptable range of values for monitored operating parameters		Total operating time during reporting period
				pressure drop	Velocity pressure	
T-207	Hard Chrome Plating	Packed-Bed Scrubber with Mesh Pad Mist Eliminator	EP 130 (one scrubber for both sources)	4.6 in. w.c. ± 1 in.	0.79 to 0.96 in. w.c.	654 hours 23 Minutes
T-307						584 hours 34 minutes

3. Identify the beginning and ending dates of the reporting period:

Beginning: 25 January 1998 Ending: 31 December 1998

4. Attach all MONITORING DATA FORMS for the reporting period. Based on the data on excess emissions and the data on operating times, calculate the following hours:

	Hours	Percent of total operating time
Duration of excess emissions caused by:		
Process upsets	0.0	0.0
Control equipment malfunctions	0.0	0.0
Other known causes	0.0	0.0
Unknown causes	0.0	0.0
Total duration of excess emissions	0.0	0.0

5. During this reporting period, the work practice standards identified in 40 CFR 63.342(f) were followed in accordance with the operation and maintenance plan for these sources. In WVA's operation and maintenance plan, the work practice standards for cleaning the Pitot tube and for checking the zero for the Pitot tube differ from the work practice standards for those requirements as specified in Table 1 to 40 CFR 63.342(f). For cleaning the tube, instead of back flushing with water or removing from the duct and rinsing with water, WVA's plan requires that the Pitot tube be removed and rinsed with caustic solution or fresh water. For checking the zero, instead of rotating the Pitot tube 180° to ensure that the same zero reading is obtained, WVA's plan requires that the pressure lines be disconnected to ensure that the same zero reading is obtained.

6. Responsible Official for the plant:

GENE E. KING	COL,OD, Commanding
(Name)	(Title)

I certify that the information contained in this report is accurate and true to the best of my knowledge.

	/ /
(Signature of Responsible Official)	(Date)

Source Emissions Calculation

EMISSION POINT: 130 UNIT: 120mm Chromium Electroplating

SOURCE DATA
Operating Schedule

24 hr/day
5 days/wk
250 days/yr
6000 hrs/yr

POLLUTION CONTROL EQUIPMENT
Packed Bed Scrubber
All chromium emissions based on stack test reports and 1998 actual operating hours.

Stack Test Flow = 36403 dscfm Rectifier Total Amp. = 110000 A

Pollutant	Emission Factor	Emission Factor Units	ERP lb/hr
Chromium Compounds	105588	mg/hr	0.2328
PM10	0.25	gr/A-hr	3.93

Pollutant	Emission Factor	Emission Factor Units	ACTUAL EMISSIONS lb/hr	lb/day	lb/yr	ton/yr
Chromium Compounds	870.5	mg/hr	0.0019	0.046	2.376	0.001
PM10	0.000044	gr/dscf	0.014	0.330	82.376	0.041

EMISSIONS CALCULATIONS FOR PM10

ERP (lbs/hr) = Emission Factor (gr/A-hr) x Rectifier Total Amp. (A) x (lbs/gr)
(lb/hr) = EMISSION FACTOR x AIR FLOWRATE
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr /2000lb/ton

EMISSIONS CALCULATIONS FOR CHROMIUM

ERP (lbs/hr) = Emission Factor (mg/hr) x (lbs/mg)
(lb/hr) = Emission Factor (mg/hr) x (lbs/mg)
(lb/day) = lb/hr x 24 hr/day
(lb/yr) = lb/hr x combined actual operating hours in 1998
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

SCFM assumed equal to DSCFM
Assumed standard temperature = 68 F
grains = 1.4286E-04 pounds
Two chrome tanks with 5 rectifiers per tank
Tank 207 - One 20,000 A and four 10,000 A rectifiers = 60,000 amps
Tank 307 - Five 10,000 A rectifiers = 50,000 amps
References:
AP-42, Fifth Edition, Table 12.20-1, July 1996
Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 155
2. Building/Location 35
3. Description Minor chromium electroplating

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

Merged with EP 145. New scrubber.

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

New MSDS (switched from powder to liquid mix).

7. Additional Comments

Emissions will be based on latest stack test performed during December 1997.

8. Changes to Air Emissions No More Less

MATERIAL SAFETY DATA SHEET

14-APR-1999

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Part Number: NOT GIVEN
Specification: NOT GIVEN
Stock Item Numbers: 681000X980015
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Formula: NOT GIVEN
Keyword: NOT GIVEN

Manufacturer:
ATOTECH USA INC.
1750 Overview Drive
Rock Hill, SC 29731-2000
Phone: ( ) -
Emergency Phone: (803) 817-3500

Supplier:
ATOTECH USA INC.
1750 Overview Drive
Rock Hill, SC 29731-2000
Phone: ( ) -
Emergency Phone: (803) 817-3500

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	EQ ___-212 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	LT _____50 deg. F	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ ___-1.3 (Water = 1)	NG
Vapor Pressure:	NG	@ 20 DEG. C.
pH:	LT _____2	NG
Vapor Density:	NA	NG
Evaporation Rate:	NA	Butyl Acetate = 1
% of Volatiles:	NA	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG
Solubility in water:	Complete.	

Odor/Appearance/Other Characteristics: No odor given/ red-brown liquid.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	NA	NG
Open Cup Flash:	NA	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NA	NG
Upper Explosion Limit:	NA	NG

SHIPPING REGULATIONS:

UN/NA Number:	UN 2922
DOT Hazard Class:	8
DOT Label:	CORROSIVE/TOXIC
Proper Shipping Name:	CORROSIVE LIQUID, TOXIC, N.O.S.

PREPARER/CONTACT INFORMATION: PRODUCT SAFETY DEPARTMENT (PSD)

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Date Prepared/Revised: 24-FEB-1998

COMPONENTS:

CHROMIC ACID
OSHA PEL: .5 MG/M3 ACGIH TLV: .05 MG/M3 Other Limits: 1 MG/10M3
BT ___14 ___40 % of product. CASRN: 7738-94-5

ACGIH - CHROMIUM, WATER-SOLUBLE CR VI COMPOUNDS, NOC.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PEL - CHROMIUM, SOL. CHROMIC, CHROMOUS SALTS (AS CR).
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

OTHER - ACCEPTABLE CEILING CONCENTRATION. OSHA TABLE Z-2 (29 CFR 1910.1000).
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

==========

:ODUCT INFORMATION

NAME USED ON LABEL: Liquid Chromic Acid Last change: 24-AUG-1998

CHEMICAL NAME (if single substance): Chromic Acid

MANUFACTURER:

Atotech USA Inc.
1750 Overview Drive
P.O. Box 12000
Rock Hill, S.C. 29731-2000

EMERGENCEY TELEPHONE NUMBER 8:00 AM - 5:00 PM: (803)817-3500

CHEMTREC (24 HOURS): 1-800-424-9300

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HAZARDOUS INGREDIENTS

Last change: 24-AUG-1998

IDENTITY	CAS NO.	%	EXPOSURE LIMITS
.romic Acid	7738945	15-40	ACGIH-TWA (1): 0.05 mg/m3 OSHA-PEL (2): 0.5 mg/m3 OSHA-C (3): 1 mg/10m3

MSDS Number: 9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

(1) Chromium, water-soluble Cr VI compounds, NOC.
(2) Chromium, Sol. Chromic, Chromous salts (as Cr).
(3) Acceptable ceiling concentration. OSHA Table Z-2 (29 CFR 1910.1000).

PHYSICAL DATA

Last change: 24-AUG-1998

BOILING POINT: -212 F.

FREEZING POINT: <50 F.

SPECIFIC GRAVITY: -1.30

VAPOR PRESSURE @ 20 C: N/A

VAPOR DENSITY (AIR=1): N/A

SOLUBILITY IN WATER: Complete

% VOLATILE: N/A

EVAPORATION RATE (Butyl Acetate=1): N/A

pH: <2.0

APPEARANCE: Red-brown liquid.

FIRE AND EXPLOSION DATA

Last change: 24-AUG-1998

FLASH POINT (Test Method): N/A

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LTS.: LEL: N/A UEL: N/A

EXTINGUISHING MEDIA: Water fog, dry chemical, or carbon dioxide may be used in areas where product is stored.

SPECIAL FIRE FIGHTING PROCEDURES: Do not get material on skin or clothing. Avoid inhalation of fumes or mists. Stay upwind, out of low areas, and ventilate closed spaces before entering. Cool containers from the side with water until fire is out. Use water spray to reduct vapor; do not put water directly on leak or spill area. Keep combustibles away from spilled material. Self-containe breathing apparatus (SCBA) and chemical-protective clothing can be worn but may not provide adequate thermal protection for chemical fire unless stated by the manufacturer. Structural fire fighter's protective clothing may not be effective. Move containers from fire area, if possible to do so without risk.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Can accelerate the burning of

combustible materials.

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HEALTH HAZARD DATA

Last change: 24-AUG-1998

EYE CONTACT: Corrosive. Causes severe burns to the eyes and surrounding areas characterized by redness, swelling, tearing, blurred vision, and pain. May cause permanent eye damage.

SKIN CONTACT: Corrosive. Toxic. May be harmful if obsorbed through skin. Causes severe burns to the skin characterized by redness, swelling, and pain. Repeated contact may cause an allergic dermatitis.

INHALATION: Causes severe irritation to the respiratory passages, including the nose, airway, and lungs characterized by sore throat, chest pain, caugh, dizziness, headache, nausea, and shortness of breath. May cause fluid to collect in lungs (pulmonary edema) causing a decrease inlung function - may e delayed.

INGESTION: Corrosive. Toxic. May be harmful if swallowed. Causes severe burns to the mouth, throat, and stomach characterized by abdominal pain, headache, sore throat, burning sensation, nausea, and vomiting. Causes kidney damage.

CHRONIC TOXICITY: Prolonged or repeated contact may cause conjunctivitis, "chrome sores" (deep penetrating ulcers) on skin, especially broken skin, or ulceration and perforatin of the nasal septum.

CARCINOGENICITY:

NTP: Yes IARC: Yes OTHER: Yes

The National Toxicology Program (NTP) has designated Hexavalent Chromium compounds as Known Human Carcinogens. The International Agency for Research on Cancer (IARC) has identified Hexavalent Chromium Compounds as Probable Human Carcinogens. The American Conference of Governmental Industrial Hygienists (ACGIH) has identified Water-Soluble Hexavalent chromium compounds as Confirmed Carcinogen.

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GGESTED FIRST AID

Last change: 24-AUG-1998

EYES: Immediately flush eyes with flowing water for at least 15 minutes

while holding eyelids away from eyes. Seek medical attention.

SKIN: Wash exposed areas thoroughly with soap and flowing water, while removing contaminated clothing and shoes. Discard footwear which cannot be decontaminated. Seek medical attention.

INHALATION: Remove exposed individual from source of exposure. If breathing is difficult, oxygen may be administered by certified persons only. Artificial respiration may be performed only if exposed individual is not breathing. Seedk medical attention.

INGESTION: Give large quantities of water or milk. Never give anything by mouth to an unconscious or convulsing person. DO NOT INDUCE VOMITING! If vomiting occurs spontaneously, keep airway clear and give more water. SEEK MEDICAL ATTENTION IMMEDIATELY. Accident victims may be given 5-10 grams of ascorbic acid (not effervescent tablets) dissolved in water.

NOTES TO PHYSICIAN: Massive overexposure of this product could lead to kidney failure and death. Death has been avoided in several cases of similar overexposures though the use of early renal dialysis. It has been reported hat there is little value from chelating agents, however, ascorbic acid administered intravenously is an effective antidote in preventing renal failure. Skin ulcers may be treated by removal from exposure, daily cleansing and debridement and application of antibiotic cream and dressing.

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REACTIVITY DATA

----------Last change: 24-AUG-1998

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Heat

INCOMPATIBILITY (Material to Avoid): Reducing agents, bases, easily combustible materials (e.g., greases, oils, paper, wood), cyanides, sulfides.

NAME USED ON LABEL: Liquid Chromic Acid

HAZARDOUS DECOMPOSITION PRODUCTS: Contact with metals may liberate flammable hydrogen gas.

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MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

SPECIAL PROTECTION INFORMATION

---Last change: 24-AUG-1998

VENTILATION: Local exhaust or an enclosed handling system ishighly recommended. Mechanical (general) ventilation is required.

RESPIRATORY PROTECTION: Use NIOSH/MSHA-approved respiratory protection if ventilation is inadequate.

EYE AND FACE PROTECTION: Chemical splash goggles & face shield. DO NOT WEAR CONTACT LENSES!

OTHER PERSONAL PROTECTION: Butyl rubber or neoprene gloves, boots, apron, and sleeves. An impervious coverall may be substituted for the apron and sleeves when additional protection is needed. An emergency eyewash and drench shower should be available in the immediate work area. Launder contaminated clothing before reuse.

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PECIAL PRECAUTIONS

---Last change: 24-AUG-1998

HANDLING: Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapor. Do not take internally. use only with adequate ventilation. Wash throughly after handling. Avoid contact with easily combustible materials. Avoid contact with reducing compounds. Emptied container retains vapor and product residue - Observe all label safeguards until container is cleaned, reconditioned or destroyed. Keep container tightly closed in an upright position.

STORAGE: Protect from Freezing - Store above 10 F. Keep away from cyanides and sulfides. Product is corrosive to common metals and mild steel.

==========

ENVIRONMENTAL INFORMATION

---Last change: 24-AUG-1998

SPILL RESPONSE: Wear NIOSH/MSHA-approved respiratory protection and appropriate personal protective clothing to minimize skin & eye contact when cleaning spill. Do not get spilled material on skin or clothing; stop leak if you can do so without risk. Remove ignition sources from area where flammable/combustible vapors may exist. if necessary, dike area of spill to prevent spreading. If spill is large, cover liquid pools with foam to control vapors, pump liquid into a salvage tank, and retain for evaluation and/or disposal. Remaining material or small spills should be covered with sand, clay, or other noncombustible absorbent material. Transfer absorbed

material to a suitable container for disposal. CAREFULLY flush area where spill has occurred with water. Retain this water/residue mixture for evaluation and/or disposal. NOTE: Discharge to a public sewerage authority should coincide with all applicable local permits and notification requirements. May be hazardous to aquatic life if released to open waters.

RECOMMENDED DISPOSAL: Disposal of waste material from the use of this product may be subject to federal, state, and local regulations. Refer to Part 261 of 40 CFR for the applicability of federal regulations. Consult with your state and local governments for additional regulatory requirements. Disposal of this material must be in a manner compliant with all federal, state, and local regulations.

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TRANSPORATION

Last change: 24-AUG-1998

HAZARDOUS MATERIAL/DANGEROUS GOODS SHIPMENT IS INDICATED BY (X) BELOW:

(X) Department of Transportation (DOT/HM-181)
(X) International Air Transportation Association (IATA) 37th Ed.
(X) International Maritime Organization (IMO/IMDG) Amdt. 27-94

SHIPPING INFORMATION:

UN (NA) Number	HAZARD CLASS	SUBSID. RISK	LABELS	MARK (IMO)	PACKING GROUP
UN2922	8	6.1	CORROSIVE TOXIC	NONE	II

SHIPPING NAME:

DOT - RQ, CORROSIVE LIQUID, TOXIC, N.O.S.
(contains CHROMIC ACID)

IATA - Same

NAME USED ON LABEL: LIQUID CHROMIC ACID

IMO - Same

DOT QUANTITY LIMITS:

Passenger Air or Rail - 1 L Cargo Air Only - 30 L

Packaging Authorization - 49 CFR 173.202, 243

MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

Special Provisions - B3, T18, T26

NOTES: IMO Stowage Loaction 'B'.

IATA PACKAGING:

Passenger Aircraft (PA)	Cargo Aircraft Only (CAO)
PkgInst - 808 Max/Pkg - 1 L	PkgInst - 812 Max/Pkg - 30 L

NOTES: (PA) Single packagings are not permitted.

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MISCELLANEOUS

EPA/DOT - REPORTABLE QUANTITY (RQ) FOR HAZARDOUS SUBSTANCES: Last change: 24-AUG-1998

(X) RQ OF 10 lb / 4.54 Kg for Chromic Acid

EPA - Any release of hazardous substance(s) in a quantity equal to or exceeding the RQ in any 24-hour period requires the immediate notification of the National Response Center in Washington, D.C. at (800)424-8802. Other notification requirements, such as state and local governments, may apply.

DOT - Any package containg a hazardous substance in a quantity equal to or exceeding the RQ is regulated as a hazardous material.

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ADDITIONAL INFORMATION

RATINGS: Last change: 24-AUG-1998

HMIS:	F: 0	H: 3*	R: 0	PPE: X	SPEC HAZ: N/APP
NFPA	F: 0	H: 3	R: 0	PPE: N/APP	SPEC HAZ: OX

F = Flammability H = Health R = Reactivity

PPE = Personal Protection Equipment Spec Haz = Special Health Hazards

W = Water Reactive OX = Oxidizer * = Chronic Hazard

*N/A = Not Available
**N/APP = Not Applicable

MATERIAL SAFETY DATA SHEET

14-APR-199

MSDS Number: 9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

***N/E = Not Established

NAME USED ON LABLE: LIQUID CHROMIC ACID

SARA TITAL III CLASSIFICATONS:

	YES	NO
Immediate (Acute) Health	X	
Delayed (Chronic) Health	X	
Sudden Release of Pressure		X
Reactive		X
Fire		X

Components of this product are identified below if they are present in excess of de minimus reporting levels. Components that are not required to be identified by specific chemical name may have a generic description.

SARA Title III Section 302 Extremely Hazardous Substances: None.

SARA Tital III Section 313 Toxic Chemicals: Chromium (VI) Compounds 15-40 %wt

STATE RIGHT-TO-KNOW:

Components of this product which are specifically identified in the ingredients section of this MSDS may be listed as hazardous by these and/or other states: California, Massachusetts, New Jersey, Pennsylvania, Florida, New York, Michigan, Connecticut, Louisiana, North Carolina, Illinois, Kentucky, Rhode Island, Indiana.

ATTENTION: This product contains a chemical(s) known to the State of California to cause cancer, birth defects, or other reproductive harm.

CAREFULLY READ THE FOLLOWING:

The identificationof ingredients in this document meets or exceeds the requirements set forth in 29 CFR, 40 CFR, et al. at the date of publication. Ingredients present in a mixture or sulution which are generically identified or not referenced in this document are not regulatorily required to be specifically identified or referenced. The information contained herein should be provided to all those who will use, handle, store, transport, or may otherwise be exposed to this product.

ATOTECH USA certifies that all ingredients, whether identified in this MSDS or not, are on the TSCA inventory (for USA manufacture and/or sales only).

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MSDS Number: __9343 Status: CURRENT Revision Date: 6-OCT-1998
PRODUCT NAME: LIQUID CHROMIC ACID

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Prepared by the Product Safety Department (PSD)

ISSUED: 02/24/1998 SUPERSEDES: 08/14/1996

End of Report

Source Emission Testing Report

Chrome Plating Scrubber Exhaust

at the

Watervliet Arsenal
Watervliet, New York

Galson Project No. 975522

January 9, 1998

Submitted by:

David Ostaszewski, PE
Project Manager

Reviewed by:

Mark Distler
General Manager/Vice President

Galson Measurements
6601 Kirkville Road
East Syracuse, New York 13057

Section 3.0
Test Program/Operating Conditions

The WVA facility is classified as a large, hard chromium electroplating facility based on the thickness of the chrome plating and the cumulative potential rectifier capacity of the chrome plating processes. This classification makes the facility subject to the chromium MACT standards outlined in 40 CFR Part 63.342(c)(1)(i). Initial and continuing compliance with these limits must be demonstrated in accordance with 40 CFR Part 63.343(b) and (c), respectively.

Prior to this initial compliance test program, pressure monitoring equipment was installed on each scrubber in accordance with 40 CFR 60.343(c)(1) and 63.344(d). The equipment was installed to monitor, and establish a baseline for scrubber pressure drops.

Source testing was performed on the scrubber exhaust (EP 155) to determine emissions of total chromium (Cr). Testing was conducted in accordance with a test protocol prepared by Galson Measurements dated October 15, 1997. A total of four test runs were conducted as the first test run was voided due to scrubber pressure drop monitoring equipment problems. Duration of each test run was 120 minutes as required by the regulation for testing of emission points with no unaffected (nonplating) sources ducted to the control devices.

Testing was performed during higher than normal plating bath operating conditions as maintained by WVA operators. WVA electroplated at a higher production rate (i.e. more minor components) and at a higher plating amperage than is normally used during production. During testing, steel plates were used to simulate the parts normally plated. The plating amperage was the maximum possible current, which exceeded the current used in typical production. For each of the four tanks, the surface area of the test plates exceeded the surface area of the components normally plated.

Process operating data was recorded by WVA personnel at fifteen minute intervals during the testing periods. These data included the following parameters which can be found in Appendix A.

- Quantity and dimensions of plates plated during testing
- Amperage per tank
- Plating tank temperature
- Scrubber pressure drop

Section 4.0
Test Methods

All testing was performed as described in the source test protocol (See Section 3.0). Source emissions of chromium were determined in accordance with EPA Reference Method (RM) 306, for electroplating operations. Chromium sampling was performed isokinetically, following RM 5 (40 CFR 60, App. A) procedures with the filter omitted and using a glass nozzle and probe liner. The 200 ml of water in the first and second impingers was replaced by 200 ml of 0.1 N NaOH solution.

RM 306 was also used to measure the chromium concentration in the collected sample. Calibration of the analytical instrument (ICP) was accomplished using a blank and two standards plus the analysis of a quality control check standard. Interference was checked using a standard check solution prepared to meet EPA CLP specifications which contains manganese. The recommended interference check concentrations for iron and manganese in RM 306 interfere with instrument performance. A lesser concentration was used as the concentrations of iron or manganese in the samples did not indicate the need for a higher interference check.

In conjunction with each chromium test run, exhaust gas velocity was determined in accordance with RMs 1 and 2. Exhaust gas oxygen (O_2) and carbon dioxide (CO_2) levels were determined in accordance with RM 3. Exhaust gas moisture content was determined via the RM 306 train and calculated in accordance with RM 4 procedures. These data were used in conjunction with the measured O_2 and CO_2 concentrations to determine exhaust gas volumetric flow rate.

Test ports in the 48-inch ID EP 155 exhaust stack are located approximately 20 feet (5.0 diameters) downstream of the stack breaching and approximately 15 feet (3.8 diameters) upstream of the stack exit. In accordance with EPA Method 1, a twenty (24) point traverse was conducted. Each point was sampled for five minutes, for a total test duration of 120 minutes.

Prior to testing, a cyclonic flow traverse was performed on the scrubber exhaust in accordance with EPA Methods 1 and 2. These data indicated that the flow profile met specified criteria and the location was acceptable for isokinetic sampling.

Sketches of the sampling and traverse point locations are presented in Appendix B. Detailed descriptions of the sampling and analytical procedures can be found in Appendix C.

4.1 Sample Marking, Chain of Custody, Sample Storage Procedures

During mobilization, all sampling media including silica gel containers were identified with a unique number. During sample retrieval, containers were labeled with a code identifying the source, test number, and date. Upon return from the field, samples were transferred to laboratory personnel with an accompanying chain-of-custody form. Each sample was then assigned a second unique number, which was used to denote the sample during its analysis and storage. Collected samples are stored in a protected environment in the laboratory facilities for three months after analysis.

4.2 QA/QC Procedures, Equipment Calibrations

All sampling, analytical and quality assurance/quality control (QA/QC) procedures outlined in the above-referenced methods were followed. All test equipment was calibrated before or during use in the field. The dry gas meter/orifice module was calibrated upon receipt, with a post-test calibration check also performed. Nozzles and pitots were likewise calibrated upon receipt and visually inspected for damage during the test program. Thermometers, thermocouples and temperature readouts are calibrated upon receipt or immediately after any damage/repair; post-test QA checks of this instrumentation was also performed. Copies of these calibration data are presented in Appendix D.

Section 5.0
Results and Discussion

Results of the test program are summarized in Table 1. Supporting field data and calculations are presented in Appendix E. All laboratory data, including chromatograms and instrument calibration data, is presented in Appendix F.

As shown in Table 1, total chromium concentrations were below the applicable standard during all four test runs conducted. As previously noted, Test Run 1 was voided due to problems with the scrubber pressure drop monitoring equipment. Chromium concentrations averaged 0.003 milligrams per dry standard cubic meter (mg/dscm) during Tests 2 through 4, or approximately 22 percent of the allowable emission limit of 0.015 mg/dscm.

Total pressure drop across the 104 and 105 scrubbers averaged 4.9 and 4.2 inches of water, respectively during Tests 2 through 4. Corresponding compliant pressure drop ranges as outlined in 40 CFR 60.343(c)(1) for Scrubber 104 is 3.9 to 5.9 inches of water, and 3.2 to 5.2 inches of water for Scrubber 105.

Except as noted, all testing ran smoothly with no sampling or process operating problems encountered. Isokinesis was within the acceptable range of 100 ± 10 percent during all test runs.

Table 1
Summary of Chromium Results
EP 155
Watervliet Arsenal
Watervliet, New York

Test Run	Date (Time)	Flow Rate (dscfm)	Concentration (mg/dscm)	Emission Rate (lb/hr)	Percent of Standard(%)[a]
1[b]	12/16/97 (0930 - 1140)	27,950	0.004	4.64E-04	27
2	12/16/97 (1432 - 1637)	28,520	0.003	3.17E-04	20
3	12/17/97 (0745 - 0953)	28,360	0.004	4.12E-04	27
4	12/17/97 (1030 - 1234)	28,010	0.003	3.36E-04	20
Average[c]	---	28,300	0.003	3.55E-04	22

[a] Chromium emission standard is 0.015 mg/dscm.
[b] Run voided due to scrubber pressure drop monitoring equipment problems.
[c] Average of runs 2 through 4.

ONGOING COMPLIANCE STATUS REPORT

Applicable Rule:

40 CFR Part 63, Subpart N - National Emissions Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title: U.S. Department of the Army

Street Address: Broadway

City: Watervliet State: New York Zip Code: 12189-4050

Plant Name: Watervliet Arsenal (WVA)

Plant Contact/Title: James Kardas, P.E., Environmental Engineer(518)266-5716/ Philip Darcy, Environmental Engineer (518)266-4534

2. Complete the following table.

Tank ID #	Type of tank	Type of control technique	Control system ID #	Acceptable range of values for monitored operating parameters	Total operating time during reporting period
				pressure drop	
Line 1 Station 28	Hard Chrome Plating	Packed-Bed Scrubber with Mesh Pad Mist Eliminator	EP 155 (two scrubbers for all sources)	4.8 in. w.c. ± 1 in. PES 104 4.2 in. w.c. ± 1 in. PES 105	0 Hours 27 Minutes
Line 1 Station 30					44 Hours 26 Minutes
Line 1 Station 32					881 hours 30 Minutes
Line 1 Station 33					407 hours 3 minutes

3. Identify the beginning and ending dates of the reporting period:

Beginning: 25 January 1998 Ending: 31 December 1998

Source Emissions Calculation

EMISSION POINT: 155 UNIT: 155mm Chromium Electroplating

SOURCE DATA
Operating Schedule

24 hr/day
5 days/wk
250 days/yr
6000 hrs/yr

POLLUTION CONTROL EQUIPMENT
Packed Bed Scrubber
All chromium emissions based on stack test reports and 1998 actual operating hours.

Stack Test Flow = 28300 dscfm Rectifier Total Amp. = 17000 A

Pollutant	Emission Factor	Emission Factor Units	ERP lb/hr
Chromium Compounds	105588	mg/hr	0.2328
PM10	0.25	gr/A-hr	0.61

Pollutant	Emission Factor	Emission Factor Units	ACTUAL EMISSIONS lb/hr	lb/day	lb/yr	ton/yr
Chromium Compounds	161	mg/hr	0.00035	0.009	0.473	0.0002
PM10	0.000044	gr/dscf	0.011	0.256	64.040	0.032

EMISSIONS CALCULATIONS FOR PM10

ERP (lbs/hr) = Emission Factor (gr/A-hr) x Rectifier Total Amp. (A) x (lbs/gr)
(lb/hr) = EMISSION FACTOR x AIR FLOWRATE
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr /2000lb/ton

EMISSIONS CALCULATIONS FOR CHROMIUM

ERP (lbs/hr) = Emission Factor (mg/hr) x (lbs/mg)
(lb/hr) = Emission Factor (mg/hr) x (lbs/mg)
(lb/day) = lb/hr x 24 hr/day
(lb/yr) = lb/hr x combined actual operating hours in 1998
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

SCFM assumed equal to DSCFM
Assumed standard temperature = 68 F
grains = 1.4286E-04 pounds
Two chrome tanks with 5 rectifiers per tank
Line 1- Station 32 - Two 2000 amp and One 5000 amp rectifiers = 9,000 amps
Line 1- Station 33 - Four 2000 A rectifiers = 8,000 amps
References:
AP-42, Fifth Edition, Table 12.20-1, July 1996
Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 165-I01
2. Building/Location 35
3. Description Lead furnace

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

None

7. Additional Comments

None

8. Changes to Air Emissions [No] More Less

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 165-I02
2. Building/Location 35
3. Description Quench

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Sodium nitrite was replaced with quench oil H-1.

7. Additional Comments

None

8. Changes to Air Emissions No [More] Less

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __2894 Status: CURRENT Revision Date: 10-MAY-1995
PRODUCT NAME: AAA QUENCH OIL H-1

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: NOT GIVEN Keyword: NOT GIVEN
Stock Item Numbers: 915000X971193
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
PARK CHEMICAL CO.
8074 MILITARY AVE.
DETROIT, MI 48204 Phone: (313) 895-7215
Emergency Phone: ( ) -

Supplier:
PARK CHEMICAL CO.
8074 MILITARY AVE.
DETROIT, MI 48204 Phone: (313) 895-7215
Emergency Phone: ( ) -

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	NA	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ ___0.88 (Water = 1)	NG
Vapor Pressure:	EQ __0.002 mmHg @ _____NG deg. F	MM.
pH:	NA	NG
Vapor Density:	NG	NG
Evaporation Rate:	NA	NG
% of Volatiles:	NA	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: NEGLIGIBLE.
Odor/Appearance/Other Characteristics: AMBER COLOR OIL.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ ____335 deg. F	NG
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NA	NG
Upper Explosion Limit:	NA	NG

SHIPPING REGULATIONS:
UN/NA Number: NG
DOT Hazard Class: NG
DOT Label: NOT GIVEN
Proper Shipping Name: NOT GIVEN

PREPARER/CONTACT INFORMATION: NOT GIVEN

MSDS Number: __2894 Status: CURRENT Revision Date: 10-MAY-1995
PRODUCT NAME: AAA QUENCH OIL H-1

Date Prepared/Revised: 22-MAR-1996

COMPONENTS:

MINERAL OIL
OSHA PEL: NOT GIVEN ACGIH TLV: 5 MG/M3 Other Limits: NOT GIVEN
____0 ____0 % of product. CASRN: 8012-95-1

==========
IDENTIFICATION
----------Last change: 22-MAR-1996
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

PRODUCT NAME: AAA QUENCH OIL (H-1)

FORMULA NUMBER: QCO 491

DATE: 01/17/94

MANUFACTURER'S NAME AND ADDRESS:

PARK METALLURICAL CORPORATION
8074 MILITARY AVENUE
DETROIT, MICHIGAN 48024
(313) 895-7215

==========
HAZARDOUS INGREDIENTS
----------Last change: 22-MAR-1996
SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

==========
PHYSICAL DATA
----------Last change: 22-MAR-1996
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

==========
FIRE AND EXPLOSION HAZARD DATA
----------Last change: 22-MAR-1996
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

EXTINGUISHING MEDIA: CO2, DRY CHEMICAL, FOAM (DO NOT USE WATER ON OIL FIRES)

MSDS Number: __2894 Status: CURRENT Revision Date: 10-MAY-1995
PRODUCT NAME: AAA QUENCH OIL H-1

SPECIAL FIRE FIGHTING PROCEDURES: NA

UNUSUAL FIRE AND EXPLOSION HAZARDS: NA

==========

HEALTH HAZARD DATA

----------Last change: 22-MAR-1996

THRESHOLD LIMIT VALUE: SEE HAZARDOUS INGREDIENTS SECTION

EFFECTS OF OVEREXPOSURE:

EYE: MAY CAUSE IRRITATION.

SKIN: MAY CAUSE IRRITATION.

INHALATION: MAY CAUSE IRRITATION.

INGESTION: MAY CAUSE IRRITATION. REPEATED EXCESSIVE EXPOSURES MAY CAUSE
LIVER AND/OR KIDNEY INJURY.

EMERGENCY AND FIRST AID PROCEDURES:

EYES: FLUSH WITH WATER FOR 15 MINUTES.

SKIN: WASH WITH SOAP AND WATER.

INHALATION: REMOVE INDIVIDUAL TO FRESH AIR.

INGESTION: DRINK LARGE QUANTITIES OF WATER. INDUCE VOMITING IF LARGE AMOUNT ARE INGESTED. GET MEDICAL ATTENTION.

==========

REACTIVITY DATA

----------Last change: 22-MAR-1996

STABILITY: YES

INCOMPATIBILITY: OXIDIZING MATERIALS.

HAZARDOUS DECOMPOSITION PRODUCTS: COx, CHx

HAZARDOUS POLYMERIZATION: NO

==========

MSDS Number: __2894 Status: CURRENT Revision Date: 10-MAY-1995
PRODUCT NAME: AAA QUENCH OIL H-1

SPILL OR LEAK PROCEDURES
----------Last change: 22-MAR-1996
SPILL INFORMATION: USE ABSORBANT MATERIAL AND PLACE INTO A DISPOSAL CONTAINER.

WASTE DISPOSAL METHOD: CONSULT FEDERAL, STATE, AND LOCAL REGULATIONS CONCERNING APPROPRIATE DISPOSAL METHODS.

==========

SPECIAL PROTECTION INFORMATION
----------Last change: 22-MAR-1996
RESPIRATORY PROTECTION: USE NIOSH APPROVED RESPIRATOR IF TLV IS EXCEEDED.

VENTILATION: MECHANICAL VENTILATION SUFFICIENT TO MAINTAIN EXPOSURE BELOW TLV.

PROTECTIVE GLOVES: RECOMMENDED.

EYE PROTECTION: SAFETY GLASSES ARE RECOMMENDED.

OTHER PROTECTIVE EQUIPMENT: N.A.

==========

SPECIAL PRECAUTIONS
----------Last change: 22-MAR-1996
HANDLING AND STORAGE PRECAUTIONS: STORE IN CLOSED CONTAINER TO AVOID EVAPORATION.

OTHER PRECAUTIONS: N.A.

End of Report

Source Emissions Calculation

EMISSION POINT: 165-I02 UNIT: Quench

SOURCE DATA

Operating Schedule
3 hr/day
5 day/wk
250 days/yr
750 hr/yr

MATERIAL DATA

Sodium Nitrite 55 gal/yr = 48.4 lbs/yr

POLLUTION CONTROL EQUIPMENT

Veturi Scrubber Efficiency: 97 %

Pollutant	EMISSIONS				
	ERP	ACTUAL			
	lb/hr	lb/hr	lb/day	lb/yr	ton/yr
Quench Oil H-1	0.0645	0.0019	0.0058	1.4520	0.0007

EMISSIONS CALCULATIONS

Material Use (lbs/yr) = Material Use (gal/yr) x SG x 8.34
ERP (lb/hr) = PLF/100 x MATERIAL USE (lbs/yr) / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

This source shares the emissions stack with point 165-I01 and 165-I03

Assumptions:
1) The Control device will remove this contaminant

2) PLF for Quench Oil H-1 100 %

SG = 0.88

Quantity of materials emitted to the air is based on inventory data sheet, Interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 165-I03
2. Building/Location 35
3. Description Salt furnace

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

New furnace manufactured by Ajax-Hultgren (Ajax Electric Co, PA). WV-12720.

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Barium chloride replaced by mixture of sodium chloride and potassium chloride.

7. Additional Comments

None

8. Changes to Air Emissions No [More] Less

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __9176 Status: PENDING Revision Date: 17-OCT-1997
PRODUCT NAME: NU-SAL

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: NOT GIVEN Keyword: NOT GIVEN
Stock Item Numbers: 27904NUSAL
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
PARK METALLURGICAL CORP.
8074 MILITARY AVE. Phone: (313) 895-7215
DETROIT, MI 48204 Emergency Phone: ( ) -

Supplier:
PARK METALLURGICAL CORP.
8074 MILITARY AVE. Phone: (313) 895-7215
DETROIT, MI 48204 Emergency Phone: ( ) -

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	NA	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	GT ____1.0 (Water = 1)	NG
Vapor Pressure:	NA	NG
pH:	NA	NG
Vapor Density:	NG	NG
Evaporation Rate:	NA	NG
% of Volatiles:	NA	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG
Solubility in water:	APPREC.	

Odor/Appearance/Other Characteristics: POWDER

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	NA	NG
Open Cup Flash:	NA	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NA	NG
Upper Explosion Limit:	NA	NG

SHIPPING REGULATIONS:

UN/NA Number:	NG
DOT Hazard Class:	NG
DOT Label:	NOT GIVEN
Proper Shipping Name:	NOT GIVEN

PREPARER/CONTACT INFORMATION: NOT GIVEN

MSDS Number: __9176 Status: PENDING Revision Date: 17-OCT-1997
PRODUCT NAME: NU-SAL

Date Prepared/Revised: 20-MAR-1997

COMPONENTS:

SODIUM CHLORIDE
OSHA PEL: NOT GIVEN ACGIH TLV: NE Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 7647-14-5

*TLV: NONE ESTAB.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

POTASSIUM CHLORIDE
OSHA PEL: NOT GIVEN ACGIH TLV: NE Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 7447-40-7

*TLV: NONE ESTAB.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

==========
TION I
----------Last change: 11-APR-1997

PRODUCT NAME: NO-SAL

FORMULA NUMBER: NOSAL

DATE: 03/20/97

MANUFACTURER'S NAME AND ADDRESS:

PARK METALLURGICAL CORPORATION
8074 MILITARY AVENUE
DETROIT, MICHIGAN 48204
(313) 895-7215

==========
SECTION 2 - HAZARDOUS INGREDIENTS
----------Last change: 11-APR-1997

' COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

MSDS Number: __9176 Status: PENDING Revision Date: 17-OCT-1997
PRODUCT NAME: NU-SAL

==========
SECTION 3 - PHYSICAL DATA
----------Last change: 11-APR-1997

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

==========
SECTION 4 - FIRE AND EXPLOSION HAZARD DATA
----------Last change: 11-APR-1997

FLASH POINT: NA

FLAMMABLE LIMITS: NA

EXTINGUISHING MEDIA: NA

ECIAL FIRE FIGHTING PROCEDURES: NA

UNUSUAL FIRE AND EXPLOSION HAZARDS: NA

==========
SECTION 5 - HEALTH HAZARD DATA
----------Last change: 11-APR-1997

THRESHOLD LIMIT VALUE: NONE EST.

EFFECTS OF OVEREXPOSURE:

EYES: CAN BE IRRITATING .
SKIN: MAY BE IRRITATING.
INHALATION: MAY BE IRRITATING. AVOID EXCESSIVE INHALATION OF DUST.
INGESTION; EFFECT NOT KNOWN.

EMERGENCY AND FIRST AID PROCEDURES: NONE USUALLY NECESSARY.

EYES: WASH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.
SKIN: WASH WITH WATER.
NGESTION: SEEK MEDICAL ADVICE.

MSDS Number: __9176 Status: PENDING Revision Date: 17-OCT-1997
PRODUCT NAME: NU-SAL

==========
SECTION 6 - REACTIVITY DATA
----------Last change: 11-APR-1997

STABILITY: YES

INCOMPATIBILITY: NONE KNOWN

HAZARDOUS DECOMPOSITION PRODUCTS: NONE KNOWN

HAZARDOUS POLYMERIZATION: NO

==========
SECTION 7 - SPILL OR LEAK PROCEDURES
----------Last change: 11-APR-1997

LL INFORMATION: SWEEP UP AND RETURN TO DRUM FOR REUSE.

WASTE DISPOSAL: DISPOSE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.

==========
SECTION 8 - SPECIAL PROTECTION INFORMATION
----------Last change: 11-APR-1997

RESPIRATORY PROTECTION: NIOSH APPROVED DUST MASK IS RECOMMENDED FOR HANDLING DRY PRODUCT OR IF FUMES BECOME EXCESSIVE

VENTILATION: MECHANICAL VENTILATION RECOMMENDED.

PROTECTIVE GLOVES: THERMAL PROTECTION RECOMMENDED.

EYE PROTECTION: SAFETY GOGGLES RECOMMENDED.

OTHER PROTECTIVE EQUIPMENT: N.A.

MSDS Number: __9176 Status: PENDING Revision Date: 17-OCT-1997
PRODUCT NAME: NU-SAL

==========
SECTION 9 - SPECIAL PRECAUTIONS
----------Last change: 11-APR-1997

HANDLING AND STORAGE PRECAUTIONS: STORE IN CLOSED CONTAINERS TO AVOID MOISTURE PICK UP.

OTHER PRECAUTIONS: N.A.

This MSDS has NOT been reviewed by the Hazardous Materials Committee

End of Report

Source Emissions Calculation

EMISSION POINT: 165-I03 UNIT: Case Hardening

SOURCE DATA
Operating Schedule
3 hr/day
5 day/wk
250 days/yr
750 hr/yr

MATERIAL DATA
Salt Mixture 520 gal/yr = 520 lbs/yr

POLLUTION CONTROL EQUIPMENT
Wet Scrubber Efficiency: 97 %

Pollutant	EMISSIONS				
	ERP	ACTUAL			
	lb/hr	lb/hr	lb/day	lb/yr	ton/yr
Sodium Chloride	0.3467	0.0104	0.0312	7.8	0.0039
Potassium Chloride	0.3467	0.0104	0.0312	7.8	0.0039

EMISSIONS CALCULATIONS

Material Use (lbs/yr) = Material Use (gal/yr) x SG x 8.34
ERP (lb/hr) = PLF/100 x MATERIAL USE (lbs/yr) / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

This source shares the emissions stack with point 165-I01 and 165-I02

Assumptions:
1) The Control device will remove this contaminant
2) The mixture is comprised of 50 percent of each salt
3) PLF for mixture 100 %

SG = 1

Quantity of materials emitted to the air is based on inventory data sheet, Interview data, and MSDS information. Updated in 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 171
2. Building/Location 35
3. Description Dry film coating spray booth

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

New MSDS, but no change in physical characteristics.

7. Additional Comments

None

8. Changes to Air Emissions [No] More Less

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __5143 Status: PENDING Revision Date: 23-DEC-1996
PRODUCT NAME: WATERBORNE SOLID FILM LUBRICANT #099

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: MIL-L-46010C Keyword: NOT GIVEN
Stock Item Numbers: 915000X950094
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
SANDSTROM PRODUCTS CO.
224 SOUTH MAIN ST. Phone: (309) 523-2121
PORT BYRON, IL 61275 Emergency Phone: (800) 424-9300

Supplier:
SANDSTROM PRODUCTS CO.
224 SOUTH MAIN ST. Phone: (309) 523-2121
PORT BYRON, IL 61275 Emergency Phone: (800) 424-9300

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	NG	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	BT ___1.31 & __1.358 (Water = 1)	WT/GAL: 10.93-11.33.
Vapor Pressure:	N*	SEE TEXT.
pH:	NG	NG
Vapor Density:	GT _____1 (Air = 1)	NG
Evaporation Rate:	EQ ___0.08	N-BUAC=1.
% of Volatiles:	BT __72.69 & __76.69 % by Volume	BY WT: 53.60-57.60.
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: NOT GIVEN
Odor/Appearance/Other Characteristics: NOT GIVEN

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	BT ____214 & ____218 deg. F	SETAFLASH.
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	N*	SEE TEXT.
Upper Explosion Limit:	NG	NG

SHIPPING REGULATIONS:
UN/NA Number: NG
DOT Hazard Class: NG
DOT Label: NOT GIVEN
Proper Shipping Name: NOT GIVEN

PREPARER/CONTACT INFORMATION: NOT GIVEN

MSDS Number: __5143 Status: PENDING Revision Date: 23-DEC-1996
PRODUCT NAME: WATERBORNE SOLID FILM LUBRICANT #099

Date Prepared/Revised: 14-DEC-1995

COMPONENTS:

2-PROPOXYETHANOL
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT ____5 ___10 % of product. CASRN: 2807-30-9

* PEL, TLV, PEL & TLV CEILING, OSHA & ACGIH STEL: NOT ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

MOLYBDENUM DISULFIDE
OSHA PEL: 10 MG/M3 ACGIH TLV: 10 MG/M3 Other Limits: NE
% of product NOT GIVEN. CASRN: 1317-33-5

* PEL CEILING, TLV CEILING, OSHA & ACGIH STEL: NOT ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ANTIMONY TRIOXIDE
OSHA PEL: 0.5 MG/M3 ACGIH TLV: 0.5 MG/M3 Other Limits: NE
BT ___10 ___15 % of product. CASRN: 1309-64-4

* PEL CEILING, TLV CEILING, OSHA & ACGIH STEL: NOT ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

BISPHENOL A DIGLYCIDYL ETHER
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
% of product NOT GIVEN. CASRN: 25068-38-6

* PEL, TLV, PEL CEILING, TLV CEILING, OSHA & ACGIH STEL: NOT ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

==========
SECTION I
----------Last change: 11-JUN-1996
PRODUCT CLASS: EPOXY

MFG. CODE ID: E199-G75

TRADE NAME: #899 WATERBORNE SOLID FILM LUBRICANT

HMIS:

HEALTH: 2
FLAMMABILITY: 1

MSDS Number: __5143 Status: PENDING Revision Date: 23-DEC-1996
PRODUCT NAME: WATERBORNE SOLID FILM LUBRICANT #099

REACTIVITY: 0
PERSONAL PROTECT.: C

(HAZARD RATING: 0=LEAST, 1=SLIGHT, 2=MODERATE, 3=HIGH, 4=EXTREME, *=CHRONIC)

(C=Safety glasses, gloves, & synthetic apron)

DATE OF PREP: 12/14/95

TELEPHONE #: (309) 523-2121
EMERGENCY #: (800) 424-9300

MANUFACTURER'S NAME AND ADDRESS:

SANDSTROM PRODUCTS COMPANY
224 SOUTH MAIN STREET
PORT BYRON, IL. 61275

==========

TION II-A HAZARDOUS COMPONENTS

----------Last change: 11-JUN-1996

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

NO.	COMPONENT	SARA	VAPOR PRESSURE (AS HG @ 20 C)	LEL (@ 25 C)
1	2-PROPOXYETHANOL	YES	1.30	1.30
2	MOLYBDENUM DISULFIDE	NO	N/A	N/A
3	ANTIMONY TRIOXIDE	YES	N/A	N/A
4	BISPHENOL A DIGLYCIDYL ETHER	NO	N/A	N/A

None of the components of this product are recognized as carcinogenic.

Under the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372, chemicals listed on the Section 313 List (40 CFR Part 372.65) are identified under the heading "SARA 313".

NO. (ACGIH) TLV/TWA SKIN

(N/A = Not applicable)

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SECTION II-B OCCUPATIONAL EXPOSURE LIMITS

----------Last change: 11-JUN-1996

MSDS Number: __5143 Status: PENDING Revision Date: 23-DEC-1996
PRODUCT NAME: WATERBORNE SOLID FILM LUBRICANT #099

NO.	(OSHA) PEL/TWA	PEL/CEILING	PEL/STEL	SKIN
1	N/E	N/E	N/E	N/E
2	10 mg/m3	N/E	N/E	N/E
3	.5 mg/m3	N/E	N/E	N/E
4	N/E	N/E	N/E	N/E

NO.	(ACGIH) TLV/TWA	TLV/CEILING	TLV/STEL	SKIN
1	N/E	N/E	N/E	N/E
2	10 mg/m3	N/E	N/E	N/E
3	.5 mg/m3	N/E	N/E	N/E
4	N/E	N/E	N/E	N/E

}} The dried film of this product may become a dust nuisance when removed by sanding or grinding. OSHA recommends a PEL/TWA of 15 mg/m3 for total dust and 5 mg/m3 for the respirable fraction. ACGIH recommends a TLV/TWA of 10 mg/m3 total dust.

}} (SKIN) absorption may contribute to the overall exposure to this material. Take appropriate measures to prevent skin contact.

{N/E = Not established}

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SECTION III PHYSICAL DATA

----------Last change: 9-JAN-1996

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

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SECTION IV HEALTH INFORMATION

----------Last change: 11-JUN-1996

EYE CONTACT: BASED ON THE PRESENCE OF COMPONENT 4 PRODUCT IS PRESUMED TO BE MODERATELY IRRITATING TO THE EYES. EXPOSURE MAY CAUSE CORNEAL INJURY.

SKIN CONTACT: BASED ON THE PRESENCE OF COMPONENTS 1 AND 4 PRODUCT IS PRESUMED TO BE MODERATELY IRRITATING TO THE SKIN. PROLONGED CONTACT MAY CAUSE DAMAGE TO THE SKIN. BASED ON THE PRESENCE OF COMPONENT 1 ABSORPTION THROUGH THE SKIN MAY RESULT IN SYMPTOMS OF EXPOSURE OF THOSE DESCRIBED FOR INHALATION AND INGESTION. BASED ON THE PRESENCE OF COMPONENT 4 CONTACT WITH THE SKIN MAY RESULT IN SKIN SENSITIZATION.

INHALATION: EXPOSURE MAY PRODUCE IRRITATION TO THE NOSE, THROAT, RESPIRATORY TRACT, AND OTHER MUCOUS MEMBRANES. BASED ON THE PRESENCE OF COMPONENT 1 EXPOSURE TO HIGH CONCENTRATIONS OF VAPOR MAY PRODUCE CENTRAL NERVOUS SYSTEM DEPRESSION. BASED ON THE PRESENCE OF COMPONENT 1 EXPOSURE MAY PRODUCE

IRRITATION TO THE NOSE, THROAT, RESPIRATORY TRACT AND OTHER MUCOUS MEMBRANES.

INGESTION: BASED ON THE PRESENCE OF COMPONENT 3 PRODUCT IS PRESERVED TO BE MODERATELY TOXIC. BASED ON THE PRESENCE OF COMPONENT 1 THIS PRODUCT MAY BE IRRITATING TO THE GASTROINTESTINAL TRACT IF INGESTED.

SIGNS AND SYMPTOMS: EYE, SKIN, RESPIRATORY, AND GASTRO-INTESTINAL IRRITATION AS NOTED ABOVE. BASED ON THE PRESENCE OF COMPONENT 1 CENTRAL NERVOUS SYSTEM DEPRESSION MAY BE EVIDENCED OF HEADACHE, DIZZINESS, NAUSEA AND SYMPTOMS OF INTOXICATION; IN EXTREME CASES, UNCONSCIOUSNESS AND DEATH MAY OCCUR. BASED ON THE PRESENCE OF COMPONENT 4 SKIN SENSITIZATION RESULTS IN ALLERGIC DERMATITIS WHICH MAY INCLUDE RASH, ITCHING, HIVES AND SWELLING OF EXTREMITIES.

AGGRAVATED MEDICAL CONDITIONS: PREEXISTING SKIN, EYE AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT. PREEXISTING SKIN OR LUNG ALLERGIES MAY INCREASE THE CHANCE OF DEVELOPING INCREASED ALLERGY SYMPTOMS FROM EXPOSURE TO THIS PRODUCT.

OTHER HEALTH EFFECTS: BASED ON THE PRESENCE OF COMPONENTS 1 AND 3 CHRONIC OVEREXPOSURE MAY CAUSE INJURY TO THE KIDNEYS AND LIVER. BASED ON THE PRESENCE OF COMPONENT 1 CHRONIC OVEREXPOSURE MAY CAUSE DAMAGE TO THE RED BLOOD CELLS. BASED ON THE PRESENCE OF COMPONENT 3 CHRONIC OVEREXPOSURE MAY CAUSE TO THE LUNGS. BASED ON THE PRESENCE OF COMPONENT 1 CHRONIC OVEREXPOSURE MAY CAUSE DAMAGE TO THE SPLEEN.

==========

SECTION V EMERGENCY AND FIRST AID PROCEDURES

Last change: 11-JUN-1996

EYE CONTACT: IMMEDIATELY FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION IF ANY SYMPTOMS PERSIST.

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING AND SHOES, WIPE EXCESS FROM SKIN AND FLUSH WITH WATER USING SOAP IF AVAILABLE. SEEK MEDICAL ATTENTION IF IRRITATION OCCURS. DO NOT REUSE CLOTHING UNTIL THOROUGHLY DECONTAMINATED. CONTAMINATED LEATHER ARTICLES CANNOT BE DECONTAMINATED AND SHOULD BE DISPOSED.

INHALATION: REMOVE VICTIM TO FRESH AIR AND TREAT SYMPTOMATICALLY. PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF THE VICTIM IS NOT BREATHING. SEEK PROMPT MEDICAL ATTENTION.

INGESTION: DILUTE WITH TWO GLASSES OFF WATER UNLESS THE VICTIM IS UNCONSCIOUS OR VERY DROWSY. INDUCE VOMITING BY GIVING TWO TABLESPOONS OF IPECAC OR BY TOUCHING A FINGER TO THE BACK OF THE VICTIM'S THROAT. KEEP THE VICTIM'S HEAD OW THE HIPS TO PREVENT ASPIRATION INTO THE LUNGS CONSULT A ... TRANSPORT TO AN EMERGENCY FACILITY IMMEDIATELY.

MSDS Number: __5143 Status: PENDING Revision Date: 23-DEC-1996
PRODUCT NAME: WATERBORNE SOLID FILM LUBRICANT #099

==========
SECTION VI FIRE AND EXPLOSION HAZARDS
----------Last change: 11-JUN-1996
FLAMMABILITY CLASSIFICATION:

OSHA: COMBUSTIBLE - CLASS IIIB
DOT: NOT REGULATED

FLASH POINT: 216 +/-2 degrees F. SETAFLASH

EXTINGUISHING MEDIA: USE WATER FOG, FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS: CLEAR FIRE AREA OF UNPROTECTED PERSONNEL. DO NOT ENTER CONFINED SPACE WITHOUT HELMET, FACE SHIELD, BUNKER COAT, GLOVES, RUBBER BOOTS, AND A POSITIVE PRESSURE NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS.

UNUSUAL FIRE AND EXPLOSION HAZARDS: CONTAINERS EXPOSED TO INTENSE HEAT FROM FIRES SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP WHICH COULD RESULT IN CONTAINER RUPTURE. CONTAINER AREAS EXPOSED TO DIRECT FLAME CONTACT SHOULD BE COOLED WITH LARGE QUANTITIES OF WATER AS NEEDED TO PREVENT WEAKENING OF CONTAINER STRUCTURE.

==========
SECTION VII REACTIVITY
----------Last change: 7-JUN-1996
STABILITY: STABLE

CONDITIONS AND MATERIALS TO AVOID: BASED ON THE PRESENCE OF COMPONENTS 1 AND 2 AND 4 AVOID OXIDIZING MATERIALS. BASED ON THE PRESENCE OF COMPONENTS 3 AND 4 AVOID STRONG ACIDS. BASED ON THE PRESENCE OF COMPONENT 4 AVOID STRONG ALKALIES.

HAZARDOUS DECOMPOSITION PRODUCTS: CARBON DIOXIDE, CARBON MONOXIDE AND UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED DURING COMBUSTION.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

==========
SECTION VIII EMPLOYEE PROTECTION
----------Last change: 11-JUN-1996
RESPIRATORY PROTECTION: AVOID PROLONGED OR REPEATED BREATHING OF VAPORS/DUST. IF EXPOSURE EXCEEDS TLV USE A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE.

MSDS Number: __5143 Status: PENDING Revision Date: 23-DEC-1996
PRODUCT NAME: WATERBORNE SOLID FILM LUBRICANT #099

PROTECTIVE CLOTHING: AVOID CONTACT WITH EYES. WEAR GOGGLES IF THESE IS A LIKELIHOOD OF CONTACT WITH EYES. DO NOT GET ON SKIN OR ON CLOTHING.

ADDITIONAL PROTECTIVE MEASURES: USE VENTILATION AS REQUIRED TO CONTROL VAPOR/DUST CONCENTRATIONS. EYE WASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE AVAILABLE FOR USE IN AN EMERGENCY.

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SECTION IX ENVIRONMENTAL PROTECTION

----------Last change: 11-JUN-1996

SPILL OR LEAK PROCEDURES:

LARGE SPILLS: EVACUATE THE HAZARD AREA OF UNPROTECTED PERSONNEL. WEAR APPROPRIATE RESPIRATOR AND PROTECTIVE CLOTHING. SHUT OFF SOURCE OF LEAK ONLY IF SAFE TO DO SO. DIKE AND CONTAIN. IF VAPOR CLOUD FORMS, WATER FOG MAY BE USED TO SUPPRESS; CONTAIN RUN-OFF. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; PLACE IN NON-LEAKING CONTAINERS FOR PROPER DISPOSAL. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE; DISPOSE OF FLUSH SOLUTIONS AS ABOVE.

SMALL SPILLS: TAKE UP WITH AN ABSORBENT MATERIAL AND PLACE IN NON-LEAKING CONTAINERS; SEAL TIGHTLY FOR PROPER DISPOSAL.

WASTE DISPOSAL: REFER TO LATEST EPA OR STATE REGULATIONS REGARDING PROPER DISPOSAL.

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SECTION X ADDITIONAL PRECAUTIONS

----------Last change: 11-JUN-1996

CONTAINERS CAN CONTAIN HAZARDOUS PRODUCT RESIDUES EVEN WHEN EMPTY. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING, OR USING TOILET FACILITIES.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, WE MAKE NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. WE ASSUME NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

This MSDS has NOT been reviewed by the Hazardous Materials Committee

End of Report

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 177
2. Building/Location 125
3. Description Electric discharge machine for precision metal cutting

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

None

7. Additional Comments

Although unit is vented, Malcolm Pirnie expects only trace emissions from this source because of the low vapor pressure of the cooling oil.

8. Changes to Air Emissions [No] More Less

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 180
2. Building/Location 125
3. Description Resin Dip Tank

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

None

7. Additional Comments

None

8. Changes to Air Emissions [No] More Less

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 185
2. Building/Location 110
3. Description Paint spray booth (stack 1 of 2)

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Decreased usage. New MSDSs.

7. Additional Comments

None

8. Changes to Air Emissions No More Less

RECORD OF AIR EMISSIONS FROM VOC SOURCES
WATERVLIET ARSENAL

Surface Coating

Bldg	Description	Composition	%	Density (lb/gal.	Usage (gal.) Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
110	Epoxy Primer(A+B)	VOCs	27%	13	7	6	6	2	2	5	3	1	1	4	9	9
110	Box Green	VOCs	36%	10	1	2		3						5		0
110	383 Green	VOCs	29%	12	13	4	10	5	5	7	4	3	8	6	11	9
		Trivalent Cr	6.9%		-	-	-	-	-	-	-	-	-	-	-	-
		Xylene	2.0%		-	-	-	-	-	-	-	-	-	-	-	-
		HMD	0.05%		-	-	-	-	-	-	-	-	-	-	-	-
110	Carc Black	VOCs	29%	12.00						1		1				
		Xylene	2.4%		-	-	-	-	-	-	-	-	-	-	-	-
		HMD	0.05%		-	-	-	-	-	-	-	-	-	-	-	-
110	Carc Tan	VOCs	32%	11.00							1	2	1	2		
		Xylene	2.4%		-	-	-	-	-	-	-	-	-	-	-	-
		Trivalent Cr	0.49%		-	-	-	-	-	-	-	-	-	-	-	-
		HMD	0.05%		-	-	-	-	-	-	-	-	-	-	-	-
110	Epoxy White (A)	VOCs	29%	11					1			2	4	6		
110	Epoxy Primer (B)	VOCs	64%	7.92					1							
110	Wash Pretreat	VOCs	89%	7.00		1	3		1	1	1	1		1	1	5
110	Denatured Alcohol	VOC	100%	6.60	1							1				
110	AFCT Thinner	VOCs	100%	7	10	1	4				3	1	2	9	13	7
110	Dope and Lacquer	Toluene	100%	7		2	5	3	2	5		1	3	1	4	8
		MEK	15%		-	-	-	-	-	-	-	-	-	-	-	-
135	#99 Dry Film	VOCs	25%	11.08	5		4	2		2				12	1	1

MATERIAL SAFETY DATA SHEET 3-JUN-1999

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

Part Number: 34092 Formula: NOT GIVEN
Specification: TT-E-527C Keyword: PAINT, ENAMEL
Stock Item Numbers: 8010005272050
8010005985944
801000X970006
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
PRATT & LAMBERT, INC. (WICHITA)
P.O. BOX 2153 Phone: (316) 733-1361
WICHITA, KS 67201 Emergency Phone: (716) 873-6000

Supplier:
PRATT & LAMBERT, INC. (WICHITA)
P.O. BOX 2153 Phone: (316) 733-1361
WICHITA, KS 67201 Emergency Phone: (716) 873-6000

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	BT	____302 & ____390 deg. F	150-199'C.
Melting Point:	NG		NG
Freezing Point:	EQ	____-50 deg. F	-45'C.
Pour Point:	NG		NG
Softening Point:	NG		NG
Specific Gravity:	EQ	____1.2 (Water = 1)	WT/GAL: 10.3 LBS.
Vapor Pressure:	EQ	_____2 mmHg @ _____68 deg. F	MMHG @ 20'C.
pH:	BT	_____4 & _____7	STD UNITS.
Vapor Density:	GT	_____1 (Air = 1)	HEAVIER THAN AIR.
Evaporation Rate:	LT	_____1	DIETHYL ETHER=1.
% of Volatiles:	EQ	_____56 % by Volume	NG
Molecular Weight:	NG		NG
Viscosity:	EQ	__67.77 cST	KU.

Solubility in water: SLIGHT IN WATER.
Odor/Appearance/Other Characteristics:
SOLVENT ODOR / LIQUID / VOC: 8.57 LB/GAL SOLIDS 1028 G/L SOLIDS CALCULATED.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	GT	____108 deg. F	>42'C, CALCULATED.
Open Cup Flash:	NG		NG
Fire Point:	NG		NG
Auto Ignition:	EQ	____300 deg. F	572'C.
Lower Explosion Limit:	EQ	____1.0 %	NG
Upper Explosion Limit:	EQ	____7.0 %	NG

SHIPPING REGULATIONS:
UN/NA Number: UN 1263
DOT Hazard Class: 3
DOT Label: FLAMMABLE
Proper Shipping Name: PAINT

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

PREPARER/CONTACT INFORMATION: W.A. ELLISON, OPERATIONS MANAGER
Date Prepared/Revised: 19-MAR-1991

COMPONENTS:

MINERAL SPIRITS
OSHA PEL: 525 MG/M3 ACGIH TLV: 525 MG/M3 Other Limits: NOT GIVEN
EQ ___35 ____0 % of product. CASRN: 64742-88-7

* SOLVENT / PEL & TLV: 100 PPM.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

SILICA CRYSTALLINE - QUARTZ
OSHA PEL: 0.1 MG/M3 ACGIH TLV: 0.1 MG/M3 Other Limits: NOT GIVEN
LT ____1 ____0 % of product. CASRN: 14808-60-7

* PIGMENT VV7330000.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ICA, CRYSTALLINE-CRISTOBALITE
OSHA PEL: 0.05 MG/M3 ACGIH TLV: 0.05 MG/M3 Other Limits: NOT GIVEN
EQ ____5 ____0 % of product. CASRN: 14464-46-1

* PIGMENT.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

COPPER PHTHALOCYANINE
OSHA PEL: 1 MG/M3 ACGIH TLV: 1 MG/M3 Other Limits: NOT GIVEN
LT ____5 ____0 % of product. CASRN: 147-14-8

* PIGMENT.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

TALC
OSHA PEL: 2 MG/M3 ACGIH TLV: 2 MG/M3 Other Limits: NOT GIVEN
EQ ___20 ____0 % of product. CASRN: 14807-96-6

* PIGMENT WW2710000 / PEL: 20 MPPCF / TLV: 15 MPPCF.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

SILICA, AMORPHOUS-DIATOMACEOUS EARTH
SHA PEL: 6 MG/M3 ACGIH TLV: 10 MG/M3 Other Limits: NOT GIVEN
LT ____5 ____0 % of product. CASRN: 68855-54-9

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

* PIGMENT / PEL: 20 MPPCF.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

TITANIUM DIOXIDE
OSHA PEL: 10 MG/M3 ACGIH TLV: 10 MG/M3 Other Limits: NOT GIVEN
LT ____5 ____0 % of product. CASRN: 13463-67-7

* PIGMENT XR22750000.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

FOR ALL COMPONENTS: PERCENT BY WEIGHT.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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IDENTIFICATION

----------Last change: 19-MAR-1991

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

)DUCT CLASS: GOVERNMENT SPEC. MAT.

TRADE NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L.

MANUFACTURER CODE I.D.: 741412 17.

EMERGENCY TELEPHONE NO.: 316-733-1361 (7 DAYS, 24 HOURS).

INFORMATION PHONE NO.: 316-733-1361 (M-F 8AM-5PM CT).

DOT EMERGENCY (800) 255-3924 (24hrs).

MANUFACTURER NAME AND ADDRESS:

Pratt & Lambert, Inc.
Industrial Coatings Div.
P.O. Box 2153
Wichita, KS 67201

HMIS:

HEALTH: 2*.
FLAMMABILITY: 2.
REACTIVITY: 0.

'hese ratings should be used only as part of fully implemented H.M.I.S. program.

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

FSN 8010-00-598-5944.

CONTAINER 01 PACKAGE DIM. 14 X 11-1/2 X 14.

GROSS WT.: 45#.

MANUFACTURER CAGE #: 61196.

CONTRACT #: SMALL PURCHASE.

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HAZARDOUS INGREDIENTS

----------Last change: 19-MAR-1991

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

INGREDIENT	SARA 313	VP mm HG @ 20 DEG. C
MINERAL SPIRITS		2
LFL: 1.0		
UFL: 7.0		
SILICA, CRYSTALLINE QUARTZ		
SILICA, CRYSTALLINE CRISTOBALITE		
COPPER PHYHALOCYANINE	X	
TALC		
SILICA; AMPHOROUS-DIATOMACEOUS EARTH		
TITANIUM DIOXIDE		

LFL = LOWER FLAMMABILITY LIMIT PERCENT.
UFL = UPPER FLAMMABILITY LIMIT PERCENT.
SKIN = SKIN ABSORPTION MUCT BE CONSIDERED AS A ROUTE OF EXPOSURE.
C-CEILING = ALLOW. EXPOSURE LEVEL SHOULD NOT BE EXCEEDED FOR ANY TIME PERIOD.
MFR = MANUFACTURER RECOMMENDED EXPOSURE LIMIT.
STEL = SHORT TERM EXPOSURE LIMIT.
X-SARA 313 = CHEMICAL IS SUBJECT TO REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF S.A.R.A. 40 CFR PART 372.
NIOSH# = NIOSH REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES NUMBER.

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HEALTH INFORMATION

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

----------Last change: 19-MAR-1991
EFFECTS OF SHORT TERM OVEREXPOSURE:

SWALLOWING: Can cause gastrointestinal irritation, nausea, and vomiting. Aspiration of material into lung may cause chemical pneumonitis which can be fatal.

INHALATION: May cause nose or throat irritation. High concentration may cause acute central nervous system depression characterized by headaches, dizziness, nausea and confusion.

EYE: May cause eye irritation.

SKIN: May cause defatting and irritation of the skin.

EFFECTS OF REPEATED OVEREXPOSURE: Repeated exposure to crystalline silica may cause pneumonoconiosis, a progressively disabling lung disease. The OSHA permissible exposure limit for ambient dusts containing crystalline silica may be calculated from the formulas provided in Table Z-3 "Mineral Dusts"- 29 CFR 1910.1000.

$$\text{PEL (mixture)} = \frac{10 \text{ mg/M3}}{\%\text{ Quartz} + 2(\%\text{Cristobalite}) + 2(\%\text{Tridymite}) + 2}$$

The OSHA Permissible Exposure Limit for amorphous silica is 20 Mppcf or

$$\text{PEL} = \frac{80 \text{ mg/M3}}{\%\text{SiO2}}$$

Preexisting respiratory conditions may be aggravated by exposure to crystalline silica.
Reports have associated prolonged and repeated occupational overexposure to solvents with permament brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH:
Titanium dioxide IS NOT listed as a potential carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, OSHA, or A.C.G.I.H. Dry titanium dioxide in a 24-month inhalation study with rats revealed a significant increase in benign and malignant lung tumors in the group exposed to 250mg/M3 respirable TiO2 dust. At lower exposure levels, this significant effect was not observed. The normal clearance mechanisms of the lungs may have been overwhelmed at the 250mg/M3 exposure level, and this may have contributed to the occurance of carcinogenicity. These exposure its are observed. At the TLV the TiO2 manufacturer concludes that there is no significant hazard for man.
The International Agency for Research on Cancer considers crystalline silica

to have limited evidence of carcinogenicity in humans and sufficient evidence in experimental animals (IARC Group 2A).

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FIRST AID AND EMERGENCY PROCEDURES
----------Last change: 19-MAR-1991
SWALLOWING: If swallowed do not induce vomiting. Call poison control center, hospital emergency room, or Physician immediately.

INHALATION: Remove to fresh air immediately. If breathing has stopped, give artificial respiration. Keep warm and quiet. Get medical attention immediately.

EYE: Flush with large amounts of water, lifting upper and lower lids occasionally. Continue for at least 15 minutes. Get medical attention.

SKIN: Remove contaminated clothing. Wash affected area with soap and water. Obtain medical attention if irritation persists.

NOTES TO PHYSICIAN: Any treatment that might be required for overexposure should be directed at the control of symptoms and the clinical conditions.

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PHYSICAL DATA
----------Last change: 19-MAR-1991
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

VOC: 3.69 LB/GAL LESS WATER & NPRS*; 443 G/L LESS WATER; CALCULATED.

VOC: 8.57 LB/GAL SOLIDS; 1028 G/L SOLIDS; CALCULATED.

All Physical data determined at 68'F (20'C) 760 mm Hg.

* Negligibly Photochemically Reactive Materials.
VOC values reported here are verified by ASTM method D-3960.

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FIRE AND EXPLOSION HAZARD DATA
----------Last change: 19-MAR-1991
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

NFPA FLAMMABILITY CLASSIFICATION: FLAMMABLE LIQUID - CLASS II.

EXTINGUISHING MEDIA: Use NFPA Class B Fire extinguishers (carbon dioxide, all purpose dry chemical or alcohol foam) designed to extinguish flammable liquid fires. Polymer foam is preferred for large fires.

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

UNUSUAL FIRE AND EXPLOSION HAZARDS: During emergency conditions, overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and flame. Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear self-contained breathing apparatus. Water may be ineffective, but may be used to cool exposed containers to prevent pressure build-up and possible auto-ignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

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REACTIVITY DATA

----------Last change: 19-MAR-1991

NEUTRALIZING AGENT: No information found.

STABILITY: Normally stable.

CONDITIONS TO AVOID: Avoid excessive heat (>100 F (38 C) and sources of ignition.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong acids or alkaline materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning, including when heated by welding or cutting, will produce smoke, carbon monoxide and carbon dioxide.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: None known.

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ENVIRONMENTAL INFORMATION

----------Last change: 19-MAR-1991

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Keep spectators away. Eliminate all ignition sources (flames, hot surfaces, and sources of electrical, static or frictional sparks). Dike and contain spill with inert material (e.g. sand, earth). Transfer liquids to covered metal containers for recovery or disposal, or remove with inert absorbent. Use only non-sparking tools. Place absorbent diking materials in covered metal containers for disposal. Prevent contamination of sewers, streams, and groundwater with spilled material or used absorbent.

TE DISPOSAL: Dispose in accordance with federal, state and local laws. Incinerate only in EPA permitted facility. Do not incinerate closed containers. Observe precautions for disposal of flammable materials.

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

Contaminated absorbent may be disposed in a hazardous waste landfill. Dispose only in accordance with federal, state and local regulations.

RCRA CLASSIFICATION: This product, if discarded directly, would be classified as hazardous waste based on its ignitability characteristic, i.e. has a flash point of 140 deg. F., or less. The proper RCRA classibication would be D001.

ENVIRORNMENTAL HAZARDS: None known.

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PERSONAL PROTECTION INFORMATION

----------Last change: 19-MAR-1991

RESPIRATORY PROTECTION: Proper selection of respiratory protection depends upon many factors including duration and level of exposure and conditions of use. In general exposure to organic chemicals such as those contained in this product may not require the use of respiratory protection if used in well ventilated areas. In restricted ventilation areas a NIOSH approved chemical cartridge respirator may be required. Under certain conditions, such as spraying, a mechanical prefilter may also be required. In confined spaces use a NIOSH/MSHA approved air supplied respirator. If the TLV's listed listed in HAZARDOUS INGREDIENTS Section are exceeded use a properly fitted NIOSH/MSHA approved respirator with an appropriate protection factor. Refer to OSHA 29 CFR 1910.134 "Respiratory Protection." and "Respiratory Protection a Manual and Guideline, American Industrial Hygiene Assoc."

VENTILATION: Provide general dilution and local exhaust ventilation in sufficient volume and pattern to maintain concentrations of hazardous substances listed in HAZARDOUS INGREDIENTS Section below the lowest exposure limits stated.

HAND PROTECITON: Solvent impermeable gloves are required for repeated or prolonged contact.

EYE PROTECTION: Wear safety spectacles.

OTHER PROTECTIVE EQUIPMENT: Not likely to be needed.

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SPECIAL PRECAUTIONS

----------Last change: 19-MAR-1991

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Do not store above 100'F (38'C) store large quantities in compliance with OSHA 29CFR1910.106. degrees F.

OTHER PRECAUTIONS:

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

Do not take internally. Close container after each use.
Do not breathe sanding dust.
Empty containers must not be washed and re-used for any purpose.
Containers should be grounded and bonded to the receiving container.
Do not weld, braze or cut on empty container.
Never use pressure to empty. Drum is not a pressure vessel.

==========

TRANSPORTATION DATA

----------Last change: 19-MAR-1991

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

IMDG:

PROPER SHIPPING NAME (ARTICLE): PAINT UN1263.

LIMITED QUANTITY: NO.

AEROSOL PROPELLENT: NOT APPLICABLE.

L.Q.: NO.

MARINE POLLUTANT: NO.

CLASS: 3.

PLACARD: FLAMMABLE.

EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES SEE ERG #26

UNIT CONTAINER	D.O.T.	U.N.
1 Pint Metal	2N	1A2
1 Quart Metal	2N	1A2
1 Gallon Metal	2N	1A2
5 Gallon Metal	17E	1A1
	17C	1A2
55 Gallon Metal	17E	1A1
	17C	1A2
Fiberboard Box	12B	4G

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SPECIAL NOTES

----------Last change: 19-MAR-1991

S IS TO CERTIFY THAT THIS ITEM IS HAZARDOUS AND INFORMATION STATED IS, TO THE BEST OF MY KNOWLEDGE, CORRECT.

MSDS Number: ___974 Status: CURRENT Revision Date: 25-APR-1993
PRODUCT NAME: ENAMEL ALKYD LUST MEDIUM GREEN 34092 TT-E-527C COMP L

W.A. ELLISON
OPERATIONS MANAGER

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. WHILE THE INFORMATION IS BELIEVED TO BE RELIABLE, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SINCE THE USE OF THIS INFORMATION AND THE CONDITIONS AND USE OF THIS PRODUCT ARE CONTROLLED BY THE USER, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THE PRODUCT.

The Corporate Safety and Environmental Affairs Department is responsible for the preparation of this Material Safety Data Sheet.

End of Report

MATERIAL SAFETY DATA SHEET
SECTION 1 - PRODUCT AND MANUFACTURER IDENTIFICATION

08610KUZ-GD

PRODUCT IDENTIFICATION:

PRODUCT NUMBER: 08610KUZ-GD
TRADE NAME: #37030 BLACK ZENTHANE, MIL-C-53039A
PRODUCT CLASS: ALIPHATIC POLYISOCYANATE

MSDS PREPARATION DATE: 07-14-98

MANUFACTURER IDENTIFICATION:

NAME: HENTZEN COATINGS, INC.
ADDRESS: 6937 W. MILL ROAD
P.O. BOX 18749
MILWAUKEE WI 53218

TELEPHONE: 414-353-4200
EMERGENCY: 800-424-9300 (CHEMTREC)

SECTION 2 - INFORMATION ON INGREDIENTS

1
CAS# 1333-86-4
CARBON BLACK
PCT BY WT: .7550
EXPOSURE LIMIT:
ACGIH TLV/TWA 3.5 MG/M3
OSHA PEL 3.5 MG/M3
OTHER LIMITS LISTED BY IARC AS A GROUP 2B, POSSIBLE HUMAN
OTHER INFORMATION - CARCINOGEN. PLEASE SEE SECTION 3.

2
CAS# 28182-81-2
HOMOPOLYMER OF HEXAMETHYLENE DIISOCYANATE
PCT BY WT: 20-30
EXPOSURE LIMIT:
ACGIH TLV/TWA NOT ESTABLISHED
OSHA PEL NOT ESTABLISHED
OTHER LIMITS MFR.'S TWA = 0.5 MG/M3, STEL = 1.0 MG/M3

3
CAS# 14808-60-7
CRYSTALLINE SILICA
PCT BY WT: 20-30
EXPOSURE LIMIT:
ACGIH TLV/TWA 0.1 MG/M3
OSHA PEL 0.1 MG/M3
OTHER LIMITS LISTED BY IARC AS GROUP 1 (SEE SECTION 3).

4
CAS# 822-06-0
HEXAMETHYLENE DIISOCYANATE MONOMER
PCT BY WT: .0350
EXPOSURE LIMIT:
ACGIH TLV/TWA 0.005 PPM
OSHA PEL 0.005 PPM

5
CAS# 1330-20-7
XYLENE
PCT BY WT: 2.2810
EXPOSURE LIMIT:
ACGIH TLV/TWA 100 PPM
OSHA PEL 100 PPM
OTHER LIMITS STEL = 150 PPM

6
CAS# 1317-61-9
BLACK IRON OXIDE PIGMENT
PCT BY WT: 5-10
EXPOSURE LIMIT:
ACGIH TLV/TWA 5 MG/M3

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610KUZ-GD
#37030 BLACK ZENTHANE, MIL-C-53039A

OSHA PEL	5 MG/M3
OTHER LIMITS	EXPOSURE LIMITS ARE FOR IRON OXIDE FUME

7
CAS# 123-86-4
BUTYL ACETATE
PCT BY WT: 1-5
EXPOSURE LIMIT:

ACGIH TLV/TWA	150 PPM
OSHA PEL	150 PPM
OTHER LIMITS	200 PPM = STEL

8
CAS# 108-10-1
METHYL ISOBUTYL KETONE
PCT BY WT: 5.2040
EXPOSURE LIMIT:

ACGIH TLV/TWA	50 PPM
OSHA PEL	50 PPM
OTHER LIMITS	75 PPM = STEL

9
CAS# 110-12-3
METHYL ISOAMYL KETONE
PCT BY WT: 20-30
EXPOSURE LIMIT:

ACGIH TLV/TWA	50 PPM
OSHA PEL	50 PPM

****
This product contains one or more reported carcinogens or suspected carcinogens which are noted above and in Section 3.
****

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

FLAMMABLE LIQUID. Keep away from heat, sparks and flame.
Vapors may cause flash fire.
Toxic gases/fumes are given off during burning or thermal decomposition.
APPEARANCE: OPAQUE LIQUID
ODOR: SOLVENT ODOR
Harmful if inhaled.
May cause the following effects:
Nose, throat and respiratory tract irritation.
Allergic respiratory reaction.
May cause lung damage.
Eye and skin irritation.
Allergic skin reaction.

POTENTIAL HEALTH EFFECTS

PRIMARY ROUTES OF ENTRY:
Dermal and inhalation.

EYE CONTACT:
Acute eye contact with liquid, aerosols and vapors can be irritating causing tearing, reddening and swelling accompanied by a stinging and/or a feeling like that of fine dust in the eyes.
If left untreated, corneal damage can occur and injury is slow to heal.

SKIN CONTACT:
Isocyanates react with skin protein and moisture and can cause irritation. Symptoms of skin irritation may be reddening, rash, swelling, scaling or blistering. Some persons may develop skin sensitization from skin contact. If material is allowed to dry on the skin, it is very difficult to remove. Repeated or prolonged skin contact with solvents can cause defatting of the of the skin which can develop into dermatitis.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610KUZ-GD
#97030 BLACK ZENTHANE, MIL-C-53039A

INHALATION:
Anesthetic. Can cause irritation of the respiratory tract or acute nervous system depression characterized by the following progressive steps if severe overexposure is continued: headache, dizziness, staggering gait, confusion or unconsciousness.
Acute inhalation of the vapors or mist of isocyanate compounds above the recommended exposure limits can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing a runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with pre-existing, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits with similar symptoms as well as an asthma attack. Exposure well above the exposure limits may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in the lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (fever, chills) has also been reported.
Overexposure to solvent vapors may cause dryness of the throat, tightness of the chest, headache, nausea, fatigue and loss of appetite.

INGESTION:
Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea.
Vomiting may cause aspiration of the solvent resulting in chemical pneumonitis.

CHRONIC EFFECTS:
Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage, liver and kidney damage.
As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms could be immediate or delayed up to several hours after exposure and could include chest tightness, wheezing, cough or asthmatic attack.
There are reports that once sensitized, an individual can experience these symptoms upon exposure to dust, cold air or other irritants.
This increased lung sensitivity can persist for weeks and in severe cases for several years.
Chronic overexposure to isocyanates has also been reported to cause lung damage, including decrease in lung function, which may be permanent.
Sensitization may be either temporary or permanent.
Prolonged skin contact can cause reddening, swelling, rash, scaling, blistering and, in some cases, skin sensitization.
Individuals who have skin sensitization can develop these symptoms from contact with liquid or vapors.
There are reports that long-term repeated exposure to Xylene may result in some loss of hearing.

CARCINOGENICITY:
This product has not been tested as a whole for carcinogenicity.
IARC has listed crystalline silica as Group 1, carcinogenic to humans.
The National Toxicology Program (NTP) classifies respirable crystalline silica as "reasonably anticipated to be a carcinogen".
May cause lung injury if respiratory precautions are not used.
Contains carbon black which has been listed by IARC as a possible human carcinogen (group 2B) based upon laboratory animal inhalation studies.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE:
Asthma and other respiratory ailments; skin allergies and eczema; chemical sensitization.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610KUZ-GD
#37030 BLACK ZENTHANE, MIL-C-53039A

SECTION 4 - FIRST AID MEASURES

EYE CONTACT:
Flush immediately with low pressure lukewarm running water for at least 15 minutes while lifting eyelids. Take to a physician for treatment.

SKIN CONTACT:
Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists.

INHALATION:
Move to an area free from risk of further exposure.
Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. Consult physician.

INGESTION:
CALL A PHYSICIAN IMMEDIATELY. Do not induce vomiting.

SECTION 5 - FIRE FIGHTING MEASURES

FIRE AND EXPLOSION PROPERTIES:

FLASHPOINT: 54.00 F

EXPLOSION LEVELS: Low - 1.00
High - 8.20

AUTOIGNITION TEMPERATURE: 450.00 F

EXTINGUISHING MEDIA:
Carbon Dioxide, dry chemical, foam or alcohol foam.

FIRE-FIGHTING PROCEDURES AND EQUIPMENT:
Full protective equipment including self-contained breathing apparatus should be worn.
During a fire, irritating and highly toxic gases (see Reactivity data) and smoke are present from the decomposition/combustion products.
Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flames.
Closed container may explode when exposed to extreme heat or burst when contaminated with water (Carbon Dioxide released).
Do not apply to hot surfaces.
Never use welding or cutting torch on or near product container (even empty) because product (even residue) can ignite explosively.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Evacuate all non-essential personnel and remove all sources of ignition (flames, hot surfaces, electrical, static and frictional sparks).
Ventilate area. Equip clean-up crew with appropriate protective equipment.
Avoid breathing vapors. Avoid skin contact.
Prevent entry into drains, sewers and waterways.
Notify appropriate authorities if necessary.
Cover spill with inert absorbent. Pour liquid decontaminant over spillage.
Allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution.
Remove containers to safe place and cover loosely. Allow to stand for 24 to 48 hours.
Wash down spill area with decontamination solution.
Do not allow entry into drains, sewers or waterways.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610KUZ-GD
#37030 BLACK ZENTHANE, MIL-C-53039A

DECONTAMINATION SOLUTION:
Concentrated ammonia (3 - 8%), detergent (2%) and water (90 - 95%) or a solution of NIACT Corp.'s Tergitol TMN-10 (20%) and water (80%).

SECTION 7 - HANDLING AND STORAGE

HANDLING:
Precautions must be taken so that persons handling this product do not breathe the vapors or have it contact the eyes or skin.
In spray operations, protection must be afforded against exposure to both vapor and spray mist.
Can cause irritation to eyes, skin, nose and throat. Avoid contact with eyes and clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin.
Use grounding and bonding connection when transferring material to prevent static discharge, fire or explosion. Avoid free fall of liquid in excess of a few inches.
Use sparkproof tools and explosion proof equipment.

STORAGE:
Do not store above 120 F or below 32 F. Store large quantities in buildings designed to comply with OSHA's 29 CFR 1910.106.
Keep away from heat, sparks and open flame.
Keep containers tightly closed and protect from moisture contamination. If moisture enters container, pressure can build up due to a reaction that produces Carbon Dioxide which can cause the sealed container to pressurize and burst. Do not reseal container if contamination is suspected.
Emptied containers may retain hazardous residue. Follow all hazard precautions in this data sheet until container is thoroughly cleaned or destroyed.
To avoid spontaneous combustion during temporary storage, soak soiled rags and waste immediately after use in a water-filled, closed container.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

ENGINEERING CONTROLS:
Exhaust ventilation sufficient to keep the airborne concentrations of the isocyanates below their respective exposure limits must be utilized.
Exhaust air may need to be cleaned by scrubber or filters to reduce environmental contamination.
Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly (that is, they are released into the work area), it is possible to be exposed to airborne monomeric Hexamethylene Diisocyanate.

RESPIRATORY PROTECTION:
The Surgeon General requires airline respirators to be used unless air sampling shows exposure to be below OSHA limits. Then, either air-purifying chemical cartridge respirators or airline respirators are required. The same precautions should be used during mixing or any operations where paint fumes would be present.
Air sampling should be done to measure airborne concentrations of the monomer of Hexamethylene Diisocyanate (HDI), the HDI polyisocyanate and organic solvents.
Good industrial hygiene practice dictates that when isocyanate-containing coatings are spray applied, some form of respiratory protection should be worn.
During the spray application of these coatings, the use of a supplied-air respirator (either positive pressure or continuous flow type) is mandatory when one or more of the following conditions exist:
- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate concentrations exceed ten times the exposure limits; or
- no airborne solvent concentration exceeds its odor threshold; or
- spraying is performed in a confined space. (See OSHA Confined Space Standard 29 CFR 1910.146.)

A properly fitted air-purifying respirator (combination organic vapor and particulate), proven by test to be effective in isocyanate-containing

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610KUZ-GD
#37030 BLACK ZENTHANE, MIL-C-53039A

spray paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when:
- the airborne isocyanate concentrations are known to be below ten times the exposure limits;
- at least one solvent in the coating has a published odor threshold; and
- at least one airborne solvent concentration is lower than its TLV but higher than its odor threshold.
The odor of the solvent will then alert the respirator wearer to any breakdown of the respirator filters.
The same precautions apply during non-spray operations such as brush or roller application of the coating if done at elevated temperatures (such as heating of the coating for application).
During sanding or grinding operations, use a NIOSH approved particulate respirator to remove solid airborne particles of sanding dust.
When welding or cutting steel coated with this product, the worker may be exposed to decomposition products (metal fumes, gases or vapors, and/or particulate) which vary depending on the type of process being used to weld or cut and the nature of the base metal. One or more of the following control procedures should be used when a person is welding or cutting coated steel:
- A power brush, grinding wheel or chemical stripper should be used to remove the coating from the steel in the area to be cut or welded. Respiratory and eye protection should be used while stripping the paint.
- A local exhaust hood should be used to remove fumes during the welding or cutting operation.
- A fresh air supplied respirator should be worn during welding or cutting.

EYE PROTECTION:
Use safety eyewear with splash guards or side shields.
A full face shield may be appropriate. Contact lenses should not be worn.

SKIN PROTECTION:
Permeation resistant gloves. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area protected only by the cream to a minimum.

OTHER PROTECTIVE EQUIPMENT AND GUIDELINES:
Safety showers and eye wash stations should be available.
Educate and train employees in the safe use of this product.

MEDICAL SURVEILLANCE:
Medical supervision of all employees who handle or come in contact with this product is recommended. This should include pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthma-type conditions, bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be permitted.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: LIQUID
APPEARANCE: OPAQUE LIQUID
ODOR: SOLVENT ODOR
ODOR THRESHOLD: -N/A
EVAPORATION RATE: 1.6000 (n-Butyl Acetate = 1)
VAPOR PRESSURE: 15.000
VAPOR DENSITY: 4.000
VOC (LB/GL): 3.4990
VOC (grams/liter): 419.28
WEIGHT PER GALLON: 10.07760 LB/GL
SPECIFIC GRAVITY: 1.2110
% NONEXEMPT SOLVENT by WEIGHT: 34.722
% NONEXEMPT SOLVENT by VOLUME: 51.207
BOILING RANGE: Lower - 232.00 F
Higher - 298.00 F
WATER SOLUBILITY: REACTS WITH WATER
pH: -N/A
FREEZING POINT: -N/A

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610KUZ-GD
#37030 BLACK ZENTHANE, MIL-C-53039A

N/A : Not Available or Not Applicable

SECTION 10 - STABILITY AND REACTIVITY

STABILITY: ( ) - UNSTABLE (X) - STABLE

CONDITIONS TO AVOID:
See INCOMPATIBILITIES.

HAZARDOUS POLYMERIZATION: ( ) - WILL OCCUR (X) - WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS:
May produce hazardous fumes when heated to decomposition as in welding.
Fumes may contain the following:
Carbon Monoxide, Carbon Dioxide, Chlorine, Hydrogen Chloride and possible Cyanide, Hexamethylene Diisocyanate.

INCOMPATIBILITIES (MATERIALS TO AVOID):
Contamination with water, epoxy catalysts, alcohols, glycol ethers, bases, metal complexes or other active materials.
Once the material has been exposed to any of the above or atmospheric moisture, do not reseal container as hazardous Carbon Dioxide gas could build up in the container resulting in rapid depressurization.

SECTION 11 - DISPOSAL CONSIDERATIONS

DISPOSAL METHODS:
Recycle, fuel blend or incinerate.
Dispose of in accordance with applicable laws and regulations.
It is the responsibility of the owner of the waste to dispose of it properly.
Laboratory analysis is recommended to profile the waste for proper disposal determination.
Any containers or equipment used should be decontaminated with the solution given in Section 6.
U.S. E.P.A. WASTE NUMBER and DESCRIPTION:
D001 Waste Paint

HAZARDOUS WASTE CHARACTERISTICS:
Ignitable.

SECTION 12 - TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME:
Paint

UN NUMBER:
UN1263

DOT HAZARD CLASS:
3

DOT LABEL:
Flammable Liquid

DOT PACKAGING GROUP:
PG II

U.S. POSTAL SERVICE: Will not handle.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08610RUZ-GD
#37030 BLACK ZENTHANE, MIL-C-53039A

SECTION 13 - REGULATORY INFORMATION

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

HEXAMETHYLENE DIISOCYANATE MONOMER
CAS# 822-06-0 PCT BY WT: .0350

XYLENE
CAS# 1330-20-7 PCT BY WT: 2.2810

METHYL ISOBUTYL KETONE
CAS# 108-10-1 PCT BY WT: 5.2040

SECTION 14 - OTHER INFORMATION

Date of issue: 07-14-98
Last Revision Date: 07-14-98

HMIS Information: Health- 2* Flammability- 3
Reactivity- 1 Personal Protective Equipment-

THE INFORMATION CONTAINED HEREIN IS INFORMATION RECEIVED FROM OUR RAW MATERIAL SUPPLIERS AND OTHER SOURCES AND IS BELIEVED TO BE RELIABLE. THIS DATA IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH HENTZEN COATINGS, INC. ASSUMES LEGAL RESPONSIBILITY.

MATERIAL SAFETY DATA SHEET 2-JUN-1999

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: MIL-C-53039A Keyword: NOT GIVEN
Stock Item Numbers: 8010012297540
8010012299561
8010012763639
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
HENTZEN COATINGS, INC.
6937 W. MILL RD., POB 18749 Phone: (414) 353-4200
MILWAUKEE, WI 53218 Emergency Phone: (800) 424-9300

Supplier:
HENTZEN COATINGS, INC.
6937 W. MILL RD., POB 18749 Phone: (414) 353-4200
MILWAUKEE, WI 53218 Emergency Phone: (800) 424-9300

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	BT __244.0 & __418.0 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	NA	NOT AVAILABLE.
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ ___1.23 (Water = 1)	WGT/GAL: 10.29.
Vapor Pressure:	EQ _____15 mmHg @ _____68 deg. F	MM HG.
pH:	NA	NOT APPLICABLE.
Vapor Density:	GT _____1 (Air = 1)	HEAVIER THAN AIR.
Evaporation Rate:	GT _____1	BUAC = 1, FASTER.
% of Volatiles:	NG	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: REACTS WITH WATER.
Odor/Appearance/Other Characteristics:
OPAQUE LIQUID, SOLVENT ODOR / VOC: 3.488 LBS/GAL; 417.967 G/L.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ ___54.0 deg. F	TCC.
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	EQ __450.0 deg. F	NG
Lower Explosion Limit:	EQ ____0.9 %	NG
Upper Explosion Limit:	EQ ____8.2 %	NG

SHIPPING REGULATIONS:
UN/NA Number: NG
DOT Hazard Class: FLAMMABLE LIQUID
DOT Label: NOT GIVEN
Proper Shipping Name: NOT GIVEN

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

PREPARER/CONTACT INFORMATION: JANE FREEMAN
Date Prepared/Revised: 1-JAN-1995

COMPONENTS:

METHYL ISOAMYL KETONE
OSHA PEL: 50 PPM ACGIH TLV: 50 PPM Other Limits: NOT GIVEN
BT ___20 ___30 % of product. CASRN: 110-12-3

SILICA
OSHA PEL: 0.1 MG/M3 ACGIH TLV: 0.1 MG/M3 Other Limits: NOT GIVEN
BT ___20 ___30 % of product. CASRN: 14808-60-7

HOMOPOLYMER OF HEXAMETHYLENE DIISOCYANATE
OSHA PEL: NE ACGIH TLV: NE Other Limits: NOT GIVEN
BT ___20 ___30 % of product. CASRN: 28182-81-2

* FOR ALL COMPONENTS: NE=NOT ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ALT COMPOUNDS
OSHA PEL: 0.05 MG/M3 ACGIH TLV: 0.05 MG/M3 Other Limits: NOT GIVEN
EQ 0.492 ____0 % of product. CASRN: 7440-48-4

TRIVALENT CHROME
OSHA PEL: 0.5 MG/M3 ACGIH TLV: 0.5 MG/M3 Other Limits: NOT GIVEN
EQ 6.866 ____0 % of product. CASRN: 7440-47-3

AROMATIC HYDROCARBONS
OSHA PEL: NE ACGIH TLV: NE Other Limits: NOT GIVEN
BT ____1 ____5 % of product. CASRN: 64742-95-6

BUTYL ACETATE
OSHA PEL: 150 PPM ACGIH TLV: 150 PPM Other Limits: NOT GIVEN
BT ____1 ____5 % of product. CASRN: 123-86-4

HEXAMETHYLENE DIISOCYANATE MONOMER
OSHA PEL: 0.005 PPM ACGIH TLV: 0.005 PPM Other Limits: NOT GIVEN
EQ _0.48 ____0 % of product. CASRN: 822-06-0

VM&P NAPHTHA
OSHA PEL: 300 PPM ACGIH TLV: 300 PPM Other Limits: NOT GIVEN
BT ____1 ____5 % of product. CASRN: 64742-89-8

XYLENE
OSHA PEL: 100 PPM ACGIH TLV: 100 PPM Other Limits: 150 PPM
EQ 2.040 ____0 % of product. CASRN: 1330-20-7

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

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PRODUCT IDENTIFICATION

----------Last change: 1-JAN-1995

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

TRADE NAME: 383 GREEN ZENTHANE, MIL-C-53039A

MANUFACTURERS CODE IDENTIFICATION: 08605GUZ-GD

PRODUCT CLASS: ALIPHATIC POLYISOCYANATE

HMIS INFORMATION:

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 1
PERSONAL PROTECTIVE EQUIPMENT:

TELEPHONE #: (414) 353-4200

NIGHT: Not Available

EMERGENCY #: (414) 353-4200

NIGHT: (800) 424-9300 (Chemtrec)

MANUFACTURER'S NAME AND ADDRESS:

HENTZEN COATINGS, INC.
6937 WEST MILL ROAD
MILWAUKEE, WISCONSIN 53218

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HAZARDOUS INGREDIENTS

----------Last change: 1-JAN-1995

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

METHYL ISOAMYL KETONE:

01

SILICA:

02

EXPOSURE LIMIT:

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

OTHER LIMITS: LISTED BY IARC AS CLASS 2A (SEE HEALTH HAZARD DATA SECTION).

HOMOPOLYMER OF HEXAMETHYLENE DIISOCYANATE:

03

EXPOSURE LIMIT:

OTHER LIMITS: MFR'S TWA = 0.5 MG/M3, STEL = 1.0 MG/M3

COBALT COMPOUNDS:

04

EXPOSURE LIMIT:

OTHER INFORMATION: NOTE: COBALT AND COBALT COMPOUNDS ARE LISTED BY IARC AS A GROUP 2B - POSSIBLE CARCINOGENS.

TRIVALENT CHROME:

05

AROMATIC HYDROCARBONS (MIXTURE OF C8'S TO C10'S):

06

EXPOSURE LIMIT:

OTHER LIMITS: 100 PPM = MFR.'S LIMIT

BUTYL ACETATE:

07

EXPOSURE LIMIT:

OTHER LIMITS: 200 PPM = STEL

HEXAMETHYLENE DIISOCYANATE MONOMER:

08

VM & P NAPHTHA:

9

XYLENE:

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

10

EXPOSURE LIMIT:

OTHER LIMITS: STEL = 150 PPM

This product contains one or more reported carcinogens which is noted as listed by NTP, IARC and/or OSHA in the Other Information field for the applicable chemical. Please see HEALTH HAZARD DATA Section for more information.

==========

PHYSICAL DATA

----------Last change: 1-JAN-1995

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

% NONEXEMPT SOLVENT BY VOLUME: 51.63

% NONEXEMPT SOLVENT BY WEIGHT: 33.94

VOC: 3.488 Lbs/Gal; 417.967 Grams/Liter

ODOR THRESHOLD: .1 PPM

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not Available

==========

FIRE AND EXPLOSION HAZARD DATA

----------Last change: 1-JAN-1995

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

FLAMMABILITY CLASSIFICATION: Class IB

EXTINGUISHING MEDIA: FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Closed container may explode when exposed to extreme heat or burst when contaminated with water (CO2 evolved). Do not apply to hot surfaces. Never use welding or cutting torch on or near drum (even empty) because product (even residue) can ignite explosively.

SPECIAL FIRE FIGHTING PROCEDURES: Full protective equipment with self-contained breathing apparatus should be worn. During a fire, irritating and highly toxic gases (see REACTIVITY DATA Section) and smoke are present

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

from the decomposition/combustion products.

==========

HEALTH HAZARD DATA

----------Last change: 1-JAN-1995

EFFECTS OF OVEREXPOSURE:

TO VAPOR AND/OR MIST: Can cause irritation to skin, eyes and respiratory tract (nose, throat, lungs). Symptoms may be watering eyes, dryness of throat, coughing, headache, tightness in chest or burning sensation. Headache, dizziness or nausea may be experienced by some as a result of exposure to solvents.

PRIMARY ROUTES OF ENTRY: DERMAL and INHALATION

CHRONIC OVEREXPOSURE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage, liver and kidney damage.

Chronic overexposure to isocyanate containing products may lead to respiratory sensitization characterized by asthma-like symptoms and/or skin sensitization characterized by allergic dermatitis which may include rash, itching, hives and swelling of extremities.

Some reports have associated repeated or prolonged contact with Trivalent Chrome to dermatitis. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Based on laboratory animal data, IARC has listed Silica as a "Probable Human Carcinogen". May cause lung injury if respiratory precautions are not used.

The Cobalt compound in this product has not been specifically identified as causing cancer in humans or animals. However, IARC has listed "Cobalt and Cobalt compounds" as possibly carcinogenic (Group 2B) based upon laboratory animal studies.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove from exposure. Restore breathing. Keep warm and quiet. Notify a physician.

EYES: Flush immediately with large amounts of running water for at least 15 minutes while lifting eyelids. Take to a physician for treatment.

SKIN: Wash affected area with soap and water. Remove contaminated clothing. Wash before reuse. Consult a physician if irritation develops or persists.

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

INGESTION: If swallowed, CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: Asthma and other respiratory ailments; chemical sensitization.

==========

REACTIVITY DATA

----------Last change: 1-JAN-1995

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS:

BY FIRE: CO2, CO, oxides of Nitrogen, traces of Hydrogen Cyanide, Hexamethylene Diisocyanate.

CONDITIONS TO AVOID: Contamination with water, epoxy catalysts, alcohols, glycol ethers, bases, metal complexes or other active materials. Once the material has been exposed to any of the above or atmospheric moisture, do not seal container as hazardous CO2 gas could build up in the container resulting in rapid depressurization.

INCOMPATIBILITY: See Conditions To Avoid.

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SPILL OR LEAK PROCEDURES

----------Last change: 1-JAN-1995

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Evacuate non-essential personnel. Remove all sources of ignition (flames, hot surfaces, electrical, static or frictional sparks). Ventilate area. Avoid breathing vapors. Cover spill with inert absorbent. Pour liquid decontaminant over spillage - allow to react for at least 10 mintues; collect material in open containers - add further amounts of decontamination solution. Remove containers to safe place - cover loosely. Wash down area with decontaminant and flush spill area with water.

DECONTAMINATION SOLUTIONS: 0-10% Ammonium Hydroxide, 2-5% Detergent and the balance is water; or a solution of NIACT Corp.'s Tergitol TMN-10 (20%) and water (80%).

WASTE DISPOSAL METHOD: Dispose of in accordance with local, state and Federal regulations. Decontaminate containers prior to disposal.

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

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SAFE HANDLING AND USE INFORMATION

----------Last change: 1-JAN-1995

RESPIRATORY PROTECTION: The Surgeon General requires airline respirators to be used unless air sampling shows exposure to be below OSHA limits. Then, either chemical cartridge respirators or airline respirators are required. The same precautions should be used during mixing or any operations where paint fumes would be present.

VENTILATION: Provide general dilution or local exhaust ventilation in volume and pattern to keep the air contaminant concentration below current applicable OSHA safety and health requirements in the mixing, application and curing areas; and to remove decomposition products during welding and flame cutting on surfaces coated with this product.

PROTECTIVE GLOVES: Chemical resistant gloves.

EYE PROTECTION: Use safety eyewear with splash guards or side shields.

OTHER PROTECTIVE EQUIPMENT: Wear protective clothing to keep skin contact at minimum.

HYGIENIC PRACTICES: Wash hands and any exposed skin thoroughly before eating or smoking. Smoke in smoking areas only.

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SPECIAL PRECAUTIONS

----------Last change: 1-JAN-1995

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not store above 120 F 32 F. Store large quantities in buildings designed to comply with OSHA 1910.106. Keep away from sparks and open flame. Keep containers tightly closed and protect from moisture. If moisture enters container, pressure can build up due to reaction producing CO2 which can cause sealed container to pressurize and burst. Do not reseal if contamination is suspected.

OTHER PRECAUTIONS: Do not take internally. Containers should be grounded when pouring. Avoid free fall of liquid in excess of a few inches. Use with adequate ventilation and respiratory equipment. Emptied containers may retain hazardous residue or explosive vapors. Follow all precautions in this data sheet until container is thoroughly cleaned or destroyed.

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TION 313 TOXIC CHEMICALS

----------Last change: 1-JAN-1995

THIS PRODUCT CONTAINS THE FOLLOWING TOXIC CHEMICALS SUBJECT TO THE REPORTING

MSDS Number: __1190 Status: CURRENT Revision Date: 14-APR-1997
PRODUCT NAME: 383 GREEN ZENTHANE, MIL-C-53039A ME

REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986 AND OF 40 CFR 372:

CHEMICAL	CAS NUMBER	WEIGHT %
COBALT COMPOUNDS	7440-48-4	.482
TRIVALENT CHROME	7440-47-3	6.866
XYLENE	1330-20-7	2.040

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SPECIAL NOTES

----------Last change: 1-JAN-1995

THE INFORMATION CONTAINED HEREIN IS INFORMATION RECEIVED FROM OUR RAW MATERIAL SUPPLIERS AND OTHER SOURCES AND IS BELIEVED TO BE RELIABLE. THIS DATA IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH HENTZEN COATINGS, INC. ASSUMES LEGAL RESPONSIBILITY.

End of Report

MATERIAL SAFETY DATA SHEET
SECTION 1 - PRODUCT AND MANUFACTURER IDENTIFICATION

08609TUZ-GD

PRODUCT IDENTIFICATION:

PRODUCT NUMBER: 08609TUZ-GD
TRADE NAME: TAN 686A ZENTHANE, MIL-C-53039A
PRODUCT CLASS: ALIPHATIC POLYISOCYANATE

MSDS PREPARATION DATE: 07-14-98

MANUFACTURER IDENTIFICATION:

NAME: HENTZEN COATINGS, INC.
ADDRESS: 6937 W. MILL ROAD
P.O. BOX 18749
MILWAUKEE WI 53218

TELEPHONE: 414-353-4200
EMERGENCY: 800-424-9300 (CHEMTREC)

SECTION 2 - INFORMATION ON INGREDIENTS

1
CAS# 28182-81-2
HOMOPOLYMER OF HEXAMETHYLENE DIISOCYANATE
PCT BY WT: 30-40
EXPOSURE LIMIT:
ACGIH TLV/TWA NOT ESTABLISHED
OSHA PEL NOT ESTABLISHED
OTHER LIMITS MFR.'S TWA = 0.5 MG/M3, STEL = 1.0 MG/M3

2
CAS# 14808-60-7
CRYSTALLINE SILICA
PCT BY WT: 20-30
EXPOSURE LIMIT:
ACGIH TLV/TWA 0.1 MG/M3
OSHA PEL 0.1 MG/M3
OTHER LIMITS LISTED BY IARC AS GROUP 1 (SEE SECTION 3).

3
CAS# 13463-67-7
TITANIUM DIOXIDE
PCT BY WT: 5-10
EXPOSURE LIMIT:
ACGIH TLV/TWA 10 MG/M3
OSHA PEL 10 MG/M3

4
CAS# 822-06-0
HEXAMETHYLENE DIISOCYANATE MONOMER
PCT BY WT: .0350
EXPOSURE LIMIT:
ACGIH TLV/TWA 0.005 PPM
OSHA PEL 0.005 PPM

5
CAS# 1330-20-7
XYLENE
PCT BY WT: 2.0660
EXPOSURE LIMIT:
ACGIH TLV/TWA 100 PPM
OSHA PEL 100 PPM
OTHER LIMITS STEL = 150 PPM

6
CAS# 1308-38-9
CHROMIC OXIDE
(SARA SECTION 313 CHROMIUM COMPOUND)
PCT BY WT: .7230
EXPOSURE LIMIT:
ACGIH TLV/TWA 0.5 MG/M3 AS CHROME
OSHA PEL 0.5 MG/M3 AS CHROME

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TU2-GD
TAN 686A ZENTHANE, MIL-C-53039A

OTHER LIMITS	68% OF CHROMIC OXIDE IS TRIVALENT CHROME.
OTHER INFORMATION -	THE BALANCE IS OXIDE.

7
CAS# 51274-00-1
YELLOW IRON OXIDE PIGMENT
PCT BY WT: 1-5
EXPOSURE LIMIT:

ACGIH TLV/TWA	5 MG/M3
OSHA PEL	5 MG/M3
OTHER LIMITS	EXPOSURE LIMITS ARE FOR IRON OXIDE FUME

8
CAS# 123-86-4
BUTYL ACETATE
PCT BY WT: 1-5
EXPOSURE LIMIT:

ACGIH TLV/TWA	150 PPM
OSHA PEL	150 PPM
OTHER LIMITS	200 PPM = STEL

9
CAS# 108-10-1
METHYL ISOBUTYL KETONE
PCT BY WT: 3.9700
EXPOSURE LIMIT:

ACGIH TLV/TWA	50 PPM
OSHA PEL	50 PPM
OTHER LIMITS	75 PPM = STEL

10
CAS# 110-12-3
METHYL ISOAMYL KETONE
PCT BY WT: 20-30
EXPOSURE LIMIT:

ACGIH TLV/TWA	50 PPM
OSHA PEL	50 PPM

****
All reportable carcinogens are listed in Section 3.
****

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

FLAMMABLE LIQUID. Keep away from heat, sparks and flame.
Vapors may cause flash fire.
Toxic gases/fumes are given off during burning or thermal decomposition.
APPEARANCE: OPAQUE LIQUID
ODOR: SOLVENT ODOR
Harmful if inhaled.
May cause the following effects:
Nose, throat and respiratory tract irritation.
Allergic respiratory reaction.
May cause lung damage.
Eye and skin irritation.
Allergic skin reaction.

POTENTIAL HEALTH EFFECTS

PRIMARY ROUTES OF ENTRY:
Dermal and inhalation.

EYE CONTACT:
Acute eye contact with liquid, aerosols and vapors can be irritating causing tearing, reddening and swelling accompanied by a stinging and/or a feeling like that of fine dust in the eyes.
If left untreated, corneal damage can occur and injury is slow to heal.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TUZ-GD
TAN 686A ZENTHANE, MIL-C-53039A

SKIN CONTACT:
Isocyanates react with skin protein and moisture and can cause irritation. Symptoms of skin irritation may be reddening, rash, swelling, scaling or blistering. Some persons may develop skin sensitization from skin contact. If material is allowed to dry on the skin, it is very difficult to remove. Repeated or prolonged skin contact with solvents can cause defatting of the of the skin which can develop into dermatitis.

INHALATION:
Anesthetic. Can cause irritation of the respiratory tract or acute nervous system depression characterized by the following progressive steps if severe overexposure is continued: headache, dizziness, staggering gait, confusion or unconsciousness.
Acute inhalation of the vapors or mist of isocyanate compounds above the recommended exposure limits can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing a runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with pre-existing, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits with similar symptoms as well as an asthma attack. Exposure well above the exposure limits may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in the lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (fever, chills) has also been reported.
Overexposure to solvent vapors may cause dryness of the throat, tightness of the chest, headache, nausea, fatigue and loss of appetite.

INGESTION:
Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea.
Vomiting may cause aspiration of the solvent resulting in chemical pneumonitis.

CHRONIC EFFECTS:
Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage, liver and kidney damage.
As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms could be immediate or delayed up to several hours after exposure and could include chest tightness, wheezing, cough or asthmatic attack.
There are reports that once sensitized, an individual can experience these symptoms upon exposure to dust, cold air or other irritants.
This increased lung sensitivity can persist for weeks and in severe cases for several years.
Chronic overexposure to isocyanates has also been reported to cause lung damage, including decrease in lung function, which may be permanent.
Sensitization may be either temporary or permanent.
Some reports have associated repeated and prolonged contact with Trivalent Chrome to dermatitis.
As noted by the American Conference of Governmental Industrial Hygienists (ACGIH) in their publication "Documentation of the Threshold Limit Values", repeated and prolonged exposures to Trivalent Chrome compounds may cause delayed effects involving the respiratory system.
Prolonged skin contact can cause reddening, swelling, rash, scaling, blistering and, in some cases, skin sensitization.
Individuals who have skin sensitization can develop these symptoms from contact with liquid or vapors.
There are reports that long-term repeated exposure to Xylene may result in some loss of hearing.

CARCINOGENICITY:
This product has not been tested as a whole for carcinogenicity.
NTP, IARC and ACGIH found that "there is sufficient evidence for the carcinogenicity of Chromium and certain Chromium compounds both in humans and in experimental animals". The Chromium compounds that are considered carcinogenic are hexavalent Chromium compounds. This product contains a trivalent Chromium compound. It is not specifically listed as a carcinogen

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TUZ-GD
TAN 686A ZENTHANE, MIL-C-53039A

by NTP, IARC or ACGIH.
IARC has listed crystalline silica as Group 1, carcinogenic to humans.
The National Toxicology Program (NTP) classifies respirable crystalline silica as "reasonably anticipated to be a carcinogen".
May cause lung injury if respiratory precautions are not used.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE:
Asthma and other respiratory ailments; skin allergies and eczema; chemical sensitization.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT:
Flush immediately with low pressure lukewarm running water for at least 15 minutes while lifting eyelids. Take to a physician for treatment.

SKIN CONTACT:
Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists.

INHALATION:
Move to an area free from risk of further exposure.
Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. Consult physician.

INGESTION:
CALL A PHYSICIAN IMMEDIATELY. Do not induce vomiting.

SECTION 5 - FIRE FIGHTING MEASURES

FIRE AND EXPLOSION PROPERTIES:

FLASHPOINT: 54.00 F

EXPLOSION LEVELS: Low - 1.00
High - 8.20

AUTOIGNITION TEMPERATURE: 450.00 F

EXTINGUISHING MEDIA:
Carbon Dioxide, dry chemical, foam or alcohol foam.

FIRE-FIGHTING PROCEDURES AND EQUIPMENT:
Full protective equipment including self-contained breathing apparatus should be worn.
During a fire, irritating and highly toxic gases (see Reactivity data) and smoke are present from the decomposition/combustion products.
Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flames.
Closed container may explode when exposed to extreme heat or burst when contaminated with water (Carbon Dioxide released).
Do not apply to hot surfaces.
Never use welding or cutting torch on or near product container (even empty) because product (even residue) can ignite explosively.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TUZ-GD
TAN 686A ZENTHANE, MIL-C-53039A

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Evacuate all non-essential personnel and remove all sources of ignition (flames, hot surfaces, electrical, static and frictional sparks).
Ventilate area. Equip clean-up crew with appropriate protective equipment.
Avoid breathing vapors. Avoid skin contact.
Prevent entry into drains, sewers and waterways.
Notify appropriate authorities if necessary.
Cover spill with inert absorbent. Pour liquid decontaminant over spillage.
Allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution.
Remove containers to safe place and cover loosely. Allow to stand for 24 to 48 hours.
Wash down spill area with decontamination solution.
Do not allow entry into drains, sewers or waterways.
DECONTAMINATION SOLUTION:
Concentrated ammonia (3 - 8%), detergent (2%) and water (90 - 95%) or a solution of NIACT Corp.'s Tergitol TMN-10 (20%) and water (80%).

SECTION 7 - HANDLING AND STORAGE

HANDLING:
Precautions must be taken so that persons handling this product do not breathe the vapors or have it contact the eyes or skin.
In spray operations, protection must be afforded against exposure to both vapor and spray mist.
Can cause irritation to eyes, skin, nose and throat. Avoid contact with eyes and clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin.
Use grounding and bonding connection when transferring material to prevent static discharge, fire or explosion. Avoid free fall of liquid in excess of a few inches.
Use sparkproof tools and explosion proof equipment.

STORAGE:
Do not store above 120 F or below 32 F. Store large quantities in buildings designed to comply with OSHA's 29 CFR 1910.106.
Keep away from heat, sparks and open flame.
Keep containers tightly closed and protect from moisture contamination. If moisture enters container, pressure can build up due to a reaction that produces Carbon Dioxide which can cause the sealed container to pressurize and burst. Do not reseal container if contamination is suspected.
Emptied containers may retain hazardous residue. Follow all hazard precautions in this data sheet until container is thoroughly cleaned or destroyed.
To avoid spontaneous combustion during temporary storage, soak soiled rags and waste immediately after use in a water-filled, closed container.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

ENGINEERING CONTROLS:
Exhaust ventilation sufficient to keep the airborne concentrations of the isocyanates below their respective exposure limits must be utilized. Exhaust air may need to be cleaned by scrubber or filters to reduce environmental contamination.
Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly (that is, they are released into the work area), it is possible to be exposed to airborne monomeric Hexamethylene Diisocyanate.

RESPIRATORY PROTECTION:
The Surgeon General requires airline respirators to be used unless air sampling shows exposure to be below OSHA limits. Then, either air-purifying chemical cartridge respirators or airline respirators are required. The same precautions should be used during mixing or any

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TUZ-GD
TAN 686A ZENTHANE, MIL-C-53039A

operations where paint fumes would be present.
Air sampling should be done to measure airborne concentrations of the monomer of Hexamethylene Diisocyanate (HDI), the HDI polyisocyanate and organic solvents.
Good industrial hygiene practice dictates that when isocyanate-containing coatings are sprzy applied, some form of respiratory protection should be worn.
During the spray application of these coatings, the use of a supplied-air respirator (either positive pressure or continuous flow type) is mandatory when one or more of the following conditions exist:
- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate concentrations exceed ten times the exposure limits; or
- no airborne solvent concentration exceeds its odor threshold; or
- spraying is performed in a confined space. (See OSHA Confined Space Standard 29 CFR 1910.146.)
A properly fitted air-purifying respirator (combination organic vapor and particulate), proven to be effective in isocyanate-containing spray paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when:
- the airborne isocyanate concentrations are known to be below ten times the exposure limits;
- at least one solvent in the coating has a published odor threshold; and
- at least one airborne solvent concentration is lower than its TLV but higher than its odor threshold.
The odor of the solvent will then alert the respirator wearer to any breakdown of the respirator filters.
The same precautions apply during non-spray operations such as brush or roller application of the coating if done at elevated temperatures (such as heating of the coating for application).
During sanding or grinding operations, use a NIOSH approved particulate respirator to remove solid airborne particles of sanding dust.
When welding or cutting steel coated with this product, the worker may be exposed to decomposition products (metal fumes, gases or vapors, and/or particulate) which vary depending on the type of process being used to weld or cut and the nature of the base metal. One or more of the following control procedures should be used when a person is welding or cutting coated steel:
- A power brush, grinding wheel or chemical stripper should be used to remove the coating from the steel in the area to be cut or welded. Respiratory and eye protection should be used while stripping the paint.
- A local exhaust hood should be used to remove fumes during the welding or cutting operation.
- A fresh air supplied respirator should be worn during welding or cutting.

EYE PROTECTION:
Use safety eyewear with splash guards or side shields.
A full face shield may be appropriate. Contact lenses should not be worn.

SKIN PROTECTION:
Permeation resistant gloves. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area protected only by the cream to a minimum.

OTHER PROTECTIVE EQUIPMENT AND GUIDELINES:
Safety showers and eye wash stations should be available.
Educate and train employees in the safe use of this product.

MEDICAL SURVEILLANCE:
Medical supervision of all employees who handle or come in contact with this product is recommended. This should include pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthma-type conditions, bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be permitted.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TUZ-GD
TAN 686A ZENTHANE, MIL-C-53039A

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: LIQUID
APPEARANCE: OPAQUE LIQUID
ODOR: SOLVENT ODOR
ODOR THRESHOLD: .10
EVAPORATION RATE: 1.6000 (n-Butyl Acetate = 1)
VAPOR PRESSURE: 15.000
VAPOR DENSITY: 4.000
VOC (LB/GL): 3.4890
VOC (grams/liter): 418.08
WEIGHT PER GALLON: 10.19940 LB/GL
SPECIFIC GRAVITY: 1.2250
% NONEXEMPT SOLVENT by WEIGHT: 34.217
% NONEXEMPT SOLVENT by VOLUME: 51.045
BOILING RANGE: Lower - 232.00 F
Higher - 298.00 F
WATER SOLUBILITY: REACTS WITH WATER
pH: -N/A
FREEZING POINT: -N/A

N/A : Not Available or Not Applicable

SECTION 10 - STABILITY AND REACTIVITY

STABILITY: ( ) - UNSTABLE (X) - STABLE

CONDITIONS TO AVOID:
See INCOMPATIBILITIES.

HAZARDOUS POLYMERIZATION: ( ) - WILL OCCUR (X) - WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS:
May produce hazardous fumes when heated to decomposition as in welding.
Fumes may contain the following:
Carbon Monoxide, Carbon Dioxide, Chlorine, Hydrogen Chloride and possible Cyanide, Hexamethylene Diisocyanate.

INCOMPATIBILITIES (MATERIALS TO AVOID):
Contamination with water, epoxy catalysts, alcohols, glycol ethers, bases, metal complexes or other active materials.
Once the material has been exposed to any of the above or atmospheric moisture, do not reseal container as hazardous Carbon Dioxide gas could build up in the container resulting in rapid depressurization.

SECTION 11 - DISPOSAL CONSIDERATIONS

DISPOSAL METHODS:
Recycle, fuel blend or incinerate.
Dispose of in accordance with applicable laws and regulations.
It is the responsibility of the owner of the waste to dispose of it properly.
Laboratory analysis is recommended to profile the waste for proper disposal determination.
Any containers or equipment used should be decontaminated with the solution given in Section 6.
U.S. E.P.A. WASTE NUMBER and DESCRIPTION:
D001 Waste Paint

HAZARDOUS WASTE CHARACTERISTICS:
Ignitable.

HENTZEN COATINGS, INC.
MATERIAL SAFETY DATA SHEET
08609TUZ-GD
TAN 686A ZENTHANE, MIL-C-53039A

SECTION 12 - TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME:
Paint

UN NUMBER:
UN1263

DOT HAZARD CLASS:
3

DOT LABEL:
Flammable Liquid

DOT PACKAGING GROUP:
PG II

U.S. POSTAL SERVICE: Will not handle.

SECTION 13 - REGULATORY INFORMATION

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

HEXAMETHYLENE DIISOCYANATE MONOMER
CAS# 822-06-0 PCT BY WT: .0350

XYLENE
CAS# 1330-20-7 PCT BY WT: 2.0660

CHROMIC OXIDE
(SARA SECTION 313 CHROMIUM COMPOUND)
CAS# 1308-38-9 PCT BY WT: .7230

METHYL ISOBUTYL KETONE
CAS# 108-10-1 PCT BY WT: 3.9700

SECTION 14 - OTHER INFORMATION

Date of issue: 07-14-98
Last Revision Date: 07-14-98

HMIS Information: Health- 2* Flammability- 3
Reactivity- 1 Personal Protective Equipment-

THE INFORMATION CONTAINED HEREIN IS INFORMATION RECEIVED FROM OUR RAW MATERIAL SUPPLIERS AND OTHER SOURCES AND IS BELIEVED TO BE RELIABLE. THIS DATA IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH HENTZEN COATINGS, INC. ASSUMES LEGAL RESPONSIBILITY.

MATERIAL SAFETY DATA SHEET 17-JUN-1999

MSDS Number: ___972 Status: CURRENT Revision Date: 15-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART A

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: MIL-P-53022B TYPE 1 Keyword: PRIMER, EPOXY
Stock Item Numbers: 8010011930517
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
PRATT & LAMBERT, INC. (WICHITA)
P.O. BOX 2153 Phone: (316) 733-1361
WICHITA, KS 67201 Emergency Phone: (716) 873-6000

Supplier:
PRATT & LAMBERT, INC. (WICHITA)
P.O. BOX 2153 Phone: (316) 733-1361
WICHITA, KS 67201 Emergency Phone: (716) 873-6000

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	BT ____231 & ____405 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ __0.959 (Water = 1)	WT/GAL: 8.0 LBS.
Vapor Pressure:	NG	NG
pH:	NG	NG
Vapor Density:	GT _____1 (Air = 1)	HEAVIER THAN AIR.
Evaporation Rate:	LT _____1	ETHER=1, SLOWER.
% of Volatiles:	EQ _____72 % by Volume	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG
Solubility in water:	NOT GIVEN	

Odor/Appearance/Other Characteristics:
NO ODOR & APPEARANCE GIVEN / VOC: 21.04 LB/GAL SOLIDS, 2525 G/L SOLIDS.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ _____40 deg. F	NG
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NG	NG
Upper Explosion Limit:	NG	NG

SHIPPING REGULATIONS:

UN/NA Number:	NG
DOT Hazard Class:	NG
DOT Label:	NOT GIVEN
Proper Shipping Name:	NOT GIVEN

MSDS Number: ___972 Status: CURRENT Revision Date: 15-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART A

PREPARER/CONTACT INFORMATION: NOT GIVEN
Date Prepared/Revised: 6-APR-1990

COMPONENTS:

ALIPHATIC AMINE ADDUCT
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
EQ ___25 ____0 % of product. CASRN: 31326-29-1

* EXPOSURE LIMITS: NONE ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

N-BUTYL ALCOHOL
OSHA PEL: 150 MG/M3 ACGIH TLV: 150 MG/M3 Other Limits: 455 MG/M3
EQ ___15 ____0 % of product. CASRN: 71-36-3

* PEL & TLV: 50 PPM SKIN/ PEL: CEIL./ OTHER LIMITS: ACGIH STEL; 150 PPM SKIN.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

)PYLENE GLYCOL MONOMETHYL ETHER
OSHA PEL: 360 MG/M3 ACGIH TLV: 360 MG/M3 Other Limits: 540 MG/M3
EQ ___50 ____0 % of product. CASRN: 107-98-2

* PEL & TLV: 100 PPM / OTHER LIMITS: ACGIH AND OSHA STEL; 150 PPM.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

TOLUENE
OSHA PEL: 375 MG/M3 ACGIH TLV: 375 MG/M3 Other Limits: 560 MG/M3
EQ ____5 ____0 % of product. CASRN: 108-88-3

* PEL & TLV: 100 PPM / OTHER LIMITS: ACGIH AND OSHA STEL; 150 PPM.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

DIETHYLENETRIAMINE
OSHA PEL: 4 MG/M3 ACGIH TLV: 4 MG/M3 Other Limits: NOT GIVEN
EQ ____5 ____0 % of product. CASRN: 111-40-0

* PEL: 1 PPM / TLV: 1 PPM SKIN.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

2-METHOXY-1-PROPANOL
)SHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
⌊T ____5 ____0 % of product. CASRN: 1589-47-5

MSDS Number: ___972 Status: CURRENT Revision Date: 15-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART A

* EXPOSURE LIMITS: NONE ESTABLISHED.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

FOR ALL COMPONENTS: PERCENT BY WEIGHT.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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IDENTIFICATION

----------Last change: 6-APR-1990

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

PRODUCT CLASS: GOVERNMENT SPEC. MAT.

TRADE NAME: PRIMER, EPOXY CTG, CORRINHIB, LEAD & CHR FREMIL-P-53022B TY I.

EMERGENCY TELEPHONE NO.: 316-733-1361.

INFORMATION PHONE NO.: 316-733-1361.

MANUFACTURER CODE I.D.: 724701 28.

MANUFACTURER NAME AND ADDRESS:

Pratt & Lambert, Inc.
Industrial Coatings Div.
P.O. Box 2153
Wichita, KS 67201

HMIS:

HEALTH: 2*.
FLAMMABILITY: 3.
REACTIVITY: 0.

These ratings should be used only as part of fully implemented H.M.I.S. program.

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HAZARDOUS INGREDIENTS

----------Last change: 6-APR-1990

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

INGREDIENT	SARA 313	VP mm HG @ 20 DEG. C

MSDS Number: ___972 Status: CURRENT Revision Date: 15-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART A

ALIPHATIC AMINE ADDUCT		
N-BUTYL ALCOHOL	X	6
PROPYLENE GLYCOL MONOMETHYL ETHER		11
TOLUENE	X	22
DIETHYLENETRIAMINE		1
2-METHOXY-1-PROPANOL		NOT GIVEN.

SKIN = SKIN ABSORPTION MUCT BE CONSIDERED AS A ROUTE OF EXPOSURE.
C-CEILING = ALLOW. EXPOSURE LEVEL SHOULD NOT BE EXCEEDED FOR ANY TIME PERIOD.
MFR = MANUFACTURER RECOMMENDED EXPOSURE LIMIT.
STEL = SHORT TERM EXPOSURE LIMIT.
X-SARA 313 = CHEMICAL IS SUBJECT TO REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF S.A.R.A. 40 CFR PART 372.

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HEALTH INFORMATION

----------Last change: 6-APR-1990

'ECTS OF SHORT TERM OVEREXPOSURE:

SWALLOWING: Can cause gastrointestinal irritation, nausea, and vomiting. Aspiration of material into lung may cause chemical pneumonitis which can be fatal.

INHALATION: May cause respiratory sensitization. May cause nose or throat irritation. High concentrations may cause acute central nervous system depression characterized by headaches, dizziness, nausea and confusion.

EYE: May cause severe eye irritation and corneal damage.

SKIN: Liquid material may be absorbed through the skin in harmful amounts. May cause skin sensitization (allergic reaction). May cause severe skin irritation.

EFFECTS OF REPEATED OVEREXPOSURE: Repeated overexposure to toluene may cause liver damage. Repeated contact may causes dermatitis. Reports have associated prolonged and repeated occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmbul or fatal.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH: Toluene has been found to cause kidney, lung and spleen damaage in laboratory animals.

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MSDS Number: ___972 Status: CURRENT Revision Date: 15-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART A

FIRST AID AND EMERGENCY PROCEDURES
----------Last change: 6-APR-1990
SWALLOWING: If swallowed do not induce vomiting. Give 1 or 2 glasses of water to dilute (Never give anything by mouth to an unconscious person). Call Poison Control Center, Hospital Emergency Room, or Physician immediately.

INHALATION: Remove to fresh air immediately. If breathing has stopped, give artificial respiration. Keep warm and quiet. Get medical attention immediately.

EYE: Flush with large amounts of water, lifting upper and lower lids occasionally. Continue for at least 15 minutes. Get medical attention.

SKIN: Immediately flush the contaminated area with large amounts of water. Remove contaminated clothing as water is applied. Consult a physician.

NOTES TO PHYSICIAN: Any treatment that might be required for overexposure should be directed at the control of symptoms and the clinical conditions.

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PHYSICAL DATA
----------Last change: 6-APR-1990
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

VOC: 5.88 LB/GAL LESS WATER & NPRS*; 706 G/L LESS WATER. CALCULATED.

VOC: 21.04 LB/GAL SOLIDS; 2525 G/L SOLIDS CALCULATED.

* Negligibly Photochemically Reactive Materials.
VOC values reported here are verified by ASTM method D-3960.

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FIRE AND EXPLOSION DATA
----------Last change: 6-APR-1990
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

NFPA FLAMMABILITY CLASSIFICATION: FLAMMABLE LIQUID - CLASS IB.

FLASHPOINT: 40 DEG. F, CALCULATED.

EXTINGUISHING MEDIA: Use NFPA Class B Fire extinguishers (carbon dioxide, all purpose dry chemical or alcohol foam) designed to extinguish flammable liquid fires. Polymer foam is preferred for large fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS: During emergency conditions, overexposure to decomposition products may cause a health hazard. Symptoms

may not be immediately apparent. Obtain medical attention.
WARNING! FLAMMABLE.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective, but may be used to cool exposed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

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REACTIVITY DATA

----------Last change: 6-APR-1990

STABILITY: Hazardous polymeization may occur with the addition of excess hardener.

CONDITIONS TO AVOID: Avoid excessive heat and sources of ignition.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong acids or alkaline materials. Oxidizing materials. Accelerators.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning, including when heated by welding cutting, will produce smoke, carbon monoxide and carbon dioxide.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Keep away from heat sparks and flame.

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ENVIRONMENTAL INFORMATION

----------Last change: 6-APR-1990

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Keep spectators away. Eliminate all ignition sources (flames, hot surfaces, and sources of electrical, static or frictional sparks). Dike and contain spill with inert material (e.g. sand, earth). Transfer liquids to covered metal containers for recovery or disposal, or remove with inert absorbent. Use only non-sparking tools. Place absorbent diking materials in covered metal containers for disposal. Prevent contamination of sewers, streams, and groundwater with spilled material or used absorbent.

WASTE DISPOSAL: Dispose in accordance with federal, state and local laws. Incinerate only in EPA permitted facility. Do not incinerate closed containers. Observe precautions for disposal of flammable materials. Contaminated absorbent may be disposed in a hazardous waste landfill. Dispose only in accordance with federal, state and local regulations.

RCRA CLASSIFICATION: This product, if discarded directly, would be classified as hazardous waste based on its ignitability characteristic, i.e. has a flash point of 140 deg. F., or less. The proper RCRA classibication

MSDS Number: ___972 Status: CURRENT Revision Date: 15-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART A

would be D001.

ENVIRORNMENTAL HAZARDS: None known.

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PERSONAL PROTECTION INFORMATION

----------Last change: 6-APR-1990

RESPIRATORY PROTECTION: Proper selection of respiratory protection depends upon many factors including duration and level of exposure and conditions of use. In general exposure to organic chemicals such as those contained in this product may not require the use of respiratory protection if used in well ventilated areas. In areas of restricted ventilation a NIOSH approved organic vapor respirator may be required. Under certain conditions, such as spraying, a mechanical prefilter may also be required. In confined areas or in high exposure situations a NIOSH/MSHA approved air supplied respirator may requried. If the TLV's or PEL's listed in HAZARDOUS INGREDIENTS Section are exceeded use a properly fitted NIOSH/MSHA approved respirator with an appropriate protection factor. Refer to OSHA 29 CFR 1910.134 "Respiratory Protection" and "Respiratory Protection a Manual and Guideline, American Industrial Hygiene Association."

VENTILATION: Provide general dilution and local exhaust ventilation in sufficient volume and pattern to keep concentrations of hazardous ingredients listed in HAZARDOUS INGREDIENTS Section below the lowest exposure limit stated. Remove decomposition products that are generated when welding, cutting, or brazing objects coated with this product.

HAND PROTECITON: Solvent impermeable gloves are required for repeated or prolonged contact.

EYE PROTECTION: Wear safety glasses meeting the specification of ANSI Z87.1 where no contact with the eye is anticipated. Chemical safety goggles meeting the apecifications of ANSI Z87.1 should be worn whenever there is a possibility of splashing or other contact with the eyes.

OTHER PROTECTIVE EQUIPMENT: Eyewash facility, safety shower.

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SPECIAL PRECAUTIONS

----------Last change: 6-APR-1990

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Do not store above 90 degrees F.

OTHER PRECAUTIONS:

Do not take internally. Close container after each use.
Keep away from children.

Avoid skin contact.
Empty containers must not be washed and re-used for any purpose.
Containers should be grounded and bonded to the receiving container.
Do not weld, braze or cut on empty container.
Never use pressure to empty. Drum is not a pressure vessel.

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SPECIAL NOTES

----------Last change: 6-APR-1990

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. WHILE THE INFORMATION IS BELIEVED TO BE RELIABLE, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SINCE THE USE OF THIS INFORMATION AND THE CONDITIONS AND USE OF THIS PRODUCT ARE CONTROLLED BY THE USER, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THE PRODUCT.

End of Report

MATERIAL SAFETY DATA SHEET 3-JUN-1999

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: NOT GIVEN Keyword: NOT GIVEN
Stock Item Numbers: 80300002812726
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
PRATT & LAMBERT, INC. (WICHITA)
P.O. BOX 2153 Phone: (316) 733-1361
WICHITA, KS 67201 Emergency Phone: (716) 873-6000

Supplier:
PRATT & LAMBERT, INC. (WICHITA)
P.O. BOX 2153 Phone: (316) 733-1361
WICHITA, KS 67201 Emergency Phone: (716) 873-6000

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	BT ____180 & ____500 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ __0.887 (Water = 1)	WT/GAL: 7.4.
Vapor Pressure:	NG	NG
pH:	NG	NG
Vapor Density:	GT _____1 (Air = 1)	HEAVIER THAN AIR.
Evaporation Rate:	LT _____1	ETHER=1, SLOWER.
% of Volatiles:	EQ _____89 % by Volume	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: NOT GIVEN
Odor/Appearance/Other Characteristics: NOT GIVEN

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ _____53 deg. F	CALCULATED.
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NG	NG
Upper Explosion Limit:	NG	NG

SHIPPING REGULATIONS:
UN/NA Number: NG
DOT Hazard Class: NG
DOT Label: NOT GIVEN
Proper Shipping Name: NOT GIVEN

PREPARER/CONTACT INFORMATION: NOT GIVEN

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

Date Prepared/Revised: 18-JUN-1990

COMPONENTS:

ISOPROPYL ALCOHOL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 67-63-0

* ACGIH & OSHA STEL.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

N-BUTYL ALCOHOL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
EQ ___15 ____0 % of product. CASRN: 71-36-3

* PEL: CEILING / ACGIH STEL.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ZINC CHROMATE
OSHA PEL: .10 MG/M3 ACGIH TLV: .01 MG/M3 Other Limits: NOT GIVEN
EQ ____5 ____0 % of product. CASRN: 13530-65-9

* PEL-CEILING: .10 MG/M3.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PHOSPHORIC ACID
OSHA PEL: 1 MG/M3 ACGIH TLV: 1 MG/M3 Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 7664-38-2

FOR ALL COMPONENTS: PERCENT BY WEIGHT.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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IDENTIFICATION

----------Last change: 18-JUN-1990

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

PRODUCT CLASS: GOVERNMENT SPEC. MAT.

TRADE NAME: PRIMER - WASH PRETREAT. FORM. 117 FOR METALS DOD-P-15328D AM 1.

MANUFACTURER CODE I.D.: 728014 01.

DATE OF PREPARATION: 6/18/90.

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

EMERGENCY PHONE NO.: 316-733-1361.

INFORMATION PHONE NO.: 316-733-1361.

H.M.I.S.:

HEALTH: 3*.
FLAMMABILITY: 3.
REACTIVITY: 0.

These ratings should be used only as part of fully implemented H.M.I.S. program.

MANUFACTURER:

Pratt & Lambert, Inc.
Industrial Coatings Div.
P.O. Box 2153
Wichita, KS 67201.

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HAZARDOUS INGREDIENTS

----------Last change: 18-JUN-1990

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

INGREDIENT		MG/CU.M.	ALLOWABLE EXPOSURE LEVEL			SARA 313	VP mm HG 20 DEG C
				MPPCF	SKIN		
ISOPROPYL ALCOHOL	TLV-TWA	980					33
	TLV-STEL	1225					
	OSHA-PEL	980					
	OSHA-STEL	1225					
N-BUTYL ALCOHOL	TLV-TWA	150	C		SKIN	X	6
	TLV-STEL	455			SKIN		
	OSHA-CEIL	150	C		SKIN		
ZINC CHROMATE	TLV-TWA	.0100				X	
	OSHA-PEL	.1000	C				
	OSHA-CEIL	.1000					
PHOSPHORIC ACID	TLV-TWA	1					1
	OSHA-PEL	1					

(N = SKIN ABSORPTION MUST BE CONSIDERED AS A ROUTE OF EXPOSURE.
C - CEILING = ALLOW. EXPOSURE LEVEL SHOULD NOT BE EXCEEDED FOR ANY TIME PERIOD.

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

MFR = MANUFACTURER RECOMMENDED EXPOSURE LIMIT.
STEL = SHORT TERM EXPOSURE LIMIT.
X - SARA 313 = CHEMICAL IS SUBJECT TO REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF S.A.R.A. 40 CFR PART 372.

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HEALTH INFORMATION

----------Last change: 18-JUN-1990

EFFECTS OF SHORT TERM OVEREXPOSURE:

SWALLOWING: Ingestion may cause severe burns of the mucous membranes of the mouth, esophagus, and stomach pain; nausea and vomiting. Can cause gastrointestinal irritation, nausea, and vomiting. Aspiration of material into lung may cause chemical pneumonitis which can be fatal.

INHALATION: May cause severe irritation of the upper respiratory tract resulting in a cough, burning of the throat, and a choking sensation. Deep inhalation may cause pulmonary edema which may be delayed in onset.

EYE: May cause severe eye irritation and corneal damage.

SKIN: Liquid material may be absorbed through the skin in harmful amounts. May cause severe burns unless washed off immediately.

EFFECTS OF REPEATED OVEREXPOSURE: Repeated and prolonged overexposure to relatively insoluble chromates may cause lung cancer.

Repeated and prolonged exposure may cause dermatitis and erosion of the teeth.

Reports have associated prolonged and repeated occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH: Zinc chromate has been listed as a potential carcinogen by the International Agency for Research on Cancer.

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FIRST AID AND EMERGENCY PROCEDURES

----------Last change: 18-JUN-1990

SWALLOWING: If swallowed do not induce vomiting. Give 1 or 2 glasses of water to dilute (Never give anything by mouth to an unconscious person).
Call Poison Control Center, Hospital Emergency Room, or Physician immediately.

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

INHALATION: Remove to fresh air immediately. If breathing has stopped, give artificial respiration. Keep warm and quiet. Get medical attention immediately.

EYE: Flush with large amounts of water, lifting upper and lower lids occasionally. Continue for at least 15 minutes. Get medical attention.

SKIN: Immediately flush the contaminated area with large amounts of water. Remove contaminated clothing as water is applied. Consult a physician.

NOTES TO PHYSICIAN: Any treatment that might be required for overexposure should be directed at the control of symptoms and the clinical conditions.

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PHYSICAL DATA

----------Last change: 18-JUN-1990

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

VOC 5.89 lb/gal less water & NPRS*	707 g/l less water	CALCULATED.
[illegible] 55.51 lb/gal solids	6661 g/l solids	CALCULATED.

*Negligibly Photochemically Reactive Materials.
VOC values reported here are verified by ASTM method D-3960.

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FIRE AND EXPLOSION DATA

----------Last change: 18-JUN-1990

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

NFPA FLAMMABILITY CLASSIFICATION: FLAMMABLE LIQUID - CLASS IB.

EXTINGUISHING MEDIA: Use NFPA Class B fire extinguishers (carbon dioxide, all purpose dry chemical or alcohol foam) designed to extinguish flammable liquid fires. Polymer foam is preferred for large fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS: During emergency conditions, overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention. WARNING! FLAMMABLE.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective, but may be used to cool exposed containers to prevent pressure build-up and possible auto-ignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

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MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

REACTIVITY DATA
----------Last change: 18-JUN-1990
STABILITY: Normally stable.

CONDITIONS TO AVOID: Avoid excessive heat and sources of ignition.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong acids or alkaline materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning, including when heated by welding or cutting, will produce smoke, carbon monoxide and carbon dioxide. In addition, oxides of chromium or oxides of zinc, may be generated. Welding, brazing, or torch cutting materials coated with this product may produce metal oxides. Overexposure to these metal oxides may result in "Metal Fume Fever". Symptoms include a flu-like illness with fever, chills, and cough. An air purifying or supplied air respirator may be required depending upon levels of exposure. Consult a qualified health and safety professional.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Keep away from heat sparks and flame.

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ENVIRONMENTAL INFORMATION
----------Last change: 18-JUN-1990
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wear appropriate protective equipment. Respirators, eye protection, acid impervious gloves and body suits. Ventilate area of leak. Stop source of leak. Confine and collect spilled material. Dilute and/or neutralize. Keep spectators away. Eliminate all ignition sources (flames, hot surfaces, and sources of electrical, static or frictional sparks). Dike and contain spill with inert material (e.g. sand, earth). Transfer liquids to covered metal containers for recovery or disposal, or remove with inert absorbent. Use only non-sparking tools. Place absorbent diking materials in covered metal containers for disposal. Prevent contamination of sewers, streams, and groundwater with spilled material or used absorbent.

WASTE DISPOSAL: Dispose in accordance with federal, state and local laws. Incinerate only in EPA permitted facility. Do not incinerate closed containers. Observe precautions for disposal of flammable materials. Contaminated absorbant may be disposed in a hazardous waste landfill. Dispose only in accordance with federal, state and local regulations.

RCRA CLASSIFICATION: This product, if discarded directly, would be classified a hazardous waste based on its ignitability characteristic, i.e. a flash point of 140 deg. F., or less. The proper RCRA classification would be D001.

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

ENVIRONMENTAL HAZARDS: None known.

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PERSONAL PROTECTION INFORMATION
----------Last change: 18-JUN-1990
RESPIRATORY PROTECTION: Proper selection of respiratory protection depends upon many factors including duration/level of exposure and conditions of use. In general exposure to organic chemicals such as those contained in this product may not require the use of respiratory protection if used in well ventilated areas. In restricted ventilation areas a NIOSH approved chemical cartridge respirator may be required. Under certain conditions, such as spraying, a mechanical prefilter may also be required. In confined areas use a NIOSH/MSHA approved air supplied respirator. If the TLV's listed in HAZARDOUS INGREDIENTS SECTION are exceeded use a properly fitted NIOSH/MSHA approved respirator with an appropriate protection factor. Refer OSHA 29 CFR 1910.134 "Respiratory Protection" and "Respiratory Protection A Manual And Guideline, American Industrial Hygiene Assoc."

VENTILATION: Provide general dilution and local exhaust ventilation in sufficient volume and pattern to maintain concentrations of hazardous substances listed in HAZARDOUS INGREDIENTS SECTION below the lowest exposure limits stated.

HAND PROTECTION: Solvent impermeable gloves are required for repeated or prolonged contact.

EYE PROTECTION: Wear safety spectacles, chemical splash goggles (ANSIZ87.1 or equivalent) and face shield.

OTHER PROTECTIVE EQUIPMENT: Eyewash facility, safety shower.

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SPECIAL PRECAUTIONS
----------Last change: 18-JUN-1990
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Do not store above 95 degrees F. Store large quantities in compliance with OSHA 29CFR1910.106.

OTHER PRECAUTIONS: Do not take internally. Close container after each use. Keep away from children. Empty containers must not be washed and re-used for any purpose. Containers should be grounded and bonded to the receiving container. Do not weld, braze or cut on empty container. Never use pressure to empty. Drum is not a pressure vessel.

==========
OTHER INFORMATION
----------Last change: 18-JUN-1990

MSDS Number: ___362 Status: CURRENT Revision Date: 13-NOV-1996
PRODUCT NAME: PRIMER-WASH PRETREAT FORM 117 FOR METALS

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. WHILE THE INFORMATION IS BELIEVED TO BE RELIABLE, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SINCE THE USE OF THIS INFORMATION AND THE CONDITIONS AND USE OF THIS PRODUCT ARE CONTROLLED BY THE USER, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THE PRODUCT.

End of Report

MATERIAL SAFETY DATA SHEET 17-JUN-1999

MSDS Number: ___497 Status: CURRENT Revision Date: 17-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART B

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: MIL-P-53022B TYPE 1 Keyword: PRIMER, EPOXY
Stock Item Numbers: 8010011930517
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
PRATT & LAMBERT, INC.
BOX 22 Phone: (716) 873-6000
BUFFALO, NY 14240 Emergency Phone: (716) 873-6000

Supplier:
PRATT & LAMBERT, INC.
BOX 22 Phone: (716) 873-6000
BUFFALO, NY 14240 Emergency Phone: (716) 873-6000

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	BT ____231 & ____405 deg. F	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ ___0.96 (Water = 1)	WT/GAL: 8.0 LBS.
Vapor Pressure:	NG	NG
pH:	NG	NG
Vapor Density:	GT _____1 (Air = 1)	HEAVIER THAN AIR.
Evaporation Rate:	LT _____1	ETHER=1, SLOWER.
% of Volatiles:	EQ _____72 % by Volume	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NG

Solubility in water: NOT GIVEN
Odor/Appearance/Other Characteristics: NOT GIVEN

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ _____40 deg. F	CALCULATED.
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NG	NG
Upper Explosion Limit:	NG	NG

SHIPPING REGULATIONS:
UN/NA Number: NG
DOT Hazard Class: NG
DOT Label: NOT GIVEN
Proper Shipping Name: NOT GIVEN

PREPARER/CONTACT INFORMATION: TOM FRIEDMAN

MSDS Number: ___497 Status: CURRENT Revision Date: 17-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART B

Date Prepared/Revised: 3-FEB-1987

COMPONENTS:

N-BUTYL ALCOHOL
OSHA PEL: 300 MG/M3 ACGIH TLV: 150 MG/M3 Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 71-36-3

* PEL: 100 PPM / TLV: 50 PPM.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PROPYLENE GLYCOL MONOETHYL ETHER
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 111-35-3

* MFR: 100 PPM, 360 MG/M3.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

TOLUENE
OSHA PEL: 200 PPM ACGIH TLV: 100 PPM Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 108-88-3

* TLV: 375 MG/M3.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

DIETHYLENETRIAMINE
OSHA PEL: NOT GIVEN ACGIH TLV: 4 MG/M3 Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 111-40-0

* TLV: 1 PPM.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PROPYLENE GLYCOL MONOMETHYL ETHER
OSHA PEL: NOT GIVEN ACGIH TLV: 100 PPM Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: 107-98-2

* TLV: 360 MG/M3.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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IDENTIFICATION

----------Last change: 3-FEB-1987

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

MSDS Number: ___497 Status: CURRENT Revision Date: 17-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART B

PRODUCT CLASS: GOVERNMENT SPEC. MAT.

TRADE NAME: PRIMER, EPOXY CTG, CORRINHIB, LEAD & CHR FREEPART B.

MANUFACTURER CODE I.D.: 724701.

EMERGENCY PHONE NO.: 316-733-1361.

INFORMATION PHONE NO.: 316-733-1361.

H.M.I.S.:

HEALTH: 2.
FLAMMABILITY: 3.
REACTIVITY: 0.

Those ratings should be used only as part of fully implemented H.M.I.S. program.

MANUFACTURER NAME AND ADDRESS:

'RATT & LAMBERT, INC.
INDUSTRIAL COATINGS DIV.
P.O. BOX 2153
WICHITA, KS 67201.

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HAZARDOUS INGREDIENTS

----------Last change: 3-FEB-1987

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

INGREDIENT	ALLOWABLE EXPOSURE LEVEL FBR/CC	MPPCF	SKIN	MAC	VP MM HG @ 20 DEG.C
N-BUTYL ALCOHOL	NA	NA	X	X	
	NA	NA	X	NA	
PROPYLENE GLYCOL MONOETHYL ETHER	NA	NA	NA	NA	
	NA	NA	NA	NA	
TOLUENE	NA	NA	NA	NA	
	NA	NA	NA	NA	
DIETHYLENETRIAMINE	NA	NA	X	NA	
PROPYLENE GLYCOL MONOMETHYL ETHER	NA	NA	NA	NA	
	NA	NA	NA	NA	

MSDS Number: ___497 Status: CURRENT Revision Date: 17-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART B

NA = Not applicable.
X-SKIN = SKIN ABSORPTION MUST BE CONSIDERED AS A ROUTE OF EXPOSURE.
X - MAC = ALLOWABLE EXPOSURE LEVEL SHOULD NOT BE EXCEEDED FOR ANY TIME PERIOD.

==========
HEALTH INFORMATION
----------Last change: 3-FEB-1987
EFFECTS OF SHORT TERM OVEREXPOSURE:

SWALLOWING: Can cause gastrointestinal irritation, nausea, and vomiting. Aspiration of material into lung may cause chemical pneumonitis which can be fatal.

INHALATION: Anesthetic. May cause irritation, of the nose and throat, and acute nervous system depression. Characterized by headache, dizziness, confusion, nausea, unconsciousness and even asphyxiation.

EYE: May cause eye irritation.

KIN: Liquid material may be absorbed through the skin in harmful amounts. May cause skin sensitization. May cause defatting and irritation of the skin.

EFFECTS OF REPEATED EXPOSURE: Repeated overexposure to toluene may cause liver damage. Repeated contact may cause dermatitis. Reports have associated prolonged and repeated occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH:
Toluene has been found to cause kidney, lung and spleen damage in laboratory animals.

==========
FIRST AID AND EMERGENCY PROCEDURES
----------Last change: 3-FEB-1987
SWALLOWING: If swallowed call poison control center, hospital emergency room or physician immediately.

INHALATION: Remove to fresh air immediately. If breathing has stopped give artificial respiration. Keep warm and quiet. Get medical attention immediately.

EYE: Flush with large amounts of water, lifting upper and lower lids asionally. Continue for at least 15 minutes. Get medical attention.

SKIN: Remove contaminated clothing. Wash affected area with soap and water.

MSDS Number: 497 Status: CURRENT Revision Date: 17-JUN-1994
PRODUCT NAME: PRIMER, EPOXY CORROSION INHIB. LEAD & CHROME FREE PART B

Obtain medical attention if irritation persists.

NOTES TO PHYSICIAN: Any treatment that might be required for overexposure should be directed at the control of symptoms and the clinical conditions.

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PHYSICAL DATA
----------Last change: 3-FEB-1987
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

VOC: 5.7 lb/gal less water 684 g/l less water CALCULATED.
VOC: 20.6 lb/gal solids 2472 g/l solids CALCULATED.

==========
FIRE AND EXPLOSION DATA
----------Last change: 3-FEB-1987
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

NFPA FLAMMABILITY CLASSIFICATION: FLAMMABLE LIQUID - CLASS 1B.

EXTINGUISHING MEDIA: Use NFPA Class B Fire extinguishers (carbon dioxide all purpose dry chemical or alcohol foam) designed to extinguish flammable liquid fires. Polymer foam is preferred for large fires.

UNUSUAL FIRE AND EXPOSION HAZARDS: During emergency conditions, overexposure to decompostion products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention. WARNING! FLAMMABLE.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear self-contained breathing apparatus. Water may be ineffective but may be used to cool exposed containers to prevent pressure build-up and possible auto - ignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

==========
REACTIVITY DATA
----------Last change: 3-FEB-1987
STABILITY: Hazardous polymerization may occur with the addition of excess hardener.

CONDITIONS TO AVOID: Avid excessive heat and sources of ignition.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong acids or alkaline materials. dizing materials. Accelerators.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning, including when heated by welding

or cutting, will produce smoke, carbon monoxide and carbon dioxide.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Keep away from heat sparks and flame.

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ENVIRONMENTAL INFORMATION

----------Last change: 3-FEB-1987

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Keep spectators away. Eliminate all ignition sources (flames, hot surfaces, and sources of electrical, static or frictional sparks). Dike and contain spill with inert material (e.g. sand, earth). Transfer liquids to covered metal containers for recovery or disposal, or remove with inert absorbent. Use only non-sparking tools. Place absorbent diking materials in covered metal containers for disposal. Prevent contamination of sewers, streams, and groundwater with spilled material or used absorbent.

WASTE DISPOSAL: Dispose in acordance with federal, state and local laws. Incinerate only in EPA permitted facility. Do not incinerate closed containers. Observe precautions for disposal or flammable materials. Contaminated absorbant may be disposed in a hazardous waste landfill. Dispose only in accordance with federal, state and local regulations.

RCRA CLASSIFICATION: This product, if discarded directly, would be classified a hazardous waste based on its ignitability characteristic, i.e. has a flash point of 140 deg. F. or less. The proper RCRA classification would be D001.

ENVIRONMENTAL HAZARDS: None known.

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PERSONAL PROTECTION INFORMATION

----------Last change: 3-FEB-1987

RESPIRATORY PROTECTION: When spraying outdoors, or in open or well-ventilated areas, use NIOSH approved mechanical filter respirator to remove overspray. In restricted ventilation areas, use NIOSH approved paint spray (combination chemical cartridge/mechanical filter) respirator to remove spray mist and organic vapors. In confined areas use a NIOSH approved air-supplied respirator. Refer to OSHA 29 CFR 1910.134 "Respiratory Protection".

VENTILATION: Provide general dilution and local exhaust ventilation in sufficient volume and pattern to maintain concentrations of hazardous ingredients listed in HAZARDOUS INGREDIENTS SECTION below the lowest exposure limits stated. Remove decomposition products that are generated when welding, cutting, or brazing objects coated with this product. Vapors produced while

drying or baking this product must be properly vented.

HAND PROTECTION: Solvent impermeable gloves are required for repeated or prolonged contact.

EYE PROTECTION: Wear safety spectacles.

OTHER PROTECTIVE EQUIPMENT: Eyewash facility, safety shower.

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SPECIAL PRECAUTIONS

----------Last change: 3-FEB-1987

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Do not store above 90 degrees F.

OTHER PRECAUTIONS: Do not take internally. Close container after each use. Keep away from children. Avoid skin contact. Empty containers must not be washed and re-used for any purpose. Containers should be grounded and bonded to the receiving container. Do not weld, braze or cut on empty container. Never use pressure to empty. Drum is not a pressure vessel.

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SPECIAL NOTES

----------Last change: 3-FEB-1987

The information contained herein is based on data considered to be accurate. While the information is believed to be reliable, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. Since the use of this information and the conditions and use of this product are controlled by the user, it is the user's obligation to determine the conditions of safe use of the product.

End of Report

MATERIAL SAFETY DATA SHEET 2-JUN-1999

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: NOT GIVEN Keyword: NOT GIVEN
Stock Item Numbers: 8010001818079
8010013283233
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
CHEMICAL SPECIALISTS & DEVELOPMENT
#5 HACKBERRY LANE Phone: (409) 756-1065
CUT & SHOOT, TX 77303 Emergency Phone: (800) 424-9300

Supplier:
CHEMICAL SPECIALISTS & DEVELOPMENT
#5 HACKBERRY LANE Phone: (409) 756-1065
CUT & SHOOT, TX 77303 Emergency Phone: (800) 424-9300

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	EQ	____179 deg. F	82'C.
Melting Point:	EQ	____-20 deg. F	-29'F.
Freezing Point:	NG		NG
Pour Point:	NG		NG
Softening Point:	NG		NG
Specific Gravity:	EQ	__0.850 (Water = 1)	NG
Vapor Pressure:	EQ	___35.1 mmHg @ _____70 deg. F	MMHG.
pH:	NK		NG
Vapor Density:	EQ	____3.4 (Air = 1)	NG
Evaporation Rate:	LT	_____1	ETHER = 1, SLOWER.
% of Volatiles:	EQ	____100 % by Volume	NG
Molecular Weight:	NG		NG
Viscosity:	NK		NG

Solubility in water: MODERATE.

Odor/Appearance/Other Characteristics:
CLEAR, LITTLE IF ANY COLOR, CHARACTERISTIC ODOR.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ	_____20 deg. F	6.7'C.
Open Cup Flash:	NG		NG
Fire Point:	NG		NG
Auto Ignition:	NK		NG
Lower Explosion Limit:	EQ	____1.0 %	NG
Upper Explosion Limit:	NK		NG

SHIPPING REGULATIONS:
UN/NA Number: UN 1263
DOT Hazard Class: 3
DOT Label: FLAMMABLE LIQUID
Proper Shipping Name: PAINT RELATED MATERIAL

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

PREPARER/CONTACT INFORMATION: DAVID SHIPP
Date Prepared/Revised: 1-SEP-1990

COMPONENTS:

METHYL ETHYL KETONE
OSHA PEL: 200 PPM ACGIH TLV: 200 PPM Other Limits: 300 PPM
EQ _30.5 ____0 % of product. CASRN: 78-93-3

* OSHA & ACGIH STEL.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
____0 ____0 % of product. CASRN: NOT GIVEN

HEXYL ACETATE MIXED SOMERS
OSHA PEL: NK ACGIH TLV: NK Other Limits: NOT GIVEN
EQ _41.0 ____0 % of product. CASRN: 88230-35-7

TOLUENE
OSHA PEL: 200 PPM ACGIH TLV: 50 PPM Other Limits: 150 PPM
EQ _10.5 ____0 % of product. CASRN: 108-88-3

)SHA STEL.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

N-BUTYL ACETATE
OSHA PEL: 150 PPM ACGIH TLV: 150 PPM Other Limits: 200 PPM
EQ _11.0 ____0 % of product. CASRN: 123-86-4

* OSHA & ACGIH STEL.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

XYLENES
OSHA PEL: 100 PPM ACGIH TLV: 100 PPM Other Limits: 150 PPM
EQ __7.0 ____0 % of product. CASRN: 1330-20-7

* OSHA & ACGIH STEL.
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

==========
GENERAL INFORMATION
----------Last change: 1-SEP-1990
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

M NAME: THINNER, AIRCRAFT COATING, POLYURETHANE

PART NUMBER/TRADE NAME: THINNER AIRCRAFT COATING

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

FSC: 8010

NIIN: 001818079

MANUFACTURER'S CAGE: 5W216

PART NO. INDICATOR: B

DISTRIBUTOR/VENDOR # 1:
DISTRIBUTOR/VENDOR # 1 CAGE:

DISTRIBUTOR/VENDOR # 2:
DISTRIBUTOR/VENDOR # 2 CAGE:

DISTRIBUTOR/VENDOR # 3:
DISTRIBUTOR/VENDOR # 3 CAGE:

DISTRIBUTOR/VENDOR # 4:
DISTRIBUTOR/VENDOR # 4 CAGE:

SAFETY DATA ACTION CODE:

SAFETY FOCAL POINT: G

RECORD NO. FOR SAFETY ENTRY: 008

TOT SAFETY ENTRIES THIS STK#: 010

STATUS: FM

SAFETY DATA REVIEW DATE: 12MAR91

SUPPLY ITEM MANAGER: GSA

MSDS PREPARER'S COMPANY NAME AND ADDRESS:

CHEMICAL SPECIALISTS & DEVELOPMENT
P.O. BOX #5 HACKBERRY LANE
CUT & SHOOT, TX 77303

OTHER MSDS NUMBER:

MSDS SERIAL NUMBER: 80ZSK

SPECIFICATION NUMBER: MIL-T-81772B

'C TYPE, GRADE, CLASS: TYPE I

HAZARD CHARACTERISTIC CODE: N/

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

UNIT OF ISSUE: CN

UNIT OF CONTAINER QTY: 5 GAL CAN

TYPE OF CONTAINER: METAL

NET UNIT WEIGHT: N/K

NRC/STATE LICENSE NUMBER: N/K

NET EXPLOSIVE WEIGHT: N/K

NET PROPELLANT WEIGHT-AMMO: N/K

COAST GUARD AMMUNITION CODE: N/K

MANUFACTURER'S NAME AND ADDRESS:

CHEMICAL SPECIALISTS & DEVELOPMENT
#5 HACKBERRY LANE
CUT & SHOOT, TX 77303 US

MANUFACTURER'S EMERG PH #: 800-424-9300

MANUFACTURER'S INFO PH # 409-756-1065

000 HAZARDOUS MATERIALS INFORMATION SYSTEM
0o0 6050.5-LR
AS OF MAY 1994
PROPRIETARY VERSION - FOR U.S. GOVERNMENT USE ONLY

==========

INGREDIENTS/IDENTITY INFORMATION

----------Last change: 1-SEP-1990

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

PROPRIETARY: NO

INGREDIENT: METHYL ETHYL KETONE (2-BUTANONE) (MEK) (SARA III)

INGREDIENT SEQUENCE NUMBER: 01
INGREDIENT ACTION CODE:
INGREDIENT FOCAL POINT: G
NIOSH (RTECS) NUMBER: EL6475000
OTHER RECOMMENDED LIMIT: NONE SPECIFIED

PROPRIETARY: NO

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

INGREDIENT: HEXYL ACETATE MIXED ISOMERS

INGREDIENT SEQUENCE NUMBER: 02
INGREDIENT ACTION CODE:
INGREDIENT FOCAL POINT: G
NIOSH (RTECS) NUMBER: 1004009HA
OTHER RECOMMENDED LIMIT: 50 PPM 8 HOUR TWA

PROPRIETARY: NO

INGREDIENT: TOLUENE (SARA III)

INGREDIENT SEQUENCE NUMBER: 03
INGREDIENT ACTION CODE:
INGREDIENT FOCAL POINT: G
NIOSH (RTECS) NUMBER: XS5250000
OTHER RECOMMENDED LIMIT: NONE SPECIFIED

PROPRIETARY: NO

INGREDIENT: N-BUTYL ACETATE (SARA III)

INGREDIENT SEQUENCE NUMBER: 04
INGREDIENT ACTION CODE:
INGREDIENT FOCAL POINT: G
NIOSH (RTECS) NUMBER: AF7350000
OTHER RECOMMENDED LIMIT: NONE SPECIFIED

PROPRIETARY: NO

INGREDIENT: XYLENES (O-,M-,P- ISOMERS) (SARA III)

INGREDIENT SEQUENCE NUMBER: 05
INGREDIENT ACTION CODE:
INGREDIENT FOCAL POINT: G
NIOSH (RTECS) NUMBER: ZE2100000
OTHER RECOMMENDED LIMIT: NOT SPECIFIED

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PHYSICAL/CHEMICAL CHARACTERISTICS

----------Last change: 1-SEP-1990

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

DECOMPOSITION TEMPERATURE: N/K

RADIOACTIVITY: N/K

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

FORM (RADIOACTIVE MATL): N/K

MAGNETISM (MILLIGAUSS): N/K

CORROSION RATY (IPY): NONE

==========

FIRE AND EXPLOSION HAZARD DATA

----------Last change: 1-SEP-1990

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

EXTINGUISHING MEDIA: REGULAR FORM OR CARBON DIOXIDE OR DRY CHEMICAL.

SPECIAL FIRE FIGHTING PROC: WEAR SELF CONTAINED BREATHING APPARATUS W/ FULL FACEPIECE OPERATED IN POSITIVE PRESS. DEMAND MODE. VAPOR MAY TRAVEL TO IGNITE SOURCES DISTANT FROM HANDLING POINT.

UNUSUAL FIRE AND EXPL HAZARDS: NEVER WELD, USE CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) CAN IGNITE EXPLOSIVELY. ALL 5 GAL PAIL & LARGE METAL CONTAINERS MUST BE GROUND/BOND WHEN TRANSFERRING MATERIAL.

==========

REACTIVITY DATA

----------Last change: 1-SEP-1990

STABILITY: YES

COND TO AVOID (STABILITY): N/K

MATERIALS TO AVOID: AVOID CONTACT WITH STRONG OXIDIZING AGENTS

HAZARDOUS DECOMP PRODUCTS: MAY FORM TOXIC MATERIALS. CARBON DIOXIDE & CARBON MONOXIDE. VARIOUS HYDROCARBONS, ETC.

HAZARDOUS POLY OCCUR: NO

CONDITIONS TO AVOID (POLY): N/K

==========

HEALTH HAZARD DATA

----------Last change: 1-SEP-1990

0-LC50 MIXTURE: N/K

ROUTE OF ENTRY - INHALATION: YES

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

ROUTE OF ENTRY - SKIN: YES
ROUTE OF ENTRY - INGESTION: NO

HEALTH HAZ ACUTE AND CHRONIC: OVEREXPOSURE MAY CAUSE CARDIAC ABNORMALITY & LIVER ABNORMALITY. ASPIRATION OF MATERIAL INTO THE LUNGS DUE TO VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

CARCINOGENICITY - NTP: N/K
CARCINOGENICITY - IARC: N/K
CARCINOGENICITY - OSHA: N/K

EXPLANATION CARCINOGENICITY: N/K

SIGNS/SYMPTOMS OF OVEREXP:

EYES: IRRIT, REDNESS, TEARING.

SKIN: PROLONGED/REPEATED CONTACT CAN CAUSE MODERATE IRRIT, DEFATT, DERMATITIS.

EXCESSIVE INHALE: NASAL & RESPIRATORY IRRIT, CENTRAL NERVOUS SYSTEM, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE & POSSIBLE UNCONSCIOUSNESS & EVEN DEATH.

SWALLOW: GASTROINTESTINAL IRRIT, NAUSEA, VOMIT & DIARRHEA.

MED COND AGGRAVATED BY EXP: N/K

EMERGENCY/FIRST AID PROC:

SKIN: THOROUGHLY WASH AREA W/SOAP & WATER. REMOVE CONTAM CLOTHES. LAUNDER CONTAM CLOTHES BEFORE REUSE.

EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER & LOWER LIDS, GET MED ATTN.

SWALLOWED: DO NOT INDUCE VOMITING, KEEP PERSON WARM, QUIET & GET MEDICAL ATTENTION.

BREATH: REMOVE PERSON TO FRESH AIR. IF BREATH IS DIFF ADMIN OXYGEN. BREATH HAS STOPPED GIVE CPR. KEEP PERSON WARM, QUIET. GET MED ATTN.

==========

PRECAUTIONS FOR SAFE HANDLING AND USE

----------Last change: 1-SEP-1990

STEPS IF MATL RELEASED/SPILL:

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

SM: ABSORB LIQ ON PAPER, VERMICULITE, FLOOR ABSORBENT.

LG: ELIM ALL IGNITE SOURCES. NO PERSONS W/OUT WEARING PROTECTIVE EQUIP. STOP AT SOURCE. DIKE AREA TO PREVENT SPREAD, PUMP LIQ TO SALVAGE TANK. TAKE UP REST W/SAND, CLAY, ETC. SHOVEL INTO CONTAINERS.*

NEUTRALIZING AGENT: N/K

WASTE DISPOSAL METHOD: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

* PREVENT RUN-OFF TO SEWERS, STREAMS OR OTHER BODIES OF WATER. IF RUN-OFF OCCURS, NOTIFY PROPER AUTHORITIES AS REQUIRED, THAT A SPILL HAS OCCURRED.

PRECAUTIONS-HANDLING/STORING: CONTAINERS MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIES RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, SOLID) ALL HAZARD PRECAUTIONS GIVEN MUST BE OBSERVED.

OTHER PRECAUTIONS: N/K

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CONTROL MEASURES

----------Last change: 1-SEP-1990

RESPIRATORY PROTECTION: NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS. SEE YOUR SAFETY EQUIPMENT SUPPLIER.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL &/OR LOCAL EXHAUST) VENTILATION.

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES: POLYETHYLENE

EYE PROTECTION: CHEM SPLASH GOGGLES OR SAFETY GLASSES

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING & BOOTS

WORK HYGIENIC PRACTICES: REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

SUPPL. SAFETY & HEALTH DATA: N/K

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TRANSPORTATION DATA

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

----------Last change: 1-SEP-1990
SEE DATA PAGES FOR ADDITIONAL INFORMATION.

TRANSPORTATION ACTION CODE:

TRANSPORTATION FOCAL POINT: G

TRANS DATA REVIEW DATE: 91072

DOT PSN CODE: LFJ

DOT SYMBOL:
DOT PACK GROUP: II
DOT/DoD EXEMPTION NUMBER: N/K

IMO PSN CODE: LCP

IMO PROPER SHIPPING NAME: PAINT OR PAINT RELATED MATERIAL
IMO REGULATIONS PAGE NUMBER: 3208
IMO UN NUMBER: 1263
IMO UN CLASS: 3.2
IMO SUBSIDIARY RISK LABEL: -

IATA PSN CODE: SXL

IATA UN ID NUMBER: 1263
IATA PROPER SHIPPING NAME: PAINT RELATED MATERIAL
IATA UN CLASS: 3
IATA SUBSIDIARY RISK CLASS:
IATA LABEL: FLAMMABLE LIQUID

AFI PSN CODE:

AFI SYMBOLS:
AFI PROP. SHIPPING NAME: UNDER REVIEW
AFI CLASS:
AFI ID NUMBER:
AFI PACK GROUP:
AFI LABEL:
AFI SPECIAL PROV:
AFI BASIC PAC REF:

MMAC CODE: NK

N.O.S. SHIPPING NAME: PAINT RELATED MATERIAL

ITIONAL TRANS DATA: FLAMMABLE LIQUID

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

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DISPOSAL DATA

Last change: 1-SEP-1990

DISPOSAL DATA ACTION CODE:

DISPOSAL DATA FOCAL POINT:

DISPOSAL DATA REVIEW DATE:

REC # FOR THIS DISP ENTRY:

TOT DISP ENTRIES PER NSN:

LANDFILL BAN ITEM:

DISPOSAL SUPPLEMENTAL DATA:

1ST EPA HAZ WST CODE NEW:
1ST EPA HAZ WST NAME NEW:
1ST EPA HAZ WST CHAR NEW:
1ST EPA ACUTE HAZARD NEW:

2ND EPA HAZ WST CODE NEW:
2ND EPA HAZ WST NAME NEW:
2ND EPA HAZ WST CHAR NEW:
2ND EPA ACUTE HAZARD NEW:

3RD EPA HAZ WST CODE NEW:
3RD EPA HAZ WST NAME NEW:
3RD EPA HAZ WST CHAR NEW:
3RD EPA ACUTE HAZARD NEW:

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LABEL DATA

Last change: 1-SEP-1990

LABEL REQUIRED: YES
TECHNICAL REVIEW DATE:
LABEL DATE:
MFR LABEL NUMBER:
LABEL STATUS: G
COMMON NAME: THINNER AIRCRAFT COATING
CHRONIC HAZARD:

SIGNAL WORD:

ACUTE HEALTH HAZARD-NONE:
ACUTE HEALTH HAZARD-SLIGHT:

MSDS Number: ___421 Status: CURRENT Revision Date: 1-MAR-1995
PRODUCT NAME: THINNER AIRCRAFT COATING

ACUTE HEALTH HAZARD-MODERATE:
ACUTE HEALTH HAZARD-SEVERE:

CONTACT HAZARD-NONE:
CONTACT HAZARD-SLIGHT:
CONTACT HAZARD-MODERATE:
CONTACT HAZARD-SEVERE:

FIRE HAZARD-NONE
FIRE HAZARD-SLIGHT:
FIRE HAZARD-MODERATE:
FIRE HAZARD-SEVERE:

REACTIVITY HAZARD-NONE:
REACTIVITY HAZARD-SLIGHT:
REACTIVITY HAZARD-MODERATE:
REACTIVITY HAZARD-SEVERE:

SPECIAL HAZARD PRECAUTIONS: OVEREXPOSURE MAY CAUSE CARDIAC ABNORMALITY & LIVER ABNORMALITY. ASPIRATION OF MATERIAL INTO THE LUNGS DUE TO VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

EYES: IRRIT, REDNESS, TEARING.

SKIN: PROLONGED/REPEATED CONTACT CAN CAUSE MODERATE IRRIT, DEFATT, DERMATITIS.

EXCESSIVE INHALE: NASAL & RESPIRATORY IRRIT, CENTRAL NERVOUS SYSTEM, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE & POSSIBLE UNCONSCIOUSNESSS & EVEN DEATH.

SWALLOW: GASTROINTESTINAL IRRIT, NAUSEA, VOMIT & DIARRHEA.

PROTECT EYE:
PROTECT SKIN:
PROTECT RESPIRATORY:

LABEL NAME: CHEMICAL SPECIALISTS & DEVELOPMENT
LABEL STREET: #5 HACKBERRY LANE
LABEL P.O. BOX: N/K
LABEL CITY: CUT & SHOOT
LABEL STATE: TX
LABEL ZIP CODE: 77303
LABEL COUNTRY: US
LABEL EMERGENCY NUMBER: 800-424-9300

R PROCURED:

MATERIAL SAFETY DATA SHEET 3-JUN-1999

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: A-A-857B Keyword: THINNER
Stock Item Numbers: 8010001605787
NOT GIVEN
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
CSD, INC.
5 HACKBURY ST., P.O. BOX 687 Phone: (409) 756-1065
CONROE, TX 77305 Emergency Phone: (409) 756-1065

Supplier:
CSD, INC.
5 HACKBURY ST., P.O. BOX 687 Phone: (409) 756-1065
CONROE, TX 77305 Emergency Phone: (409) 756-1065

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	EQ ____175 deg. F	175F 79C
Melting Point:	NG	NK
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	EQ __0.824 (Water = 1)	.824
Vapor Pressure:	EQ _____70 mmHg @ _____70 deg. F	MMHG
pH:	NG	NK
Vapor Density:	EQ ____3.0 (Air = 1)	3.0(AIR=1)
Evaporation Rate:	EQ ____4.9	4.9
% of Volatiles:	NG	NG
Molecular Weight:	NG	NG
Viscosity:	NG	NK
Solubility in water:	5%	

Odor/Appearance/Other Characteristics:
CLEAR, LITTLE IF ANY COLOR, CHARACTERISTIC ODOR.

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	EQ _____38 deg. F	38F 3.33C
Open Cup Flash:	NG	Method: TCC
Fire Point:	NG	NG
Auto Ignition:	NG	K
Lower Explosion Limit:	EQ ____0.9 %	.9
Upper Explosion Limit:	NG	NK

SHIPPING REGULATIONS:

UN/NA Number:	NG
DOT Hazard Class:	FLAMMABLE LIQUID
DOT Label:	FLAMMABLE LIQUID
Proper Shipping Name:	PAINT RWLATED MATERIAL

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

PREPARER/CONTACT INFORMATION: NOT GIVEN
Date Prepared/Revised: 1-JUL-1988

COMPONENTS:

ALIPHATIC NAPHTHA
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
BT ___16 ___17 % of product. CASRN: NOT GIVEN

*OTHER RECOMMENDED LIMIT: NK
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

TOLUENE (SARA III)
OSHA PEL: 'OT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
BT ___12 ___20 % of product. CASRN: 108-88-3

*OTHER RECOMMENDED LIMIT: NK
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

,UTYL ALCOHOL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
BT ___10 ___11 % of product. CASRN: 124-68-5

*OTHER RECOMMENDED LIMIT: NK
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ISOBUTYL ACETATE (SARA III)
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
BT ___30 ___35 % of product. CASRN: 110-19-0

*OTHER RECOMMENDED LIMIT: NK
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ISOPROPYL ALCOHOL (SARA III)
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
EQ ___20 ____0 % of product. CASRN: 67-63-0

*OTHER RECOMMENDED LIMIT: NK
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

METHYL ETHYL KETONE (2-BUTANONE) (MEK) (SARA III)
SHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
BT ___10 ___15 % of product. CASRN: 78-93-3

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

*OTHER RECOMMENDED LIMIT: NK
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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General Information

----------Last change: 1-JUL-1988

DOD Hazardous Materials Information System
DoD 6050.5-LR
AS OF August 1993
Proprietary Version - For U.S. Government Use Only

FSC: 8010
NIIN: 001605787
Manufacturer's CAGE: 5W216
Part No. Indicator: B
Part Number/Trade Name: THINNER DOPE & LACQUER CELLULOSE NITRATE
Item Name: THINNER DOPE & LACQUER
Manufacturer's Name: CSD, INC.
Manufacturer's Street: #5 HACKBERRY
Manufacturer's P. O. Box: NK
Manufacturer's City: CUT & SHOOT
Manufacturer's State: TX
Manufacturer's Country: US
Manufacturer's Zip Code: 77303
Manufacturer's Emerg Ph #: 409-756-1065
Manufacturer's Info Ph #: NK
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: G
Record No. For Safety Entry: 006
Tot Safety Entries This Stk#: 014
Status:
Date MSDS Prepared: 01JUL88
Safety Data Review Date: 25OCT89
Supply Item Manager: GSA
MSDS Preparer's Name: NK
Preparer's Company: CSD, INC.
Preparer's St Or P. O. Box: #5 HACKBERRY
Preparer's City: CUT & SHOOT
Preparer's State: TX
Preparer's Zip Code: 77303
Other MSDS Number:

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

MSDS Serial Number: BHMFX
Specification Number: A-A-857B
Spec Type, Grade, Class: NK
Hazard Characteristic Code:
Unit Of Issue: GL
Unit Of Issue Container Qty: 1 GL
Type Of Container: METAL
Net Unit Weight: NK
NRC/State License Number: NK
Net Explosive Weight: NK
Net Propellant Weight-Ammo: NK
Coast Guard Ammunition Code: NK

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Ingredients/Identity Information
----------Last change: 1-JUL-1988
Proprietary: NO
Ingredient: ALIPHATIC NAPHTHA
Ingredient Sequence Number: 01
Percent: 16-17
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: 1002250AN
CAS Number: NK
OSHA PEL: NK
ACGIH TLV: 300 B
Other Recommended Limit: NK

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 02
Percent: 12-20
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 50 PPM; 9293
ACGIH TLV: 100 PPM/150 STEL
Other Recommended Limit: NK

Proprietary: NO
Ingredient: N-BUTYL ALCOHOL
Ingredient Sequence Number: 03
Percent: 11-10MI
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: 6A5950000

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

CAS Number: 124-68-5
OSHA PEL: NK
ACGIH TLV: 100 A
Other Recommended Limit: NK

Proprietary: NO
Ingredient: ISOBUTYL ACETATE (SARA III)
Ingredient Sequence Number: 04
Percent: 30-35
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: AI4025000
CAS Number: 110-19-0
OSHA PEL: 150 PPM
ACGIH TLV: 150 PPM; 9192
Other Recommended Limit: NK

Proprietary: NO
Ingredient: ISOPROPYL ALCOHOL (SARA III)
Ingredient Sequence Number: 05
Percent: 20
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: NT8050000
CAS Number: 67-63-0
OSHA PEL: 400 PPM/500 STEL
ACGIH TLV: 400 PPM/500STEL;9192
Other Recommended Limit: NK

Proprietary: NO
Ingredient: METHYL ETHYL KETONE (2-BUTANONE) (MEK) (SARA III)
Ingredient Sequence Number: 06
Percent: 10-15
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: EL6475000
CAS Number: 78-93-3
OSHA PEL: 200 PPM/300 STEL
ACGIH TLV: 200 PPM/300STEL 9192
Other Recommended Limit: NK

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Physical/Chemical Characteristics
----------Last change: 1-JUL-1988
Appearance And Odor: CLEAR, LITTLE IF ANY COLOR, CHARACTERISTIC ODOR.
Boiling Point: 175F 79C
Melting Point: NK

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

Vapor Pressure (MM Hg/70 F): 70
Vapor Density (Air=1): 3.0(AIR=1)
Specific Gravity: .824
Decomposition Temperature: NK
Evaporation Rate And Ref: 4.9
Solubility In Water: 5%
Percent Volatiles By Volume: 100
Viscosity: NK
pH: NK
Radioactivity: NK
Form (Radioactive Matl): NK
Magnetism (Milligauss): NK
Corrosion Rate (IPY): NK
Autoignition Temperature: NK

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Fire and Explosion Hazard Data

----------Last change: 1-JUL-1988

Flash Point: 38F 3.33C
Flash Point Method: TCC
Lower Explosive Limit: .9
Upper Explosive Limit: NK
Extinguishing Media: USE FOAM, CO2, OR DRY CHEMICAL FIRE FIGHTING APPARATUS
Special Fire Fighting Proc: SELF-CONTAINED BREATHING APPARATUS, WATER SPRAY FOR COOLING.
Unusual Fire And Expl Hazrds: AVOID EXCESSIVE WATER; KEEP WORK AREA FREE OF HOT METAL SURFACES.

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Reactivity Data

----------Last change: 1-JUL-1988

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS AND OPEN FLAME.
Materials To Avoid: STRONG OXIDIZERS
Hazardous Decomp Products: CARBON MONOXIDE FROM BURNING
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NK

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Health Hazard Data

----------Last change: 1-JUL-1988

LD50-LC50 Mixture: NK

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: NK
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NK
Signs/Symptoms Of Overexp: EYE IRRITANT. CAN CAUSE DERMATITIS, ANESTETIC RESPIRATORY TRACT IRRITATION; NAUSEA, VOMITING, HEADACHES, DIZZINESS, LIVER OR KIDNEY DAMAGE. CAN BE ABSORBED THROUGH SKIN; CAUSE BIRTH AND REPRODUCTIVE DEFECTS IN SOME LAB ANIMALS.
Med Cond Aggravated By Exp: NK
Emergency/First Aid Proc: EYES: FLUSH WITH LARGE QUANTITIES OF WATER FOR AT LEAST 15 MINUTES OR SEEK IMMEDMED. ATTN. SKIN: WASH WITH LARGE QUANTITIES OF WATER. SEEK MEDICAL ATTN IF IRRI-TATION PERSISTS. INHALATION: REMOVE FROM EXPOSURE AND SEEK FRESH AIR. IF BREATH-ING STOPS, GIVE CPR AND SEEK IMMEDIATE MEDICAL ATTENTION. INGESTION: CONTACT PHYSICIAN IMMEDIATE. PHYSICIAN SHOULD CONTACT POISON CONTROL CENTER 212-664-2121

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Precautions for Safe Handling and Use

----------Last change: 1-JUL-1988

Steps If Matl Released/Spill: REMOVE ALL SOURCES OF IGNITION. FLUSH SPILLED MATERIAL INTO SUITABLE RETAINING AREAS OR CONTAIN-ERS WITH LARGE QUANTITIES OF WATER. SMALL AMOUNTS OF SPILLED MATERIAL MAY BE ABSORBED INTO AN APPROPRIATE ABSORBANT.
Neutralizing Agent: NK
Waste Disposal Method: DISPOSE OF PRODUCT IN ACCORDANCE WITH APPLICABLE LOCAL, COUNTY, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: KEEP CONTAINERS COOL, DRY AND AWAY FROM SOURCES OFIGNITION. USE/STORE THIS PRODUCT WITH ADEQUATE VENTILATION. KEEP CONTAINERS CLOSED WHEN NOT USING.
Other Precautions: AVOID INHALATION AND CONTACT WITH SKIN.

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Control Measures

----------Last change: 1-JUL-1988

Respiratory Protection: NIOSH APPROVED CARTRIDGE RESPIRATOR OR SELF-CONTAINED BREATHING APPARATUS.
Ventilation: MECHANICAL VENTILATION OR LOCAL EXHAUST TO REDUCE TLV TO APPROVED LEVEL.
tective Gloves: IMPERMEABLE GLOVES (NEOPRENE)
Eye Protection: SAFETY GLASSES, GOGGLES, FACE SHEILDS
Other Protective Equipment: IMPERMEABLE APRONS

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

Work Hygienic Practices: NK
Suppl. Safety & Health Data: NK

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Transportation Data

----------Last change: 1-JUL-1988

Transportation Action Code:
Transportation Focal Point: G
Trans Data Review Date: 89298
DOT PSN Code: KFV
DOT Proper Shipping Name: PAINT RELATED MATERIAL
DOT Class: FLAMMABLE LIQUID
DOT Label: FLAMMABLE LIQUID
Limited Quantity: NO
DOT Mode Indicator:
Identification Number: UN1263
Reportable Qty - Trans File: NO
DOT/DoD Exemption Number: NK
IMO PSN Code: LCP
IMO Proper Shipping Name: PAINT OR PAINT RELATED MATERIAL
IMO Regulations Page Number: 3268
IMO UN Number: 1263
IMO UN Class: 3.2
IMO Subsidiary Risk Label: -
IATA PSN Code: SXI
IATA UN ID Number: 1263
IATA Proper Shipping Name: PAINT
IATA UN Class: 3
IATA Subsidiary Risk Class:
IATA Label: FLAMMABLE LIQUID
AFR 71-4 PSN Code: HHJ
AFR 71-4 Prop. Shipping Name: PAINT
AFR 71-4 Class: FLAMMABLE LIQUID
AFR 71-4 Label: FLAMMABLE LIQUID
AFR 71-4 ID Number: UN1263
AF MMAC Code: NK
Tech Entry NOS Shipping Name: NK
Additional Trans Data: NK

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Disposal Data

----------Last change: 1-JUL-1988

Disposal Data Action Code:
Disposal Data Focal Point:
Disposal Data Review Date:

MSDS Number: 9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

Rec # For This Disp Entry:
Tot Disp Entries This Stock#:
Landfill Ban Item:
Disposal Supplemental Data:
1st EPA Haz Wst Code UnUsed:
1st EPA Haz Wst Name UnUsed:
1st EPA Haz Wst Char UnUsed:
1st EPA Acute Hazard UnUsed:
2nd EPA Haz Wst Code UnUsed:
2nd EPA Haz Wst Name UnUsed:
2nd EPA Haz Wst Char UnUsed:
2nd EPA Acute Hazard UnUsed:
3rd EPA Haz Wst Code UnUsed:
3rd EPA Haz Wst Name UnUsed:
3rd EPA Haz Wst Char UnUsed:
3rd EPA Acute Hazard UnUsed:

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Label Data

Last change: 1-JUL-1988

Label Required: YES
Date of Technical Review:
Label Date:
Manufacturer's Label No.:
Label Status: E
Common Name of Product:
Chronic Hazard:
Signal Word:
Acute Health Hazard-None:
Acute Health Hazard-Slight:
Acute Health Hazard-Moderate:
Acute Health Hazard-Severe:
Contact Hazard-None:
Contact Hazard-Slight:
Contact Hazard-Moderate:
Contact Hazard-Severe:
Fire Hazard-None:
Fire Hazard-Slight:
Fire Hazard-Moderate:
Fire Hazard-Severe:
Reactivity Hazard-None:
Reactivity Hazard-Slight:
Reactivity Hazard-Moderate:
Reactivity Hazard-Severe:
Special Hazard Precautions: MAY BE POISONOUS IF INHALED OR ABSORBED THROUGH SKIN. VAPORS MAY CAUSE DIZZINESS OR SUFFOCATION. CONTACT MAY IRRITATE OR BURN SKIN AND EYES. FIRE MAY PRODUCE IRRITATING OR POISONOUS

MSDS Number: __9511 Status: CURRENT Revision Date: 12-MAY-1994
PRODUCT NAME: THINNER DOPE & LACQUER CELLULOSE NITRATE

GASES. RUNOFF FROM FIRE CONTROL OR DILUTION WATER MAY CAUSE POLLUTION.
Protect Eye:
Protect Skin:
Protect Respiratory:
Mfg's Name From Label: CSD INC. (OBSOLETE ADDRESS; USE 4N760)
Mfg's Street From Label: 420 SEABOARD DRIVE
Mfg's P.O. Box From Label:
Mfg's City From Label: MATTHEWS
Mfg's State From Label: NC
Mfg's Zip Code From Label: 28105-5073
Mfg's Country From Label: US
Emergency Ph. No. From Label: 704-821-9822
Year Procured:

End of Report

AAPER ALCOHOL & CHEMICAL -- SPECIALLY DENATUREATED ALCOHOL 3A, 200 PROOF - ALCOHOL,D
MATERIAL SAFETY DATA SHEET
NSN: 6810005437415
Manufacturer's CAGE: 61305
Part No. Indicator: B
Part Number/Trade Name: SPECIALLY DENATUREATED ALCOHOL 3A, 200 PROOF

General Information

Item Name: ALCOHOL,DENATURED
Company's Name: AAPER ALCOHOL AND CHEMICAL CO.
Company's Street: 11 ISAAC SHELBY DRIVE
Company's P. O. Box: 339
Company's City: SHELBYVILLE
Company's State: KY
Company's Country: US
Company's Zip Code: 40065-8814
Company's Emerg Ph #: 502-633-0650
Company's Info Ph #: 502-633-0650
Record No. For Safety Entry: 004
Tot Safety Entries This Stk#: 007
Status: FM
Date MSDS Prepared: 01JAN91
Safety Data Review Date: 06APR94
Supply Item Manager: GSA
MSDS Serial Number: BMXHJ
Specification Number: O-E-760
Spec Type, Grade, Class: TYPE III
Hazard Characteristic Code: F3
Unit Of Issue: GL
Unit Of Issue Container Qty: 1 GL CN
Type Of Container: METAL

Ingredients/Identity Information

Proprietary: NO
Ingredient: ETHYL ALCOHOL (FLAMMABLE/NERVOUS SYSTEM DEPRESSANT)
Ingredient Sequence Number: 01
Percent: 95.2
NIOSH (RTECS) Number: KQ6300000
CAS Number: 64-17-5
OSHA PEL: 1000 PPM
ACGIH TLV: 1000 PPM
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: METHYL ALCOHOL (SARA III) (FLAMMABLE/POISON)
Ingredient Sequence Number: 02
Percent: 4.8
NIOSH (RTECS) Number: PC1400000
CAS Number: 64-56-1
OSHA PEL: 200 PPM
ACGIH TLV: 200 PPM/250 PPM STEL
Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR AND COLORLESS.
Boiling Point: 173F,78C
Melting Point: -173F,-114C
Vapor Pressure (MM Hg/70 F): 44.6 @ 60F
Vapor Density (Air=1): 1.59
Specific Gravity: 0.7981 @ 60 F
Solubility In Water: COMPLETE.

Fire and Explosion Hazard Data

Flash Point: 50.0F,10.0C
Flash Point Method: TCC
Lower Explosive Limit: 3.3
Upper Explosive Limit: 19
Extinguishing Media: DRY CHEMICAL, ALCOHOL FOAM, CARBON DIOXIDE; WATER MAY BE INEFFECTIVE, BUT MAY BE USED TO KEEP FIRE EXPOSED CNTNR COOL.
Special Fire Fighting Proc: IF LEAK OR SPILL HAS NOT IGNITED, DISPERSE VAPOR W/WATER SPRAY & PROTECT MEN ATTEMPTING TO STOP LEAK. WATER MAY BE USED TO FLUSH SPILL/DILUTE TO NONFLAMMABLE.
Unusual Fire And Expl Hazrds: FIREFIGHTERS SHOULD WEAR SCBA IN POSITIVE PRESSURE MODE W/FULL FACE PIECE WHEN THERE IS A POSSIBILITY OF EXPOSURE TO SMOKE, FUMES OR HAZARDOUS DECOMP PROUCTS.

Reactivity Data

Stability: YES
Materials To Avoid: CONTACT WITH ACETYL CHLORIDE AND A WIDE RANGE OF OXIDIZING AGENTS MAY REACT VIOLENTLY.
Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHAL: EXPOSURE TO OVER 1000 PPM MAY CAUSE HEADACHE, DROWSINESS AND LASSITUDE, APPETITE LOSS, & INABILITY TO CONCENTRATE. IRRIT OF THROAT. INGEST: CAN CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION, NAUSEA, VOMITING, DIARRHEA. EYE: LIQ/VAPOR MAY CAUSE IRRIT. SKIN: MAY CAUSE IRRIT & DEFATTING OF SKIN ON PROLONGED CONTACT.
Emergency/First Aid Proc: INGEST: IF CONSCIOUS/ABLE TO SWALLOW, GIVE MILK/WATER TO DRINK (DILUTE). NEVER GIVE ANYTHING BY MOUTH TO UNCONSCIOUS/ CONVULSING PERSON. CALL DR/CHEMTREC IMMED. INDUCE VOMIT ONLY IF ADVISED BY DR/CHEMTREC. INHAL: IMMED REMOVE TO FRESH AIR. IF BREATHING STOPPED, GIVE IMMED FLUSH W/COOL WTR. FLUSH EYE 15 MIN. GET MED AID IMMED.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WEAR RESP PROTECTION & PROTECTIVE CLOTHING. CONTAIN SPILLED MATERIAL. TRANSFER TO SECURE CONTAINERS. WHERE NECESSARY, COLLECT USING ABSORBENT MEDIA. REPORT RELEASE IF QUANTITY IS REPORTABLE UNDER APPLICABLE LAWS & REGULATIONS.
Waste Disposal Method: ALL RECOVERED MATERIAL SHOULD BE PACKAGED, LABLED, TRANSPORTED, AND DISPOSED OF, OR RECLAIMED IN CONFORMANCE WITH APPLICABLE LAWS AND REGULATIONS AND IN CONFORMANCE WITH GOOD ENGINEERING PRACTICES.
Precautions-Handling/Storing: PROTECT CONTAINER AGAINST PHYSICAL DAMAGE. DETACHED OR OUTSIDE STORAGE IS PREFERRED. INSIDE STORAGE SHOULD BE IN A NFPA FLAMM LIQ STORAGE RM/CABINET.
Other Precautions: ELIMINATE IGNIT SOURCES. SMOKING PROHIBITED IN STORAGE AREAS. ELEC INSTALLATION SHOULD BE IN ACCORD W/ARTICLE 501 (NAT'L ELEC CODE). FOLLOW NFPA 30, FLAMM/COMBUST LIQ CODE--STORAGE/HANDLING. MAKE FREQUENT LEAKAGE INSPECTIONS. *

Control Measures

Respiratory Protection: WHERE EXPOSURE IS LIKELY TO EXCEED ACCEPTABLE CRITERIA, USE NIOSH/MSHA REPIRATORY PROTECTION EQUIPMENT. RESPIRATORS SHOULD BE SELECTED BASED ON THE FORM & CONCENTRATION OF CONTAMINANAT IN AIR & IN ACCORDANCE W/OSHA 29 CFR 1910.134.
Ventilation: HANDLE IN THE PRESENCE OF ADEQUATE VENTILATION.
Protective Gloves: WEAR IMPERVIOUS GLOVES
Eye Protection: SAFETY GLASSES (ANSI Z87.1)(POS CONTACT)
Other Protective Equipment: WEAR PROTECT CLOTH IMPERVIOUS TO PRODUCT FOR

DURATION OF ANTICIPATED EXPOS IF THERE IS POTENTIAL/REPEATED SKIN CONTACT.
Work Hygienic Practices: N/K * KEEP FROM HEAT/SUN. OPEN W/CARE. CLOSE AFTER USE. CNTNR HAZARDOUS WHEN EMPTY. SINCE EMPTIED CNTNR RETAIN **
Suppl. Safety & Health Data: ** RESIDUE, OBSERVE PRECAUTIONS. PROVIDE AUTO SPRINKLER SYS. ISOLATE FROM OXIDIZERS, CHEM CAPABLE OF SPONTANEOUS HEATING, MAT'LS REACT W/AIR/MOISTURE TO LIBERATE HEAT, IGNIT SOURCES/ EXPLOSIVES. CONSULT LOCAL FIRE CODES. BOND/GRND METAL CNTNR WHEN CONTENTS TRANSFERED. NEVER USE PRESSURE TO EMPTY. NOT FOR HOUSEHOLD USE.

Transportation Data

Trans Data Review Date: 92134
DOT PSN Code: EGH
DOT Symbol: D
DOT Proper Shipping Name: DENATURED ALCOHOL
DOT Class: 3
DOT ID Number: NA1986
DOT Pack Group: I
DOT Label: FLAMMABLE LIQUID, POISON
IMO PSN Code: ANA
IMO Proper Shipping Name: ALCOHOLS, FLAMMABLE, TOXIC, N.O.S. o
IMO Regulations Page Number: 3104
IMO UN Number: 1986
IMO UN Class: 3.1
IMO Subsidiary Risk Label: TOXIC
IATA PSN Code: ARM
IATA UN ID Number: 1986
IATA Proper Shipping Name: ALCOHOLS, FLAMMABLE, TOXIC, N.O.S. *
IATA UN Class: 3
IATA Subsidiary Risk Class: 6.1
IATA Label: FLAMMABLE LIQUID & TOXIC
AFI PSN Code: ARM
AFI Symbols: 0
AFI Prop. Shipping Name: ALCOHOLS, TOXIC, N.O.S.
AFI Class: 3
AFI ID Number: UN1986
AFI Pack Group: II
AFI Label: 6.1
AFI Basic Pac Ref: 7-7
MMAC Code: NK

Disposal Data

Label Data

Label Required: YES
Label Status: G
Common Name: SPECIALLY DENATURED ALCOHOL 3A, 200 PROOF
Special Hazard Precautions: INHAL: EXPOSURE TO OVER 1000 PPM MAY CAUSE HEADACHE, DROWSINESS AND LASSITUDE, APPETITE LOSS, & INABILITY TO CONCENTRATE. IRRIT OF THROAT. INGEST: CAN CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION, NAUSEA, VOMITING, DIARRHEA. EYE: LIQ/VAPOR MAY CAUSE IRRIT. SKIN: MAY CAUSE IRRIT & DEFATTING OF SKIN ON PROLONGED CONTACT. N/K
Label Name: AAPER ALCOHOL AND CHEMICAL CO.
Label Street: 11 ISAAC SHELBY DRIVE
Label P.O. Box: 339
Label City: SHELBYVILLE
Label State: KY
Label Zip Code: 40066-0339
Label Country: US
Label Emergency Number: 800-424-9300 CHEMTREC

Source Emissions Calculation

EMISSION POINT:	185		UNIT:	Paint Spray Booth	
SOURCE DATA					
Operating Schedule		14	hr/day		
		5	day/wk		
		250	days/yr		
		3500	hr/yr		
MATERIAL DATA					
PAINTS/COATINGS					
Box Paint (Med. Gr.)		5.5	gal/yr	=	55.04 lbs/yr
Carc Black		1	gal/yr	=	10.09 lbs/yr
Green (383)		42.5	gal/yr	=	435.97 lbs/yr
Carc Tan		3	gal/yr	=	30.65 lbs/yr
Primer, Epoxy White (A)		17.3	gal/yr	=	138.51 lbs/yr
Primer, Pretreat		7.5	gal/yr	=	54.42 lbs/yr
Primer, Epoxy (B)		17.3	gal/yr	=	138.51 lbs/yr
THINNERS					
ACFT Thinner		25	gal/yr	=	177.23 lbs/yr
Dope & Lacquer		17	gal/yr	=	116.83 lbs/yr
Denatured Alcohol		1	gal/yr	=	6.66 lbs/yr
POLLUTION CONTROL EQUIPMENT					
Fabric Filter		Efficiency:		0	% (VOC)
				90	% (Particulate)

Material	Pollutant	EMISSIONS				
		ERP	ACTUAL			
		lb/hr	lb/hr	lb/day	lb/yr	ton/yr
		PAINTS/COATINGS				
Box Paint (Med. Gr.)	VOC	0.0056	0.0056	0.0788	19.7058	0.0099
	Particulate	0.0030	0.0003	0.0042	1.0601	0.0005
Carc Black	VOC	0.0010	0.0010	0.0140	3.4896	0.0017
	Particulate	0.0006	0.0001	0.0008	0.1981	0.0001
	HAPs					
	Xylene	0.0001	0.0001	0.0009	0.2301	0.0001
	Hexamethylene Di.	0.000001	0.000001	0.00001	0.0035	0.0000
	Methyl Isobutyl Ketone	0.0001	0.0001	0.0021	0.5248	0.0003
Green (383)	VOC	0.0424	0.0424	0.5929	148.2310	0.0741
	Particulate	0.0247	0.0025	0.0345	8.6323	0.0043
	HAPs					
	Hexamethylene Di.	0.0006	0.0006	0.0084	2.0927	0.0010
	Trivalant Chrome	0.0086	0.0086	0.1197	29.9339	0.0150
	Xylene	0.0025	0.0025	0.0356	8.8939	0.0044
	Cobalt	0.0006	0.0001	0.0009	0.2145	0.0001
Carc Tan	VOC	0.0030	0.0030	0.0419	10.4873	0.0052
	Particulate	0.0017	0.0002	0.0024	0.6049	0.0003
	HAPs					
	Xylene	0.0002	0.0002	0.0025	0.6314	0.0003
	Hexamethylene Di.	0.000003	0.000003	0.00004	0.0107	0.0000
	Methyl Isobutyl Ketone	0.0003	0.0003	0.0049	1.2168	0.0006
Primer, Epoxy White (A)	VOC	0.0291	0.0291	0.4072	101.8054	0.0509
	Particulate	0.0031	0.0003	0.0044	1.1012	0.0006
	HAPs					
	Toluene	0.0020	0.0020	0.0277	6.9255	0.0035
Primer, Pretreat Wash	VOC	0.0124	0.0124	0.1733	43.3171	0.0217
	Particulate	0.0010	0.0001	0.0013	0.3330	0.0002
Primer, Epoxy (B)	VOC	0.0281	0.0281	0.3934	98.3426	0.0492
	Particulate	0.0034	0.0003	0.0048	1.2050	0.0006
	HAPs					
	Toluene	0.0020	0.0020	0.0277	6.9255	0.0035
		THINNERS				
ACFT Thinner	VOC	0.0506	0.0506	0.7089	177.2250	0.0886
	HAPs					
	MEK	0.0154	0.0154	0.2162	54.0536	0.0270
	Toluene	0.0053	0.0053	0.0744	18.6086	0.0093
	Xylene	0.0035	0.0035	0.0496	12.4058	0.0062
Dope & Lacquer	VOC	0.0334	0.0334	0.4673	116.8267	0.0584
	HAPs					
	Toluene	0.0067	0.0067	0.0935	23.3653	0.0117
	MEK	0.0050	0.0050	0.0701	17.5240	0.0088

Denatured Alcohol	VOC	0.0019	0.0019	0.0266	6.6562	0.0033
	HAPs					
	Methanol	0.0001	0.0001	0.0013	0.3328	0.0002
HAPs	Total Hex. Di.	0.0006	0.0006	0.0084	2.1069	0.0011
	Total Xylene	0.0063	0.0063	0.0886	22.1611	0.0111
	Total Trivalant Chrome	0.0086	0.0086	0.1197	29.9339	0.0150
	Total Toluene	0.0160	0.0160	0.2233	55.8250	0.0279
	Total Methanol	0.0001	0.0001	0.0013	0.3328	0.0002
	Total MEK	0.0205	0.0205	0.2863	71.5776	0.0358
	Total Methyl Isobutyl Ketone	0.0005	0.0005	0.0070	1.7415	0.0009
	Total Cobalt	0.0006	0.0001	0.0009	0.2145	0.0001
	Total Particulate	0.0375	0.0038	0.0525	13.1346	0.0066
	Total VOCs	0.2075	0.2075	2.9043	726.0867	0.3630

EMISSIONS CALCULATIONS

Material Use (lbs/yr) = Material Use (gal/yr) x SG x 8.34 lbs/gal
ERP (lb/hr) = PLF/100 x MATERIAL USE (lbs/yr) / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

Exact percentages of various contaminants not given because of trade secracy.
Hazardous air pollutants could not be identified for all materials used do to the trade secracy of formulas
Assume 30% of the total particulate in the paint emits to the control device (Other 70% remains on part)
POLLUTION LOADING FACTOR

PAINTS/COATINGS				PLFs (based on MSDS)
Box Paint (Med. Gr.)		SG=	1.2	35.8 % (VOC)
				19.26 % (Particulate)
Carc Black		SG=	1.21	34.58 % (VOC)
				19.626 % (Particulate)
	Xylene			2.28 % (CAS # 1330207)
	Hexamethylene Diisocyanate			0.035 % (CAS # 822060)
	Methyl Isobutyl Ketone			5.2 % (CAS #108-10-1)
Green (383)		SG=	1.23	34 % (VOC)
				19.8 % (Particulate)
	Hexamethylene Diisocyanate			0.48 % (CAS # 822060)
	Trivalant Chrome			6.866 %
	Xylene			2.04 % (CAS # 1330207)
	Cobalt			0.492 % (CAS #7440-48-4)
Carc Tan		SG=	1.225	34.217 % (VOC)
				19.7349 % (Particulate)
	Hexamethylene Diisocyanate			0.035 % (CAS # 822060)
	Xylene			2.06 % (CAS # 1330207)
	Methyl Isobutyl Ketone			3.97 % (CAS #108-10-1)
Primer, Epoxy White (A)		SG=	0.96	73.5 % (VOC)
				7.95 % (Particulate)
	Toluene			5 % (CAS #108-88-3)
Primer, Pretreat Wash		SG=	0.87	79.6 % (VOC)
				6.12 % (Particulate)
Primer, Epoxy (B)		SG=	0.96	71 % (VOC)
				8.7 % (Particulate)
	Toluene			5 % (CAS #108-88-3)
THINNERS				
AFCT Thinner		SG=	0.85	100 %(VOC)
	MEK			30.5 %(CAS #78-93-3)
	Toluene			10.5 % (CAS #108-88-3)
	Xylene			7 % (CAS # 1330207)
Dope & Lacquer		SG=	0.824	100 % (VOC)
	Toluene			20 %(CAS # 108883)
	MEK			15 %(CAS # 78933)
Denatured Alcohol		SG=	0.7981	100 % (VOC)
	Methanol			5 %(CAS # 67561)

PLFs listed above are the percent of emissions by weight
All thinners applied by hand rag or brush.
Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. Updated June 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 186
2. Building/Location 110
3. Description Paint spray booth (stack 2 of 2)

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Decreased usage. New MSDSs.

7. Additional Comments

None

8. Changes to Air Emissions No More Less

RECORD OF AIR EMISSIONS FROM VOC SOURCES
WATERVLIET ARSENAL

Surface Coating

Bldg	Description	Composition	%	Density (lb/gal.	Usage (gal.) Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
110	Epoxy Primer(A+B)	VOCs	27%	13	7	6	6	2	2	5	3	1	1	4	9	9
110	Box Green	VOCs	36%	10	1	2		3						5		0
110	383 Green	VOCs	29%	12	13	4	10	5	5	7	4	3	8	6	11	9
		Trivalent Cr	6.9%		-	-	-	-	-	-	-	-	-	-	-	-
		Xylene	2.0%		-	-	-	-	-	-	-	-	-	-	-	-
		HMD	0.05%		-	-	-	-	-	-	-	-	-	-	-	-
110	Carc Black	VOCs	29%	12.00						1		1				
		Xylene	2.4%		-	-	-	-	-	-	-	-	-	-	-	-
		HMD	0.05%		-	-	-	-	-	-	-	-	-	-	-	-
110	Carc Tan	VOCs	32%	11.00							1	2	1	2		
		Xylene	2.4%		-	-	-	-	-	-	-	-	-	-	-	-
		Trivalent Cr	0.49%		-	-	-	-	-	-	-	-	-	-	-	-
		HMD	0.05%		-	-	-	-	-	-	-	-	-	-	-	-
110	Epoxy White (A)	VOCs	29%	11					1			2	4	6		
110	Epoxy Primer (B)	VOCs	64%	7.92					1							
110	Wash Pretreat	VOCs	89%	7.00		1	3		1	1	1	1		1	1	5
110	Denatured Alcohol	VOC	100%	6.60	1							1				
110	AFCT Thinner	VOCs	100%	7	10	1	4				3	1	2	9	13	7
110	Dope and Lacquer	Toluene	100%	7		2	5	3	2	5		1	3	1	4	8
		MEK	15%		-	-	-	-	-	-	-	-	-	-	-	-
135	#99 Dry Film	VOCs	25%	11.08	5		4	2		2				12	1	1

Material Safety Data Sheets for products
used at Emission Point 186 are
included with Emission Point 185

Source Emissions Calculation

EMISSION POINT:	186		UNIT:	Paint Spray Booth	
SOURCE DATA					
Operating Schedule		14	hr/day		
		5	day/wk		
		250	days/yr		
		3500	hr/yr		
MATERIAL DATA					
PAINTS/COATINGS					
Box Paint (Med. Gr.)		5.5	gal/yr	=	55.04 lbs/yr
Carc Black		1	gal/yr	=	10.09 lbs/yr
Green (383)		42.5	gal/yr	=	435.97 lbs/yr
Carc Tan		3	gal/yr	=	30.65 lbs/yr
Primer, Epoxy White (A)		17.3	gal/yr	=	138.51 lbs/yr
Primer, Pretreat		7.5	gal/yr	=	54.42 lbs/yr
Primer, Epoxy (B)		17.3	gal/yr	=	138.51 lbs/yr
THINNERS					
ACFT Thinner		25	gal/yr	=	177.23 lbs/yr
Dope & Lacquer		17	gal/yr	=	116.83 lbs/yr
Denatured Alcohol		1	gal/yr	=	6.66 lbs/yr
POLLUTION CONTROL EQUIPMENT					
Fabric Filter		Efficiency:		0 % (VOC)	
				90 % (Particulate)	

Material	Pollutant	EMISSIONS				
		ERP	ACTUAL			
		lb/hr	lb/hr	lb/day	lb/yr	ton/yr
PAINTS/COATINGS						
Box Paint (Med. Gr.)	VOC	0.0056	0.0056	0.0788	19.7058	0.0099
	Particulate	0.0030	0.0003	0.0042	1.0601	0.0005
Carc Black	VOC	0.0010	0.0010	0.0140	3.4896	0.0017
	Particulate	0.0006	0.0001	0.0008	0.1981	0.0001
	HAPs					
	Xylene	0.0001	0.0001	0.0009	0.2301	0.0001
	Hexamethylene Di.	0.000001	0.000001	0.00001	0.0035	0.0000
	Methyl Isobutyl Ketone	0.0001	0.0001	0.0021	0.5248	0.0003
Green (383)	VOC	0.0424	0.0424	0.5929	148.2310	0.0741
	Particulate	0.0247	0.0025	0.0345	8.6323	0.0043
	HAPs					
	Hexamethylene Di.	0.0006	0.0006	0.0084	2.0927	0.0010
	Trivalant Chrome	0.0086	0.0086	0.1197	29.9339	0.0150
	Xylene	0.0025	0.0025	0.0356	8.8939	0.0044
	Cobalt	0.0006	0.0001	0.0009	0.2145	0.0001
Carc Tan	VOC	0.0030	0.0030	0.0419	10.4873	0.0052
	Particulate	0.0017	0.0002	0.0024	0.6049	0.0003
	HAPs					
	Xylene	0.0002	0.0002	0.0025	0.6314	0.0003
	Hexamethylene Di.	0.000003	0.000003	0.00004	0.0107	0.0000
	Methyl Isobutyl Ketone	0.0003	0.0003	0.0049	1.2168	0.0006
Primer, Epoxy White (A)	VOC	0.0291	0.0291	0.4072	101.8054	0.0509
	Particulate	0.0031	0.0003	0.0044	1.1012	0.0006
	HAPs					
	Toluene	0.0020	0.0020	0.0277	6.9255	0.0035
Primer, Pretreat Wash	VOC	0.0124	0.0124	0.1733	43.3171	0.0217
	Particulate	0.0010	0.0001	0.0013	0.3330	0.0002
Primer, Epoxy (B)	VOC	0.0281	0.0281	0.3934	98.3426	0.0492
	Particulate	0.0034	0.0003	0.0048	1.2050	0.0006
	HAPs					
	Toluene	0.0020	0.0020	0.0277	6.9255	0.0035
THINNERS						
ACFT Thinner	VOC	0.0506	0.0506	0.7089	177.2250	0.0886
	HAPs					
	MEK	0.0154	0.0154	0.2162	54.0536	0.0270
	Toluene	0.0053	0.0053	0.0744	18.6086	0.0093
	Xylene	0.0035	0.0035	0.0496	12.4058	0.0062
Dope & Lacquer	VOC	0.0334	0.0334	0.4673	116.8267	0.0584
	HAPs					
	Toluene	0.0067	0.0067	0.0935	23.3653	0.0117
	MEK	0.0050	0.0050	0.0701	17.5240	0.0088

Denatured Alcohol	VOC	0.0019	0.0019	0.0266	6.6562	0.0033
	HAPs					
	Methanol	0.0001	0.0001	0.0013	0.3328	0.0002
HAPs	Total Hex. Di.	0.0006	0.0006	0.0084	2.1069	0.0011
	Total Xylene	0.0063	0.0063	0.0886	22.1611	0.0111
	Total Trivalant Chrome	0.0086	0.0086	0.1197	29.9339	0.0150
	Total Toluene	0.0160	0.0160	0.2233	55.8250	0.0279
	Total Methanol	0.0001	0.0001	0.0013	0.3328	0.0002
	Total MEK	0.0205	0.0205	0.2863	71.5776	0.0358
	Total Methyl Isobutyl Ketone	0.0005	0.0005	0.0070	1.7415	0.0009
	Total Cobalt	0.0006	0.0001	0.0009	0.2145	0.0001
	Total Particulate	0.0375	0.0038	0.0525	13.1346	0.0066
	Total VOCs	0.2075	0.2075	2.9043	726.0867	0.3630

EMISSIONS CALCULATIONS

Material Use (lbs/yr) = Material Use (gal/yr) x SG x 8.34 lbs/gal
ERP (lb/hr) = PLF/100 x MATERIAL USE (lbs/yr) / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

Exact percentages of various contaminants not given because of trade secracy.
Hazardous air pollutants could not be identified for all materials used do to the trade secracy of formulas
Assume 30% of the total particulate in the paint emits to the control device (Other 70% remains on part)
POLLUTION LOADING FACTOR

PAINTS/COATINGS				PLFs (based on MSDS)
Box Paint (Med. Gr.)		SG=	1.2	35.8 % (VOC)
				19.26 % (Particulate)
Carc Black		SG=	1.21	34.58 % (VOC)
				19.626 % (Particulate)
	Xylene			2.28 % (CAS # 1330207)
	Hexamethylene Diisocyanate			0.035 % (CAS # 822060)
	Methyl Isobutyl Ketone			5.2 % (CAS #108-10-1)
Green (383)		SG=	1.23	34 % (VOC)
				19.8 % (Particulate)
	Hexamethylene Diisocyanate			0.48 % (CAS # 822060)
	Trivalant Chrome			6.866 %
	Xylene			2.04 % (CAS # 1330207)
	Cobalt			0.492 % (CAS #7440-48-4)
Carc Tan		SG=	1.225	34.217 % (VOC)
				19.7349 % (Particulate)
	Hexamethylene Diisocyanate			0.035 % (CAS # 822060)
	Xylene			2.06 % (CAS # 1330207)
	Methyl Isobutyl Ketone			3.97 % (CAS #108-10-1)
Primer, Epoxy White (A)		SG=	0.96	73.5 % (VOC)
				7.95 % (Particulate)
	Toluene			5 % (CAS #108-88-3)
Primer, Pretreat Wash		SG=	0.87	79.6 % (VOC)
				6.12 % (Particulate)
Primer, Epoxy (B)		SG=	0.96	71 % (VOC)
				8.7 % (Particulate)
	Toluene			5 % (CAS #108-88-3)
THINNERS				
AFCT Thinner		SG=	0.85	100 %(VOC)
	MEK			30.5 %(CAS #78-93-3)
	Toluene			10.5 % (CAS #108-88-3)
	Xylene			7 % (CAS # 1330207)
Dope & Lacquer		SG=	0.824	100 % (VOC)
	Toluene			20 %(CAS # 108883)
	MEK			15 %(CAS # 78933)
Denatured Alcohol		SG=	0.7981	100 % (VOC)
	Methanol			5 %(CAS # 67561)

PLFs listed above are the percent of emissions by weight
All thinners applied by hand rag or brush.
Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. Updated June 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 187
2. Building/Location 110
3. Description Paint bake oven

Unit has been converted to a staging area.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 198
2. Building/Location 36
3. Description Polyelectrolytic mixing tank for wastewater treatment

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Reduced usage: 1,500 lbs in 96', 1,000 lbs in 97', and 550 lbs in 98'.

7. Additional Comments

None

8. Changes to Air Emissions No More Less

Source Emissions Calculation

EMISSION POINT: 198 UNIT: IWTP - Polyelectrolytic mixing tank

SOURCE DATA
Operating Schedule
1 hr/day
6 day/wk
300 days/yr
300 hr/yr

MATERIAL DATA
Polyelectrolyte 550 lb/yr

POLLUTION CONTROL EQUIPMENT
None Efficiency: 0 %

Pollutant	EMISSIONS				
	ERP	ACTUAL			
	lb/hr	lb/hr	lb/day	lb/yr	ton/yr
Particulate	0.00183	0.00183	0.00183	0.55000	0.00028
VOCs	0.18333	0.18333	0.18333	55.00000	0.02750

EMISSIONS CALCULATIONS

ERP (lb/hr) = PLF/100 x MATERIAL USE / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

Assumed PLF from existing permit

PLF for Particulates = 0.1 % (based on existing permit)
PLF for VOCs = 10 % (based on MSDS)

Quantity of materials emitted to the air is based on inventory data sheet, Interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 200
2. Building/Location 40
3. Description Photopolymer resin curing

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Increased usage by 50 percent to approx. 100 gallons per year. Updated MSDS.

7. Additional Comments

None

8. Changes to Air Emissions No [More] Less

Source Emissions Calculation

EMISSION POINT:	200	UNIT: Photo Resin Curing Unit

SOURCE DATA

Operating Schedule	1.5	hr/day
	5	day/wk
	250	days/yr
	375	hr/yr

MATERIAL DATA

Cibatool SL 5170	100 gal/yr	=	959.1 lb/yr

POLLUTION CONTROL EQUIPMENT

None	Efficiency:	0 %

Pollutant	EMISSIONS				
	ERP	ACTUAL			
	lb/hr	lb/hr	lb/day	lb/yr	ton/yr
VOC	0.025320	0.025320	0.037980	9.49509	0.00475

EMISSIONS CALCULATIONS

MATERIAL USE (lbs/yr) = MATERIAL USE (gal/yr) x SG x 8.34 (lbs/gal)
ERP (lb/hr) = PLF/100 x MATERIAL USE (lbs/yr) / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

SG = 1.15 %

Per MSDS there is < 1% VOCs by weight, therefore assumed 0.99% VOCs to be conservative.

PLF = 0.99 %

Can not seperate VOCs due to the fact that the formula percentages are considered to be a trade secret.

Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. Updated in May 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 211
2. Building/Location 135
3. Description Steriolithography unit

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

None

5. Changes to operating procedures since 1996

None

6. Changes in raw materials/chemical usage since 1996

Decreased usage to less than 15 gallons per year. Updated MSDS.

7. Additional Comments

None

8. Changes to Air Emissions No More Less

MATERIAL SAFETY DATA SHEET 14-APR-1999

MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

Part Number: NOT GIVEN Formula: NOT GIVEN
Specification: NOT GIVEN Keyword: NOT GIVEN
Stock Item Numbers: 02684MSDS9333
0JXE0SL5510
NOT GIVEN
Synonyms: NOT GIVEN NOT GIVEN

Manufacturer:
CIBA-GEIGY CORP. (LOS ANGELES)
5121 SAN FERNANDO ROAD WEST Phone: ( ) -
LOS ANGELES, CA 90039 Emergency Phone: (818) 247-6210

Supplier:
CIBA-GEIGY CORP. (LOS ANGELES)
5121 SAN FERNANDO ROAD WEST Phone: ( ) -
LOS ANGELES, CA 90039 Emergency Phone: (818) 247-6210

PHYSICAL/CHEMICAL CHARACTERISTICS:

Boiling Point:	NG	NG
Melting Point:	NG	NG
Freezing Point:	NG	NG
Pour Point:	NG	NG
Softening Point:	NG	NG
Specific Gravity:	~ ___1.17 (Water = 1)	NG
Vapor Pressure:	LT _____1 mmHg @ _____68 deg. F	mmHg @ 20'C
pH:	NG	NG
Vapor Density:	GT _____1 (Air = 1)	NG
Evaporation Rate:	LT _____1	Butyl Acetate=1
% of Volatiles:	NG	NG
Molecular Weight:	NG	NG
Viscosity:	~ ____270 cST	cps @ 25'C (77'F)
Solubility in water:	Slight	

Odor/Appearance/Other Characteristics:
Light Amber, Clear Liquid, Slight Odor / VOC: 12 g/L (estimated value)

FIRE AND EXPLOSION HAZARD DATA:

Closed Cup Flash:	GT ____203 deg. F	>95'C
Open Cup Flash:	NG	NG
Fire Point:	NG	NG
Auto Ignition:	NG	NG
Lower Explosion Limit:	NG	NG
Upper Explosion Limit:	NG	NG

SHIPPING REGULATIONS:

UN/NA Number:	NG
DOT Hazard Class:	NG
DOT Label:	NOT GIVEN
Proper Shipping Name:	NOT GIVEN

MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

PREPARER/CONTACT INFORMATION: Rajesh S. Patel, E,H & S Chemist
Date Prepared/Revised: 3-APR-1998

COMPONENTS:

ACYRLATE ESTER
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT 10.00 30.00 % of product. CASRN: NOT GIVEN

*CAS#: CONFIDENTIAL / OSHA & ACGIH STEL / FOR ALL COMP.: NE=NOT ESTABLISHED
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

CYCLOALIPHATIC EPOXY RESIN
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT 30.00 60.00 % of product. CASRN: NOT GIVEN

*CAS#: CONFIDENTIAL / OSHA & ACGIH STEL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

IPHATIC GLYCIDYL ETHER
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT 10.00 30.00 % of product. CASRN: NOT GIVEN

*CAS#: CONFIDENTIAL / OSHA & ACGIH STEL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

DIACRYLATE ESTERS
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT _0.00 10.00 % of product. CASRN: NOT GIVEN

*CAS#: CONFIDENTIAL / OSHA & ACGIH STEL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

PHOTOINITIATOR
OSHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT _0.00 10.00 % of product. CASRN: NOT GIVEN

*CAS#: CONFIDENTIAL / OSHA & ACGIH STEL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

ACRYLIC ESTER
SHA PEL: NE ACGIH TLV: NE Other Limits: NE
BT _0.00 10.00 % of product. CASRN: NOT GIVEN

MSDS Number: 9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

*CAS#: LA101000-01 / OSHA & ACGIH STEL
OSHA PEL: NOT GIVEN ACGIH TLV: NOT GIVEN Other Limits: NOT GIVEN
% of product NOT GIVEN. CASRN: NOT GIVEN

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1. PRODUCT IDENTIFICATION

----------Last change: 8-JUN-1998

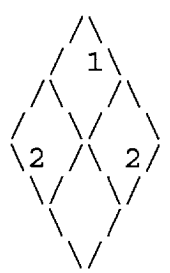
TRADE NAME: CIBATOOL SL 5510

MATERIAL CODE: FPC6105

CHEMICAL FAMILY: Epoxy resin and acrylate ester blend

MSDS NO: 11095

NFPA RATING:



EFFECTIVE DATE: 4/3/98
PRINTED: 05/20/98

8AM TO 4:30 PM PHONE: (818) 247-6210
24-HOUR HEALTH/ENVIRONMENTAL EMERGENCY PHONE: 1-800-873-1138

MANUFACTURER'S NAME AND ADDRESS:

CIBA SPECIALTY CHEMICALS CORPORATION
NORTH AMERICA
PERFORMANCE POLYMERS
6121 SAN FERNANDO ROAD WEST
LOS ANGELES, CA 90039

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COMPOSITION/INFORMATION ON INGREDIENTS

----------Last change: 8-JUN-1998

MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.

OSHA	CHEMICAL IDENTITY	EXPOSURE LIMITS MFR.	CARCINOGEN STATUS IARC	NTP	OSHA
*	Acrylate ester	NE	NR	NR	NR
*	Cycloaliphatic epoxy resin	NE	NR	NR	NR
*	Aliphatic glycidyl ether	NE	NR	NR	NR
*	Diacrylate esters	NE	NR	NR	NR
*	Photoiniator	NE	NR	NR	NR
*	ACRYLIC ESTER	NE	NR	NR	NR

NE = Not Established
NR = Not Reviewed
* = OSHA Hazardous Ingredient

HAZARDS IDENTIFICATION

Last change: 9-JUN-1998

EMERGENCY OVERVIEW: WARNING!!! Causes severe eye irritation. Causes skin irritation and possible allergic skin reaction. Harmful if inhaled. Harmful if swallowed.

PRIMARY ROUTE(S) OF ENTRY: Dermal, inhalation.

POTENTIAL HEALTH EFFECTS: Vapor or mist can cause irritation to the nose and throat. Liquid or vapor can cause substantial irritation to eyes. Substance can cause moderate irritation. Substance can be possibly harmful if swallowed.

CHRONIC: Prolonged or repeated exposure can cause allergic reaction.

4. FIRST AID MEASURES

Last change: 8-JUN-1998

INGESTION: If swallowed dilute by giving two (2) glasses of water to drink.
a physician. Never give anything by mouth to an unconscious person.

SKIN: For skin contact, wash with large amounts of running water, and soap,

if available, for 15 minutes. Remove contaminated clothing and shoes. Get immediate medical attention. Discard or decontaminate clothing before re-use and destroy contaminated shoes.

INHALATION: If inhaled, remove from area to fresh air. If not breathing, give artificial respiration. Get immediate medical attention if breathing is difficult, transport to medical care and, if available, give supplemental oxygen.

EYES: For eye contact, flush eyes with plenty of water for several minutes. Get medical attention if irritation occurs.

NOTE TO PHYSICIAN: Allergic dermatitis or respiratory response in susceptible individuals may be delayed. It may appear after weeks or even months of frequent and prolonged contact.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Allergy, eczema, eye or respiratory conditions.

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5. FIRE FIGHTING MEASURES

----------Last change: 9-JUN-1998

FLASH POINT: >95'C (>203 'F)

FLASH POINT METHOD USE: Closed Cup

FIRE FIGHTING EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, foam, water.

FIRE FIGHTING EQUIPMENT: Use self-contained breathing apparatus and full protective clothing.

FIRE AND EXPLOSION HAZARDS: Heat/inhibitor depletor/Exposure to radiation/oxidizers can cause spontaneous polymerization generating heat and pressure. Sealed containers can explode. Avoid the use of a stream of water to control fire since frothing can occur.

HAZARDOUS COMBUSTION PRODUCTS: Decomposition and combustion products may be toxic.

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MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

6. ACCIDENTAL RELEASE MEASURES

Last change: 8-JUN-1998

ACCIDENTAL RELEASE MEASURES: Evacuate the spill area. Wear protective clothing. Dike and absorb spill on inert material (sand, earth, etc.) Transfer containers for disposal. Remove contaminated clothing and wash affected skin areas with soap and water. Wash clothing before re-use. If spilled on a porous surface, ground contamination must be considered.

7. HANDLING AND STORAGE

Last change: 8-JUN-1998

SIGNAL WORD: Warning!

PRECAUTIONS: Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. Wash thoroughly after handling. Avoid breathing vapor or mist. Keep containers closed when not in use. Use only with adequate ventilation. Do not take internally.

OTHER HANDLING INFORMATION: In accordance with good industrial practice, handle with care and avoid unnecessary personal contact. Avoid contact with eyes and prolonged or repeated skin contact. Do not inhale mists. Use with adequate ventilation. For industrial use only.

STORAGE INFORMATION: MAXIMUM 35' C. Store indoors in a cool, dry area with adequate ventilation. Store out of direct sunlight.

ADDITIONAL INFORMATION: PLEASE READ TECHNICAL DATA SHEET BEFORE HANDLING THE PRODUCT. KEEP OUT OF THE REACH OF CHILDREN. FOR INDUSTRIAL USE ONLY.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Last change: 8-JUN-1998

PERSONAL PROTECTIVE EQUIPMENT: Eye bath and safety shower should be available. Wear protective clothing.

SKIN PROTECTION: Wear impervious clothing.

RESPIRATORY PROTECTION: Wear respirator (MSHA/NIOSH or approved equivalent) suitable for concentrations and type of air contaminants encountered.

EYE PROTECTION: Wear splash-proof chemical goggles.

ENGINEERING CONTROLS: Good general mechanical ventilation and local exhaust.

EMERGENCY RESPONSE PROTECTION: Wear breathing apparatus (MSHA/NIOSH-approved, pressure demand, self-contained or equivalent) and full protective gear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Last change: 15-FEB-1996

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

10. STABILITY AND REACTIVITY

Last change: 8-JUN-1998

CONDITIONS TO AVOID: Heat, direct sunlight, UV radiation, and free radical initiators.

STABILITY: Unstable

INCOMPATIBILITY: Strong oxidizing agents and inert gases

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide, and oxides of nitrogen.

HAZARDOUS POLYMERIZATION: May occur.

11. TOXICOLOGICAL INFORMATION

Last change: 8-JUN-1998

TE ORAL EFFECTS (LD50): (rats) >2000 gm/Kg (components)

SENSITIZATION: Skin sensitizer

MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

SKIN IRRITATION: Moderate irritant.

EYE IRRITATION: Moderate - severe.

12. ECOLOGICAL INFORMATION

Last change: 8-JUN-1998

BIODEGRADABILITY: No information available.

ECOTOXICITY: No information available.

DISPOSAL CONSIDERATIONS

Last change: 8-JUN-1998

WASTE DISPOSAL METHOD: Incinerate liquid; landfill or incinerate contaminated diking material in accordance with local, state, and federal regulations.

14. TRANSPORT INFORMATION

Last change: 8-JUN-1998

DOT: Non-Bulk

PROPER SHIPPING NAME: Not Regulated

IATA: Non-Bulk

PROPER SHIPING NAME: Not Regulated

15. REGULATORY INFORMATION

Last change: 8-JUN-1998

MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA): This product is considered to be a hazardous chemical under the OSHA Hazard Communication Standard (29 CFR 1910.1200).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA): This product is not considered to be a hazardous waste under RCRA (40 CFR 261).

SARA TITLE III: SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (EHS): This product contains no chemicals regulated under Section 302 as extremely hazardous substances.

SARA TITLE III: SECTION 304 - CERCLA: This product contains no chemicals regulated under Section 304 as extremely hazardous chemicals for emergency release notification ("CERCLA" List).

SARA TITLE III: SECTION 311/312 - HAZARD COMMUNICATION STANDARD (HCS): Immediate (acute) health hazard.

SARA TITLE III: SECTION 313 - TOXIC CHEMICAL LIST (TCL): This product does not contain a toxic chemical for routine annual Toxic Chemical Release Reporting under Sec. 313 (40 CFR 372).

TSCA SECTION 8(B) - INVENTORY STATUS: All chemical(s) comprising this product are listed on the TSCA inventory.

TSCA SECTION 12(B) - EXPORT NOTIFICATION: This product does not contain any chemicals subject to Section 12(b) export notification.

CALIFORNIA PROPOSITION 65: This product does not contain any chemicals currently on the California List of Known Carcinogens and Reproductive Toxins.

PENNSYLVANIA RIGHT-TO-KNOW: The following is required composition information:

Generic Name: Cycloaliphatic epoxy resin
CASRN: Confidential
Comment: Not on Pennsylvania Hazardous Substance List.

Generic Name: Aliphatic glycidyl ether
CASRN: Confidential
Comment: Not on Pennsylvania Hazardous Substance List.

Generic Name: Acrylate ester
CASRN: Confidential
Comment: Not on Pennsylvania Hazardous Substance List.

Generic Name: Diacrylate esters
CASRN: Confidential

MSDS Number: __9333 Status: CURRENT Revision Date: 4-AUG-1998
PRODUCT NAME: CIBATOOL SL-5510

Comment: Not on Pennsylvania Hazardous Substance List.

Chemical Name: ACRYLIC ESTER
CASRN: LA101000-01
Common Name: acrylic ester
Comment: Not on Pennsylvania Hazardous Substance List.

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16. OTHER INFORMATION

----------Last change: 8-JUN-1998

MSDS NO.: 11095

REASON ISSUED: New format

PREPARED BY: Rajesh S. Patel
APPROVED BY: Rajesh S. Patel
TITLE: E H & S Chemist

APPROVAL DATE: 04/02/98
SUPERSEDES DATE: 09/29/97

OTHER INFORMATION: L/M Codes: DL0597 - DR(D10020030)

Material Code: FPC6106

Disclaimer: The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied is made with respect to the information contained herein.

End of Report

Source Emissions Calculation

EMISSION POINT:	211	UNIT: UV Light Curing

SOURCE DATA

Operating Schedule	0.5	hr/day
	5	day/wk
	200	days/yr
	100	hr/yr

MATERIAL DATA

Cibatool SL5180	15 gal/yr	=	146.367 lbs/yr

POLLUTION CONTROL EQUIPMENT

None	Efficiency:	0 %

Pollutant	EMISSIONS				
	ERP	ACTUAL			
	lb/hr	lb/hr	lb/day	lb/yr	ton/yr
VOC	0.014490	0.014490	0.007245	1.449033	0.00072452

EMISSIONS CALCULATIONS

MATERIAL USE (lbs/yr) = MATERIAL USE (gal/yr) x SG x 8.34 (lbs/gal)
ERP (lb/hr) = PLF/100 x MATERIAL USE (lbs/yr) / HOURS OF OPERATION PER YEAR
ACTUAL (lb/hr) = ERP (lb/hr) x (1 - CONTROL EFF/100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x day/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

SG = 1.17

Per MSDS there is < 1% VOCs by weight, therefore assumed 0.99% VOCs to be conservative.

PLF = 0.99 %

Can not speciate VOCs due to the fact that the formula percentages are considered to be a trade secret.

Quantity of materials emitted to the air is based on inventory data sheet,
Interview data, and MSDS information. Updated in 1999.

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 217
2. Building/Location 114
3. Description Chromium electroplating scrubber

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

New source. Constructed, but not yet operational.

5. Changes to operating procedures since 1996

Not applicable.

6. Changes in raw materials/chemical usage since 1996

Not applicable.

7. Additional Comments

Emissions will be determined when proposed stack testing is complete.

8. Changes to Air Emissions No [More] Less

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point 218
2. Building/Location 114
3. Description Caustic scrubber

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

New source. Constructed, but not yet operational.

5. Changes to operating procedures since 1996

Not applicable.

6. Changes in raw materials/chemical usage since 1996

Not applicable.

7. Additional Comments

Emissions will be determined when proposed stack testing is complete.

8. Changes to Air Emissions No [More] Less

1999 Air Emissions Inventory Update
Watervliet Arsenal

Site Visit Summary

1. Emission Point NP-44
2. Building/Location 135
3. Description Navy ship shaft coating

4. Changes to physical aspects (e.g., location, stack configuration, etc.) since 1996

New process.

5. Changes to operating procedures since 1996

Not applicable.

6. Changes in raw materials/chemical usage since 1996

Not applicable.

7. Additional Comments

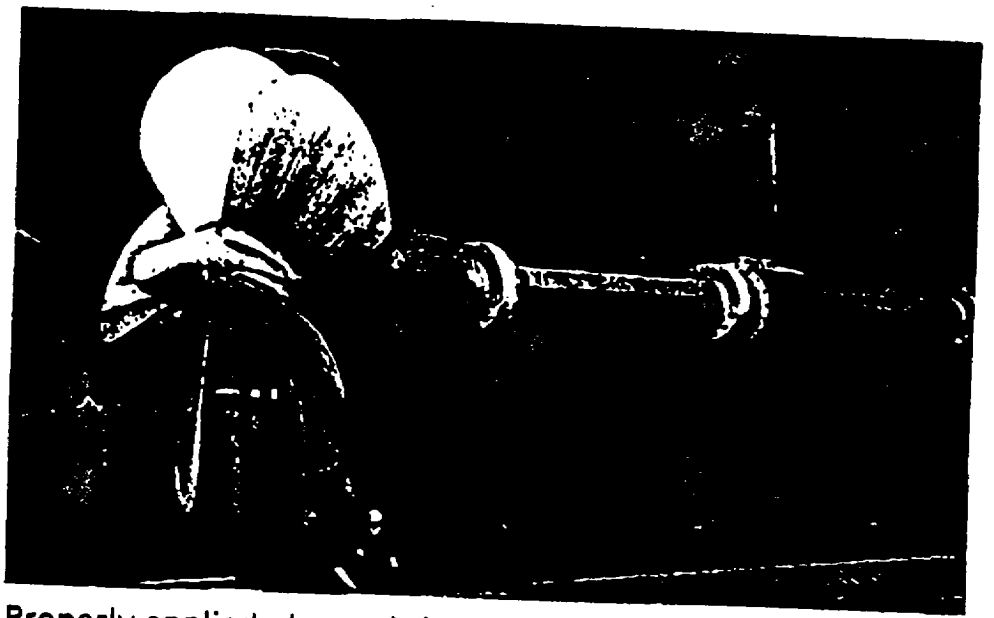
Emissions based on 8 gallons each of solvent per year.

8. Changes to Air Emissions No [More] Less

Bulletin 9708

Phillycoat®

PROPELLER SHAFT COATING SYSTEM



Properly applied glass-reinforced epoxy laminate will provide the most effective long wearing, corrosion protection for water-borne main propulsion propeller shafting and other metal surfaces exposed to severe marine environments.

TECHNICAL SERVICE			
7195	8 hr. day	525.00	525.00
7197	Overtime	90.00/hr	90.00/hr
7198	Sat/Sun/Holiday	120.00/hr	120.00/hr
7190	Travel Time	250.00/day	250.00/dy
7191	Travel Expense	Actual	Actual
7196	Living Expense	Actual	Actual

TO: TOM BELL
SOWU-AT
FAX #: 518 266 4555

FROM: STAN NELSON
DATE: 7/16/97
PAGES INCLUDING THIS PAGE: 18
FAX #: PHONE #:

TDFS 149150

ITW Philadelphia Resins

P.O. Box 309
130 Commerce Drive
Montgomeryville, PA 18936
Telephone 215.855.8450
FAX 215.855.4688
Telex 277595 PRCO UR

The three basic requirements for satisfactory shaft protection

1. **Use of a qualified materials system**
2. **Correct surface preparation**
3. **Proper application technique**

MATERIAL SELECTION

ITW Philadelphia Resins' PHILLYCLAD® 1775/620TS was developed to exceed the requirements of Navy, Coast Guard and commercial shaft coating specifications. It is the most generally used shaft coating in the world. Meeting NATO requirements and those of most other navies and Classification Societies it is also in use on U.S., Canadian and Russian icebreakers. In particular, it meets the U.S. Navy's present MIL-R-23461 (Ships) and the proposed new specification.

SURFACE PREPARATION— NEW AND USED SHAFTS

Sandblast to near white metal with clean grit or sand. Number 2 sand shot is recommended with a minimum air pressure of 5.5 kg/cm² (75 psi). A surface profile of at least 0.075 mm (0.003") is desirable. Schedule the blasting so there is a minimum delay before the coating is applied. Wrapping the shaft with polyethylene sheet may protect the finish for up to 24 hours if there is unavoidable delay. If the coating finishes on a shrunk-on sleeve, the sleeve end should be faired so there will not be a step in the coating. Use PHILLY-BOND® No. 6 for this. Use it also to fill any corrosion pits or other surface irregularities. Allow at least one hour for hardening. Rinse the shaft with PRT-59 Solvent, trichlorethane or other chlorinated solvent. Do not use hydrocarbon solvents. Pour ample solvent over the shaft so that it runs off. Do this twice. Do not use any cloth, paper or waste to dry it. Do not handle or contaminate the shaft in any way.

NOTES

1. Do not prepare the shaft until it is ready to be coated.
2. Temperature is important. The shaft and resin should not be below 20°C (68°F). 27°C (80°F) is desirable. Both the cure time and tape wet-out by the resin are significantly affected at low temperature.

Estimating the materials required

1. To determine the quantity of glass tape required per layer, the following formula is used:

$$L = \frac{3.5DH}{W}$$

L = Length of glass tape in millimeters (inches) per layer
D = Diameter of shaft in millimeters (inches)
H = Length of shaft to be covered, millimeters (inches)
W = Width in millimeters (inches) of glass tape

Small shafts under 150 mm (6") in diameter, use 75 mm (3") wide glass tape. Larger shafts use 150 mm (6") wide glass tape. All shafts require 4 layers.

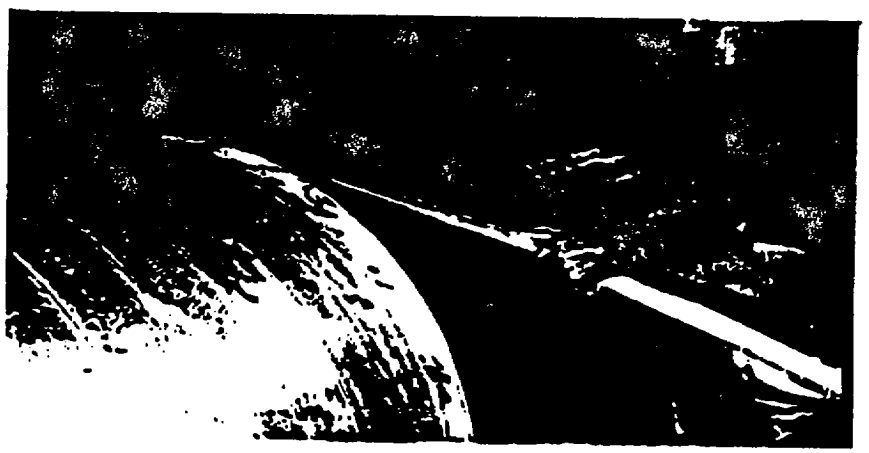
MATERIALS REQUIRED

PHILLYBOND® No. 6	0.454 kg (1 lb) kit, 267 cc (16.3 in³) or 3.785 liter (1 gallon) unit, 3785 cc (231 in³).	MIL-R-17882C
PRT 59 Solvent	3.785 liter (1 gallon) cans and 18.925 liter (5 gallon) pails.	
Glass Tape	Woven edge 150 mm (6") or 75 mm (3") wide, 40 m (150') rolls.	
PHILLYCLAD® 1775/620TS	Clear epoxy resin and hardener. 3.785 liter (1 gallon) unit. See the last note on the back page for when the shaft cannot be rotated during application.	
PHILLYCLAD® 6470	Heavy duty gray epoxy coating for couplings and bolts after assembly. Coverage 2 m³/liter (80 ft²/gallon) at 250 µm (10 mils). 2 gallon (7.57 liters) unit.	
Jiffy H Mixer Blade	To be driven by an electric drill.	

Polyethylene sheet or heavy paper is required to protect the lathe bed or floor from drips and spillage.

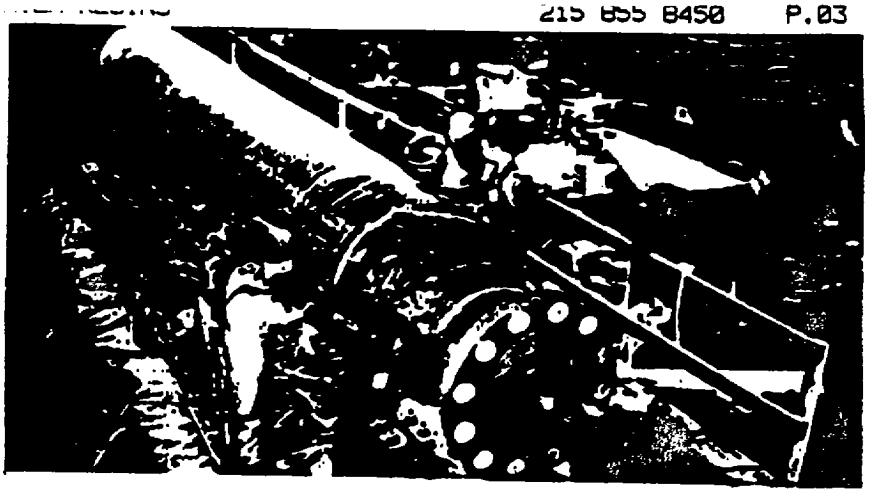
2. To determine the quantity of resin required per coat, find the number of square millimeters (sq ft) to be covered. (3.5 x diameter x length.) One liter covers 2 square meters. (One gallon covers 80 sq ft)
3. Four layers of tape require 5 coats of Resin.
4. Quantity of solvent to wash shaft will vary but usually two washdowns are needed to obtain oil and dirt free surface. Figure on 19 liters (4 gallons) per 6 meters (20') of shaft. PRT-59 is also useful for cleaning mixing tools, etc.

APPLICATION TECHNIQUE



Do not mix the resin and hardener until ready to start the application. Check the shaft with a clean cloth to be sure there is no oil or dirt from handling.

Power mix a pre-measured unit of resin and hardener with a Jiffy type H mixer blade at about 175 rpm. The mix must be thorough and complete, making sure the resin and hardener on the sides of the container are blended together thoroughly. Generally 3 to 5 minutes is sufficient. The resin and hardener temperature must be 22°C (72°F) or above. If the mixture turns milky upon mixing, it is too cold or the mixing RPM are too high.



Pour mixed resin on top of the shaft as it rotates in a lathe or on powered rollers. Spread it with gloved hands or roller to completely wet out the surface. (Use throw-away plastic gloves or clean re-usable rubber gloves.) Two men can typically cover a shaft 500 mm (20") by 6 meters (20') long in 10 to 15 minutes. It is essential that there be no dry spots. Two persons are required for the tape application. One holds the roll of tape on a horizontal axle, and feeds it on to the rotating shaft. The other stands by with a large pair of scissors to assist in any way necessary.

When starting the layer of tape, wind one complete turn around the shaft to cover the tape end completely. Use moderate tension so the tape sinks in the resin but does not slip excessively. Once the turn is complete, apply more tension by braking the roll with the thumbs and lead off with decreasing tape overlap into an open helical wind. Take care not to create wrinkles, but also avoid unnecessary overlapped turns. Once the helix is established the adjacent tape edges should be about 3 mm (1/8") apart. Continue the helical winding until the other end of the shaft is approached, start progressive overlapping and finish up with one complete straight turn. Cut the tape without stopping the shaft rotation.

Allow the resin to soak through the tape completely, it may take 15 minutes. When it has, apply a second layer of mixed resin. Wind on a second layer of tape, starting at the end where the first layer finished. Allow this to soak through and repeat the procedure until four alternating layers of tape have been put on the shaft.

When the fourth layer of tape has soaked through thoroughly, apply a generous fifth coat of resin. Keep the shaft rotating slowly until the resin has hardened. Excessive speed at this stage may cause ridges in the resin coat.

Do not use short left-over pieces of tape if they will cause extra joins. When a tape roll ends part way along a shaft, overlap its end with the new tape and put a complete turn around the shaft. Progress out to a helix as normal. Wrinkles should be pressed out if possible. If too large, cut the fold with the scissors and press it flat. A large fold may require a narrow triangle to be cut out.

Long tapers, whether to a coupling or to a sleeve, should always be wrapped going up the taper. When the general winding direction of a layer is in the contrary direction make a separate winding for the taper. Start along the shaft sufficient distance so that the com-

Phillyclad Propeller Shaft Coating System

plete starting turns of these two sections of the layer do not overlap each other.

1. Convenient speed range for wrapping shafts with tape:

   14.5 meters to 25.5 meters (48' to 84') per minute surface speed.

   If shaft diameter is d, turning speed range in revolutions per minute will be:

   $\frac{4650}{d}$ to $\frac{8150}{d}$ rpm when d is in millimeters.

   $\frac{183}{d}$ to $\frac{321}{d}$ rpm when d is in inches.

2. Cure Time: May be handled after 8 hours at 24°C (75°F). Faster at higher temperatures. Allow 18-24 hours at 18°C (65°F) and below.

3. Shafts already coated and in for repairs or inspection which show pin holes must be repaired as follows:

   (a) Mechanically sand area in and around pin hole and fill hole with PHILLYBOND No. 6 Paste.

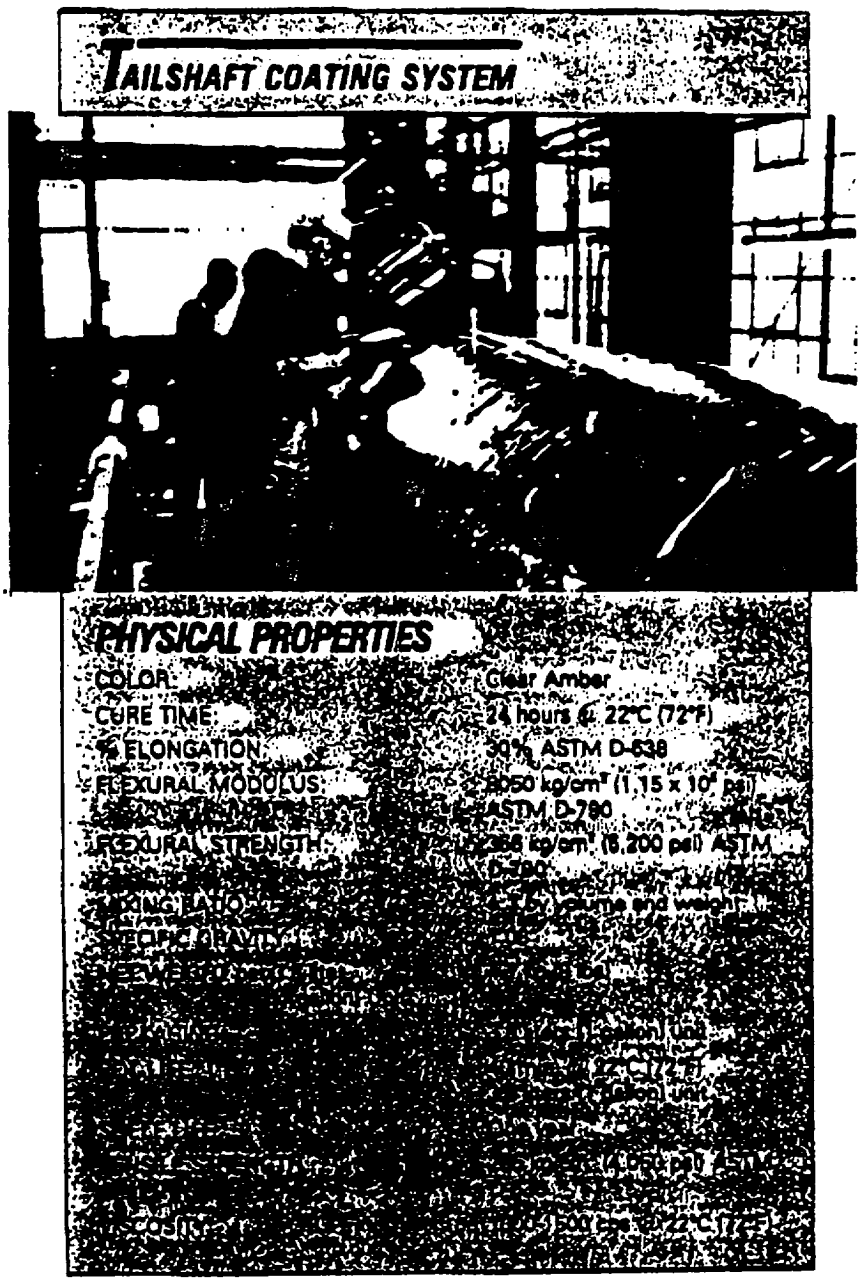
   (b) Sand flush.

   (c) Apply one coat of epoxy resin PR-1775 with PRH-620TS hardener. More extensive repairs can utilize glass tape and resin.

4. Flange, nuts and strut areas difficult to coat with glass tape are cleaned as described and coated with PHILLYCLAD 6470 — two coats (10-12 mils per coat).

5. When the shaft cannot be rotated during application or a section has to be repaired when installed in the ship, then PHILLYCLAD 1762/620TS resin/hardener system should be used. This is non-sagging but otherwise similar to PHILLYCLAD 1775/620TS.

Whenever possible PHILLYCLAD 1775/620TS and rotary application is preferred because it gives a smoother finish and is also transparent.



ITW Philadelphia Resins

P.O. Box 309
130 Commerce Drive
Montgomeryville, PA 18936
Telephone 215.855.8450
FAX 215.855.4688
Telex 277595 PRCO UR

ITW Philadelphia Resins		Material Safety Data Sheet
Part No. 7087	PHILLYCLAD SOLVENT PRT 59	Page 1

PHILLYCLAD SOLVENT PRT 59

Last revised: 8/29/96
Printed: 5/28/97

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical family Non-halogenated organic solvent

General Information: PRT-59 is a non-halogenated organic solvent.

MANUFACTURER

ITW Philadelphia Resins
130 Commerce Dr.
Montgomeryville, PA 18936

EMERGENCY INFORMATION

Emergency telephone number
(CHEMTREC) **(800) 424-9300**
Other calls: **(215) 855-8450**

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS CONSTITUENTS

Constituent	Abbr.	CAS No.	Weight percent	Exposure limits ACGIH TLV	OSHA PEL	Other Limits
Propylene Glycol Monomethyl Ether		107982	> 80	100 ppm	n/e	100 ppm (CANAD.

"TLV" means the Threshold Limit Value exposure (eight-hour, time-weighted average, unless otherwise noted) as established by the American Conference of Governmental Industrial Hygienists. "STEL" indicates a short-term exposure limit. "PEL" indicates the OSHA Permissible Exposure Limit. "n/e" indicates that no exposure limit has been established. An asterisk (*) indicates a substance whose identity is a trade secret of our supplier and unknown to us.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance, physical form, odor: Pale amber liquid with ethereal odor.

WARNING! Flammable. Keep away from heat, sparks, open flame. Severe eye irritant. May cause skin irritation. Overexposure may cause respiratory tract, mucous membrane irritation. Can cause CNS effects (evidenced by dizziness, headache, nausea and vomiting). Avoid skin and eye contact. Wash thoroughly after handling. Avoid breathing vapor. Use with adequate ventilation. Keep container closed when not in use.

Potential health effects:

Primary routes of exposure:

■ Skin contact ☐ Skin absorption ☐ Eye contact ■ Inhalation ☐ Ingestion

Symptoms of acute overexposure:

Skin:

Like most solvents, this product can extract the natural fats and oils of skin tissue; prolonged contact can lead to skin irritation.

Eyes:

May cause moderate irritation (burning sensation, tearing, redness, swelling).

6. ACCIDENTAL RELEASE MEASURES

Spill control:

Avoid personal contact. Eliminate ignition sources. Ventilate area.

Containment:

Dike, contain and absorb with clay, sand or other suitable non-combustible material.

Cleanup:

For large spills, pump to storage/salvage vessels. Soak up residue with an absorbent such as clay, sand, or other suitable material and dispose of properly (RCRA hazardous waste).

Special procedures:

Prevent spill from entering drainage/sewer systems, waterways, and surface waters. Use non-sparking tools

7. HANDLING AND STORAGE

Handling precautions:

Do not breathe vapor or mist. Do not get in eyes, on skin or clothing. Wash thoroughly after handling. Close container after each use. Ground container when pouring. Keep away from heat, flame or sparks. Use non-sparking tools.

Storage precautions:

Keep in a cool place, without direct exposure to sunlight. Keep container tightly closed and otherwise in accordance with NFPA regulations. Maintain air space in storage containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

Ventilation:

Good general ventilation is usually adequate for most industrial applications. Local exhaust should be used in confined areas.

Other engineering controls:

Keep container tightly closed. Observe label precautions. Have emergency eye wash and safety shower present.

Personal protective equipment

Eye and face protection:

Safety glasses or goggles.

Skin Protection:

Chemical resistant rubber gloves and long sleeve clothing.

Respiratory protection:

In confined areas, use NIOSH approved respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity:	0.959		**Boiling point (°F):**	(initial) 212
Melting point (°F):	n/d		**Vapor density (air = 1):**	>1
Vapor pressure (mmHg):	12	at 68 °F	**Evaporation rate (butyl acetate = 1):**	<1
VOC (grams/liter):	840		**Solubility in water:**	Appreciable
Percent volatile by volume:	100		**pH (5% solution or slurry in water):**	n/d
Percent solids by weight:	0			

Inhalation:
Irritation of respiratory tract, headaches, dizziness and nausea.

Ingestion:
Gastrointestinal disturbance and effects similar to those of inhalation; liquid drawn into lungs during vomiting can cause severe damage.

Effects of chronic overexposure:
Skin contact may cause dermatitis. Chronic exposure to solvents above their TLV's may cause liver/kidney disorders. May cause nasal irritation, affect mucous tissue/ membrane dysfunction.

Medical conditions which may be aggravated by exposure:
May aggravate skin, eye and respiratory disorders.

Carcinogenicity – OSHA regulated: **ACGIH:** **National Toxicology Program:**
International Agency for Research on Cancer:
Cancer-suspect constituent(s) None

Other effects:
Reports have associated repeated and prolonged occupational exposure to solvents with permanent brain and Central Nervous System damage.

4. FIRST AID MEASURES

First aid for eyes:
Immediately flush with large amounts of water for at least 15 minutes while holding eyelids open. Consult a physician.

First aid for skin:
Remove contaminated clothing and wash with mild soap and plenty of water. Consult a physician if irritation persists.

First aid for inhalation:
Remove to fresh air. Restore respiration if necessary.

First aid for ingestion:
Do NOT induce vomiting. Drink plenty of milk or water to dilute. Keep head below hips to prevent aspiration into lungs. Call a doctor.

5. FIRE FIGHTING MEASURES

Extinguishing media:
☐ Water ■ Carbon dioxide ■ Dry chemical ■ Foam ☐ Alcohol foam

Flash Point (°F): 97 **Method:** TCC

Explosive limits in air – Lower: 3.0 **Upper:** 12

Special firefighting procedures:
Firefighters should wear self-contained breathing apparatus to avoid inhalation of smoke or vapors. Water may be used to cool exposed containers.

Unusual fire and explosion hazards:
Contains combustible solvent. Do not use in area where sparks or open flames are present.

Hazardous products of combustion:
May form carbon and nitrogen oxides. Other unknown toxic smoke and vapors may form.

10. STABILITY AND REACTIVITY

This product is chemically stable. Hazardous polymerization will not occur.

Conditions to avoid:
Extreme heat, sparks and open flames.

Incompatible materials:
Oxidizing agents, strong acids and bases.

Hazardous decomposition products:
May form carbon and nitrogen oxides. Other unknown toxic smoke and vapors may form.

Conditions of hazardous polymerization:
None reported

11. TOXICOLOGICAL INFORMATION

Acute oral effects:
LD50 (rat): No data available.
No data.

Acute dermal effects
LD50 (rabbit): No data available.
No data.

Acute inhalation effects:
LC50 (rat): No data available. in 4 hours
No data.

Eye irritation:
No data.

Subchronic effects
No data.

Chronic effects
No data.

Carcinogenicity, teratogenicity, and mutagenicity:
No data.

Toxicological information on hazardous chemical constituents of this product:

Constituent	Oral LD50 (rat)	Dermal LD50 (rabbit)	Inhalation LC50 (rat, 4 hours)
Propylene Glycol Monomethyl Ether	5660 mg/kg	13000 mg/kg	n/d

12. ECOLOGICAL INFORMATION

Ecotoxicity:
No data available.

Mobility and persistence:
No data available.

Environmental fate:
No data available.

13. DISPOSAL CONSIDERATIONS

Waste management recommendations:
Do not dispose of in a landfill. Incineration is the preferred method of disposal.

14. TRANSPORT INFORMATION

Proper shipping name: FLAMMABLE LIQUIDS, N.O.S.
Technical name: PROPYLENE GLYCOL MONOMETHYL ETHER
Hazard class: 3
UN number: 1993 **Packing group:** III **IMDG Page no.:**
Emergency Response Guide no.:
Other: U.S. Domestic Ground: Non-Regulated Material

15. REGULATORY INFORMATION

U.S. Federal Regulations

TSCA:

All ingredients of this product are listed, or are exempt from listing, on the TSCA Inventory.

The following RCRA code(s) applies to this material if it becomes waste: D001

Regulatory status of hazardous chemical constituents of this product:

Constituent	Extremely Hazardous*	Toxic Chemical**	CERCLA RQ (lbs)	TSCA 12B Expo Notification
Propylene Glycol Monomethyl Ether	No	No	No	Not required

*Consult the appropriate regulations for emergency planning and release reporting requirements for substances on the SARA Section 301 Extremely Hazardous Substances list.
**Substances for which the "Toxic Chemical" column is marked "Yes" are on the SARA Section 313 list of Toxic Chemicals, for which release reporting may be required. Consult the appropriate regulations for specific requirements.

Classification of this material for SARA Section 312 hazardous materials inventory reporting:
Immediate health hazard Delayed health hazard Fire hazard

Canadian regulations

WHMIS hazard class(es): B2; D2B

All components of this product are on the Domestic Substances List.

16. OTHER INFORMATION

Hazardous Materials Information System (HMIS) ratings:

Health	Flammability	Reactivity
2*	3	1

The information and recommendations in this document are based on the best information available to us at the time of preparation, but we make no other warranty, express or implied, as to its correctness or completeness, or as to the results of reliance on this document.

17

MATERIAL SAFETY DATA SHEET

PHILLYCLAD 1775 RESIN

ITW Philadelphia Resins 130 Commerce Drive, Montgomeryville, PA 18936
Emergency Telephone No.: (800) 424-9300 ; Other calls: (215) 855-8450

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATINGS: HEALTH: 2*
FLAMMABILITY: 1
REACTIVITY: 1

REVISED: January 24, 1994

SECTION 1. PRODUCT IDENTITY

TRADENAME: PHILLYCLAD 1775 RESIN
CHEMICAL FAMILY: Epoxy resin solution

OTHER PRODUCT INFORMATION: This product is formulated to cure with Phillyclad 1775 Hardener. The following information pertains to the resin only.

SECTION 2. HAZARDOUS INGREDIENTS

INGREDIENT(S)	WEIGHT PCT.	CAS NO.	TLV-TWA1,2	Notes
Bisphenol A diglycidyl ether resin Moderate skin sensitizer, skin irritant	>60	25068386	n/e	

1. "TLV" means the Threshold Limit Value exposure (8-hour time-weighted average, unless otherwise noted) established by ACGIH. "OSHA PEL" refers to the Permissible Exposure Limits for airborne contaminants as specified in 29 CFR 1900.1000.
2. "N/E" indicates that neither TLV nor OSHA Permissible Exposure Limit has been established.
3. An asterisk (*) in the CAS No. column indicates an ingredient which is a trade secret of our supplier and unknown to ITW Philadelphia Resins.

NOTES: A1--human carcinogen. A2--suspect carcinogen. C--ceiling limit (not a TWA). D--the TLV applies to dusts; this ingredient is not a dust as sold in our product. S--absorption through skin may be a significant route of exposure. "TC" indicates a "Toxic Chemical" subject to the reporting requirements of SARA Section 313 (40 CFR Sec. 372).

SECTION 3. PHYSICAL PROPERTIES

BOILING POINT (F): >635
MELTING POINT (F): n/a
PERCENT SOLIDS BY WEIGHT: 100
pH (5% by weight in water): n/d
VAPOR DENSITY (Air=1): n/d
SPECIFIC GRAVITY: 1.17
APPEARANCE AND ODOR: Straw liquid with mild aromatic odor.
EVAPORATION RATE (BuAc=1): n/a
SOLUBILITY IN WATER: Negligible
VAPOR PRESSURE (mmHg): <0.01 mm Hg at 68

VOLATILE ORGANIC COMPOUNDS (VOC): 0 lbs/gal (EPA Reference Method 24)

NOTE: "n/d" = "not determined".

SECTION 4. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: >200 F; METHOD: PMCC

EXPLOSIVE LIMITS IN AIR: Lower--n/d; Upper--n/d

EXTINGUISHING MEDIA:	Water	CO2	Dry chemical	Foam	Alcohol foam
	no	yes	yes	yes	no

SPECIAL FIREFIGHTING PROCEDURES: Fire fighters should wear self contained breathing apparatus in confined areas.
UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

SECTION 5. HEALTH HAZARD DATA

EMERGENCY AND FIRST AID PROCEDURES--

EYES: Flush eye with clean water for at least 15 minutes while gently holding eyelids open. Get immediate medical attention.
SKIN: Immediately remove contaminated clothing, and wash with plenty of soap and water. Get medical attention if symptoms persist.
INHALATION: Remove patient to fresh air. Administer oxygen if breathing is difficult. Get medical attention.
INGESTION: Do not induce vomiting. Give patient milk or water to dilute. Immediately consult a physician.

SECTION 5. HEALTH HAZARD DATA (cont'd)

TOXICITY DATA--Oral LD50 (rat): 2,000 mg/kg (DGEBPA)
Dermal LD50 (rabbit): >20,000 mg/kg (DGEBPA)
Inhalation LC50 (rat): no data; Exposure time: hours

SYMPTOMS OF ACUTE OVEREXPOSURE--

EYES: Moderate eye irritant.
SKIN: Moderate skin irritant.
INHALATION: Because of its very low volatility, this product is not likely to produce any adverse effects by inhalation.
INGESTION: Generally considered to have a low order of acute oral toxicity.

EFFECTS OF CHRONIC OVEREXPOSURE: Repeated excessive overexposure may result in skin sensitization.

MEDICAL CONDITIONS WHICH EXPOSURE MAY AGGRAVATE: Preexisting skin and eye allergies may increase the chance of developing increased allergy symptoms from exposure.

CARCINOGENICITY--OSHA regulated? no ACGIH? no OTHER?
National Toxicology Program? no International Agency for Research on Cancer? no
Ingredient(s) listed: None

SECTION 6. REACTIVITY DATA

STABILITY: Chemically Stable
Conditions to avoid: Heat, sparks, and open flames.
Materials to avoid: Strong acids and oxidizing agents.
Hazardous decomposition products: Carbon dioxide, carbon monoxide, aldehydes, and acids.

HAZARDOUS POLYMERIZATION: will not occur.
Conditions to avoid: None

SECTION 7. SPILL OR LEAK PROCEDURES

SPILL CONTROL: Avoid personal contact. Scrape up as much material as possible and place in a suitable, labeled, container for waste disposal. Residue may be removed using a safety solvent.

WASTE DISPOSAL: Dispose of in accordance with applicable federal, state, and local regulations.

Applicable CERCLA/RCRA Hazardous Waste Codes: None
Reportable Quantity under CERCLA, in pounds: ---

SECTION 8. PROTECTIVE EQUIPMENT

EYES: Safety glasses or goggles.
SKIN: Chemical resistant rubber gloves; clean long-sleeve and long leg clothing.
RESPIRATORY: Not ordinarily required for resin. Dust masks should be worn during any grinding or machining procedures on cured resins. NIOSH approved respirators may be required in confined areas.
VENTILATION: General mechanical ventilation is usually adequate for most industrial applications.

SECTION 9. PRECAUTIONS FOR STORAGE, HANDLING, ETC.

---Store in a cool, dry place with adequate ventilation.
---Keep away from open flame and high temperatures.
---Practice good housekeeping procedures to avoid all skin contact and breathing of vapors.
---Handle in accordance with the hazard potential of curing agent.
---Wash thoroughly after handling.

ITW Philadelphia Resins bases the information and recommendations in this document on data believed to be correct. No warranty of any kind, however, is made as to the information in this document.

MATERIAL SAFETY DATA SHEET

PHILLYCLAD 620 TAILSHAFT HARDENER

ITW Philadelphia Resins 130 Commerce Drive, Montgomeryville, PA 18936
Emergency Telephone No.: (800) 424-9300 ; Other calls: (215) 855-8450

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATINGS: HEALTH: 3*
FLAMMABILITY: 1
REACTIVITY: 1

REVISED: January 24, 1994

SECTION 1. PRODUCT IDENTITY

TRADENAME: PHILLYCLAD 620 TAILSHAFT HARDENER
CHEMICAL FAMILY: Polyamino amide

OTHER PRODUCT INFORMATION: The following information applies to the hardener component only.

SECTION 2. HAZARDOUS INGREDIENTS

INGREDIENT(S)	WEIGHT PCT.	CAS NO.	TLV-TWA1,2	Notes
Polyamino amide Skin and eye irritant. *CAS # is a trade secret of our supplier.	>60	*	n/e	
2,4,6-Tri(Dimethylaminomethyl) Phenol (DMP) Severe skin and eye irritant; skin sensitizer.	1-5	90722	n/e	
Tetraethylene pentamine (TEPA) Severe skin and eye irritant; respiratory irritant; sensitizer.	1-5	112572	n/e	

1. "TLV" means the Threshold Limit Value exposure (8-hour time-weighted average, unless otherwise noted) established by ACGIH. "OSHA PEL" refers to the Permissible Exposure Limits for airborne contaminants as specified in 29 CFR 1900.1000.
2. "N/E" indicates that neither TLV nor OSHA Permissible Exposure Limit has been established.
3. An asterisk (*) in the CAS No. column indicates an ingredient which is a trade secret of our supplier and unknown to ITW Philadelphia Resins.

NOTES: A1--human carcinogen. A2--suspect carcinogen. C--ceiling limit (not a TWA). D--the TLV applies to dusts; this ingredient is not a dust as sold in our product. S--absorption through skin may be a significant route of exposure. "TC" indicates a "Toxic Chemical" subject to the reporting requirements of SARA Section 313 (40 CFR Sec. 372).

SECTION 3. PHYSICAL PROPERTIES

BOILING POINT (F): n/d
MELTING POINT (F): n/d
PERCENT SOLIDS BY WEIGHT: 100
pH (5% by weight in water): n/d
VAPOR DENSITY (Air=1): n/a
SPECIFIC GRAVITY: 0.98-1.0
APPEARANCE AND ODOR: Amber to red liquid with amine odor odor.
EVAPORATION RATE (BuAc=1): n/a
SOLUBILITY IN WATER: Slightly soluble
VAPOR PRESSURE (mmHg): n/d at

VOLATILE ORGANIC COMPOUNDS (VOC): 0 lbs/gal (EPA Reference Method 24)

NOTE: "n/d" = "not determined".

SECTION 4. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: >200 F; METHOD: PMCC
EXPLOSIVE LIMITS IN AIR: Lower--n/d; Upper--n/d

EXTINGUISHING MEDIA:	Water	CO2	Dry chemical	Foam	Alcohol foam
	no	yes	yes	yes	no

SPECIAL FIREFIGHTING PROCEDURES: Firefighters should wear self-contained breathing apparatus to avoid inhalation of smoke or vapors.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Closed containers may rupture when exposed to high heat.

SECTION 5. HEALTH HAZARD DATA

EMERGENCY AND FIRST AID PROCEDURES--

EYES: Flush eyes with plenty of water for at least 15 minutes while holding eyelids open. Get prompt medical attention.
SKIN: Wash affected area with plenty of soap and water for at least 15 minutes. If symptoms persist, contact a physician.
INHALATION: Remove victim to fresh air and provide oxygen if breathing is difficult. Get medical attention if effects occur.
INGESTION: Do not induce vomiting. Give patient water or milk if available. Seek medical attention immediately.

PHILLYCLAD 620 TAILSHAFT HARDENER

SECTION 5. HEALTH HAZARD DATA (cont'd)

TOXICITY DATA--Oral LD50 (rat): 1653 mg/kg (DMP); 3990 mg/kg (TEPA)
Dermal LD50 (rabbit): 660 mg/kg (TEPA); 1350 mg/kg (DMP)
Inhalation LC50 (rat): not available; Exposure time: hours

SYMPTOMS OF ACUTE OVEREXPOSURE--

EYES: Severe eye irritant.
SKIN: Severe skin irritant.
INHALATION: Prolonged inhalation of heated vapors may cause irritation of the nose, throat and respiratory tract.
INGESTION: Liquid may cause severe damage to mucous membranes if swallowed.

EFFECTS OF CHRONIC OVEREXPOSURE: Repeated excessive overexposures to phenol have caused liver and kidney effects in laboratory animals.

MEDICAL CONDITIONS WHICH EXPOSURE MAY AGGRAVATE: None reported.

CARCINOGENICITY--OSHA regulated? no ACGIH? no OTHER?
National Toxicology Program? no International Agency for Research on Cancer? no
Ingredient(s) listed: None

SECTION 6. REACTIVITY DATA

STABILITY: Chemically stable
Conditions to avoid: Avoid mixing with large quantities of resin as heat is evolved.
Materials to avoid: Mineral acid, oxidizing materials and epoxy resins under controlled conditions.
Hazardous decomposition products: Carbon monoxide, carbon dioxide, and oxides of nitrogen.

HAZARDOUS POLYMERIZATION: Will not occur.
Conditions to avoid: None

SECTION 7. SPILL OR LEAK PROCEDURES

SPILL CONTROL: Avoid personal contact. Absorb on inert material such as sand, earth or vermiculite and place into a suitable, labeled container for waste disposal. Residue may be cleaned with a safety solvent. Wear adequate protective clothing.

WASTE DISPOSAL: Dispose of in accordance with Federal, State and Local regulations.

Applicable CERCLA/RCRA Hazardous Waste Codes: None
Reportable Quantity under CERCLA, in pounds: ---

SECTION 8. PROTECTIVE EQUIPMENT

EYES: Safety glasses or goggles.
SKIN: Chemical resistant rubber gloves and long sleeve clothing.
RESPIRATORY: NIOSH approved respiratory protection required in the absence of proper environmental control. For emergencies, a self-contained breathing apparatus, or full-face respirator is recommended.
VENTILATION: Material is in a paste form. Vapors will not readily form. When working in confined areas, NIOSH approved respirators are required.

SECTION 9. PRECAUTIONS FOR STORAGE, HANDLING, ETC.

Store in a cool dry place with adequate ventilation.
---Keep away from open flame and high temperatures.
---Practice good housekeeping procedures to avoid all skin contact and breathing of vapors.
---Wash thoroughly after handling, and before smoking, eating or using toilet facilities.
---Avoid prolonged or repeated inhalation of heated vapors or spray mists. ---Avoid prolonged or repeated skin contact.
---Keep away from heat.

ITW Philadelphia Resins bases the information and recommendations in this document on data believed to be correct. No warranty of any kind, however, is made as to the information in this document.

Source Emissions Calculation

EMISSION POINT:	NP-44		UNIT: Navy Ship Shaft Coating
SOURCE DATA			
Operating Schedule			
		8	hr/day
		1	day/wk
		10	days/yr
		80	hrs/yr
MATERIAL DATA			
PTR 59 Solvent	8 gal/yr =	64.0	lbs/yr
POLLUTION CONTROL EQUIPMENT			
None	Efficiency	0	%

Pollutant	EMISSIONS				
	ERP	lb/hr	lb/day	lb/yr	ton/yr
VOCs	0.800	0.800	6.398	63.984	0.032

EMISSIONS CALCULATIONS

Material Used (lbs/yr) = Material Use (gal/yr)x SG x 8.34 (lbs/gal)
ERP (lb/hr) = PLF/100 x Material Use (lbs/yr) / Hours of Operation Per Year
Actual (lb/hr) = ERP (lb/hr) x (1-Control Eff / 100)
(lb/day) = lb/hr x hr/day
(lb/yr) = lb/day x days/yr
(ton/yr) = lb/yr /2000lb/ton

COMMENTS

Solvent SG = 0.959
Solvent PLF = 100 %

Quantity of materials emitted to the air is based on inventory data sheet, Interview data, and MSDS information. New in 1999.