
OAR Box 1939

Prepped by Keeia Richards

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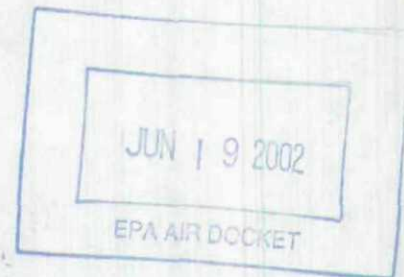
Docket Number:

A-2000-48

INFORMATION REQUEST FOR
CLAY CERAMIC PRODUCTS MANUFACTURING OPERATIONS **A-2000-48****II - D - 350****I. Instructions**

Please return the completed information request to:

Bruce C. Jordan, Director
Attn: Bill Neuffer
Emission Standards Division (MD-13)
U. S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711



If you need clarification of any question or item, please contact Mr. Bill Neuffer of EPA at (919) 541-5435.

This information request should be completed for **each facility** that manufactures clay ceramic products, including facilities that are not major sources. **Information is requested for all processes at your plant that emit hazardous air pollutants (HAP's), including those processes that are not associated with clay ceramic products manufacturing.**

Sections II through VII request information specific to clay ceramic products manufacturing, and Section VIII requests information on emissions of HAP's from other processes located at the facility. Processes that may emit HAP's include those processes that use or handle any materials that contain a HAP compound, all processes with elevated temperatures, and all other processes in which HAP compounds may be formed. The HAP list from Section 112(b) of the Clean Air Act is included as Attachment 1 to this information request. Attachment 2 provides background information on the requirements of the Clean Air Act and explains how the information requested in this questionnaire will be used by EPA. Attachment 3 is a list of abbreviations and acronyms used in this information request.

Several tables are provided throughout the information request for your convenience in answering the questions. An example response is given (shaded first column or row) in each table. If additional space is needed to respond, please make copies of applicable pages. If necessary, please make copies of this information request for additional facilities. **No additional emission testing or monitoring is required to respond to this request.**

II. General Facility Information

A. Name of company SAXONBURG CERAMICS, INC
Name of facility SAXONBURG, PA

Facility address:

No. and street 100 ISABELLA ST

City SAXONBURG State PA Zip 16056

Latitude and longitude coordinates of plant: 40° 45' 8" 79° 48' 45"

Standard Industrial Classification (SIC) Code(s) of clay ceramic products manufacturing operations 3264

Dun and Bradstreet No. 04-430-1737

Total No. of employees for company 165 for facility 72

(If facility is a foreign subsidiary or if company has foreign subsidiaries, include number of employees not based in the U.S.).

Please complete the following shift information for the facility:

Shift	No. of employees	Hours per shift	Days per year
1	52	8	365
2	10	8	365
3	10	8	365

B. Respondent name R. T. GAAB

Respondent title V.P. Mfg & C.F.O

Respondent address (if different from above) and telephone number:

No. and street _____

City _____ State _____ Zip _____

Telephone No. (724) 360-4232

Name and telephone number of technical contact person (if different from above)

Name ATAL ROY

Telephone No. (724) 360-4228

III. Information on Operating Permits and Applicable Federal Emission Standards

- A. Please provide copies of relevant parts of all operating permits and permit applications for your facility. Relevant parts include the sections that provide specific information and data on: processes that emit HAP's; the use of HAP-containing substances; emission levels for HAP and surrogate pollutants (i.e., VOC

for organic HAP's and PM for metal and other particulate HAP's); emission control device design and operation; monitoring and operation and maintenance (O&M) procedures for control devices; and generation and releases of other media such as wastewater and solid waste that are associated with the operation of air pollution controls for clay ceramic products manufacturing processes.

If the operating permit or application contains the same information requested in any part of this questionnaire, you may respond to the requested information by referencing the page or section of the permit/application to avoid duplication. If you reference your permit or application, you must supplement your response with all of the additional information requested in this questionnaire that is not included in the permit/application. If you prefer, you may submit the requested information from your permit/application on a 3-1/2 inch diskette.

- B. If any source or emission unit at this facility is subject to a New Source Performance Standard or other Federal emission standard, please identify the source and applicable standard. Examples of applicable NSPS include *40 CFR 60, Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants*, and *40 CFR 60, Subpart UUU - Standards of Performance for Calciners and Dryers in Mineral Industries*.

DON'T KNOW

IV. Clay Ceramic Products Production and Raw Material Consumption Information

- A. Using Table 1, please provide the 1996 production rates and the current production capacity for each type of clay ceramic product manufactured (e.g., dinnerware, sanitaryware, ceramic wall tile, etc.). If you manufacture products that differ by raw material formulation, identify such products separately and provide production data for each (e.g., commercial floor tile, decorative wall tile). Provide data in the units listed for each row. Provide the weight percent of each raw material and additive in the product formulation that is a HAP, contains a HAP, or is a precursor to a HAP. Precursors to HAP's include any materials that are likely to form HAP's during processing. Examples include clay, shale, and talc that contain fluorides and/or chlorides, which are precursors for HF and HCl, respectively. Indicate additives by chemical compound, rather than by trade name. Weight percents should be provided on a dry basis. If you do not know if a specific raw material or additive contains a HAP, you should list each questionable raw material and additive. The weight percents specified should correspond to the weight percents in

the mix, not the weight percent in the final product. If the product is glazed and the glaze may contain a HAP, specify the weight percent of the glaze. If the weight percent of a raw material or additive varies, please indicate the average weight percent or the range of weight percents of the raw material or additive. As an alternative to providing the raw material weight percents in Table 1, you may submit the corresponding Material Safety Data Sheet (MSDS) prepared by your facility for the clay ceramic product **if** the MSDS lists the quantities of **all raw materials and additives** in the product. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

- B. If available, please provide a copy of the MSDS's for the raw materials and additives listed in Table 1.
- C. If available, please provide chemical analyses, including organic content, of the clay ceramic product raw materials listed in Table 1.

TABLE 1. PRODUCTION AND RAW MATERIAL/ADDITIVES INFORMATION

Product type	EXAMPLE: Ceramic floor tile		L-3 STEATITE		L-5 STEATITE		ALUMINA	
1996 production (tons/yr)	12,500		DON'T KNOW		DON'T KNOW		DON'T KNOW	
Production capacity total weight (tons)	15,000		DON'T KNOW		DON'T KNOW		DON'T KNOW	
Weight percent of raw materials and additives that are, contain, or are precursors of HAP's	Raw material/ additive	Weight percent*	Raw material/ additive	Weight percent*	Raw material/ additive	Weight percent*	Raw material/ additive	Weight percent*
	ball clay	24	TALCS	PROPRIETARY	STRONTIUM CARBONATE		ALUMINUM OXIDE	PROPRIETARY
	shale	19	CLAY	INFORMATION	TALC	PROPRIETARY	CLAY	INFORMATION
	glaze	8	NEPHELINE SYENITE		CLAY	INFORMATION	NEPHELINE SYENITE	
			FELSPAR		CALCIUM CARBONATE		TALC	
			CALCIUM LIGNOSULFONATE		GUM		GUM	
			POLY VINYL ALCOHOL		SODIUM POLYMETHACRYLATE		SODIUM POLYMETHACRYLATE	
			SODIUM POLYMETHACRYLATE		IRON CHROMATE		SODIUM ALGINATE	
			POLY ETHYLENE GLYCOL				METHYL CELLULOSE	
			IRON CARBONATE				BUTYL OLEATE	

*Weight percents should be specified on a dry basis and may be specified as either an average or a range.

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 1. PRODUCTION AND RAW MATERIAL/ADDITIVES INFORMATION
(Additional Sheet)

Product type	CORDIERITE		SEMI CORDIERITE		TITANIA			
1996 production (tons/yr)	DON'T KNOW		DON'T KNOW		DON'T KNOW			
Production capacity (tons/yr)	DON'T KNOW		DON'T KNOW		DON'T KNOW			
Weight percent of raw materials and additives that are, contain, or are precursors of HAP's	Raw material/additive	Weight percent*	Raw material/additive	Weight percent*	Raw material/additive	Weight percent*	Raw material/additive	Weight percent*
	TALCS	PROPRIETARY	TALCS	PROPRIETARY	TITANIUM DIOXIDE	PROPRIETARY		
	CLAYS	INFORMATION	CLAYS	INFORMATION	NEPHELINE SYENITE	INFORMATION		
	MULLITE		MULLITE		TALC			
	NEPHELINE SYENITE		FELSPAR		SODIUM POLYMETHACRYLATE			
	FELSPAR		GUM		POLYVINYL ALCOHOL			
	GUM		BUTYL OLEATE		POLYETHYLENE GLYCOL			
					CALCIUM LIGNOSULFONATE			
					SODIUM POLYMETHACRYLATE			

*Weight percents should be specified on a dry basis and may be specified as either an average or a range.

If additional space is required, please make copies of this page. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

- D. **Using Table 2**, please provide information on the consumption and HAP composition of all glazes that contain HAP's or HAP precursors and that your facility applies to clay ceramic products. Indicate the type of product each type of glaze is applied to and the total weight of glazes used in 1996. If the glazes are formulated at your facility indicate so and provide the production capacity. List each ingredient of the glaze. Beside each ingredient, indicate the total amount of the ingredient used in 1996. If the information requested in the table is contained in your facility's operating permit or permit application, you may reference the applicable sections of the permit (or application) rather than filling out the table.
- E. In the space below, please indicate any glazes used by your facility that do not contain HAP's and are substitutes for HAP-containing glazes used by your industry. Indicate which HAP-containing materials the non-HAP glazes replace. Also, describe any limitations on the use of those substitute glazes.

- F. If available, please provide a copy of the MSDS's for the glazes used by your facility. If your facility prepares its own glaze, please provide any available MSDS's for the glaze ingredients.

TABLE 2. CONSUMPTION AND HAP COMPOSITION OF GLAZES

Type of product glazed	EXAMPLE: Wall tile		DOUBLE FIRE STEATITE	
1996 consumption (tons/yr)	1,140		DON'T KNOW	
Produced at facility? (yes/no)	yes		NO	
Production capacity (tons/yr)	1,500		DON'T KNOW	
Total usage (weight) of each ingredient in 1996	Ingredient	Total 1996 usage (tons)	Ingredient	Total 1996 usage (tons)
	ball clay	630	GLAZE FRIT	DON'T KNOW
	Cr ₂ O ₃	0.23	CLAY	
	CoO	0.18	CARBONHYDRATE	
	MnO ₂	0.06	METHYL CELLULOSE	
			SODIUM POLYMETHACRYLATE	

If additional space is required, please make copies of this page. If the information requested in the table is contained in your facility's operating permit or permit application, you may reference the applicable sections of the permit (or application) rather than filling out the table.

TABLE 2. CONSUMPTION AND HAP COMPOSITION OF GLAZES

Type of product glazed	EXAMPLE: Wall tile		SINGLE FIRE STEATITE	
1996 consumption (tons/yr)	1,140		DON'T KNOW	
Produced at facility? (yes/no)	yes		Yes	
Production capacity (tons/yr)	1,500		DON'T KNOW	
Total usage (weight) of each ingredient in 1996	Ingredient	Total 1996 usage (tons)	Ingredient	Total 1996 usage (tons)
	ball clay	630	CLAY	DON'T KNOW
	Cr ₂ O ₃	0.23	SILICA	
	CoO	0.18	NEPHELINE SYENITE	
	MnO ₂	0.06	CARBOHYDRATE	
			METHYLCELLULOSE	
			SODIUM POLYMETHACRYLATE	

If additional space is required, please make copies of this page. If the information requested in the table is contained in your facility's operating permit or permit application, you may reference the applicable sections of the permit (or application) rather than filling out the table.

V. Description of Clay Ceramic Product Manufacturing Processes

- A. Please provide a simple process flow diagram for each clay ceramic product manufacturing process line. An example process flow diagram is provided in Figure 1. A diagram of the plant layout with all processes and emission points clearly labeled is also acceptable.

Assign a unique identification number (ID No.) for each process that has associated emissions (e.g., TK-1 for tunnel kiln no. 1) and each emission point. Please identify all emission points, including those that do not emit HAP's. For emission points that are vented to an air pollution control device (APCD), assign an ID No. to the APCD (e.g., BH-1 for baghouse no. 1). For emission points that are uncontrolled, assign an ID No. to the uncontrolled stack (e.g., S-1) or building roof vent (e.g., RV-1). Use these same ID Nos. throughout the rest of the information request for any responses that pertain to any process or emission point.

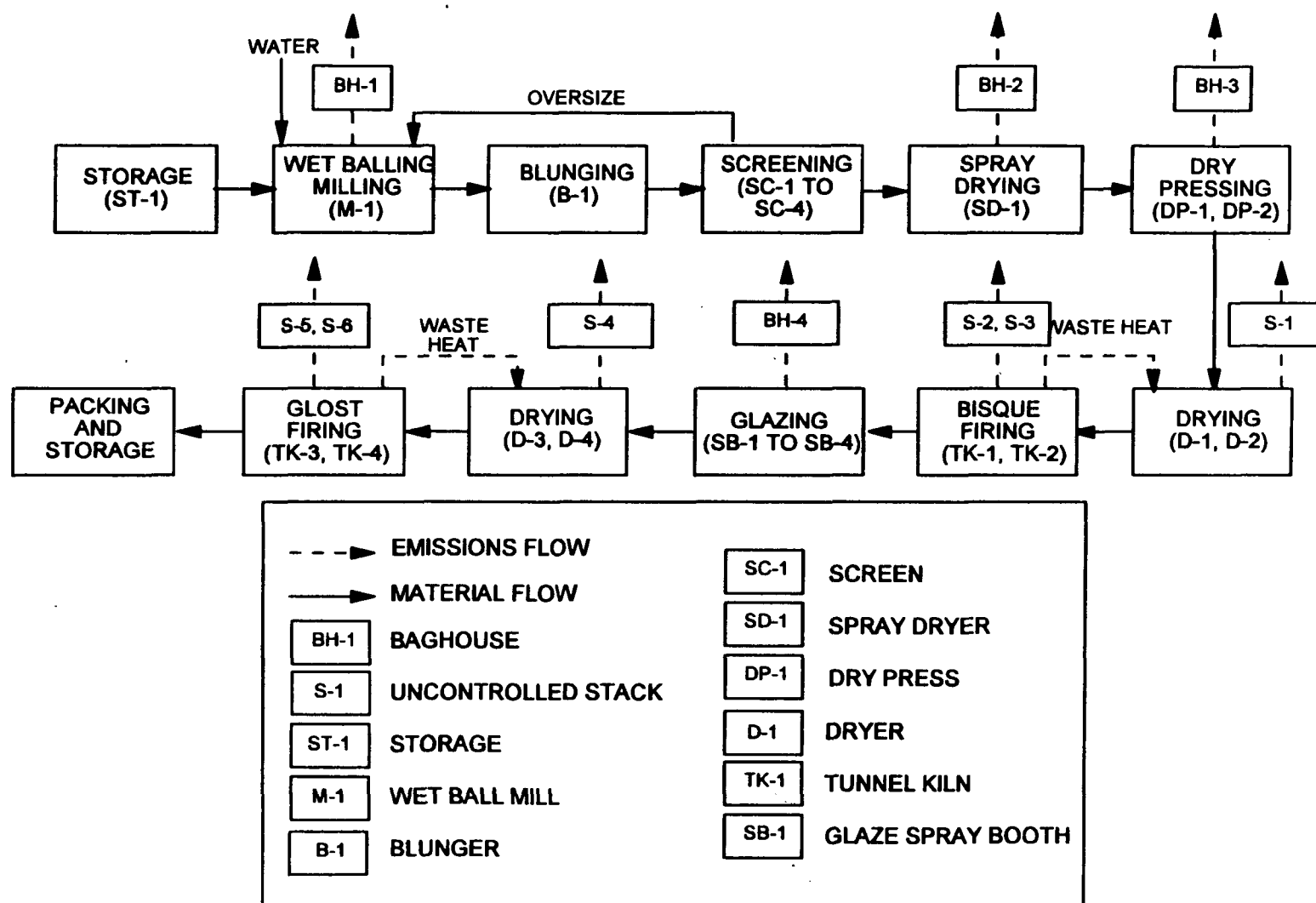
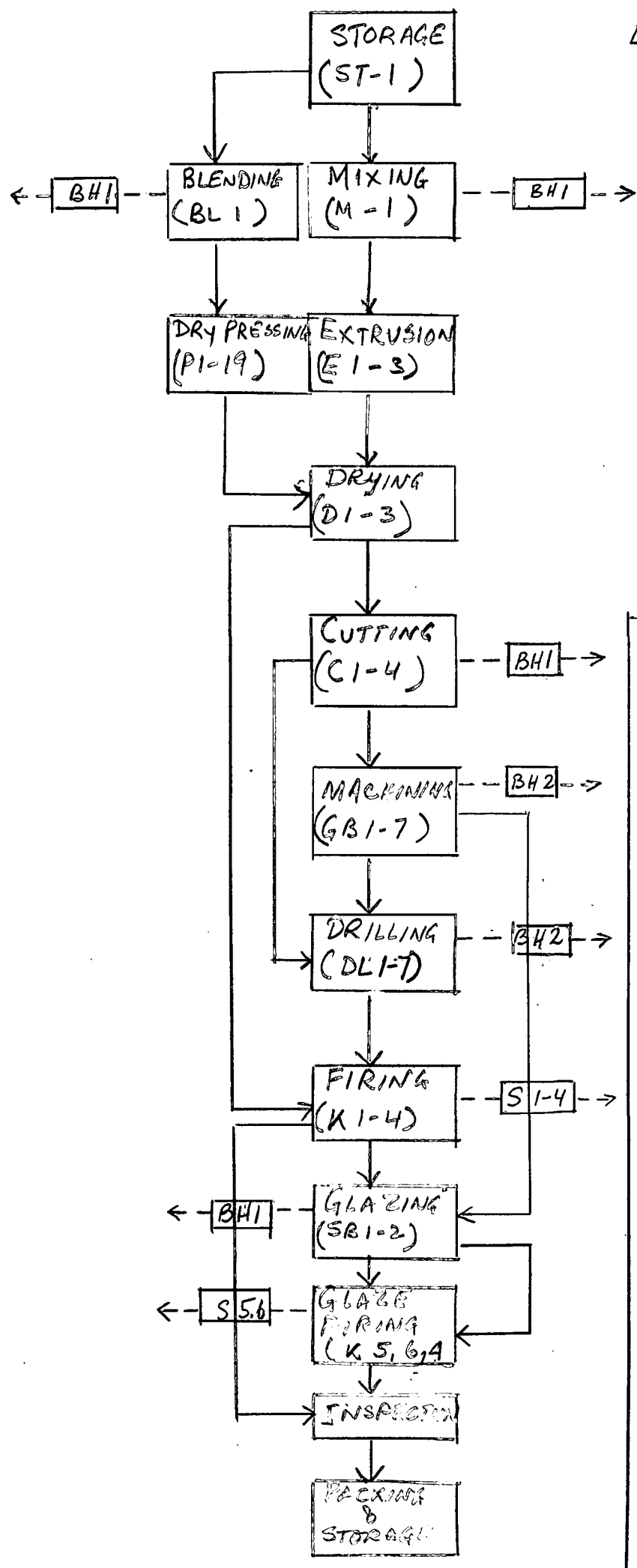


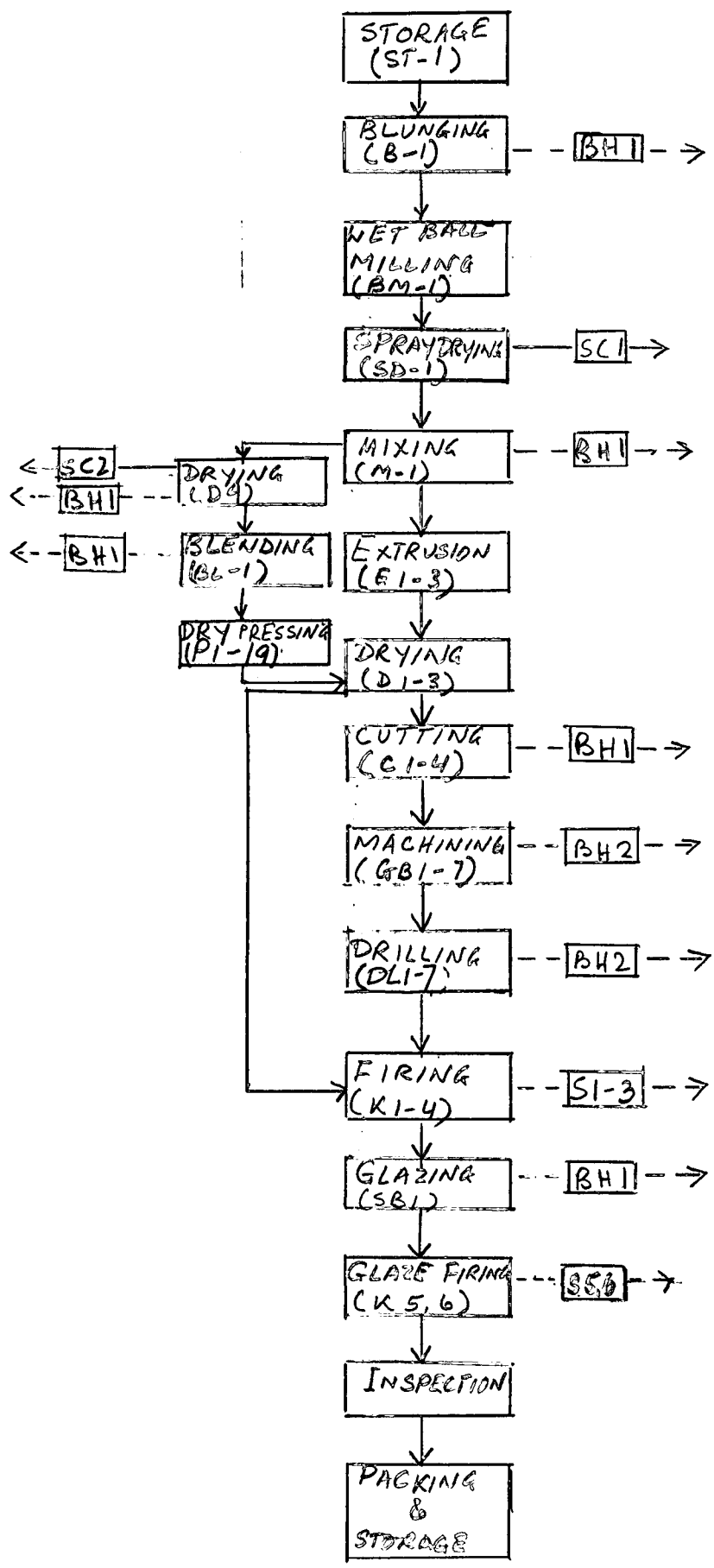
Figure 1. Example Process Flow Diagram for Clay Ceramic Manufacturing.

L-3 Speatite



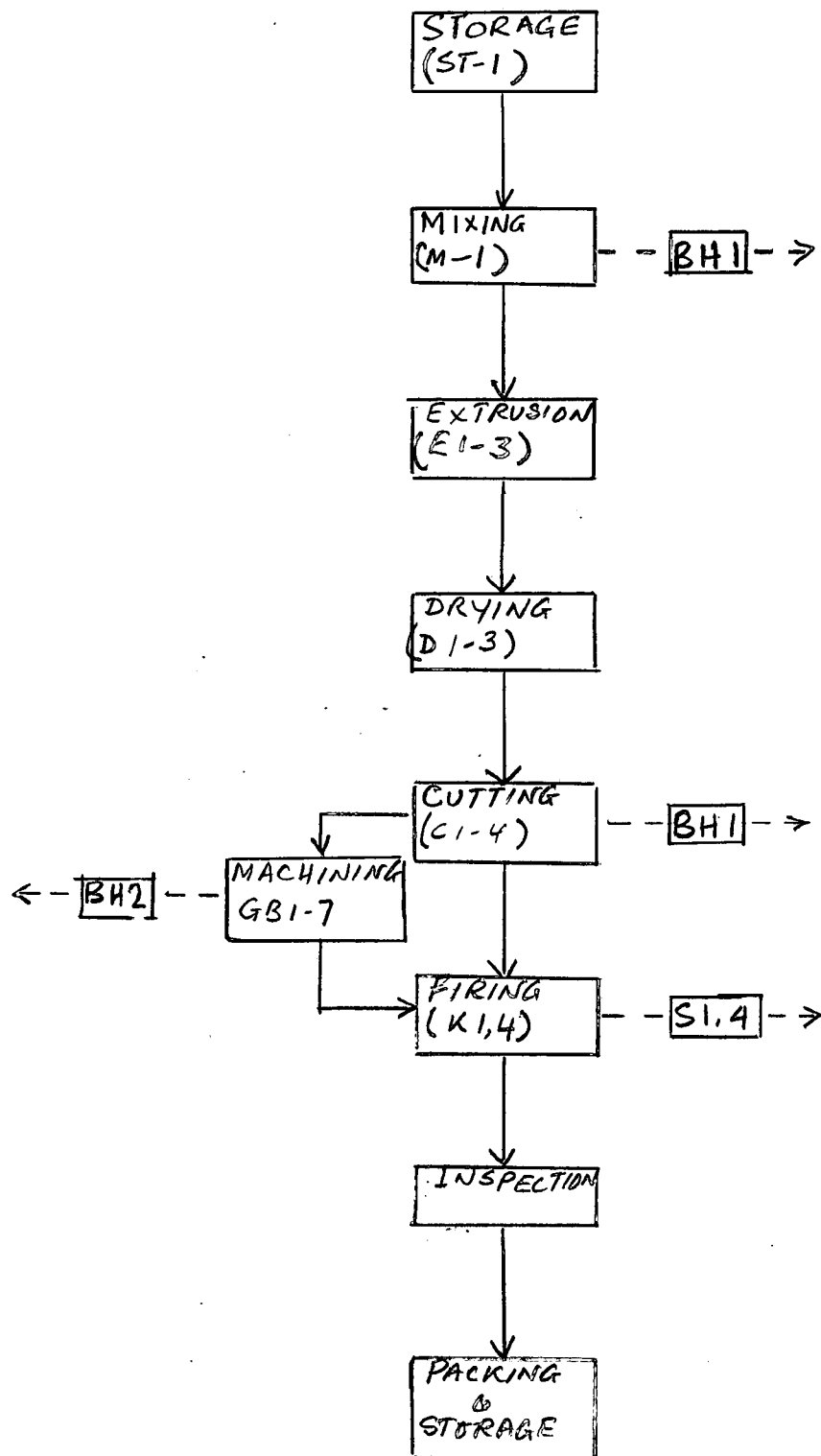
- EMISSIONS FLOW
--- MATERIAL FLOW
- K 5,6 GLAZE FIRING
 - SB1,2 GLAZE SPRAY BOOTH
 - K1-4 KILN
 - DL1-7 DRILLING
 - GB1-7 MACHINING
 - BH1,2 BAG HOUSE
 - S1-6 UNCONTROLLED STACK
 - ST1 STORAGE
 - BL1 BLENDER
 - M1 MIXER
 - P1-19 DRY PRESS
 - E1-3 EXTRUSION
 - D1-4 DRYER
 - C1-4 CUTTING

L-5 STEATITE

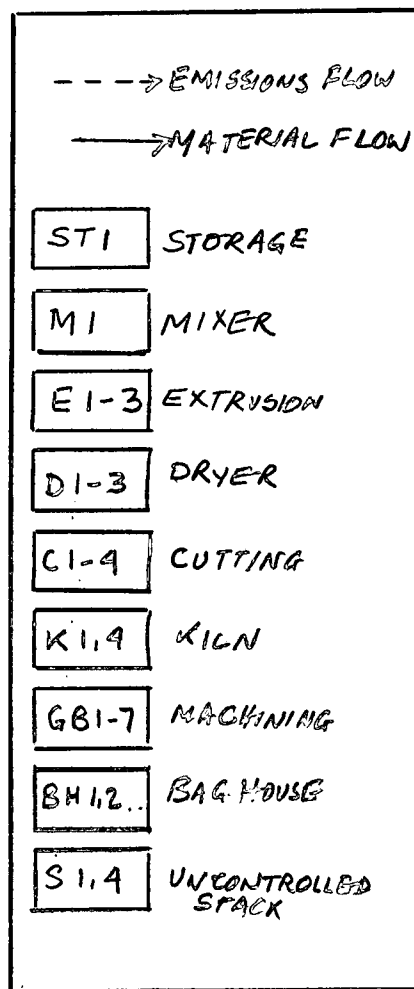


--> EMISSION FLOW
--> MATERIAL FLOW

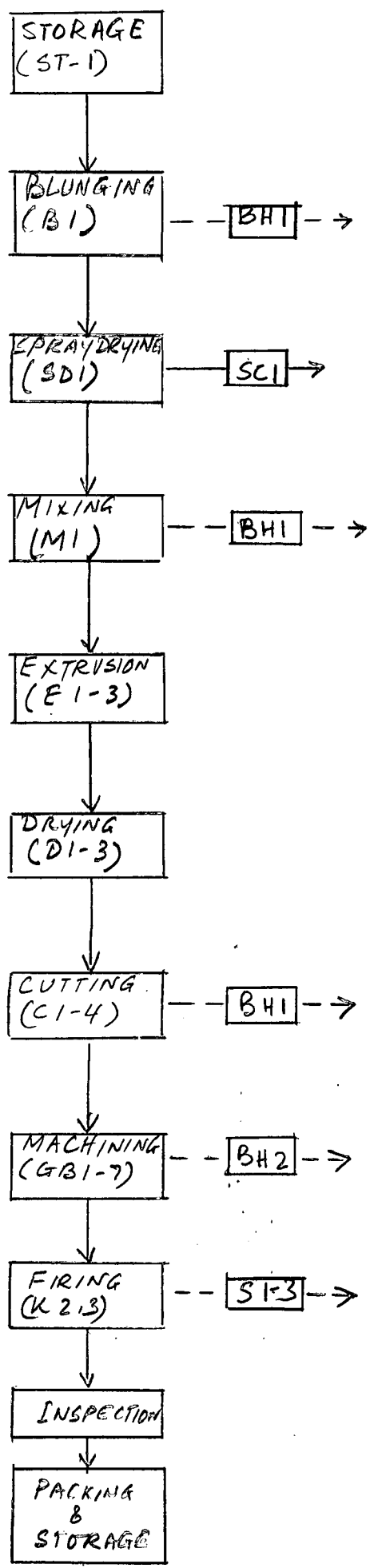
- SI-6 UNCONTROLLED STACK
- SC1 SCRUBBER
- K5,6 GLAZE FIRING
- SB1 GLAZE SPRAY BOOTH
- ST-1 STORAGE
- BH1,2 BAG HOUSE
- B1 BLUNGER
- BM1 BALL MILL
- SD1 SPRAY DRYER
- M1 MIXER
- E1,3 EXTRUSION
- D1-4 DRYER
- C1-4 CUTTING
- GB1-7 MACHINING
- DL1-7 DRILLING
- K1-4 KILN



CORDIERITE
&
SEMI CORDIERITE



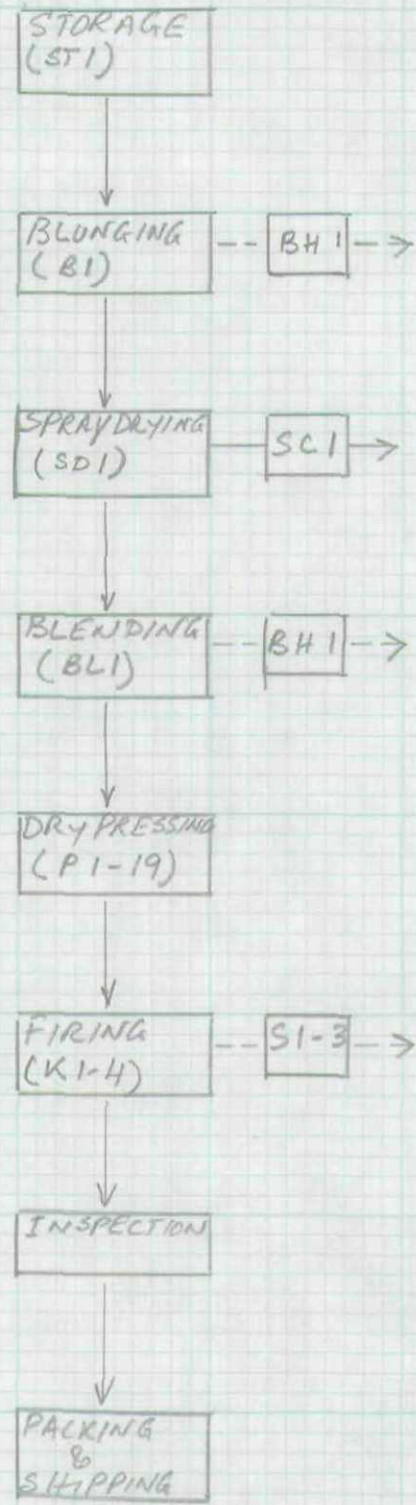
ALUMINA



--> EMISSION FLOW
--> MATERIAL FLOW

- ST1 STORAGE
- B1 BLUNGER
- SD1 SPRAY DRYING
- M1 MIXER
- E1-3 EXTRUSION
- D1-3 DRYING
- C1-4 CUTTING
- GB1-7 MACHINING
- K1-4 KILN
- BH1,2 BAG HOUSE
- SC1 SCRUBBER
- S1-3 UNCONTROLLED STACK

TITANIA



---> EMISSIONS FLOW

—> MATERIAL FLOW

ST1	STORAGE
B1	BLUNGER
SD1	SPRAY DRYER
BL1	BLENDER
P1-19	PRESS
K1-4	KILN
BH1	BAG HOUSE
SC1	SCRUBBER
SI-4	UNCONTROLLED STACK

- B. Using Tables 3A through 3D, please provide current production rates, production capacities, and related information for each type of equipment used in clay ceramic product manufacturing. In Tables 3A and 3B, provide the requested information only for those sources that are known or expected to emit HAP's. In Table 3C, provide the requested information for all thermal processing, such as drying and firing sources. Provide data in the units listed in each row. For combustion sources that use different fuels, Table 3C should be completed for each type of fuel. For example, if a kiln typically is fired with gas, but periodically is fired with oil, one column in Table 3C should be completed for the kiln when fired with gas, and another column should be completed for the same kiln when fired with oil. For kilns used in the production of clay ceramic products that are fired more than once, indicate the firing stage (e.g., glaze fire, first fire, second fire). For products that are fired once, enter "single" as the firing stage.

In Table 3D, provide the requested information on glaze spraying operations. If the spraying operation has multiple stages, provide the information for the entire glaze spray line (e.g., the typical spraying rate should be specified as the total combined rate for all spraying stages).

TABLE 3A. RAW MATERIAL PROCESSING AND BENEFICIATION
(GRINDERS, SCREENS, MAGNETIC SEPARATORS, ETC.)^a

1. Process ID No. from flow diagram	EXAMPLE: M-1					
2. Type of equipment	wet ball mill					
3. Purpose	primary grinding					
4. Raw materials processed	ball clay					
5. Typical production rate (tons/hr)	12					
6. APCD ID No. or Stack ID No. from flow diagram	BH-2					
7. Hazardous air pollutants emitted	trace metals (Cr, Mn, Ni compounds)					

^aProvide information only for processes or equipment that are known or expected to emit HAP's. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

TABLE 3B. MIXING AND FORMING (MIXERS, BLUNGERS, EXTRUDERS, PRESSES, ETC.)^a

1. Process ID No. from flow diagram	EXAMPLE: DP-1					
2. Type of equipment	dry press					
3. Product type	technical ceramics					
4. Raw materials processed	clay, talc					
5. Typical production rate (tons/hr)	1					
6. APCD ID No. or Stack ID No. from flow diagram	BH-3					
7. Hazardous air pollutants emitted	trace metals (Cr, Ni, Mn compounds)					

^aProvide information only for processes or equipment that are known or expected to emit HAP's. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

TABLE 3C. THERMAL PROCESSING (DRYERS, KILNS, ETC.)^a

1. Process ID No. from flow diagram	EXAMPLE: TK-1	K1	K2	K3	K4	EL1
2. Type of equipment	tunnel kiln	TUNNEL KILN	IPSEN ROLLER HEARTH	RICKLY ROLLER HEARTH	RICKLY BELL PERIODIC	ELECTRIC GLAZE KILN
3. Firing stage	single	SINGLE	SINGLE	SINGLE	SINGLE	GLOST
4. Product type	wall tile	L-3 & L-5 STEATITE CORDIERITE TITANIA	L-3 & L-5 STEATITE ALUMINA	L-3 & L-5 STEATITE ALUMINA	L-3 STEATITE CORDIERITE	L3 & L-5 STEATITE
5. Typical operating temperature (°F)	1800	2300 +	2300 +	2300 +	2300	1900
6. Fuel type	natural gas	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	ELECTRIC
7. Heat input (MM Btu/hr)	14.6	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW
8. For batch processes only: 8a. Cycle time (hr)	not applicable	N/A	N/A	N/A	14 HOURS	N/A
8b. Equipment capacity (tons)	not applicable	N/A	N/A	N/A	N/A	N/A
9. For continuous processes only: Typical production rate (tons/hr)	2.5	DON'T KNOW	DON'T KNOW	DON'T KNOW	N/A	DON'T KNOW
10. APCD ID No. or Stack ID No. from flow diagram	S-2, S-3	S1	S3	S4	S2	S5
11. Hazardous air pollutants emitted	HF, HCl	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW

^aProvide information for all thermal processing units. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

TABLE 3C. THERMAL PROCESSING (DRYERS, KILNS, ETC.)^a

1. Process ID No. from flow diagram	EXAMPLE: TK-1	EL2	D 1	D2	D3	D4
2. Type of equipment	tunnel kiln	ELECTRIC GLAZE KILN	DRIER	DRIER	DRIER	ROTARY DRIER
3. Firing stage	single	GLOST	DRYING	DRYING	DRYING	DRYING
4. Product type	wall tile	L-3 & L-5 STEATITE	L-3 & L-5 STEATITE CORDIERITE ALUMINA	L-3 & L-5 STEATITE CORDIERITE ALUMINA	L-3 & L-5 STEATITE CORDIERITE ALUMINA	L-3 & L-5 STEATITE
5. Typical operating temperature (°F)	1800	1900	200	200	200	200
6. Fuel type	natural gas	ELECTRIC	STEAM	STEAM	STEAM	STEAM
7. Heat input (MM Btu/hr)	14.6	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW
8. For batch processes only: 8a. Cycle time (hr)	not applicable	N/A	N/A	N/A	N/A	N/A
8b. Equipment capacity (tons)	not applicable	N/A	N/A	N/A	N/A	N/A
9. For continuous processes only Typical production rate (tons/hr)	2.5	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW
10. APCD ID No. or Stack ID No. from flow diagram	S-2, S-3	S5				SC1
11. Hazardous air pollutants emitted	HF, HCl	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW	DON'T KNOW

^aProvide information for all thermal processing units. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

TABLE 3C. THERMAL PROCESSING (DRYERS, KILNS, ETC.)^a

1. Process ID No. from flow diagram	EXAMPLE: TK-1	SD1				
2. Type of equipment	tunnel kiln	SPRAY DRIER				
3. Firing stage	single	DRYING				
4. Product type	fire brick	L-38 L5 STEATITE ALUMINA TITANIA				
5. Typical operating temperature (°F)	1800	480				
6. Fuel type	natural gas	NATURAL GAS				
7. Heat input (MM Btu/hr)	14.6	DON'T KNOW				
8. For batch processes only: 8a. Cycle time (hr)	not applicable	N/A				
8b. Equipment capacity (tons)	not applicable	N/A				
9. For continuous processes only Typical production rate (tons/hr)	2.5	300 lbs/hr				
10. APCD ID No. or Stack ID No. from flow diagram	S-2, S-3	SC 1				
11. Hazardous air pollutants emitted	H ₂ F, HCl	DON'T KNOW				

^aProvide information for all thermal processing units. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

TABLE 3D. GLAZE SPRAY BOOTHS AND SPRAY LINES^a

1. Process ID No. from flow diagram	EXAMPLE: SB-1				
2. Type of product glazed or sprayed	Floor tile				
3. Number of spraying stages	4				
4. Manual or automatic spraying	Automatic				
5. Totally enclosed? (yes/no)	No				
6. Typical spraying rate (gal/hr)	4				
7. Estimated transfer efficiency (%)	70				
8. Type of spray application method	Air-assisted				
9. Exhaust rate (ft ³ /min)	5,600				
10. Equipped with water curtain? (yes/no)	Yes				
11. Water flow rate (gal/min) (if equipped with water curtain)	30				
12. APCD ID No. or Stack ID No. from flow diagram	BH-4				
13. Hazardous air pollutants emitted	Cr₂O₃, CoO, MnO₂				

^aProvide information only for processes or equipment that are known or expected to emit HAP's. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

C. Using **Table 4**, please provide information on procedures used to monitor the process operating rate for each of the pieces of equipment and HAP emission sources listed in Tables 3A to 3D. Use the same HAP emission source types and equipment ID numbers you listed in Tables 3A to 3D.

- Indicate whether you **monitor process rate** or not.
- Provide a **summary of process rate monitoring procedures** that describes how process rate is measured for the particular piece of equipment. Include **where** the rate is monitored (i.e., rate of material fed, rate of material discharged, or material production rate), the **units used** to measure process rate (e.g, lb/hr or pieces/hr), and **how** the process data is **recorded**, i.e., manually, automatically (e.g., computer - printout or stored to disk), or not at all. If you monitor process rate at both the feed and discharge ends of the equipment, indicate so.
- Indicate the **type of monitor, equipment, or instrument used** to measure process operating rate.
- Indicate the **monitoring frequency** or how often process rate measurements are made.
- If instruments are used to measure process throughput, indicate in the **monitor accuracy** column the accuracy of the instrument. The monitor accuracy could be listed in terms of a percentage of the throughput (± 1 percent), mass per unit time (± 2 lb/hr), number of pieces per unit time (± 10 pieces/hr), or other appropriate units.
- Indicate the **frequency** that the monitor is calibrated.
- Provide data in the units listed for each row.

TABLE 4. SUMMARY OF PROCESS RATE MONITORING PROCEDURES

HAP emission source type	Equipment ID No.	Do you monitor process rate? (yes/no)	Summary of process rate monitoring procedures	Type of monitor used	Monitoring frequency	Monitor accuracy	Monitor calibration frequency
EXAMPLE: Spray dryer	SD-1	Yes	Feed rate to dryer measured in tons/hour using weigh hopper; automatically recorded on disk.	gravimetric weigh hopper	hourly	± 0.5 %	annually
TUNNEL KILN	K1	NO	DON'T MEASURE	N/A	N/A	N/A	N/A
IPSEN ROLLER HEARTH KILN	K2	NO	DON'T MEASURE	N/A	N/A	N/A	N/A
BICKLY ROLLER HEARTH KILN	K3	NO	DON'T MEASURE	N/A	N/A	N/A	N/A
BICKLY BELL PERIODIC KILN	K4	NO	DON'T MEASURE	N/A	N/A	N/A	N/A

*Provide information only for processes or equipment that are known or expected to emit HAP's. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

If additional space is required, please make copies of this page.

VI. Identification of Clay Ceramic Product Manufacturing Emission Points

- A. Use the process flow diagrams developed for your facility and **Table 5** to provide the following information for each HAP emission source at your facility.
- Define **HAP emission source type** in terms of equipment, such as dryers, kilns, etc. As in the process flow diagram, you may group multiple pieces of similar equipment.
 - Use the same **equipment ID numbers** indicated on the process flow diagram(s).
 - If the emission source vents inside a building or to outside ambient air without first passing through a control device, place a check mark in the **uncontrolled** column.
 - If the emission source vents inside a building or to outside ambient air after passing through a **fabric filter, dry injection fabric filter, scrubber, ESP, or afterburner**, place the APCD ID number(s) in the column corresponding to the APCD type.
 - If the emission source vents through a control device type other than those already listed in Table 5, indicate the control device type in the **other control** column and place the APCD ID number in the appropriate cell.
 - In the **emission test data** column, place a "yes" or "no" in the appropriate cell to indicate whether the specific source has been tested for any pollutants, including any HAP's, VOC, PM, or opacity.

TABLE 5. SUMMARY OF HAP EMISSION SOURCES, AIR POLLUTION CONTROL EQUIPMENT, AND AVAILABILITY OF EMISSION TEST DATA

Page 19 of 35

- B. **Using Table 6**, please provide information on stack parameters and emission estimates for each emission point at your facility that is known or expected to emit HAP's. Provide information for all APCD's, including those that exhaust inside the building. Include data for each inlet and outlet, if available, as indicated in the table. If you have more than one inlet to an APCD, provide data for each of the inlets. Provide data in the units listed for each row.

Provide emission estimates for any HAP's or HAP surrogates, such as PM for metal HAP's or VOC for organic HAP's. Emission estimates may consist of measurements reported in emission test reports or may be calculated using mass balances, emission factors, engineering judgement, or other estimation methods. Provide the emission estimates as emission factors in units of lb of pollutant emitted per ton of product (lb/ton). **Provide complete copies of any emission test reports or other reports that document measurements of emissions.** Test reports and other emission measurement documents should include the following information: process identification; location of sampling point; stack diameter, temperature, and flow rate; test method, including analytical procedures; number of test runs; emission concentration, emission rate, percent oxygen, and percent moisture for each test run; process operating rate; type of APCD; and APCD operating parameters. However, test reports with incomplete documentation may still be useful and should also be submitted.

You do not need to fill out Table 6 for emission points that are covered by an emission test report that is included in your submittal. **If emission test reports are not available, provide calculations that support your emission estimate, including the basis for all assumptions in the estimate.** Note that emission estimates are needed for all HAP's that the facility emits or has the potential to emit. (Please refer to the HAP list in Attachment 1.) If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 6. GENERAL INFORMATION ON HAP EMISSION POINTS

1. APCD ID No. or Stack ID No. from flow diagram	EXAMPLE: VS-2	S-1	S2	S3				
2. Type of APCD	Venturi scrubber							
3. Specific emission sources served (Provide ID Nos.)	SD-2	K1 (TK)	K2 (IPSEN)	K3 (BICKLY R.H.)				
4. Product type	floor tile	L3 & L5 STEATITE CORDIERITE, TITANIA	L3 & L5 STEATITE ALUMINA	L3 & L5 STEATITE ALUMINA				
5. Stack dimensions: 5a. Height (ft)	40	20	23	25.5 - 2 STACKS				
5b. Cross-sectional area (ft²)	9.1	1.4	5.5	1.1 - 2 STACKS				
Provide data for each inlet and outlet, if available, for Items 6-10.	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
6. Gas flow rate: 6a. Actual (acf/min)	24,000	24,300	ND	ND	ND	ND	ND	ND
6b. @ std. conditions* (dscf/min)	17,000	17,200	ND	ND	ND	ND	ND	ND
7. Gas moisture content (%)	8.2	21.3	ND	ND	ND	ND	ND	ND
8. Gas oxygen content (%)	11.8	13.4	ND	ND	ND	ND	ND	ND
9. Gas temperature (°F)	600	152	ND	ND	ND	ND	ND	ND

TABLE 6. (continued)

		Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
10. Emission estimates:									
10a. HAP's									
Pollutant	Units	ND	ND	ND	ND	ND	ND	ND	ND
HF	lb/ton	ND	ND	ND	ND	ND	ND	ND	ND
HCl	lb/ton	ND	ND	ND	ND	ND	ND	ND	ND
10b. HAP surrogates									
PM (lb/ton)		100	0.18	ND	ND	ND	ND	ND	ND
VOC (lb/ton)		ND	ND	ND	ND	ND	ND	ND	ND
11. Basis for emissions estimates (e.g., test data, emission factors, engineering judgement)									
11a. HAP's (specify pollutant)									
HF		ND	ND	ND	ND	ND	ND	ND	ND
HCl		ND	ND	ND	ND	ND	ND	ND	ND
11b. HAP surrogates									
PM		test data	test data	ND	ND	ND	ND	ND	ND
VOC		ND	ND	ND	ND	ND	ND	ND	ND

*Standard conditions: 68°F, 29.9 millimeters of mercury.

ND = No data.

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 6. GENERAL INFORMATION ON HAP EMISSION POINTS

1. APCD ID No. or Stack ID No. from flow diagram	EXAMPLE: VS-2	S 4	S 5	S 6
2. Type of APCD	Venturi scrubber			
3. Specific emission sources served (Provide ID Nos.)	SD-2	K 4 (BICKLY BELL PERIODIC)	K 5 (GLAZE FIRING)	K 6 (GLAZE FIRING)
4. Product type	floor tile	L3 & L5 STEATITE CORDIERITE	L3 & L5 STEATITE	L3 & L5 STEATITE
5. Stack dimensions: 5a. Height (ft)	40	24	10	24
5b. Cross-sectional area (ft ²)	9.1	3.7	0.9	0.9
Provide data for each inlet and outlet, if available, for Items 6-10.	Inlet Outlet	Inlet Outlet	Inlet Outlet	Inlet Outlet
6. Gas flow rate: 6a. Actual (acf/min)	24,000 24,300	ND ND	ELECTRICALLY	ELECTRICALLY
6b. @ std. conditions* (dscf/min)	17,000 17,200	ND ND	HEATED	HEATED
7. Gas moisture content (%)	8.2 21.3	ND ND		
8. Gas oxygen content (%)	11.8 13.4	ND ND		
9. Gas temperature (°F)	600 152	ND ND		

TABLE 6. (continued)

		Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
10. Emission estimates:									
10a. HAP's									
Pollutant	Units	ND	ND	ND	ND	ND	ND	ND	ND
HF	lb/ton	ND	ND	ND	ND	ND	ND	ND	ND
HCl	lb/ton	ND	ND	ND	ND	ND	ND	ND	ND
10b. HAP surrogates									
PM (lb/ton)		100	0.18	ND	ND	ND	ND	ND	ND
VOC (lb/ton)		ND	ND	ND	ND	ND	ND	ND	ND
11. Basis for emissions estimates (e.g., test data, emission factors, engineering judgement)									
11a. HAP's (specify pollutant)									
HF		ND	ND	ND	ND	ND	ND	ND	ND
HCl		ND	ND	ND	ND	ND	ND	ND	ND
11b. HAP surrogates									
PM		test data	test data	ND	ND	ND	ND	ND	ND
VOC		ND	ND	ND	ND	ND	ND	ND	ND

*Standard conditions: 68°F, 29.9 millimeters of mercury.

ND = No data.

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

- C. **Using Tables 7A through 7F**, please provide design and operating data for each APCD associated with all dryers, kilns, and any other clay ceramic products manufacturing source that may emit HAP's. Use Tables 7A to 7E for specific types of APCD's. Use Table 7F for other types of APCD's. When using Table 7F, please specify the type of control device and 2 to 4 key design or operating parameters for the device. If the information requested in Tables 7A through 7F is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the tables. Provide data in the units listed for each row.

TABLE 7A. FABRIC FILTERS (BAGHOUSES) OR CARTRIDGE-TYPE DUST COLLECTORS

1. APCD ID No. from flow diagram	EXAMPLE; BH-1	BH-1	BH-2			
2. Baghouse or cartridge-type (circle one)	<u>baghouse</u> or cartridge-type	<u>baghouse</u> or cartridge-type	<u>baghouse</u> or cartridge-type	baghouse or cartridge-type	baghouse or cartridge-type	baghouse or cartridge-type
3. Year installed	1985	1961	1959			
4. Manufacturer	Acme	W. W. SLY MFG	NORBLO			
5. No. of bags/cartridges	150	383	224			
6. Filter material	fiberglass	CLOTH	CLOTH			
7. Filter material weight (oz/yd ²)	16.2	DON'T KNOW	DON'T KNOW			
8. Bag/cartridge life (months)	8	5 YEARS	5 YEARS			
9. Air-to-cloth ratio (acfm/ft ²)	2.5	DON'T KNOW	DON'T KNOW			
10. Cleaning method	pulse Jet	AIR SHAKER	AIR SHAKER			

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 7B. DRY INJECTION FABRIC FILTERS

1. APCD ID No. from flow diagram	EXAMPLE: DIFF-1					
2. Year installed	1985					
3. Manufacturer	Acme					
4. Type of sorbent	limestone					
5. Injection rate (lb/hr)	15					
6. No. of fabric filter bags	150					
7. Filter material	fiberglass					
8. Filter material weight (oz/yd ²)	16.2					
9. Bag life (months)	8					
10. Air-to-cloth ratio (acfm/ft ²)	2.5					
11. Cleaning method	pulse-jet					

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 7C. SCRUBBERS

1. APCD ID No. from flow diagram	EXAMPLE: SCR-1	SC 1	SC 2			
2. Year installed	1988	1969	DON'T KNOW			
3. Manufacturer	Acme	TOWER IRON WORK	HOMEMADE			
4. Type of scrubber	venturi	VENTURI	VENTURI			
5. Scrubber liquor	recycled water	RECYCLED WATER	RECYCLED WATER			
6. Gas pressure drop across scrubber (in. water)	24	DON'T KNOW	DON'T KNOW			
7. Liquid to gas ratio (gal/1000 ft ³)	6	DON'T KNOW	DON'T KNOW			
8. Chemical additives						
8a. Type of additive used	None	NONE	NONE			
8b. Feed rate (specify units: _____)	Not applicable	N/A	N/A			

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 7D. ELECTROSTATIC PRECIPITATORS

1. APCD ID No. from flow diagram	EXAMPLE: ESP-1					
2. Year installed	1992					
3. Type (e.g., rigid electrode)	rigid electrode					
4. Number of fields	3					
5. Pressure drop (in. water)	0.2					
6. Total plate area (ft ²)	92,000					
7. Frequency of cleaning	every 10 min.					
8. Primary power supply:						
8a. Voltage (V)	440					
8b. Current (amps)	178					
9. Secondary power supply:						
9a. Voltage (kV)	50					
9b. Current (milliamps)	1,000					

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 7E. AFTERBURNERS (INCINERATORS)

1. APCD ID No. from flow diagram	EXAMPLE: AB-1					
2. Year installed	1992					
3. Manufacturer	ACME					
4. Type of afterburner	Thermal					
4a. Thermal or catalytic						
4b. With or without concentrator ^a	Without					
5. Number of chambers	1					
6. Operating temperature (°F) (Thermal afterburners)	1500					
6a. Primary chamber						
6b. Secondary chamber	NA					
7. Temperature across bed (°F) (catalytic afterburners)	NA					
7a. Inlet to bed						
7b. Outlet of bed	NA					

TABLE 7E. (continued)

8. Fuel type	propane					
9. Fuel firing rate (MMBtu/hr)	8.2					
10. Design residence time (seconds at specified temperature) ^b	2 seconds at 1500°F					

NA = Not applicable

^aIf concentrator is used, please provide details of concentrator design and operation on a separate attachment.

^bResidence time is calculated as the volume of the combustion chamber divided by the design gas volumetric flow rate.

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 7F. OTHER CONTROL DEVICES

1. Type of APCD					
2. APCD ID No. from flow diagram					
3. Year installed					
4. Manufacturer					
5. _____ (specify parameter)					
6. _____ (specify parameter)					
7. _____ (specify parameter)					
8. _____ (specify parameter)					

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

- C. Using **Table 8**, please provide the following information on current monitoring procedures for each of the control devices listed in Tables 7A to 7E: **parameters monitored** (e.g., baghouse pressure drop, afterburner chamber temperature); **monitoring frequency**, **monitoring devices** used (e.g., differential pressure transducer, thermocouple) and recordkeeping practices (e.g., manually recorded in log book, continuously recorded by electronic data acquisition system). Describe briefly other operation and maintenance (O&M) procedures for each control device. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

VII. Pollution Prevention Practices for Clay Ceramic Products Manufacturing

- A. Please describe all pollution prevention practices (i.e., process modifications, such as re-use of discarded or rejected materials, or any practice that prevents or reduces the amount of air emissions, or the generation and release of solid waste or wastewater associated with the operation of air pollution controls. If the information requested here is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than providing the information below.

TABLE 8. CONTROL DEVICE MONITORING AND O&M PROCEDURES

APCD ID No.	Parameters monitored	Monitoring frequency	Type of device used	Recordkeeping procedures	O&M practices	
					Monitoring equipment	Control device
EXAMPLE: BH-1	pressure drop	daily	pressure gauge	manually recorded in log book	calibrate (quarterly)	visual inspection of baghouse structure (quarterly)
	opacity	continuous	opacity monitor	electronically stored on disk	check zero span, blowers (daily); clean lenses (weekly)	
BH1	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	
BH2	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA
	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 8. CONTROL DEVICE MONITORING AND O&M PROCEDURES
(Additional Sheet)

APCD ID No.	Parameters monitored	Monitoring frequency	Type of device used	Recordkeeping procedures	O&M practices	
					Monitoring equipment	Control device
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	
	-----	-----	-----	-----	-----	

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

VIII. Information on Processes Other Than Clay Ceramic Products Manufacturing Processes

A. **Using Table 9**, please identify all other processes or operations at this facility that are not addressed in Items II through VII above and that are potential sources of HAP emissions. Estimate total annual emissions of each HAP emitted by these colocated processes. If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

TABLE 9. ESTIMATED ANNUAL HAP EMISSIONS FROM OTHER SOURCES

Process/emission source/SIC Code(s)	HAP's emitted	Estimated annual emissions, tons
EXAMPLE: Nonclay technical ceramic manufacturing	HF	0.2
SIC 3264		
SIC _____		
SIC _____		
SIC _____		
SIC _____		

If the information requested in the table is contained in your facility's operating permit, you may reference the applicable sections of the permit rather than filling out the table.

45

MATERIAL SAFETY DATA SHEET

MSDS No: 013

UNIMIN CORPORATION
258 Elm Street
New Canaan, CT 06840

Emergency Telephone Number
(203) 966-8880

Telephone Number for Information
(203) 966-8880

Date Prepared: October 23, 1995
=====

SECTION 1: IDENTIFICATION

PRODUCT NAME: Nepheline Syenite - various grades

SYNONYMS: Anhydrous sodium potassium alumino silicate, Inorganic feldspathic mineral
=====

SECTION 2: COMPONENTS

<u>CAS#</u>	<u>Component</u>	<u>Percentage</u>	<u>Exposure Limits</u>
37244-96-5	Nepheline Syenite	100%	PEL- 5 mg/m ³ TWA (respirable fraction) TLV- 10 mg/m ³ TWA (total dust) MSHA- 5 mg/m ³ TWA (respirable fraction)

PEL means OSHA Permissible Exposure Limit.

TLV means American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.

MSHA means Mine Safety and Health Administration Exposure Limit.

TWA means 8 hour time weighted average.

Note: The Permissible Exposure Limits (PEL) reported above are the pre-1989 limits that were reinstated by OSHA June 30, 1993 following a decision by the 11th Circuit Court of Appeals. These PELs are now being enforced by Federal OSHA. Be aware that more restrictive exposure limits may be enforced by some states, agencies or other authorities.
=====

SECTION 3: HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW**

This product is a chemically inert, non-combustible mineral. Excessive inhalation of dust may cause lung injury with symptoms of shortness of breath and reduced pulmonary function.
=====

MSDS No: 013

HEALTH HAZARDS:

Inhalation: Inhalation of dust may cause irritation of the nose, throat and respiratory passages.

Skin Contact: No adverse effects expected.

Eye Contact: Contact may cause mechanical irritation and possible injury.

Ingestion: No adverse effects expected for normal, incidental ingestion.

Chronic Health Effects: Prolonged overexposure to any nuisance dust may cause lung injury. Symptoms include cough, shortness of breath, and reduced pulmonary function.

Cancer Status: None of the components of this product are listed as carcinogens or suspected carcinogens by IARC, NTP or OSHA.

Medical Conditions Aggravated by Exposure: Individuals with respiratory disease, including but not limited to, asthma and bronchitis, or subject to eye irritation should be excluded from exposure.

Signs and Symptoms of Exposure: Overexposure to nuisance dusts may cause mucous membrane and respiratory irritation, cough, sore throat, nasal congestion, sneezing and shortness of breath.

=====

SECTION 4: FIRST AID

Gross Inhalation: Remove victim to fresh air. If breathing has stopped, perform artificial respiration. If breathing is difficult have qualified personnel administer oxygen. Get prompt medical attention.

Skin Contact: No first aid should be needed since this product does not affect the skin. Wash exposed skin with soap and water before breaks and at the end of the shift.

Eye Contact: Flush the eyes immediately with large amounts of running water, lifting the upper and lower lids occasionally. If irritation persists or for imbedded foreign body, get immediate medical attention.

Ingestion: If large amounts are swallowed, get immediate medical attention.

=====

SECTION 5: FIRE AND EXPLOSION DATA

Flash Point (Method Used): Fully oxidized, will not burn.

Autoignition Temp: Will not burn.

Flammable Limits: LEL: Not applicable UEL: Not applicable

MSDS No: 013

Extinguishing Media: This product will not burn but is compatible with all extinguishing media. Use any media that is appropriate for the surrounding fire.

Special Fire Fighting Procedures: None required with respect to this product. Firefighters should always wear self-contained breathing apparatus for fires indoors or in confined areas.

Unusual Fire and Explosion Hazards: None.

Hazardous Combustion Products: None.

=====

SECTION 6: ACCIDENTAL RELEASE MEASURES

If uncontaminated, collect using dustless method (HEPA vacuum or wet method) and place in appropriate container for use. If contaminated, use appropriate method for the nature of contamination. Consider possible toxic or fire hazards. Wear appropriate protective equipment. Collect for disposal.

=====

SECTION 7: HANDLING AND STORAGE

Avoid breathing dust. Use normal precautions against bag breakage or spills of bulk material. Avoid creation of respirable dust. Use good housekeeping in storage and use areas to prevent accumulation of dust in work area.

Use adequate ventilation and dust collection. Maintain and use proper, clean respiratory equipment (See Section 8). Launder clothing that has become dusty. WARN and TRAIN employees in accordance with state and federal regulations.

WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS - USERS IN CASE OF RESALE) BY POSTING AND OTHER MEANS OF THE HAZARDS AND OSHA PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.

=====

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Use local exhaust as required to maintain exposures below applicable occupational exposure limits. See also ACGIH "Industrial Ventilation - A Manual for Recommended Practice", (current edition).

Respiratory Protection: Use appropriate respiratory protection for respirable particulates based on consideration of airborne workplace concentrations and duration of exposure. Refer to the most recent standards of ANSI (Z88.2) OSHA (29 CFR 1910.134), MSHA (30 CFR Parts 56 and 57) and NIOSH Respirator Decision Logic.

Gloves: Protective gloves recommended.

Eye Protection: Safety glasses or goggles recommended.

Other Protective Equipment/Clothing: As appropriate for the work environment. Dusty clothing should be laundered before reuse.

=====

MSDS No: 013

9: PHYSICAL AND CHEMICAL PROPERTIES**Appearance and Odor:** White powder, odorless.**pH:** Not applicable**Boiling Point:** Not applicable**Melting Point:** 1223°C / 2233°F**Solubility in Water:** Negligible**Percent Volatile:** 0%**Specific Gravity (water=1):** 2.61**Vapor Pressure:** Not applicable**Vapor Density:** Not applicable**Evaporation Rate:** Not applicable**SECTION 10: STABILITY AND REACTIVITY****Stability:** Stable**Conditions to Avoid:** None**Incompatibility:** None known.**Hazardous Decomposition Products:** None.**Hazardous Polymerization:** Will not occur.**Conditions to Avoid:** None**SECTION 11: TOXICOLOGICAL INFORMATION**

No acute toxicity data is available for product or components. Refer to Section 3 for health hazard information.

SECTION 12: ECOLOGICAL INFORMATION

No ecotoxicity data is available. This product is not expected to present an environmental hazard.

SECTION 13: DISPOSAL

Waste Disposal Method: If uncontaminated, dispose as an inert, non-metallic mineral. If contaminated, dispose in accordance with all applicable local, state/provincial and federal regulations.

SECTION 14: TRANSPORTATION DATA**U.S. DOT HAZARD CLASSIFICATION****Proper Shipping Name:** Not Regulated**Technical Name:** N/A**UN Number:** N/A**Hazard Class/Packing Group:** N/A**Labels Required:** None**DOT Packaging Requirements:** N/A

MSDS No: 013

Exceptions: N/A
=====SECTION 15: OTHER REGULATORY INFORMATIONSARA 311/312: Hazard Categories for SARA Section 311/312 Reporting:
Not ApplicableSARA 313 This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under the SARA Section 313 (40 CFR 372):
NoneCERCLA Section 103 Reportable Quantity: NoneCalifornia Proposition 65: This Product contains the following substances known to the State of California to cause cancer and/or reproductive harm: NoneCanadian WHMIS Classification: Not a controlled product.
=====16: OTHER INFORMATIONEuropean Community Labeling Classification: N/AEuropean Community Risk and Safety Phrases: NoneNFPA Hazard Rating: Health: 0 Fire: 0 Reactivity: 0HMIS Hazard Rating: Health: 0 Fire: 0 Reactivity: 0References:

Registry for Toxic Effects of Chemical Substances (RTECS), 1995
Patty's Industrial Hygiene and Toxicology
NTP Seventh Annual Report on Carcinogens, 1994
Hawley's Condensed Chemical Dictionary, twelfth edition

=====

CREATION DATE: October 23, 1995 REVISION DATE: October 23, 1995

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. The information set forth herein is based on technical data the Unimin Corporation believes reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside the control of Unimin Corporation, no warranties, expressed or implied, are made and no liability is assumed in connection with any use of this information. Any use of these data and information must be determined by the user to be in accordance with federal, state and local laws and regulations.



GEO Specialty Chemicals, Inc.

701 WISSAHICKON AVE.
CEDARTOWN, GA 30125

MATERIAL SAFETY DATA SHEET

SAXONBURG CERAMICS
ISABELLA STREET
SAXONBURG PA 16056

CUSTOMER # 085700001

1 PRODUCT INFORMATION

PRODUCT TRADE NAME	EMEREST 2328		
SYNONYMS	Butyl Oleate; Oleic Acid, Butyl Ester		
HEALTH 1	FLAMMABILITY 1	REACTIVITY 0	
National Fire Protection Association (NFPA) Rating			
HEALTH 1	FLAMMABILITY 1	REACTIVITY 0	
Hazardous Materials Identification System (HMIS) Rating			
This Material Safety Data Sheet complies with 29 CFR 1910.1200 OSHA Hazard Communication Standard			
TELEPHONE NUMBER	770/748-1200 EXT.258	EMERGENCY NUMBER	770/748-1200 EXT.252

EMERGENCY OVERVIEW

Amber liquid with mild odor. May cause mild transient skin and eye irritation.

2 COMPOSITION / INFORMATION ON INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD DATA
Butyl Oleate	142-77-8	100	PEL: None established TLV: None established

LISTED AS CARCINOGEN BY:	IARC NO	NTP NO	OSHA NO	ACGIH NO	OTHER NO
PEL = OSHA Permissible Exposure Limit		TLV = ACGIH Threshold Limit			
STEL = Short Term Exposure Limit		TWA = Time Weighted Average			

3 HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

ROUTES OF EXPOSURE

INHALATION

Not considered hazardous under normal conditions of use. Exposure to mist or spray may cause irritation of respiratory passages.

SKIN CONTACT

Possible mild transient skin irritation on prolonged contact.

SKIN ABSORPTION

No data.

EYE CONTACT

May cause mild transient eye irritation.

INGESTION

Considered practically non-toxic.

EFFECTS OF OVEREXPOSURE

ACUTE OVEREXPOSURE

Possible eye, skin and respiratory tract irritation.

CHRONIC OVEREXPOSURE

No data.

4 FIRST AID MEASURES

EYES

Flush at once with large amounts of water for at least 15 minutes holding lids apart. Washing within one minute is essential to achieve maximum effectiveness. Get medical attention.

SKIN

Wash thoroughly with soap and water. If irritation should develop get medical attention.

INHALATION

Remove to fresh air.

INGESTION

Do not induce vomiting. If vomiting should occur spontaneously, keep airway clear. Get medical attention. Never give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN

None

5 FIRE FIGHTING MEASURES

FLASH POINT (Test Method) >200°F (93°C) PMCC AUTOIGNITION TEMPERATURE Not Available

FLAMMABLE LIMITS IN AIR, % by Volume

LOWER

UPPER

Not Available

Not Available

EXTINGUISHING MEDIA Water spray, carbon dioxide, foam and dry chemical.

UNUSUAL FIRE OR EXPLOSION HAZARDS

None

SPECIAL FIRE FIGHTING PROCEDURES

Cool exposed containers with water spray. Self-contained breathing apparatus in confined areas.

6 ACCIDENTAL RELEASE MEASURES

Stop leaks. Clean up large spills with vacuum truck. Soak up small spills with absorbent material and place in labeled waste container for disposal. Wear adequate personal protective clothing and equipment.

7 HANDLING AND STORAGE

PRECAUTIONARY STATEMENTS

CAUTION!

MAY CAUSE IRRITATION.

Avoid contact with eyes, skin, and clothing.

Avoid breathing spray or mist.

Wear chemical splash goggles, gloves and protective clothing when handling.

Use with adequate ventilation and employ respiratory protection where spray or mist may be generated.

Wash thoroughly after handling.

Do not take internally.

FOR INDUSTRIAL USE ONLY.

OTHER HANDLING & STORAGE REQUIREMENTS

Always mix well before using. Product may congeal or stratify if cold.

Allow to warm to room temperature and mix well before using.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION REQUIREMENTS

Local exhaust ventilation recommended.

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION

Chemical splash goggles or face shield.

SKIN PROTECTION

Rubber or plastic gloves.

RESPIRATORY PROTECTION

None required under normal conditions of use. NIOSH/MSHA approved respirator if necessary. Follow manufacturer's recommendations.

OTHER REQUIRED EQUIPMENT

Standard work clothing and work shoes.

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	SOLUBILITY IN WATER, % BY Weight
Clear amber liquid	Insoluble
ODOR	pH
Mild	10% (50/50 IPA/Water) : 5.0
SPECIFIC GRAVITY (Water = 1)	BOILING POINT (760 mm Hg)
0.86	Not Available
VAPOR PRESSURE	FREEZING POINT
Not Available	Not Available
VAPOR DENSITY (Air = 1)	MELTING POINT
Not Available	Not Applicable
EVAPORATION RATE (Butyl Acetate = 1)	VISCOSITY
Not Available	Not Available
DENSITY @ 20°C	% VOLATILES BY WEIGHT
7.2 lb/gal	Nil

10 STABILITY AND REACTIVITY

STABLE <input checked="" type="checkbox"/>	UNSTABLE <input type="checkbox"/>
CONDITIONS TO AVOID	
None	
INCOMPATIBLE MATERIALS	
Strong oxidizing agents.	
HAZARDOUS POLYMERIZATION	WILL OCCUR <input type="checkbox"/>
	WILL NOT OCCUR <input checked="" type="checkbox"/>
CONDITIONS TO AVOID	
None	
HAZARDOUS DECOMPOSITION PRODUCTS	
Carbon dioxide and carbon monoxide.	

11 TOXICOLOGICAL INFORMATION

Acute Oral LD50	=	>5.0 ml/kg (rat)
Primary Skin Irritation Index	=	0.46/8.00 (rabbit)
Draize Eye Irritation Score	=	0/110 (rabbit)

12 ECOLOGICAL INFORMATION

Not Available

13 DISPOSAL CONSIDERATIONS

Dispose of product by incineration in an approved chemical waste facility (or by other approved methods) in accordance with applicable Federal, State and local regulations. Avoid landfilling liquids. Since emptied container retains product residue all labeled hazard precautions must be observed.

14 TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME Non-hazardous

Harmonized Tariff Schedule Number: 2916.15.10 00

15 REGULATORY INFORMATION

NOTICE: This product does not contain any ingredients subject to the reporting requirements of SARA Title III, Section 313 (40 CFR Part 372).

SARA Section 311/312: Not Applicable.

TSCA: Components found in TSCA Inventory.

16 OTHER INFORMATION

TECHNICAL CONTACT **Mr. Steve Poehner**

DATE 07-16-97

TITLE **Quality Assurance Manager**

LAST REVISED **03/26/97**

CHEMICAL EMERGENCY TELEPHONE (CHEMTREC) 1-800-424-9300

The information herein is given in good faith but no warranty, expressed or implied, is made.

MATERIAL SAFETY DATA SHEET

Issue Date: 01/11/96

TO THE PURCHASER: This MSDS contains important environmental, safety and health information for your employees. Federal regulations require that this information be made available to them. If you resell this product, a copy of this MSDS should be given to the buyer.

PRODUCT IDENTIFICATION: CC250/CC250B2000/CC250-2/CC250-3
(Common Name) Ferro frit CC250

CHEMICAL FAMILY: Frits TSCA Inventory CAS # 65997-18-4*

SYNONYM: Chemical substances manufactured in the production of frit.
(From US-EPA/ISCA description) "Frit is a mixture of inorganic chemical substances produced by rapidly quenching a molten, complex combination of materials, confining the chemical substances thus manufactured as non migratory components of glassy solid flakes or granules. --"

SECTION I

MANUFACTURERS NAME: Ferro Corporation, Frit Division

MAIL: 4150 East 56th. Street
P.O. Box 6550
Cleveland, Ohio 44101

SHIP: 4150 East 56th. Street
Cleveland, Ohio 44105

TELEPHONE: Ferro 24 hour Informational number: (216) 641-5324
Facility Informational number: (216) 641-8580

SECTION IIa - HAZARDOUS COMPONENTS

Frit is a fused silicate glass substance. The components of this glass product listed below are from the inventory of potentially hazardous substances referenced by FCO-OSHA in 29 CFR 1910.1200.

COMPONENT:	Exposure Limit (Air), mg/m ³		
	ACGIH/ILV	FED OSHA/PEL	CAL OSHA/PEL
Particulates not otherwise classified (Total Dust)	10/3 (r)	15.	10.

(r) Respirable

PRODUCT IDENTIFICATION: CC250/CC250B2000/CC250-2/CC250-3

SECTION IIb - "SARA III" DATA

This product contains the following component(s) that require reporting under Section 313 of the Emergency Planning and Community Right-To-Know Act, also known as Title III of the SARA (The Superfund Amendments and Reauthorization Act), and 40 CFR Part 372:

COMPONENT: (a)

None

(a) The percent reported is based on the theoretical composition of this frit. While existing in theory, the component(s) mentioned are only present as part of FRIT (CAS # 65997-18-4*).

SECTION III - PHYSICAL DATA

SPECIFIC GRAVITY (H₂O = 1) 1.6-3.0 MELTING POINT (°F.) > 1200

SOLUBILITY IN WATER Negligible

APPEARANCE AND ODOR Frit flake or milled glass powder / Odorless

Boiling Point / Vapor Pressure / Vapor Density / % Volatiles By Volume / Evaporation Rate All N/A

SECTION IV - FIRE & EXPLOSION HAZARD DATA

FLASH POINT: N/A FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA: None UNUSUAL FIRE & EXPLOSION HAZARDS: None

SECTION V - REACTIVITY DATA

STABILITY: Stable X Unstable N/A Conditions to avoid N/A

INCOMPATIBILITY: (Materials to avoid) N/A

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Avoid fumes from firing

HAZARDOUS POLYMERIZATION: Will not occur X (Conditions to avoid) N/A

PRODUCT IDENTIFICATION: CC250/CC250B2000/CC250-2/CC250-3

SECTION VI - HEALTH HAZARD DATA

PRINCIPAL ROUTES OF ABSORPTION: Inhalation and Ingestion

EFFECTS OF OVEREXPOSURE: Prolonged contact with frit dust can be very irritating to the eyes and/or skin. High dust levels can be irritating to the respiratory tract.

With adequate ventilation, dust control, and good personal hygiene, symptoms of overexposure should not occur. Advise regular medical monitoring of employees by a physician competent in industrial health.

CARCINOGENICITY: N/A

EMERGENCY AND FIRST AID PROCEDURES: If overexposure is suspected move employees to fresh air; if breathing is difficult give oxygen. Call a physician. For dust in eyes; flush immediately with clean water and call a physician.

SOURCE OF HEALTH HAZARD DATA: This MSDS was developed from information on the constituent substances of this frit material, not from test data on the frit itself.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Uncontaminated material may be recovered and re-used. If contaminated scoop, vacuum, or wash into a receptacle for disposal.

WASTE DISPOSAL METHOD: Follow Federal or State and Local regulations for disposal.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Protect containers against physical damage; store in dry area away from feed and food products.

OTHER PRECAUTIONS: Employees should wash and change into clean clothes before going home.

PRODUCT IDENTIFICATION: CC250/CC250B2000/CC250-2/CC250_3

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION: (Specify Type) Use a NIOSH approved dust and/or fume respirator as necessary.

VENTILATION: Local Exhaust - Recommended for dust control; vent dust to collector.

PROTECTIVE GLOVES: Use judgment - work gloves recommended.

EYE PROTECTION: Use judgement - safety glasses recommended.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Wear appropriate clean, protective clothing such as, but not limited to, coveralls, smocks, aprons, gloves, shoes, and hats.

WORK/HYGIENIC PRACTICES: Food, beverages, and smoking materials should NOT be in the work area. Hygiene is very important; employees should wash thoroughly before eating, drinking, smoking, or applying cosmetics.

Judgments as to the suitability of information herein or the purchaser's purposes are necessarily the purchaser's responsibility. Reasonable care has been taken in the preparation of this information, but FERRO EXTENDS NO WARRANTIES, MAKES NO REPRESENTATIONS AND ASSUMES NO RESPONSIBILITY AS TO THE ACCURACY OR SUITABILITY OF THIS INFORMATION FOR ANY PURCHASER'S USE OR FOR ANY CONSEQUENCE OF ITS USE.

Non-Standard Abbreviations Used on Material Safety Data Sheets

ACGIH - American Conference of Governmental Industrial Hygienists

CAL/OSHA - California Occupational Safety and Health Administration

CAS # - Chemical Abstract Service Number

CFR - Code of Federal Regulations

FED/OSHA - Federal Occupational Safety and Health Administration

IARC - International Agency for Research on Cancer

MSDS - Material Safety Data Sheet

N/A - Not Applicable

NIOSH - National Institute for Occupational Safety and Health

NTP - National Toxicology Program (Department of Health and Human Services)

PEL - Permissible Exposure Limit

TSCA - Toxic Substances Control Act

TLV - Threshold Limit Value (registered terminology of ACGIH)

TWA - Time Weighted Average

US EPA - United States Environmental Protection Agency

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MSDS NO: UCNO081G MATERIAL SAFETY DATA SHEET
MATERIAL FRAME UPLOAD DATE: 10/05/97 VERSION: 002

#3000

PRODUCT: POLYETHYLENE GLYCOL COMPOUND 20M

ORDER NO: 132555
PROD NO : 235371

SAXONBURG CERAMICS
ISABELLA STREET

SAXONBURG ,PA 16056

VAN WATERS & ROGERS INC. , A ROYAL FAKHOED COMPANY (425)889-3400
5100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

PRODUCT NAME:
POLYETHYLENE GLYCOL COMPOUND 20M

MSDS #: UCNO081G

08/15/97 EFFECTIVE DATE

I. IDENTIFICATION

PRODUCT NAME: POLYETHYLENE GLYCOL COMPOUND 20M

CHEMICAL NAME: MODIFIED POLYETHYLENE GLYCOL

CHEMICAL FAMILY: OXYALKYLENE POLYMER

FORMULA: $\text{HO}(\text{CH}_2\text{CH}_2\text{O})_n\text{H}-(\text{O}-\text{CH}_2\text{CH}_2)_n\text{OH}$
 $\text{R}=\text{CH}_2\text{CH}(\text{OH})\text{CH}_2-\text{O}-(\text{C}_6\text{H}_4)-\text{C}(\text{CH}_3)_2-(\text{C}_6\text{H}_4)-\text{O}-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2$

MOLECULAR WEIGHT: 15,000-20,000

SI IMS: NOT APPLICABLE (MIXTURE)

CAS # AND NAME:

42617-82-2

PHENOL,4,4'-(1-METHYLETHYLIDENE)BIS-, POLYMER WITH (CHLOROMETHYL)

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PRODUCT: POLYETHYLENE GLYCOL COMPOUND ZOM

ORDER NO: 139555

PROD NO : 235371

OXIRANE AND ALPHA-HYDRO-OMEGA-HYDROXYPOLY(OXY-1,2-ETHANEDITHIO)

II. PHYSICAL DATA (DETERMINED ON TYPICAL MATERIAL)

BOILING POINT, 760 MM HG: DECOMPOSES

200 C (392 F)

SPECIFIC GRAVITY(H2O = 1): 1.114

AT 55/55 C

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FREEZING POINT: FREEZING/MELTING POINT

61-63 C - (142-145 F)

VAPOR PRESSURE AT 20°C: <0.01 mmHg

VA. DENSITY (AIR = 1): >10

EVAPORATION RATE:

(BUTYL ACETATE = 1); <0.01

SOLUBILITY IN WATER BY WT: "65% AT 20 C

APPEARANCE: TRANSPARENT COLORLESS ABOVE FREEZING/MELTING POINT -
OPAQUE WHITE BELOW FREEZING/MELTING POINT

ODOR: MILD

PHYSICAL STATE: LIQUID ABOVE FREEZING/MELTING POINT -
SOLID BELOW FREEZING/MELTING POINT

III. INGREDIENTS

%	MATERIAL	CAS#	EXPOSURE LIMIT
100	MODIFIED POLYETHYLENE GLYCOL	42617-92-3	SEE SECTION V

IV. FIRE AND EXPLOSION HAZARD DATA

F. POINT (TEST METHOD(S)):

470 F (243.3 C)

FENSKY-MARTENS CLOSED CUP ASTM D 93

520 F (271.1 C)

CLEVELAND OPEN CUP ASTM D 92

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FLAMMABLE LIMITS IN AIR, BY VOLUME:

LOWER: NOT DETERMINED

UPPER: NOT DETERMINED

EXTINGUISHING MEDIA:

APPLY ALCOHOL-TYPE OR ALL-PURPOSE-TYPE FOAM BY MANUFACTURER'S RECOMMENDED TECHNIQUES FOR LARGE FIRES. USE CARBON DIOXIDE OR DRY CHEMICAL MEDIA FOR SMALL FIRES.

SPECIAL FIRE FIGHTING PROCEDURES:

DO NOT DIRECT A SOLID STREAM OF WATER OR FOAM INTO HOT, BURNING POOLS; THIS MAY CAUSE FROTHING AND INCREASE FIRE INTENSITY.

USE SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

FOR FLAKED, GRANULAR OR POWDERED MATERIAL:

AVOID DISPERSION OF DUST IN THE AIR TO REDUCE THE POTENTIAL FOR DUST IGNITION/RAPID BURNING. DUST IS EASILY IGNITED; AVOID IGNITION SOURCES. ALL METAL PARTS AND EQUIPMENT SHOULD BE PROPERLY BONDED AND GROUNDED. IN THE PRESENCE OF FLAMMABLE GASES, LIQUIDS, OR VAPORS, HANDLE IN INERT NITROGEN-BLANKETED EQUIPMENT.

STATIC IGNITION HAZARD CAN RESULT FROM HANDLING AND USE. ELECTRICALLY BOND AND GROUND ALL CONTAINERS AND EQUIPMENT BEFORE TRANSFER OR USE OF MATERIAL. USE PROPER BONDING AND GROUNDING DURING PRODUCT TRANSFER AS DESCRIBED IN NATIONAL FIRE PROTECTION ASSOCIATION DOCUMENT NFPA 77.

V. HEALTH HAZARD DATA

TLV AND SOURCE:

PARTICULATES NOT OTHERWISE CLASSIFIED (PNOC)
(NUISANCE PARTICULATES)

15 MG/M3 TWA TOTAL DUST, OSHA

5 MG/M3 TWA RESPIRABLE FRACTION, OSHA

10 MG/M3 TWA INHALABLE PARTICULATE, ACGIH

3 MG/M3 TWA RESPIRABLE PARTICULATE, ACGIH

EFFECTS OF SINGLE OVEREXPOSURE:

SWALLOWING:

NO EVIDENCE OF HARMFUL EFFECTS FROM AVAILABLE INFORMATION.

SKIN ABSORPTION:

NO EVIDENCE OF HARMFUL EFFECTS FROM AVAILABLE INFORMATION.

INHALATION:

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SHORT-TERM HARMFUL HEALTH EFFECTS ARE NOT EXPECTED FROM VAPOR GENERATED AT AMBIENT TEMPERATURE.

SKIN CONTACT:

BRIEF CONTACT MAY CAUSE SLIGHT IRRITATION WITH ITCHING AND LOCAL REDNESS.

EYE CONTACT:

CAUSES IRRITATION, EXPERIENCED AS STINGING AND DISCOMFORT OR PAIN.
CORNEAL INJURY MAY OCCUR.

EFFECTS OF REPEATED OVEREXPOSURE:

ALTHOUGH THIS MATERIAL IS NOT A SKIN IRRITANT, SUBMERSION BY WORKERS OF UNPROTECTED SKIN IN HIGHLY CONCENTRATED SOLUTIONS OF THIS MATERIAL FOR PROLONGED PERIODS OF TIME COULD RESULT IN SKIN DEHYDRATION.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

A KNOWLEDGE OF THE AVAILABLE TOXICOLOGY INFORMATION AND OF THE PHYSICAL AND CHEMICAL PROPERTIES OF THE MATERIAL SUGGESTS THAT OVEREXPOSURE IS UNLIKELY TO AGGRAVATE EXISTING MEDICAL CONDITIONS.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN:

HEALTH HAZARD EVALUATION:

THIS MATERIAL WAS NOT MUTAGENIC IN AN AMES BACTERIAL ASSAY.

OTHER EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE TO VAPOR GENERATED AT HIGH TEMPERATURES MAY RESULT IN EYE AND RESPIRATORY TRACT IRRITATION, DIZZINESS, NAUSEA AND THE INHALATION OF HARMFUL AMOUNTS OF MATERIAL.

THIS PRODUCT MAY CONTRIBUTE TO NUISANCE DUST AND POSSIBLY TO RESPIRABLE DUST.
AVOID BREATHING DUST.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING:

NO EMERGENCY CARE ANTICIPATED.

SKIN:

WASH SKIN WITH SOAP AND WATER.

INHALATION:

REMOVE TO FRESH AIR.

EYES:

IF NECESSARILY FLUSH EYES WITH WATER AND CONTINUE WASHING FOR SEVERAL MINUTES.
REMOVE CONTACT LENSES, IF WORN. OBTAIN MEDICAL ATTENTION.

NOTES TO PHYSICIAN:

TOXICOLOGY STUDIES HAVE SHOWN THIS OR SIMILAR MATERIAL TO BE OF VERY LOW ACUTE

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TOXICITY. THERE IS NO SPECIFIC ANTIDOTE. TREATMENT OF OVEREXPOSURE SHOULD BE DIRECTED AT THE CONTROL OF SYMPTOMS AND THE CLINICAL CONDITION OF THE PATIENT.

VI. REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID:

NONE KNOWN.

INCOMPATIBILITY (MATERIALS TO AVOID):

NORMALLY UNREACTIVE; HOWEVER, AVOID STRONG BASES AT HIGH TEMPERATURES, STRONG ACIDS, STRONG OXIDIZING AGENTS AND MATERIALS REACTIVE WITH HYDROXYL COMPOUNDS.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:

BURNING CAN PRODUCE THE FOLLOWING PRODUCTS:

C₂H₄ MONOXIDE AND/OR CARBON DIOXIDE.

THERMAL DECOMPOSITION MAY PRODUCE ALDEHYDES.

CARBON MONOXIDE IS HIGHLY TOXIC IF INHALED; CARBON DIOXIDE IN SUFFICIENT

CONCENTRATIONS CAN ACT AS AN ASPHYXANT.

ACUTE OVEREXPOSURE TO ALDEHYDES MAY RESULT IN IRRITATION OF THE EYES,

SKIN AND RESPIRATORY TRACT. IN ADDITION, SOME ALDEHYDES ARE SKIN SENSITIZERS

AND/OR PROBABLE CARCINOGENS.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID:

NONE KNOWN.

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

COLLECT FOR DISPOSAL.

WASTE DISPOSAL METHOD:

INCINERATE IN A FURNACE WHERE PERMITTED UNDER FEDERAL, STATE, AND LOCAL REGULATIONS.

SEE SECTION IX, "OTHER PRECAUTIONS."

VIII. SPECIAL PROTECTION

RESPIRATORY PROTECTION (SPECIFY TYPE):

DUST RESPIRATOR, IF DUSTING CONDITIONS EXIST.

VENTILATION:

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GENERAL (MECHANICAL) ROOM VENTILATION IS EXPECTED TO BE SATISFACTORY. IF PERSONNEL EXPOSURE EXCEEDS EXPOSURE LIMITS, APPLY LOCAL EXHAUST VENTILATION AT POINTS OF DUST GENERATION.

PROTECTIVE GLOVES:

PVC-COATED

EYE PROTECTION:

SAFETY GLASSES OR MONOGOGGLES

OTHER PROTECTIVE EQUIPMENT:

EYE BATH, SAFETY SHOWER

IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

WARNING:

CAUSES EYE IRRITATION.

STATIC IGNITION HAZARD CAN RESULT FROM HANDLING AND USE.

DUST DISPERSED IN AIR MAY BE IGNITED AND BURN RAPIDLY.

AVOID CONTACT WITH EYES.

ELECTRICALLY BOND AND GROUND ALL CONTAINERS AND

EQUIPMENT BEFORE TRANSFER OR USE OF MATERIAL.

DO NOT HANDLE OR EMPTY IN PRESENCE

OF FLAMMABLE VAPOR.

AVOID HEAT, SPARKS AND FLAME UNDER DUST CONDITIONS.

KEEP CONTAINER CLOSED.

USE WITH ADEQUATE VENTILATION.

WASH THOROUGHLY AFTER HANDLING.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS:

STORAGE AND HANDLING INSTRUCTIONS:

USE PRODUCT PROMPTLY AFTER OPENING.

AVOID PROLONGED EXPOSURE TO HEAT AND AIR.

TEMPERATURE NOT TO EXCEED 50 DEGREES FARENHEIT OF FLASHPOINT IN PRESENCE

OF OXYGEN OR IN OPEN SYSTEMS.

DISPOSAL - POTENTIAL FOR A DUST EXPLOSION EXISTS IF ATTEMPT IS MADE TO

INCINERATE ORGANIC POWDERS. IF INCINERATION IS DESIRED, DISSOLVE

IN A SUITABLE SOLVENT AND INCINERATE AS A SOLUTION.

THIS PRODUCT MAY CONTAIN TRACE AMOUNTS OF ETHYLENE OXIDE (CAS NO. 75-21-9).

A CONDITION WHICH CREATES THE POTENTIAL FOR ACCUMULATION OF ETHYLENE OXIDE

IN THE HEAD SPACE OF SHIPPING AND STORAGE CONTAINERS AND IN ENCLOSED AREAS

WHERE THE PRODUCT IS BEING HANDLED OR USED. ETHYLENE OXIDE IS LISTED BY OSHA

AS PROBABLY CARCINOGENIC TO HUMANS, IARC AS CARCINOGENIC TO HUMANS, AND NTP

AS REASONABLY ANTICIPATED TO BE CARCINOGENIC. OSHA CONSIDERS THAT, AT

EXCESSIVE LEVELS, ETHYLENE OXIDE MAY PRESENT REPRODUCTIVE, MUTAGENIC,

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GENOTOXIC, NEUROLOGIC AND SENSITIZATION HAZARDS. IF THIS PRODUCT IS HANDLED WITH ADEQUATE VENTILATION, THE PRESENCE OF THESE TRACE AMOUNTS IS NOT EXPECTED TO RESULT IN ANY SHORT OR LONG TERM HAZARD.

THIS PRODUCT MAY NOT BE EXEMPT FROM OSHA'S ETHYLENE OXIDE STANDARD

29CFR1910.1047. USERS SHOULD COMPLY WITH ALL APPLICABLE PROVISIONS.

PERSONNEL SHOULD BE MONITORED TO DETERMINE LEVELS OF EXPOSURE TO ETHYLENE

OXIDE. IF NECESSARY, PROTECTIVE MEASURES SHOULD BE TAKEN. THE OSHA

PERMISSIBLE EXPOSURE LIMIT FOR ETHYLENE OXIDE IS 1 PPM TWA, THE ACTION LEVEL

IS 0.5 PPM TWA, THE ACGIH TLV IS 1 PPM TWA AND OSHA HAS ESTABLISHED AN

EXCURSION LIMIT OF 5 PPM (15 MINUTE AVERAGE).

X. REGULATORY INFORMATION

STATUS ON SUBSTANCE LISTS:

THE CONCENTRATIONS SHOWN ARE MAXIMUM OR CEILING LEVELS (WEIGHT %) TO BE USED FOR CALCULATIONS FOR REGULATIONS. TRADE SECRETS ARE INDICATED BY "TS".

FEDERAL EPA

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA) REQUIRES NOTIFICATION OF THE NATIONAL RESPONSE CENTER OF RELEASE OF QUANTITIES OF HAZARDOUS SUBSTANCES EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITIES (RQS) IN 40 CFR 302.4.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
ACETALDEHYDE	75-07-0	0.0005
ETHYLENE OXIDE	75-21-8	0.0005
1,4-DIOXANE	123-91-1	0.0005
FORMALDEHYDE	50-00-0	0.0004

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III REQUIRES EMERGENCY PLANNING BASED ON THRESHOLD PLANNING QUANTITIES (TPQS) AND RELEASE REPORTING BASED ON REPORTABLE QUANTITIES (RQS) IN 40 CFR 355 (USED FOR SARA 302, 311 AND 312).

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

NONE

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III REQUIRES SUBMISSION OF ANNUAL REPORTS OF RELEASE OF TOXIC CHEMICALS THAT APPEAR IN

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PROD NO : 235371

40 CFR 372 (FOR SARA 313). THIS INFORMATION MUST BE INCLUDED IN ALL MSDS THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
THIS PRODUCT DOES NOT CONTAIN TOXIC CHEMICALS AT LEVELS WHICH REQUIRE REPORTING UNDER THE STATUTE.		

TSCA INVENTORY STATUS:
ALL COMPONENTS OF THIS PRODUCT ARE ON THE TSCA INVENTORY OR ARE EXEMPT FROM TSCA INVENTORY REQUIREMENTS.

STATE RIGHT-TO-KNOW

CALIFORNIA PROPOSITION 65
THIS PRODUCT CONTAINS TRACE LEVELS OF ETHYLENE OXIDE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM, AND TRACE LEVELS OF ACETALDEHYDE, 1,4-DIOXANE AND FORMALDEHYDE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.
SEE MASSACHUSETTS LISTING FOR AMOUNTS.

MASSACHUSETTS 105 CMR 670.000 RIGHT-TO-KNOW, SUBSTANCE LIST (MSL)
HAZARDOUS SUBSTANCES AND EXTRAORDINARILY HAZARDOUS SUBSTANCES ON THE MSL MUST BE IDENTIFIED WHEN PRESENT IN PRODUCTS.

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

EXTRAORDINARILY HAZARDOUS SUBSTANCES (> 0.0001%)		
CHEMICAL	CAS NUMBER	UPPER BOUND CONCENTRATION %
ACETALDEHYDE	75-07-0	.0006
1,4-DIOXANE	123-91-1	.0005
ETHYLENE OXIDE	75-21-8	.0005
FORMALDEHYDE	50-00-2	.0004

PENNSYLVANIA RIGHT-TO-KNOW, HAZARDOUS SUBSTANCE LIST
HAZARDOUS SUBSTANCES AND SPECIAL HAZARDOUS SUBSTANCES ON THE LIST MUST BE IDENTIFIED WHEN PRESENT IN PRODUCTS.

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REPORT NUMBER: 703

VAN WATERS & ROGERS INC.

PAGE: 009

MSDS NO: UCN0081G

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 10/06/97

VERSION: 002

PRODUCT: POLYETHYLENE GLYCOL COMPOUND 20M

ORDER NO: 139555

PROD NO : 235371

COMPONENTS PRESENT IN THIS PRODUCT AT A LEVEL WHICH COULD REQUIRE
REPORTING UNDER THE STATUTE ARE:

NONE

CALIFORNIA SCAQMD RULE 443.1 VOC'S:
VAPOR PRESSURE AT <0.01 MMHG AT 20'C.

VOC 1 G/L

VOC 1 G/L LESS WATER AND LESS EXEMPTED SOLVENTS

OTHER REGULATORY INFORMATION:

EPA HAZARD CATEGORIES: IMMEDIATE HEALTH

REVISED SECTIONS

THE INFORMATION IN THIS MSDS HAS BEEN UPDATED.

PLEASE REVIEW ALL SECTIONS.

REPORT NUMBER: 703 VAN WATERS & ROGERS INC. PAGE: 010
MSDS NO: UCN0081G MATERIAL SAFETY DATA SHEET
MAINFRAME UPLOAD DATE: 10/06/97 VERSION: 002
PRODUCT: POLYETHYLENE GLYCOL COMPOUND 20M

ORDER NO: 139555
PROD NO : 235371

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400

12/30/97 14:22 PRODUCT: 235371 CUST NO: 157961 ORDER NO: 139555

----- NOTICE -----

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ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM
THE PUBLICATION OR USE OF, OR RELIANCE UPON , INFORMATION CONTAINED HEREIN.
THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
PROCESS.

* * * E N D O F M S D S * * *

R. T. VANDERBILT COMPANY, INC.
Industrial Minerals and Chemicals
30 Winfield Street
Norwalk, CT 06855
203-853-1400 FAX 203-853-1452

* * * * *
* MATERIAL *
* SAFETY *
* DATA SHEET *
* * * * *

Customer Info:

Page 1 of 4

#2900

Date: 09/19/97

Revised: 03/20/90

Supersedes: 12/06/89

I. PRODUCT IDENTIFICATION

P14406

Trade Name: DARVAN* No. 7

Chemical Name: Sodium polymethacrylate, CAS Reg No. 54193-36-1
and Water, CAS Reg. No. 7732-18-5.

Synonyms: 2-Propenoic acid, 2-methyl-, homopolymer, sodium salt.

Hazardous Ingredients/OSHA: None

Carcinogenic Ingredients/OSHA/NTP/IARC: None

SARA Title III Section 313 Ingredients: None

II. WARNING STATEMENTS

CAUTION] May cause eye irritation and slight skin irritation.

III. PHYSICAL AND CHEMICAL DATA

Appearance and Odor: Colorless liquid, no odor.

Density, at 25 deg C, Mg/cu m: 1.16

Solubility in Water: Completely miscible

Boiling Point: About 212 deg F

Vapor Pressure: About the same as water

(* - Registered in U.S. Patent and Trademark Office)

III. PHYSICAL AND CHEMICAL DATA (Continued)

Percent Volatiles by Weight: About 75% water

Evaporation Rate: Equal to water

pH: About 10-11

IV. FIRE PROTECTION

Flash Point (deg F/deg C): >212/100 CC

N F P A ID SYSTEM

Flammable Limit:

1
0 0

LEL - N/A

UEL - N/A

Extinguishing Media: Aqueous liquid product does not burn. On solids, carbon dioxide, foam, and dry chemical.

Special Firefighting Procedure: None

Unusual Fire Hazard: None

V. REACTIVITY DATA

Thermal Stability: Stable

Materials to Avoid: Not known

Hazardous Polymerization: Will not occur

Hazardous Decomposition Products: Carbon and sodium oxides at combustion temperatures.

VI. HEALTH HAZARD DATA

Exposure Limits:

For product - Not established

Effects of Overexposure:

While animal tests indicate that the product is not an eye or skin irritant, slight irritation may occur due to the alkaline nature of the product. Similarly, any risk of ingestion injury would be related to pH range of 10-11. Swallowing significant amounts of liquid may cause caustic burns to the gastrointestinal tract. No inhalation hazard is expected.

VII. PHYSIOLOGICAL EFFECTS SUMMARY

Acute oral LD50 20,000 mg/kg rats;
Acute dermal LD50 5,000 mg/kg rabbits.

Primary skin irritation index 0.25 (rabbits). Non-irritating to rabbit eyes.

VIII. PRECAUTIONS FOR SAFE HANDLING

Wash thoroughly after using. Keep from freezing. If frozen, thaw and mix before using.

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IX. PROTECTION AND CONTROL MEASURES

Protective Equipment: Rubber gloves, goggles.

Respiratory Protection: Not typically required.

Ventilation: Use local exhaust ventilation. A capture velocity of 100-150 fpm is recommended.

X. EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Call a physician if necessary.

Skin Contact: Wash with soap and water. Launder contaminated clothing before reuse.

Inhalation: No inhalation hazard expected. Expose to fresh air.

Ingestion: Call a physician immediately if significant amounts have been swallowed. Give the patient large amounts of water or milk to drink for dilution effect.

XI. SPILL AND DISPOSAL PROCEDURES

Spill or Leakage Procedure: Prevent liquid from entering drinking water supplies or streams. Collect liquid or solidify with absorbent material and place in a closed container for disposal.

Waste Disposal: Not classified as a RCRA hazardous waste. Dispose of according to applicable environmental regulations.

For Additional Information Contact:

Legal Affairs
R. T. VANDERBILT CO., INC.
30 Winfield Street
P.O. Box 5150
Norwalk, CT 06856
Tel. No.: (203) 853-1400

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MSDS # 3
Rev. D

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME KELCO Division of Merck & CO., Inc.		EMERGENCY TELEPHONE NO. (619) 292-4900
ADDRESS (Number, Street, City, State and ZIP Code) 8355 Aero Drive, San Diego, California 92123		
CHEMICAL NAME AND SYNONYMS ALGIN, SODIUM ALGINATE		TRADE NAME AND SYNONYMS KELSET, KELCOSOL, KELTONE
CHEMICAL FAMILY POLYSACCHARIDE	CAS # 9005-38-3	

SECTION II - HAZARDOUS INGREDIENTS

NONE

SECTION III - PHYSICAL DATA

SOLUBILITY IN WATER	Soluble, forming viscous solutions, becoming a paste at higher concentrations.
APPEARANCE AND ODOR	White to tan powder, slight odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH- POINT (METHOD USED)	N/A (Product will burn when in contact with a flame, self-extinguishes when ignition source is removed).
EXTINGUISHING MEDIA	Water, foam, dry chemical, CO ₂
SPECIAL FIRE FIGHTING PROCEDURES	None. Treat as a "Class A" fire. Once ignited, the product tends to smolder. Auto ignition temperature is above 200°C.
UNUSUAL FIRE AND EXPLOSION HAZARDS	In common with most organic materials, this product should be treated as a combustible dust in the finely divided and suspended state.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Nuisance dust : 10 mg/M ³ total dust
EFFECTS OF OVEREXPOSURE	
SKIN : none	
EYES : may cause irritation in some individuals.	
INGESTION : essentially non-toxic ; LD ₅₀ (rats) is greater than 5 g/kg.	
INHALATION : excessive inhalation of dust can impede respiration due to hygroscopic properties.	
EMERGENCY AND FIRST AID PROCEDURES	
EYES : irrigate with clean water.	
INHALATION : symptomatic treatment.	

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SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid): Strong Oxidizing Agents			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Sweep or vacuum. Note that an extreme slip hazard can develop if material spilled on the floor becomes wet.
WASTE DISPOSAL METHOD	Handle as a non-hazardous material.
BOD ₅ :	Approx. 300 mg O ₂ /g
COD :	Approx. 660 mg O ₂ /g

SECTION VIII - SPECIAL PROTECTION INFORMATION	
RESPIRATORY PROTECTION (Specify type)	A dust respirator should be worn if handling results in dust generation that exceeds the TLV, or if dust becomes annoying.
VENTILATION	LOCAL EXHAUST Sufficient to remove airborne dust if handling results in dust generation.
PROTECTIVE GLOVES	Not necessary
OTHER PROTECTIVE EQUIPMENT	EYE PROTECTION Goggles recommended in heavy dust concentrations.

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Store in a cool, dry place to maintain best product performance.
OTHER PRECAUTIONS	

PAGE (2)
MSDS # 3
Rev. D

Date Prepared : 3/86
Prepared by : J. K. Baker

(C)

While this information and recommendations set forth are believed to be accurate as of the date hereof, Kelco Div. of Merck & Co., Inc. makes no warranty with respect hereto and disclaims all liability from reliance thereon.

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REPORT NUMBER: 703

VAN WATERS & ROGERS INC.

PAGE: 001

MSDS NO: DW53928

MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 01/20/93

VERSION: 006

PRODUCT: METHOCEL (R) A4M METHYLCELLULOSE

ORDER NO: 114053

PROD NO : 298790

SAXONBURG CERAMICS INC
6004 STITT ST

MONROE , NC 28110

VAN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

----- FOR PRODUCT AND SALES INFORMATION -----

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE AT
VW&R CHARLOTTE 704-399-4255 CHARLOTTE , NCPRODUCT NAME:
METHOCEL (R) A4M METHYLCELLULOSE

MSDS #: DW53928

1. INGREDIENTS: (% w/w, unless otherwise noted)

Methylcellulose	CAS# 009004-67-5	85-99%
Water	CAS# 007732-18-5	1-10%
Sodium chloride	CAS# 007647-14-5	0.5-5%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: Not applicable.
VAP PRESS: Not applicable.
VAP DENSITY: Not applicable.
SOL. IN WATER: See section 9.
SP. GRAVITY: Not applicable.
APPEARANCE: White to slightly off-white free-flowing powder.
ODOR: Not available.

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REPORT NUMBER: 703

VAN WATERS & ROGERS INC.

PAGE: 002

MSDS NO: DW53928

MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 01/20/93

VERSION: 006

PRODUCT: METHOCEL (R) A4M METHYLCELLULOSE

ORDER NO: 114053

PROD NO : 298790

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: N/A

METHOD USED: N/A

FLAMMABLE LIMITS

LFL: Not deter.

UFL: Not deter.

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Minimum explosive dust concentration is 0.03 oz./cu. ft. Similar to flour or grain dusts; keep clouds of such dust away from possible ignition sources.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid dust clouds or layers.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: Same as wood or paper.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Sweep up and use if possible, or discard using disposal method listed below.

DISPOSAL METHOD: Preferable method is to dispose in landfill. Disposal can also be accomplished by incineration under controlled conditions to eliminate dust explosions. In both methods, disposal techniques should be in compliance with applicable federal, state, and local laws and regulations regarding management, use, handling, treatment, storage, disposal, and transportation of used chemicals.

6. HEALTH HAZARD DATA:

EYE: Solid or dust may cause irritation or corneal injury due to mechanical action.

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REPORT NUMBER: 703

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 003

MSDS NO: DW53928

EFFECTIVE DATE: 01/20/93

VERSION: 006

PRODUCT: METHOCEL (R) A4M METHYLCELLULOSE

ORDER NO: 114053

PROD NO : 298790

SKIN CONTACT: Essentially nonirritating to skin.

SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts.

INGESTION: Single dose oral toxicity is low. No hazards anticipated from ingestion incidental to industrial exposure. The oral LD50 for rats is >10,000 mg/kg.

INHALATION: Single exposure to dust is not likely to be hazardous.

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Methylcellulose did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. Methylcellulose has been shown to be negative in animal and in vitro ('test tube') mutagenicity tests.

7. FIRST AID:

EYES: Irrigate immediately with water for at least five minutes. Mechanical effects only.

SKIN: No adverse effects anticipated by this route of exposure.

INGESTION: No adverse effects anticipated by this route of exposure.

INHALATION: No adverse effects anticipated by this route of exposure.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): Dow Industrial Hygiene Guide is 10 mg/m3.

VENTILATION: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RESPIRATORY PROTECTION: In dusty atmospheres, use an approved dust respirator.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

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REPORT NUMBER: 703
MSDS NO: DW53928
EFFECTIVE DATE: 01/20/93

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 004

VERSION: 006

PRODUCT: METHOCEL (R) A4M METHYLCELLULOSE

ORDER NO: 114053
PROD NO : 298790

EYE PROTECTION: Use safety glasses. If there is a potential for exposure to particles which could cause mechanical injury to the eye, wear chemical goggles.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Use reasonable caution and personal cleanliness. Cellulose ethers are water-soluble polymers which form aqueous dispersions by swelling and by successive hydration of their structural layers. There is no sharp solubility limit. CAUTION: (1) Under certain conditions a fine dust of this material in air may cause a dust explosion when exposed to heat, sparks, and open flame. (2) If material spills and gets wet, could cause slipping hazard.

DS STATUS: Revised regsheet (WHMIS) information.

REGULATORY INFORMATION: (Not meant to be all-inclusive--selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

U.S. REGULATIONS

=====

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

A fire hazard

Hazard categories are listed solely to assist with federal reporting under Title III. They are not intended and are not appropriate for evaluation safe product handling and use. To review health and safety information, refer to the body of this material safety data sheet.

REPORT NUMBER: 703

MSDS NO: DW53928

EFFECTIVE DATE: 01/20/93

VAN WATERS & ROGERS INC.

MATERIAL SAFETY DATA SHEET

PAGE: 005

VERSION: 006

PRODUCT: METHOCEL (R) A4M METHYLCELLULOSE

ORDER NO: 114053

PROD NO : 298790

CANADIAN REGULATIONS

=====

The Workplace Hazardous Materials Information System (W.H.M.I.S.)

Classification for this product is:

This product is not a "Controlled Product" under WHMIS.

The Transportation of Dangerous Goods Act (T.D.G.A.) classification for
this product is:

Not regulated.

(R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

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#2850

METHOCEL MC STD
4000REPORT NUMBER: 703
MSDS NO: DW53928
EFFECTIVE DATE: 01/20/93VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 006

VERSION: 006

PRODUCT: METHOCEL (R) A4M METHYLCELLULOSE

ORDER NO: 114053

PROD NO : 298790

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VW&R CHARLOTTE
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

03/01/93 10:46 PRODUCT: 298790 CUST NO: 187508 ORDER NO: 114053

----- NOTICE -----

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* * * E N D O F M S D S * * *

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R.T. Vanderbilt Company, Inc.

INDUSTRIAL MINERALS AND CHEMICALS

30 Winfield Street, Norwalk, CT 06855 • (203) 853-1400 • TWX 710-468-2940
 West Coast: 6279 East Slauson Avenue, Los Angeles, CA 90040 • (213) 723-5208

2740
**MATERIAL
 SAFETY
 DATA SHEET**

Page 1 of 2

Date: May 3, 1985 Revised: January 10, 1985 Supersedes: Dec. 12, 1979

I. PRODUCT IDENTIFICATION

Trade Name: **VEEGUM I**

Chemical Name: Hydrated magnesium aluminum silicate mineral

CAS No. 12173-47-6

USP/NF Category:

Synonyms: Smectite Clay

Hazardous Ingredients/OSHA: None

Hazard: Toxic by inhalation.

Carcinogenic Ingredients/OSHA/NTP/IARC: None

II. WARNING STATEMENTS

No special requirements under normal conditions for use.

III. PHYSICAL AND CHEMICAL DATA

Appearance: White flakes	Vapor Pressure: N/A
Density: 2.6 Mg/m ³	Vapor Density: N/A
Solubility in water: Negligible	Volatiles: None
Boiling point: N/A	Evaporation rate: N/A

IV. FIRE PROTECTION

Nonflammable

V. REACTIVITY DATA

Nonreactive

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MSDS: VEEGUM T

Page 2 of 2

VI. HEALTH HAZARD DATA

VII. PHYSIOLOGICAL EFFECTS SUMMARY

VEEGUM: Acute oral toxicity - Mice: LD₅₀ >50,000 mg./kg. body weight
Chronic external toxicity - Rabbits: None by dermal application.
Chronic external toxicity - Humans: None by dermal application
Feeding study - rats: No growth development effect at a dose of 10% of diet for 12 weeks.

VIII. PRECAUTIONS FOR SAFE HANDLING

Avoid breathing dust.
No special requirements under ordinary conditions of use and with adequate ventilation.

IX. PROTECTION AND CONTROL MEASURES

Use dust mask if TLV for nuisance dust is exceeded.

X. EMERGENCY AND FIRST AID PROCEDURES

Not expected to be a problem. No special requirements.

XI. SPILL AND DISPOSAL PROCEDURES

Normal disposal for nuisance dust according to state and local regulations.

For Additional Information Contact:

Environmental Affairs
R. T. VANDERBILT CO., INC.
30 Winfield Street
Norwalk, CT 06851
Tel. No. (203)853-1400

Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
Telephone (215) 481-4911



MATERIAL SAFETY DATA SHEET

SECTION 1 - MATERIAL IDENTIFICATION

PRODUCT NAME AIRVOL* INTERMEDIATE/PARTIALLY HYDROLYZED
POLYVINYL ALCOHOL STANDARD GRADES
AIRVOL* PVOH, 203, 205, 321, 421, 425, 502,
517, 523, 540, 603, 703, 704, 705, 713, 718,
723, 730, 740, 7425, 7805, 803, 804, 805,
823, 824, 830, 840, 6003, 6107, 6108, 6230,
6510, 203S, 205C, 205S, 205U, 523C, 523S,
540C, 540S, 205SF, 205TG, 205TV, 321LF,
425NF, 425TG, 523SF, 523TG, 523TV, 54UNF,
540SF, 540TV, WS-42, WS-42P, WS-53P, WS-517,
WS-518, WS-712, WS-716, WS-717, WS-724,
WS-724P, WS42LH, WS42NF, WS53NF, 540SOG
*AIRVOL is a registered trademark of Air
Products and Chemicals, Inc.

PRODUCT CODE PVOH, V-203, V-203S, V-205, V-205C, V-205S,
V-205U, V-321, V-421, V-425, V-502, V-517,
V-523, V-523C, V-523S, V-540, V-540C, V-540S,
V-6003, V-603, V-6107, V-6108, V-6230,
V-6510, V-703, V-704, V-705, V-711, V-713,
V-718, V-723, V-730, V-740, V-7425, V-7805,
V-803, V-804, V-805, V-815, V-823, V-824,
V-830, V-840, V205SF, V-205TG, V205TV,
V321LF, V425NF, V425TG, V523SF, V523TG,
V523TV, V540NF, V540SF, V540TV, WS-42,
WS-42P, WS-517, WS-518, WS-53P, WS-712,
WS-716, WS-717, WS-724, WS42LH, WS42NF,
WS42OG, WS53NF, WS724P, 203OG, 205OG, 321OG,
425OG, 523OG, 540OG, 540SF, 540TV, 540SOG

MSDS REVISION NUMBER 1477 -03

MANUFACTURER Air Products and Chemicals, Inc
7201 Hamilton Blvd., Allentown, PA 18195-1501

TELEPHONE NUMBER 800-345-3148

EMERGENCY TELEPHONE NUMBER(S)
800-523-9374 (Continental U.S.)
215-481-7711 (Outside Continental U.S.)
800-322-9092 (Pennsylvania Only)

DATE PREPARED FEBRUARY 1994

REVISION NOTES Updated Composition Information
Updated fire and explosion data
Updated regulatory information

C.A.S. CHEMICAL NAME 25213-24-5 Intermediate and Partially

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Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
Telephone (215) 481-4911



SYNONYMS	Hydrolyzed PVOH Polyvinyl Alcohol; PVA; PVOH Tackified Polyvinyl Alcohol; Polyvinyl Alcohol; PVA; PVOH
CHEMICAL FAMILY	Vinyl Polymer
EMPIRICAL FORMULA	(C ₄ H ₆ O ₂ .C ₂ H ₄ O) _x
INTENDED USE	Adhesive, Coating Adhesive, Binder

SECTION 2 - INGREDIENTS

%	CAS Number and Chemical Name
95	25213-24-5 Intermediate and Partially Hydrolyzed PVOH
<3	67-56-1 METHYL ALCOHOL
<1	127-09-3 Sodium Acetate
<2	7732-18-5 Water

OSHA (ACGIH) EXPOSURE LIMITS						
CAS#	TWA		STEL		CEILING	
	ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³
25213-24-5	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)
67-56-1	200 (200)	260 (262)	250 (250)	325 (328)	N/E (N/E)	N/E (N/E) SKIN (SKIN)
127-09-3	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)
7732-18-5	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)	N/E (N/E)

N/E = Not Established. All values in () are U.S. ACGIH (American Conf. of Gov. Indust. Hygienists) - TLV; All others are OSHA - PEL.

SECTION 3 - HEALTH HAZARDS

EMERGENCY OVERVIEW

HMIS HEALTH RATING 1 FLAMMABILITY 1 REACTIVITY 0
Amorphous powder, White, ODOR: Odorless.
Mild eye irritant, Mild respiratory tract irritant.
The powder can explode if mixed in air and ignited in a confined space. Under hot ambient conditions, or if heated, flammable methanol and methylacetate vapors released from the powder over time can produce an explosive atmosphere in the head space of closed transport and storage tanks and result in an explosion if ignited. If unconfined, ignition of the powder will give rise to a Class A

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fire.

In case of fire use: Water streams.

ROUTES OF EXPOSURE

Eye Contact, Inhalation.

EXPOSURE STANDARDS

Methanol and methyl acetate vapors exceeding the Threshold Limit Value (TLV = 200 ppm, T.W.A.) may be encountered in the headspace of PVOH bulk tank cars, trailers and silos, especially on warm days. For Methanol, OSHA PEL TWA 200 ppm, 260 mg/m³; OSHA PEL STEL 250 ppm, 310 mg/m³. Poisoning by inhalation of methanol vapor is uncommon but can occur at extreme levels of exposure. Symptoms of overexposure include visual impairment, loss of acuity and sometimes total blindness. Respiratory protection - a self-contained breathing apparatus - is recommended when exposure to methanol vapors as described herein is anticipated.

HEALTH HAZARDS

Mild eye irritant. Mild respiratory tract irritant.

TARGET ORGANS

None

SIGNS AND SYMPTOMS OF EXPOSURE (Acute effects)

Contact with eyes causes mild irritation and discomfort.
Inhalation of dust may cause respiratory irritation.

SIGNS AND SYMPTOMS OF EXPOSURE (Possible Longer Term Effects)

Contact with eyes causes mild irritation and discomfort.
Inhalation of dust may cause irritation in the respiratory tract.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

None known.

IRRITATION EFFECTS DATA

None

ACUTE TOXICITY EFFECTS DATA

Oral LD50 (rat): >10 g/kg
Dermal LD50 (rabbit): >7490 mg/kg
Inhalation LC50 (rat): No Data

OTHER ACUTE EFFECTS

No Data

CHRONIC/SUBCHRONIC DATA

No delayed, subchronic or chronic test data are known.

SECTION 4 - FIRST AID

EYE CONTACT

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Immediately flush eyes with water for at least 15 minutes.

SKIN CONTACT

Wash affected area with soap and water.

INHALATION

None

INGESTION

None

SECTION 5 - FIRE AND EXPLOSION DATA

CHARACTERISTICS:

FLASH POINT	Not applicable
FLASH POINT METHOD(S)	Not applicable
UPPER EXPLOSION LIMIT (UEL)	Not limited
LOWER EXPLOSION LIMIT (LEL)	0.08 oz/ft ³ (0.87 gm/m ³) (Approximately)
AUTOIGNITION TEMPERATURE	Not applicable
FIRE HAZARD CLASSIFICATION (OSHA/NFPA)	Combustible Solid

EXTINGUISHING MEDIA

If unconfined, ignition of the powder will give rise to a Class A fire. In case of fire use: Water streams.

SPECIAL FIRE FIGHTING PROCEDURES

None

UNUSUAL FIRE AND EXPLOSION HAZARDS

Polyvinyl alcohol powder forms an explosive mixture in air. Information about specific explosivity testing results and special precautions needed for bulk handling are available on request. Care should be taken to prevent the accumulation of polyvinyl alcohol dust. PVOH powder is a ST-1 dust explosion hazard, according to the methods of ASTM E-1226. However, the explosive hazard is highly dependent on particle size; the finer the particles, the higher the explosion strength. Polyvinyl alcohol contains minor amounts of methanol and methylacetate which can diffuse from the powder over time. Under certain conditions of heat and confinement, vapor spaces of trucks, railcars and silos could exceed the lower explosive limit and produce an explosion given an ignition source. The energy required for ignition of a flammable vapor is much less than that of a flammable dust. Therefore, care should be taken to provide proper ventilation to remove residual vapor along with proper bonding and grounding of the storage or transport vessel. Care should be exercised when opening truck or railcar hatches. Emptying of bags of powder directly into vessels where flammable vapors exist should be strictly prohibited because static discharges can be generated of sufficient strength to produce an

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AIR
PRODUCTS 

explosion.

The powder can explode if mixed in air and ignited in a confined space. Under hot ambient conditions, or if heated, flammable methanol and methylacetate vapors released from the powder over time can produce an explosive atmosphere in the head space of closed transport and storage tanks and result in an explosion if ignited.

SECTION 6 - REACTIVITY HAZARD DATA

CHEMICAL STABILITY

Stable

CONDITIONS TO AVOID (if unstable)

Not applicable

INCOMPATIBILITY (Materials to Avoid)

Oxidizing Agents (i.e. perchlorates, nitrates etc.).

HAZARDOUS DECOMPOSITION PRODUCTS (from burning, heating, or reaction with other materials)

Irritating and toxic fumes at elevated temperatures.

HAZARDOUS POLYMERIZATION

Will not occur

CONDITIONS TO AVOID (if polymerization may occur)

None known

SECTION 7 - SPILL, LEAK AND WASTE DISPOSAL INFORMATION

CONTAINMENT TECHNIQUES (Removal of ignition sources, diking etc)

Not applicable

CLEAN-UP PROCEDURES

Shovel spilled chemical product into empty, dry container for later disposal or recovery. Flush area with water spray.

OTHER EMERGENCY ADVICE

Surfaces subject to spills or dusting with this product can become slippery when wet.

WASTE DISPOSAL

Dispose of as a non-hazardous solid waste. Dispose of in an approved landfill if allowed locally. Comply with all Federal, State and Local Regulations. Chemical and/or biological degradation is feasible.

ENVIRONMENTAL EFFECTS

No Data

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SECTION 8 - PERSONAL PROTECTION/EXPOSURE CONTROLS

EYE PROTECTION

Chemical safety glasses.

HAND PROTECTION

Not required under normal conditions.

RESPIRATORY PROTECTION

Not required under normal conditions. Moderate eye irritant.

PROTECTIVE CLOTHING

No specific recommendation.

ENGINEERING CONTROLS

No specific controls needed.

WORK AND HYGIENIC PRACTICES

None

SECTION 9 - STORAGE AND HANDLING

STORAGE

Keep in cool, dry, ventilated storage and in closed containers.

HANDLING

Avoid dusting conditions.

OTHER PRECAUTIONS

No special precautions required.

SECTION 10 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM	Amorphous powder
COLOR	White
ODOR	Odorless

pH	4-8 aqueous solution
VAPOR PRESSURE (mm Hg)	Not applicable
VAPOR DENSITY (Air = 1)	Not applicable
BOILING POINT	Not applicable
FREEZING/MELTING POINT	Not applicable
SOLUBILITY IN WATER	In hot water
SPECIFIC GRAVITY (Water = 1)	0.6408 gm/cm ³ (Bulk density); 40 lb/ft ³ (Bulk density)
EVAPORATION RATE (Butylacetate = 1)	Not applicable

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VISCOSITY (CPS)
MOLECULAR WEIGHT

Available upon request
No Data

SECTION 11 - TRANSPORTATION INFORMATION

DOT NON-BULK SHIPPING NAME Not regulated

IMO SHIPPING DATA Not classed as dangerous goods according
to international transport regulations.

ICAO/IATA SHIPPING DATA Not classed as dangerous goods according
to international transport regulations.

SECTION 12 - U.S. FEDERAL REGULATIONS

TOXIC SUBSTANCES CONTROL ACT (TSCA)-

All components are included in the EPA Toxic Substances Control
Act (TSCA) Chemical Substance Inventory.

OSHA Hazard Communication Standard (29CFR1910.1200) hazard class(es)
None

EPA SARA Title III Section 312 (40CFR370) hazard class
None

EPA SARA Title III Section 313 (40CFR372) toxic chemicals above "de
minimis" level are
67-56-1 METHYL ALCOHOL AT <2%

SECTION 13 - STATE REGULATIONS

PROPOSITION 65 SUBSTANCES component(s) known to the State of
California to cause cancer and/or reproductive toxicity and subject
to warning and discharge requirements under the "Safe Drinking Water
and Toxic Enforcement Act of 1986"
None

NEW JERSEY TRADE SECRET REGISTRY NUMBER(S)
Not applicable

SECTION 14 - INTERNATIONAL REGULATIONS

CANADA

DSL

Included on Inventory

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WHMIS HAZARD CLASSIFICATION

None

WHMIS TRADE SECRET REGISTRY NUMBER(S)

None

WHMIS HAZARDOUS INGREDIENTS

Included in Section 2

WHMIS SYMBOLS

None

EUROPEAN ECONOMIC COMMUNITY (EEC)

EINICS MASTER INVENTORY

Polymeric substance; monomers included on inventory

MATERIAL SAFETY DATA SHEET

Page 1 of 3

Users may consult OSHA and other applicable safety laws/regulations before use.

Product Name: R-03-16 DEXTRINE

Date Mailed:

Date of last revision: 3-3-97

#2520
DEXTRINE
#17525

SECTION 1 - SOURCE AND NOMENCLATURE

Manufacturer: The J.S. McCormick Co.
Address: Center City Tower, Suite 1050
City,St.,Zip: Pittsburgh, PA 15222-3907

Emergency Phone: (412) 471-7246

Chemical Name and Synonyms: Dextrin
Chemical Family: Carbohydrate
Intended Uses: Binders (Non-Curing)

SECTION 2 - HAZARDOUS INGREDIENTS

Ingredient in Product	%	PEL	TLV	Other Work Place Exposure Limits
Carbohydrate	9004-53-9 100		10 mg/m3	

Remarks:

SECTION 3 - PHYSICAL DATA

	Entire Product	Or Ingredient (Name)
Boiling Point (F):	NA	NA
Melting Point (F)(Give Method):	NA	NA
Specific Gravity (Water = 1):	1.45	NA
Vapor Pressure (mmHg):	NA	
Evaporation Rate:	NA	
Vapor Density (Air = 1):	NA	
Percent Volatile:	(Volume) ND	Weight) NA
Other:	NA	
Appearance/Odor:	White to Yellow Powder / Bland Odor	

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SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: NA
Method Used: NA

Flammable Explosive Limits: (Name) NA (Lower) 0.05 g/l (Upper) NA

Fire Extinguishing Media: Water, Foam, CO2

Special Fire Fighting Procedures: Minimize excessive dusts.

Unusual Fire and Explosion Hazards: Excessive dusts from grain products are potentially explosive. Avoid open flames, open lights, or welding in area of dry product.

SECTION 5 - PRODUCT HEALTH HAZARD DATA

Routes of Entry: Inhalation, Swallowing, Eyes

Possible Symptoms of Exposure

Eyes: None Known

Skin: None Known

Breathing: None Known

Ingestion: None Known

Other: NA

Chronic Effects: None Known

Emergency and First Aid Procedures

Inhalation: NA

Skin Contact: NA

Eye Contact: Flush with water for at least 15 minutes. Contact physician.

Ingestion: Contact physician.

Other: No hazard, but if exposed simply wash off with warm water. Not listed in the National Toxicology Program Annual Report on Carcinogens.

SECTION 6 - REACTIVITY DATA

Stability: Stable

Incompatibility (Materials to Avoid): Avoid contact with oxidizing materials.

Hazardous Decomposition Products: None

Hazardous Polymerization: Will not occur.

SECTION 7 - SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled: All cleanup of dry product or dust to be performed by vacuum and/or wet cleaning methods.

Waste Disposal Method: Disposal must be carried out in accordance with local, state and federal regulations.

SECTION 8 - SPECIAL PROTECTION INFORMATION

Ventilation Requirements: Use adequate ventilation in volume and pattern to keep concentration in air below TLV or PEL.

Protective Equipment

Eyes: Comply with OSHA Standard 1910.133

Gloves: As required to prevent excessive contact.

Respiratory: Comply with OSHA Standard 1910.134

Other Protective Equipment: Comply with OSHA Standard 1910.132

SECTION 9 - SPECIAL PRECAUTIONS

Handling/Storage Precautions: Avoid broken or punctured drums to prevent spillage and excessive concentration in air.

Other Precautions: Avoid prolonged breathing of dust or mist. Use only with adequate ventilation. Avoid contact with skin and eyes.

The foregoing data has been compiled from sources which the company, in good faith, believes to be dependable and is accurate and reliable to the best of our knowledge and belief. However, the company cannot make any warranty or representation respecting the accuracy or completeness of the data and assumes no responsibility for any liability or damages relating thereto or for advising you regarding the protection of your employees, customers or others.

ND - NOT DETERMINED

NA - NOT APPLICABLE

(LESS THAN

) MORE THAN

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MATERIAL SAFETY DATA SHEET

GOULAC POWDER

PAGE 1 OF 2

#2600

LIGNOTECH USA, INC.
Research & Development
100 Highway 51 South
Rothschild, WI 54474-1198
TEL: (715)359-6544
FAX: (715)355-3648

EMERGENCY PHONE (715)359-6544
*CHEMTREC PHONE (800)424-9300

MSDS NO. : 317400R
ORDER NO. :
DATE PREPARED: 06-MAY-1994
REPLACES : All Previous
PREPARED BY : G. Rasmussen
>>> NOT OSHA OR WHMIS HAZARDOUS <<<

*USE ONLY IN THE EVENT OF CHEMICAL EMERGENCIES
INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR
ACCIDENT INVOLVING CHEMICALS.

***** I. PRODUCT IDENTIFICATION *****

COMMON NAME : Calcium Lignosulfonate
SYNONYMS : See Above
MANUFACTURER : LignoTech USA, Inc.
SHIPPING NAME - DOT : Lignin Pitch - Class 55
HAZARD CLASS - DOT : Not Restricted
HAZARD CLASS - IATA : Not Restricted

CHEMICAL FORMULA : Amorphous Polymer
CHEMICAL FAMILY : Wood Chemicals
CAS NUMBER(s) : 8061-52-7
UN NUMBER : Excluded
PHYSICAL STATE : powder

HMIS RATING (SCALE 0-4) : HEALTH = 1 FIRE = 1 REACTIVITY = 0 SPECIAL =

WARNING : NUISANCE DUST -- As with all dusts, avoid high concentrations.

***** II. HAZARDOUS INGREDIENTS *****

None known

***** III. PHYSICAL DATA *****

BOILING POINT (C) : Not Applicable
FREEZING POINT (C) : Not Applicable
VAPOR PRESSURE (mm Hg) : Not Applicable
VAPOR DENSITY (Air = 1) : Not Applicable
% VOLATILES BY WEIGHT : 6.0 (water)
APPEARANCE AND ODOR : Brown powder with slight odor.

SPECIFIC GRAVITY (25 C) : Not Applicable
pH (3% Soln) : 7.0
BULK DENSITY (g/ml) : 0.37 - 0.56
SOLUBILITY IN WATER : 100% Soluble
EVAPORATION RATE : Not Applicable
WATER/OIL DIST.COEFF. : 100% in water

***** IV. HEALTH HAZARD DATA *****

THRESHOLD LIMIT VALUES : OSHA PELV = 15 mg/M3 for dust ACGIH TLV = 15 mg/M3 for dust
: Minimize contact with eyes, skin, clothing. Tests to determine acute oral toxicity to
: rats produced no deaths from which an LD50 could be determined.

CARCINOGEN LISTINGS - NTP / IARC : Not a carcinogen
PRIMARY ROUTE(s) OF ENTRY : Skin contact, eye contact, inhalation
SYMPTOMS OF OVEREXPOSURE : No effects of overexposure to lignosulfonates are known.
CONDITIONS AGGRAVATED BY EXPOSURE: None known.
IRRITANCY OF MATERIAL : None known.
SENSITIZATION TO MATERIAL : None known.
TERATOGENICITY : None known.
MUTAGENICITY : None known.
REPRODUCTIVE TOXICITY : None known.
SYNERGISTIC SUBSTANCES : None known.

FIRST AID -- EYES : Irrigate with potable water.
SKIN : Skin should be flushed with clean water.
INHALATION : Remove from dusty area.
INGESTION : Give water to dilute and get medical attention.

NOTES TO PHYSICIAN : Very low toxicity.

***** V. FIRE AND EXPLOSION HAZARD DATA *****

FLASH POINT (Method Used) : Not Applicable AUTO IGNITION TEMP: 400 C for dust
FLAMMABLE LIMITS IN AIR, % BY VOL. : LOWER: 0.2 oz./cu.ft. UPPER: 3.5 oz./cu.ft.
EXTINGUISHING MEDIA : Use water spray, carbon dioxide, dry chemical, alcohol-type or universal-type
: foams applied by manufacturers recommended techniques.
SPECIAL FIRE FIGHTING PROCEDURES : Use supplied breathing air and protective clothing.
UNUSUAL FIRE AND EXPLOSION HAZARDS : Flammable solids may provide conditions for a dust explosion.

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***** VI. SPILL OR LEAK PROCEDURES *****

SPILL RESPONSE : Mechanically collect and remove spilled material. Area may be washed with water.
:
NEUTRALIZING CHEMICALS : None required.
WASTE DISPOSAL METHODS : Incinerate, bury or flush to sewer following applicable regulations.
:

***** VII. REACTIVITY DATA *****

STABILITY : Stable CONDITIONS TO AVOID: Contact with strong oxidizing agents.
INCOMPATIBILITY : MATERIALS TO AVOID : None
HAZARDOUS POLYMERIZATION : Will not occur CONDITIONS TO AVOID: None
HAZARDOUS DECOMPOSITION PRODUCTS : Sulfur dioxide, carbon dioxide, and carbon monoxide.

***** VIII. CONTROL MEASURES *****

VENTILATION REQUIREMENTS : Adequate ventilation for comfort is recommended.
RESPIRATORY PROTECTION : Full respiratory protection program recommended.
: NIOSH approved dust mask recommended.
PROTECTIVE GLOVES : Gloves recommended for prolonged exposure.
EYE PROTECTION : Goggles recommended for prolonged exposure.
OTHER PROTECTIVE EQUIPMENT : Clothing which contacts skin should be changed daily.

***** IX. SPECIAL PRECAUTIONS *****

REPAIR/MAINTENANCE OF : None required.
CONTAMINATED EQUIPMENT
HYGIENE IN HANDLING AND STORAGE : Personal hygiene is strongly encouraged so all clothing items are changed daily.
OTHER : Normal precautions common to good manufacturing practice should be followed.

***** X. ADDITIONAL REGULATORY CONCERNS *****

Lignosulfonates are non-toxic & non-irritating. Government regulations for use of lignosulfonates are summarized below:

Agriculture Canada Animal Feeds. File No. 832.2B2.	21 CFR 176.210 - Defoamers
40 CFR 180.1001 Section (e) - Pesticides for Animals	21 CFR 177.1210 - Gaskets
21 CFR 176.120; 176.170; 176.180; 178.3120 - Paper	21 CFR 175.105 - Adhesives
21 CFR 173.310 - Boiler Water	21 CFR 573.600 - Animal Feeds
21 CFR 172.715; 182.99 - Pesticides for Food	

The information and recommendations contained herein are offered as a service to our customers but are not intended to relieve the user from its responsibility to investigate and understand pertinent sources of information and to comply with all laws and procedures applicable to the safe handling and use of these materials. The information and recommendations provided herein were believed by LignoTech USA, Inc. to be accurate at the time of preparation or obtained from sources believed to be generally reliable. However, LignoTech USA, Inc. makes no warranty concerning their accuracy and LignoTech USA, Inc. will not be liable for claims relating to any party's use of or reliance on information or recommendations contained herein, regardless of whether it is claimed that the information or recommendations are inaccurate, incomplete or otherwise misleading.

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MATERIAL SAFETY DATA SHEET

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Users may consult OSHA and other applicable safety laws/regulations before use.

#2570

Product Name: 1607 MOGUL

Date Mailed:

Date of last revision: 3-5-92

SECTION 1 - SOURCE AND NOMENCLATURE

Manufacturer: The J.S. McCormick Co.

Emergency Phone: (412) 471-7246

/ (313) 548-6860

Address: Four Station Square Suite 550

Contact Person: Technical Services Manager / Chief Chemist

City, St., Zip: Pittsburgh, PA 15219 -1119

Chemical Name and Synonyms: Cereal Grain Product Made of Corn

Chemical Family: NA

Intended Uses: Binders (Non-Curing), Additives

SECTION 2 - HAZARDOUS INGREDIENTS

<u>Ingredient in Product</u>	<u>%</u>	<u>PEL</u>	<u>TLV</u>	<u>Other Work Place Exposure Limits</u>
Natural Corn Material 9004-53-9	100		10 mg/m3	

Remarks:

SECTION 3 - PHYSICAL DATA

	<u>Entire Product</u>	<u>Or Ingredient (Name)</u>
Boiling Point (F):	NA	NA
Melting Point (F)(Give Method):	NA	NA
Specific Gravity (Water = 1):	1.10	NA
Vapor Pressure (mmHg):	NA	
Evaporation Rate:	NA	
Vapor Density (Air = 1):	NA	
Percent Volatile:	(Volume) NA	(Weight) NA

Other: NA

Appearance/Odor: Yellow Powder / None

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SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: 770 DEG F.

Method Used: Closed Cup

Flammable Explosive Limits: (Name) 450 DEG F.

(Lower) NO

(Upper) NO

Fire Extinguishing Media: Water, CO2

Special Fire Fighting Procedures: NA

Unusual Fire and Explosion Hazards: Dust: (.02 to 2 oz. per cu. ft.)

SECTION 5 - PRODUCT HEALTH HAZARD DATA

Routes of Entry: Inhalation, Swallowing, Eyes

Possible Symptoms of Exposure

Eyes: NA

Skin: NA

Breathing: NA

Swallowing: NA

Other: NA

Chronic Effects: None Known

Emergency and First Aid Procedures

Inhalation: NA

Skin Contact: NA

Eye Contact: NA

Swallowing: NA

Other: NA

SECTION 6 - REACTIVITY DATA

Stability: NA

Incompatibility (Materials to Avoid): NA

Hazardous Decomposition Products: NA

Hazardous Polymerization: Will not occur

SECTION 7 - SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled: All cleanup of dry product or dust to be performed by vacuum and/or wet cleaning methods.

Waste Disposal Method: Do not flush with water. Large spills when mixed with water have a tendency to rapidly gel and plug drains. Discard as normal refuse.

SECTION 8 - SPECIAL PROTECTION INFORMATION

Ventilation Requirements: Use adequate ventilation in volume and pattern to keep concentration in air below TLV or PEL.

Protective Equipment

Eyes: Comply with OSHA Standard 1910.133 .

Gloves: As required to prevent excessive contact.

Respiratory: Comply with OSHA Standard 1910.134 .

Other Protective Equipment: Comply with OSHA Standard 1910.132 .

SECTION 9 - SPECIAL PRECAUTIONS

Handling/Storage Precautions: Avoid broken or punctured containers to prevent spillage and excessive concentration in air.

Other Precautions: Avoid prolonged breathing of dust or mist. Use only with adequate ventilation. Avoid contact with skin and eyes.

The foregoing data has been compiled from sources which the company, in good faith, believes to be dependable and is accurate and reliable to the best of our knowledge and belief. However, the company cannot make any warranty or representation respecting the accuracy or completeness of the data and assumes no responsibility for any liability or damages relating thereto or for advising you regarding the protection of your employees, customers or others.

ND - NOT DETERMINED

NA - NOT APPLICABLE

< LESS THAN

> MORE THAN

MATERIAL SAFETY DATA SHEET

PRODUCT GROUP: GROUND LIMESTONE, QUINCY PRODUCTS

Page 1 of 4

I. PRODUCT IDENTIFICATION

MANUFACTURERS NAME: J. M. HUBER CORPORATION
ADDRESS: CALCIUM CARBONATE DIVISION
 3150 GARDNER EXPRESSWAY, PO BOX 4005
 QUINCY, IL 62305

TELEPHONE NO.: 217/224-1100

EMERGENCY PHONE NO.: CHEMTREC - 1-800-424-9300

TRADE NAME/LABEL NAME: HUBERCARB Q 1, Q 1T, Q 2, Q 2T, Q 3, Q 3T, Q 4, Q 6, Q 20-60, Q 100, Q 200, Q 200T, Q 270, Q 325, Q 60, Q 40-200, Q 6-20, CMF

CHEMICAL NAME/SYNONYMS: LIMESTONE; WHITING; CALCIUM CARBONATE

SHIPPING NAME: DOT - NOT RESTRICTED

IATA: NOT RESTRICTED

II. HAZARDOUS INGREDIENTS

MATERIAL: LIMESTONE**CAS NO.** 1317-65-3

Limestone is a natural occurring mineral substance consisting primarily of Calcium Carbonate with lesser amounts of Magnesium Carbonate together with many other ingredients present in small but varying amounts. The compounds present at concentrations of 0.1% or greater are:

COMPOUND	CAS NO.	TYPICAL CONCENTRATION, %
Calcium Carbonate	471-34-1	95-98
Magnesium Carbonate	546-93-0	1-2
Crystalline Silica	14808-60-7	0.8

In addition, surface treated products, designated by the letter "T", contain 0.75 to 1.5% stearic acid (CAS #57-11-4), except Q 200T and Q 325T which contain oleic acid (CAS #112-80-1).

Q1/Q1T grades contain 0.75% of sodium polyacrylate dispersant (CAS #9003-04-7).

Natural minerals invariably contain trace quantities of materials cited in the California Safe Drinking and Toxic Enforcement Act. In addition to crystalline silica, the earth's most common mineral, limestones frequently contain trace quantities of Lead and Arsenic. Test results show these substances, if present, are at concentrations of less than 5 PPM.

Respirable Silica (quartz) is not expected to be present in the dust from this product at levels exceeding 1%. If silica levels above 1% are present, the TLV value is 0.1 mg of respirable silica per cu. meter. Use dust mask approved by NIOSH for mineral dust if this respirable silica level is exceeded.

REVISED DATE: January 4, 1993



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III. HEALTH HAZARD DATA

ROUTE OF EXPOSURE	HAZARD DETERMINATION	BASIS FOR DETERMINATION
INHALATION	Limestone	ACGIH TLV: Total dust 10.0 mg/m ³
		OSHA PEL: Total dust 15 mg/m ³ TWA
	Silica, quartz	Respirable dust 5 mg/m ³ TWA
		ACGIH TLV: 0.1 mg/m ³ respirable
		OSHA PEL: 0.1 mg/m ³ respirable TWA

SOURCE: OSHA 29 CFR 1910.1000 Table Z-1-A

SOURCE: ACGIH TLV's Threshold Limit Values for Chemical Substances

*ACGIH classifies limestone as a nuisance dust when toxic impurities are not present (e.g. quartz less than 1%).

SKIN CONTACT	Non-hazardous	Historical
SKIN ABSORPTION	Non-hazardous	Historical
EYE CONTACT	Nuisance Dust	Historical
INGESTION	Non-hazardous	Historical

SOURCE: To the best of our knowledge, no studies have been done on eye, skin or ingestion hazards.

EFFECTS OF ACUTE OVEREXPOSURE: No acute effects.

Brief exposures to nuisance dust concentrations above the 8-hour recommended Threshold Limit Value (TLV) should pose no acute health problems.

EFFECTS OF CHRONIC OVEREXPOSURE: As is true with any mineral product, long term overexposure to high concentrations of this dust without the use of a dust mask may produce X-ray evidence of dust in the lungs. Continued long term overexposure may affect respiratory function in some individuals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Unknown.

EMERGENCY AND FIRST AID PROCEDURES:

EYES AND SKIN: No special precautions; flush with water.

INHALATION AND INGESTION: No special precautions.

IV. PHYSICAL DATA

N.A. - NOT APPLICABLE

APPEARANCE AND ODOR:	White powder with negligible odor	BOILING POINT:	N.A.
% VOLATILES BY VOL:	N.A.	VAPOR PRESSURE:	N.A.
SPECIFIC GRAVITY:	(WATER = 1.0): 2.71	EVAPORATION RATE	N.A.
MELTING POINT:	Decomposes @ 1799 Degrees F	(BUTYL ACETATE = 1):	N.A.
pH:	8.5-9.5 at 10% solids	VAPOR DENSITY:	N.A.
		SOLUBILITY IN WATER:	NEGLIGIBLE

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V. FIRE AND EXPLOSION DATA

FLASH POINT: NONE

AUTOIGNITION TEMP.: NONE

FLAMMABLE LIMITS IN AIR: N.A.

Limestone is not a fire hazard or an explosive hazard in either the powder or slurry form. Special fire fighting procedures or extinguishing media are not applicable.

VI. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO STABILITY: Reacts with acids to liberate CO₂.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION: None

HAZARDOUS DECOMPOSITION PRODUCTS: None

VII. DISPOSAL, SPILL OR LEAK PROCEDURES

WASTE DISPOSAL METHOD:

Limestone is not classified as a hazardous waste under RCRA Section 3001. Use normal waste disposal procedures which are in compliance with Federal, State, and Local Regulations.

SPILL OR LEAK PROCEDURES:

Limestone is not classified as a "toxic pollutant" or a "hazardous substance" under Sections 307 and 311 of the Clean Water Act. Accidental releases can be cleaned up by sweeping, vacuuming, or flushing with water.

NEUTRALIZING CHEMICALS: None Required

VIII. SPECIAL PROTECTION INFORMATION

VENTILATION

Use sufficient general area ventilation. Local exhaust may be necessary where Threshold Limit Values (TLV's) are exceeded or dusty conditions exist.

PERSONAL PROTECTIVE EQUIPMENT:

EYE: Non-essential, but desirable
GLOVES: Non-essential
OTHER: None

RESPIRATORY PROTECTION: For dusty conditions use a dust mask approved by NIOSH.

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IX. SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS/LABELING:

O.S.H.A./H.M.I.S. LABEL

HEALTH	= 1*	SLIGHT RISK
FLAMMABILITY	= 0	NONE
MAX. PERSONAL PROTECTION	= E	DUST MASK
REACTIVITY	= 0	NONE

*May affect lung function, avoid exposures to high levels of dust.

Contains small amounts of crystalline silica. Limited evidence suggests that pure silica is a human carcinogen. Limestone is not considered to be a carcinogen.

For additional information on the HMIS Rating System, contact:

The National Paint and Coatings Association
1500 Rhode Island Avenue, N.W.
Washington, DC 20005

ADDITIONAL REGULATORY CONCERNS:

FEDERAL:

USDA: None CPSC: None OTHER: None SARA 313: None RCRA TCLP: None

TSCA: Is this product and all its ingredients certified for inclusion in the Toxic Substances Control Act Inventory of Chemical Substances? Yes.

OSHA: Have ingredients in concentrations above 0.1% been:
1. Listed in the NTP Annual Report on Carcinogens? No.
2. Found to be a potential carcinogen by OSHA or IARC?

IARC found limited evidence for human carcinogenicity of the crystalline silica ingredient only. Limited evidence means a "causal" interpretation is credible, but alternative explanations such as chance, bias, or confounding effects could not be adequately excluded.

HUBERCARB Q products typically contain less than 1.0% by weight of crystalline silica. At the present level of expertise of medical research, there is no direct evidence that crystalline silica at these levels in limestones constitutes a health risk.

STATE: Consult Local and State Hazard Communication Regulations.

FOR MORE INFORMATION CONTACT: J. M. Huber Corporation-Calcium Carbonate Division
PHONE: (217) 224-1100

The information contained in this Material Safety Data Sheet is believed to be reliable. No guarantee is implied or expressed regarding the accuracy of this information or the use of the product since the conditions for use are beyond our control. Nothing contained herein should be construed as a recommendation to use this product in conflict with existing patents covering any material or its use.

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CHEMICAL PRODUCTS CORPORATION

MSDS No. 172

Revised Sep. 95

MATERIAL SAFETY DATA SHEET

Page 1 of 7 Pages

1. PRODUCT IDENTIFIERNAME: **Strontium Carbonate, Types A, C, D, G, & W.**

SYNONYMS: Carbonic Acid, Strontium Salt.

MANUFACTURER: Chemical Products Corporation (CPC)

P.O. Box 2470

102 Old Mill Road, S.E.

Cartersville, Georgia 30120

Telephone: Day, 770-382-2144; Night, 770-382-2212

EMERGENCY: CHEMTREC, 800-424-9300 (24 Hours every day)

2. INFORMATION ON INGREDIENTS

<u>COMPONENT</u>	<u>CAS #</u>	<u>EXPOSURE LIMITS</u>	<u>% BY WT</u>
Barium Carbonate	513-77-9	OSHA PEL: 0.5 mg/cu m as Ba. 0.7 mg/cu m as BaCO ₃ ACGIH TLV-TWA: Same	0.4% - 1.5%
Strontium Carbonate	1633-05-2	OSHA PEL: Nuisance Dust, 10 mg/cu m	ca 98%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is not soluble in water. It will not burn or react with water. Strontium carbonate is essentially non-toxic through oral, dermal, or inhalation exposure. Barium carbonate is harmful if ingested or inhaled.

POTENTIAL HEALTH EFFECTS: Barium carbonate is a muscle stimulant and can cause excessive salivation, abdominal pain, vomiting, and diarrhea; no effect would be expected at the levels present in this product.

Routes of Entry: Ingestion and inhalation.

Human Effects: The carbonate will react with stomach acid, releasing carbon dioxide gas - bloating may occur. Soluble barium enters the bloodstream and acts as a muscle stimulant. In barium poisoning, hypokalemia is observed. In acutely poisoned dogs, potassium infusion corrected all of the clinical signs of barium poisoning except hypertension.

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Acute Inhalation: Physical blockage of breathing passages with choking sensation. The barium present might cause vomiting, abdominal pain, and diarrhea.

Chronic Inhalation: No effect expected.

Acute Skin Contact: Product is alkaline and will dry the skin.

Chronic Skin Contact: May cause drying of the skin.

Acute Eye Contact: Will irritate the eyes.

Chronic Eye Contact: May cause irritation.

Acute Ingestion: Will neutralize stomach acid. The barium present might cause vomiting, abdominal pain, and diarrhea.

Chronic Ingestion: No adverse effect expected.

Carcinogenicity: NTP.....: Not listed.
IARC.....: Not listed.
OSHA.....: Not regulated.

Medical Conditions Aggravated by Exposure: None are known.

4. FIRST AID MEASURES

Ingestion: Have victim drink one tablespoon of Epsom Salts (magnesium sulfate) or Glauber's Salt (sodium sulfate) dissolved in water. If victim is not vomiting, induce vomiting by giving Syrup of Ipecac or by sticking finger down throat.

Inhalation: Flush mouth and nasal passages with water as much as possible.

Eye Contact: Flush eyes with large amounts of water until irritation subsides. Get medical attention.

Skin Contact: Wash with water and use soap if available.

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5. FIRE FIGHTING MEASURES

Flashpoint: Non-Flammable.

Flammability: None.

Autoignition: None.

General Hazard: At very high temperature, decomposition will occur gradually releasing carbon dioxide gas.

Fire Fighting Instructions: No special instructions.

Fire Fighting Equipment: No special equipment is required.

Hazardous Combustion Products: None.

6. ACCIDENTAL RELEASE MEASURES

Small Spill: Sweep or scoop up spilled material.

Large Spill: Try to keep material dry. Reaction with acid releases carbon dioxide gas which may reach hazardous concentrations in a confined space. Scoop up spilled material and dispose of in accordance with local, state, and federal regulations.

7. HANDLING AND STORAGE

Storage Temperature: Not critical.

Storage Pressure: Not critical.

General: Stable product. No special handling or storage procedures are required.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Control airborne concentrations below the exposure limits. Use only with adequate ventilation.

Respiratory Protection: Use a NIOSH-approved dust mask if excessive dust is present.

Skin Protection: Cover exposed skin areas and wear general-purpose gloves.

Eye Protection: Wear safety glasses. Use chemical goggles if excessive dust is present.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid.

Vapor Pressure: Not applicable.

Specific Gravity: 3.5.

Solubility in Water: 0.001% at 20 Deg. C.

pH: A 1% suspension of this product in water is slightly alkaline.

Boiling Point: Not applicable.

Melting Point: Decomposes to the oxide at about 1100 Deg. C.

Vapor Density: Not applicable.

Evaporation Rate: Not applicable.

Odor: None, or possibly a very slight rotten egg odor.

Appearance: White powder or granules.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Incompatibility: In acids, decomposes releasing carbon dioxide gas.

Hazardous Decomposition Products: Carbon dioxide gas can be hazardous in confined spaces.

Hazardous Polymerization: Does not occur.

11. TOXICOLOGICAL INFORMATION

Eye: No data. Believed to be a mild irritant.

Skin: No data. Not expected to be absorbed through intact skin.

Ingestion: Strontium exhibits very low toxicity; Strontium Chloride Oral Rat LD50 = 2250 mg/kg. Barium Carbonate Oral Rat LD50 = 418 mg/kg; further information is given in National Toxicology Program TR 432, NIH Pub. No. 94-3163.

Inhalation: No data. Expected to be similar to ingestion.

Sub-chronic: Not known. No effects expected.

Chronic/Carcinogenic: Not known. Slight possibility of slight blood pressure increase due to Barium Carbonate. No evidence of carcinogenic effects.

Teratogenic: Not known. No effects expected.

Reproductive: Not known. No effects expected.

Mutagenic: Not known. No effects expected.

12. ECOLOGICAL INFORMATION

TOXICITY: Low.

DISTRIBUTION: The elements strontium and barium are widely distributed in the natural environment.

CHEMICAL FATE: Probably slowly converted to strontium and barium sulfates because of sulfate availability in the environment.

13. WASTE MANAGEMENT INFORMATION

If disposed of in its original form, this product is not a hazardous waste; however, the barium in the product can become soluble upon leaching with certain strong acids.

A TCLP above 100 ppm soluble barium constitutes a RCRA hazardous waste. This is equal to 0.2 % soluble barium in a waste. The barium in this product can be rendered non-leachable by reacting it with sulfuric acid or any soluble sulfate to form highly-insoluble barium sulfate. Barium sulfate is not a RCRA hazardous waste.

14. TRANSPORT INFORMATION

D.O.T. Shipping Name..... : Not Regulated.
Technical Shipping Name..... : Strontium Carbonate.
D.O.T. Hazard Class..... : Not Regulated.
U.N./N.A. Number..... : None.
Product R.Q. (lbs)..... : None.
D.O.T. Label..... : None.
D.O.T. Placard..... : None.
Freight Class Bulk..... : Inorganic Chemical.
Freight Class Package..... : Inorganic Chemical.
Product Label..... : Strontium Carbonate.

15. REGULATORY INFORMATION

OSHA Status..... : This product is non-hazardous under the criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.
TSCA Status..... : Listed on TSCA Inventory.
CERCLA Reportable Quantity..... : None.
SARA Title III:
 Section 302, Extremely Hazardous Substances.... : None.
 Section 311/312, Hazard Categories..... : Category 1 (Acute Hazard).
 Section 313, Toxics Release Inventory..... : None; Barium Carbonate content is below the reporting threshold.
RCRA Status.....: This product contains barium which may be solubilized by some acids. This product is not a hazardous waste when tested by the RCRA TCLP test.

16. OTHER INFORMATION

NFPA Rating (National Fire Protection Association):

Health - 1 (Materials which on exposure would cause irritation but only minor residual injury, even if no treatment is given)
Fire - 0 (Materials that are non-flammable).
Reactivity - 0 (Materials which in themselves are normally stable even under fire exposure conditions, and which are not reactive with water).
Special - NA

Reason for Issue.....: Change in Area Code, New toxicology information.

Prepared by..... : Jerry A. Cook.

Title..... : Technical Director.

Approval Date..... : September, 1995.

Supersedes Date..... : December, 1994.

MSDS Number..... : 172.

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Chemical Products Corporation. The data on this sheet relates only to the specific material designated herein. Chemical Products Corporation assumes no legal responsibility for use or reliance upon these data.

THE **Feldspar** CORPORATION MATERIAL SAFETY DATA SHEET

- 1040 Crown Pointe Pkwy, Suite 270, Atlanta, GA 30338 • (770) 392-8660 • Fax (770) 392-8670

SECTION I. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAMES: *SP-G, F-20, G-20, G-40, G-200, NC-4 AND FELEX (Various Grades)*

#2010

CHEMICAL NAME: Feldspar (CAS No. 68476-25-5)

PRODUCER:

The Feldspar Corporation
1040 Crown Pointe Parkway, Suite 270
Atlanta, GA 30338

TELEPHONE NUMBERS:

(Emergency and Information)
(770) 392-8660 8am - 5pm EST M-F
(770) 392-8670 FAX

MSDS No. 9701 DATE PREPARED: November 1, 1997

SECTION II. HAZARDOUS INGREDIENTS

Free Silica (Crystalline Quartz) Formula: SiO_2 Typically 6-10% CAS No. 14808-60-7

Feldspar is a naturally occurring anhydrous, inorganic, igneous rock. It is a complex aluminum silicate containing varying amounts of sodium, potassium, and calcium. Formula: $(\text{Na}, \text{K}, \text{Ca}) \text{AlSi}_3\text{O}_8$; SiO_2

SECTION III. PHYSICAL DATA

BOILING POINT: Not Applicable VAPOR PRESSURE: Not Applicable SPECIFIC GRAVITY: 2.60-2.65

MELTING POINT: 1100-1450°C SOLUBILITY IN WATER: Negligible PERCENT VOLATILE: Not Applicable

ODOR AND APPEARANCE: Earthy smell when wet. White to tan granules and / or powder.

SECTION IV. FIRE AND EXPLOSION DATA: Non-flammable and non-explosive.

SECTION V. HEALTH HAZARD INFORMATION

OSHA PEL: CRYSTALLINE QUARTZ (Respirable) 0.1 mg/m^3 (TWA-TLV)

ACGIH TLV: CRYSTALLINE QUARTZ (Respirable) 0.1 mg/m^3 (TWA-TLV)

NIOSH TWA: CRYSTALLINE QUARTZ (Respirable) 0.05 mg/m^3

HAZARD BY ROUTES OF EXPOSURE:

INHALATION: **WARNING**: These products contain crystalline silica. Repeated, prolonged inhalation of dust may cause delayed lung injury which may result in silicosis or pneumoconiosis. The International Agency For Research On Cancer in its publication, "IARC Monographs On The Evaluation Of The Carcinogenic Risk To Humans - Silica, Some Silicates, Coal Dust and Para-aramid Fibrils" - Volume 68, 1997, has concluded that there is sufficient evidence for the carcinogenicity of crystalline silica in humans, and has, therefore, classified crystalline silica in Group 1, carcinogenic to humans. The National Toxicology Program's ("NTP's") Sixth Annual Report on Carcinogens, 1991, lists crystalline silica (respirable) as a substance which may reasonably be anticipated to be a carcinogen. In humans, a number of studies have found an association between lung cancer and exposure to dust containing respirable crystalline silica. In many of these studies, though not all, lung cancer risks were elevated and could not be explained by confounding factors such as cigarette smoking or arsenic or radon inhalation. While the IARC working group concluded there was sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite, it noted that carcinogenicity in humans was not detected in all circumstances studied. **NOTE**: The State of California requires the following statement: "Airborne particles of respirable size of crystalline silica are known to the State of California to cause cancer."

INGESTION: Nausea may result from accidental ingestion. May cause cancer.

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SECTION V. HEALTH HAZARD INFORMATION (Continued)

EYE: Inflammation of eye tissue may occur from overexposure.

SKIN CONTACT/ABSORPTION: Inflammation from contact with open cuts may occur.

SIGNS AND SYMPTOMS ASSOCIATED WITH EXPOSURE OVER THE TLV:

Short Term: Shortness of breath, coughing associated with inhalation of dust. Long Term: May cause silicosis, a chronic disease of the lungs marked by acute fibrosis; may cause cancer.

EMERGENCY/FIRST AID PROCEDURES:

INHALATION: Move to fresh air; consult physician and /or obtain competent medical assistance as necessary.

INGESTION: Consult physician and/or obtain competent medical assistance.

EYE CONTACT: Flush with water; consult physician and/or obtain competent medical assistance as necessary.

SKIN CONTACT: Wash thoroughly with water.

SECTION VI. REACTIVITY DATA

STABILITY: Feldspar is a stable material under ordinary conditions.

INCOMPATIBILITY: None known.

HAZARDOUS POLYMERIZATION: Not known to occur.

SECTION VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED:

If uncontaminated, recover and reuse. If contaminated, collect in suitable containers for disposal. Use appropriate method to avoid creating dust. Avoid breathing dust. Wear a NIOSH/MSHA/OSHA approved respirator.

WASTE DISPOSAL METHOD: May be buried in approved land disposal facility in accordance with Federal, State, and local regulations. Feldspar is not a hazardous waste under RCRA (40 CFR Part 261).

SECTION XIII. CONDITIONS FOR SAFE USE

VENTILATION: Local exhaust required for dust removal. Refer to OSHA 1910.24, ASTM, and/or ANSI Standards. Do not exceed OSHA PEL or ACGIH TLV.

RESPIRATORY PROTECTION: Use NIOSH/MSHA/OSHA approved respirator if dust is present.

EYE PROTECTION: Optional, but recommended. NIOSH recommends against wearing contact lenses when working with crystalline silica.

PROTECTIVE GLOVES: Optional, but recommended.

SECTION IX. SPECIAL PRECAUTIONS

1. Do not breathe dust.
2. Avoid creating dust in closed areas.
3. Use adequate ventilation as recommended by NIOSH/MSHA/OSHA for crystalline silica.

SECTION X. OTHER RELATED INFORMATION

1. NPCA / CPMA HMIS Ratings: Health (2) Flammability (0) Reactivity (0) Personal Protection (E)
2. Feldspar is not hazardous under DOT Regulations.
3. Government regulations require that personnel working with crystalline silica receive appropriate training in safe work habits, respiratory protection and health risks.

The information and data contained herein are believed to be accurate, but the manufacturer makes no warranty with respect thereto and disclaims responsibility for reliance thereon. This data relates only to the specific material described herein, and does not relate to use in connection with any other materials or in any process.

The Feldspar Corporation makes no warranties, express or implied, concerning this product. No warranty of fitness for any particular purpose is made, and we assume no responsibility whatever for any use of this product. This product should be used by properly trained personnel, and in compliance with applicable health and safety laws and regulations.

Industrial Chemicals Division

MATERIAL SAFETY DATA SHEET

P.O. Box 300, Bauxite, AR 72011



NO. 151

Original: January 23, 1981 Supersedes: September 30, 1993 Revised: October 14, 1994

Product Name: CALCINED ALUMINA

Aluminum Company of America, 425 Sixth Avenue Alcoa Building, Pittsburgh, PA 15219-1850 USA

Emergency Phone: 412-553-4001

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATIONChemical Formula: Aluminum Oxide Al_2O_3

Other Designation: All A-grades and P-grades (except those produced by Alcoa Chemie); APC-grades; NSA-14; RGA; OF-2000; Premalox; Realox (ground, unground, superground and dispersible); Special Catalytic; Mixed Phase Coarse; Mixed Phase Fines; Abrasive Grade Alumina, PCT; WGA; and all Fused Grades.

Product Use: Production of refractories, ceramics, and catalyst supports.

USA Phones: Chemtrec: 1-800-424-9300; Health & Safety: 1-412-553-4649; Product Information: 1-800-643-8771

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>CAS No.</u>	<u>Exposure Limits</u>	<u>Typical % by Weight</u>
Aluminum oxide	1344-28-1	ACGIH TLV 10 mg/m ³ OSHA PEL 15, 5 mg/m ³ respirable dust	98.6-99.7

3. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW**

No unusual fire or spill hazard. Low health risk by inhalation. White, odorless crystalline powder.

Potential Health Effects

EYES: May cause mechanical irritation.

SKIN: None.

INHALATION: Low health risk by inhalation. Treat as a nuisance dust.

Alumina is a low health risk by inhalation and should be treated as a nuisance dust as specified by the American Conference of Governmental Industrial Hygienists (ACGIH).

4. FIRST AID MEASURES

EYES: Flush eyes with plenty of water for at least 15 minutes. Consult a physician if irritation persists.

SKIN: Wash with soap and water for at least 15 minutes. Consult a physician if irritation persists.

INHALATION: Remove to fresh air. If breathing is labored or stopped, give artificial respiration.
Get immediate medical attention.

INGESTION: If swallowed, dilute with large amounts of water. Do not induce vomiting. Consult a physician immediately.

MATERIAL SAFETY DATA SHEET

Original: January 23, 1981 Supersedes: September 30, 1993

Revised: October 14, 1994

No. 151

Page 3 of 4

Product Name: CALCINED ALUMINA**11. TOXICOLOGICAL INFORMATION**No LD₅₀ or LC₅₀ found for oral, dermal or inhalation routes of administration.**12. ECOLOGICAL INFORMATION**

ECOTOXICOLOGICAL/CHEMICAL FATE INFORMATION: Not available.

13. DISPOSAL CONSIDERATION

Collect in containers, bags, or covered dumpster boxes. If reuse or recycling is not possible, material may be disposed of at a sanitary landfill.

TCLP data are available for this product in its uncontaminated state.

RCRA STATUS: Not regulated.

14. TRANSPORT INFORMATION

U.S.A. DOT: Not Regulated – Enter the proper freight classification on the shipping paperwork, "MSDS Number," and "Product Name" for shipping purposes.

Canadian TDG Hazard Class & PIN: Not regulated.

15. REGULATORY INFORMATION**U.S. Federal Regulations:**

TSCA STATUS: Components of this product are listed on the TSCA inventory.

CERCLA REPORTABLE QUANTITY: None.

SARA TITLE III:

Section 302 Extremely Hazardous Substances: None.

Section 311/312 Hazardous Categories: None.

Section 313 Toxic Chemicals: None.

International Regulations:

CANADIAN DOMESTIC SUBSTANCES LIST: Components of this product are listed on the Canadian DSL.

EUROPEAN COMMUNITY: Components of this product are listed on ECHOIN, the European core inventory (EC) market.

16. OTHER INFORMATION

MSDS Status: Changes in Sections 1, 4, 13, 14, 16, and format.

Prepared by the Hazardous Materials Control Committee.

References:

- American Industrial Hygiene Association (AIHA) Hygienic Guide Series, June 1978 Edition.
- U.S. Dept. of Health and Human Services, NIOSH: Registry of Toxic Effects of Chemical Substances, 1985-86 Edition.
- Sax, N. Irving: Dangerous Properties of Industrial Materials, Van Nostrand Reinhold Co., Inc., 1984.
- American Conference of Governmental Industrial Hygienists, Inc. (ACGIH), Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1992.

EMERGENCY
TRANSPORTATION
(CHEMTREC): ... (800) 424-9300
OTHER: (410) 931-4570
(BUSINESS HOURS, EST/EDT)

MSDS NO.: 9.5
ISSUE DATE: 6/1/93
PAGE: 1 of 6

MATERIAL SAFETY DATA SHEET



SCM Chemicals—Americas

7 St. Paul Street
Baltimore, Maryland 21202

1. CHEMICAL PRODUCT

TiONA® VC
Titanium Dioxide (TiO₂) Dry

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Material or Component</u>	<u>CAS No.</u>	<u>% by Weight</u>
Titanium Dioxide	13463-67-7	99.0

(See Section 8 for exposure guidelines)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

ODORLESS WHITE POWDER, CHEMICALLY STABLE, INERT
NUISANCE DUST. MAY HAVE A DRYING EFFECT ON
MUCOUS MEMBRANES.

POTENTIAL HEALTH EFFECTS

INHALATION: Inert nuisance dust. Temporary drying effect on irritation of mucous membranes may result from excessive exposure. Exposure to dust may aggravate pre-existing respiratory conditions.

EYES: Inert foreign body hazard only.

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MSDS NO.: 9.5
ISSUE DATE: 6/1/93
PAGE: 3 of 6

6. ACCIDENTAL RELEASE MEASURES

Vacuum or sweep material and place in disposal container. Prevent run-off from entering storm sewers and ditches which lead to natural waterways.

7. HANDLING AND STORAGE

HANDLING: Minimize breathing dust and contact with skin. Product supplied in groundable semi-bulk containers must be grounded to avoid discharge of static electricity while transporting the container or emptying its contents.

STORAGE: Store in dry area. Can cause slippery condition if wet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Good natural ventilation will be sufficient for most conditions. Local exhaust ventilation may be necessary if airborne dust concentration approaches the exposure guideline.

INHALATION PROTECTION: If exposure guidelines are exceeded, use of NIOSH approved dust respirator would be required.

EYE PROTECTION: Safety glasses with sideshields or goggles to protect against airborne dust.

SKIN PROTECTION: Use of gloves are suggested when prolonged or repeated contact with hands is likely. Individuals having sensitive skin may find it beneficial to use a barrier cream or moisturizer when excessive or prolonged contact with skin is likely.

EXPOSURE GUIDELINES:

COMPONENT	OSHA (PEL)		ACGIH (TLV)	
	TWA	STEL	TWA	STEL
Titanium Dioxide	10*/5** mg/m ³	n.e.	10 mg/m ³	n.e.

n.e. = none established

* = Total dust

** = Respirable fraction

14. TRANSPORTATION INFORMATION

D.O.T. SHIPPING NAME: Not regulated.
TECHNICAL SHIPPING NAME: Titanium Dioxide, N.O.I.
D.O.T. HAZARD CLASS: None.
UN/NA NUMBER: None.
PACKING GROUP: None.
RQ (lbs): None.
MARINE POLLUTANT: Not applicable.
D.O.T. LABEL: None.
D.O.T. PLACARD: None.
STCC #: 2816125

15. REGULATORY INFORMATION

OSHA STATUS: This Product is considered hazardous under the criteria of the Federal OSHA Hazard Communication Standard §29 CFR 1910.1200.

TSCA INVENTORY STATUS: All ingredients are listed.

CANADIAN DSL STATUS: All ingredients are listed.

EUROPEAN EINECS STATUS: All ingredients are listed.

CERCLA REPORTABLE QUANTITY (RQ): None.

SARA TITLE III:

Section 302/304 - No extremely hazardous substances.

Section 311/312 - Reporting requirements are applicable for materials or components in Section 2 of this MSDS.

Section 313 - No section 313 chemicals.

NOTE: Consult state and local regulations which may also apply.

Material Safety Data Sheet

Required under USDL Safety and Health Regulations
Shipyard Employment (29 CFR 1915)

U.S. Department of Labor

Occupational Safety and Health Administration

OMB No. 1218-0074
Expiration Date 05/31/86

Section I

Manufacturer's Name

KYANITE MINING CORPORATION

Emergency Telephone Number

804 983 2085

Address (Number, Street, City, State, and ZIP Code)

PO BOX 486 DILLWYN, VA 23936

Chemical Name
and Synonyms

Alumina Silicate

Trade Name
and Synonyms

Kyanite Mullite 325

Chemical
Family

same as above: Formula
Al₂O₃ - SiO₂, 3Al₂O₃ - 2SiO₂ (formula)

Section II - Hazardous Ingredients

n/a

Paints, Preservatives, and Solvents

% TLV (Units) Alloys and Metallic Coatings

% TLV (Units)

Pigments			Base Metal		
Catalyst			Alloys		
Vehicle			Metallic Coatings		
Solvents			Filler Metal Plus Coating or Core Flux		
Additives			Others		
Others					

Hazardous Mixtures of Other Liquids, Solids or Gases

% TLV (Units)

Section III - Physical Data

Boiling Point (*F)	PCE-37	Specific Gravity (H ₂ O=1)	3.6-3.7-3.0
Vapor Pressure (mm Hg.)	N/A	Percent Volatile by Volume (%)	
Vapor Density (AIR=1)	N/A	Evaporation Rate	
Solubility in Water	Nil		

Appearance and Odor

odorless, dark or white granular material

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	Lei	Uei
none	n/a		
Extinguishing Media			
n/a			
Special Fire Fighting Procedures			
n/a			

Unusual Fire and Explosion Hazards

Section V - Health Hazard Data

Threshold Limit Value

Effects of Overexposure

no know cases of overexposure to date

Emergency First Aid Procedures

remove to dust free area

Section VI - Reactivity Data

N/A

Stability	Unstable		Conditions to Avoid
	Stable		

Incompatibility (Materials to Avoid)

Hazardous Decomposition Products

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur		

Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled

reat as nuisance dust

Waste Disposal Method

no special precautions

Section VIII - Special Protection Information

Respiratory Protection (Specify Type)

non-toxic dust mask or better

Ventilation	Local Exhaust	Special
	recommended	n/a
	Mechanical (General)	Other
	recommended	

Protective Gloves

Eye Protection

recommended

Other Protective Equipment

Section IX - Special Precautions

Precautions to be Taken in Handling and Storing

no special precautions

For Company Use

The information and recommendations set forth herein are taken from sources believed to be accurate as of the date hereof; however, Kyanite Mining Corporation makes no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assumes no liability to any user thereof.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration
MATERIAL SAFETY DATA SHEET

Form Approved
OMB No. 44-R1387

#281
#105203

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking. (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME		EMERGENCY TELEPHONE NO.
THE FELDSPAR CORPORATION, EPK CLAY DIVISION		(904) 481-2421
ADDRESS (Number, Street, City, State, and ZIP Code) P.O. Box 8, Edgar, Florida 32049		
CHEMICAL NAME AND SYNONYMS FLORIDA KAOLIN (CLAY) -CAS Registry No. 1332-58-7		TRADE NAME AND SYNONYMS EPK
CHEMICAL FAMILY KAOLINITE	FORMULA Al ₂ Si ₂ O ₅ (OH) ₄	

SECTION II - HAZARDOUS INGREDIENTS

NONE

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	2.56
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT, VOLATILE BY VOLUME (%)	N/A
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	0 Pts/100 Pts H ₂ O		
APPEARANCE AND ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	N/A	FLAMMABLE LIMITS	Loi	Uoi
EXTINGUISHING MEDIA	N/A			
SPECIAL FIRE FIGHTING PROCEDURES	N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS				
N/A				

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

None - Non-Toxic (Nuisance Only) Non-Carcinogenic

EMERGENCY AND FIRST AID PROCEDURES

N/A

SECTION VI - REACTIVITY DATA

N/A

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

No special requirements.

WASTE DISPOSAL METHOD

Recycle or normal disposal

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

Optional

VENTILATION

LOCAL EXHAUST ventilation as required to
prevent excessive dust.

SPECIAL

MECHANICAL (General) as above.

OTHER

PROTECTIVE GLOVES

N/A

EYE PROTECTION

N/A

OTHER PROTECTIVE EQUIPMENT

N/A

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

N/A

OTHER PRECAUTIONS

N/A

#212 #0510



Cyprus Industrial
Minerals Company

MATERIAL SAFETY DATA SHEET

KAOLIN CLAY

HMIS

Health (No Acute Effects)	0
Flammability	0
Reactivity	0
Personal Protection	E*

I. IDENTIFICATION

Product Name: Kingeley Clay	CAS #: 1332-58-7
Chemical Name: Kaolin; Hydrous Aluminum Silicate	Chemical Family: Silicates
Formula: $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ + Impurities	Date Prepared: June 1986

II. INGREDIENTS

Mineral or Chemical Name(s)	Weight %	CAS #
KAOLINITE - A NATURAL HYDROUS ALUMINUM SILICATE MINERAL	up to 99%	1332-58-7
QUARTZ - A NATURAL CRYSTALLINE SILICA MINERAL	less than 1%	14808-60-7

III. PHYSICAL DATA

Boiling Point: Not Applicable	Freezing Point: Not Applicable
Vapor Pressure: Not Applicable	Vapor Density: Not Applicable
Evaporation Rate: Not Applicable	% Volatile: UP TO 35% (ALL WATER) DRY UP TO 30% (ALL WATER) SLURRY
Specific Gravity (water = 1): 2.4 to 2.7	Solubility In Water: Negligible pH: 4.0 to 7.5
Appearance and Odor: White to cream in color with an earthy odor. Slurry in a cream or gray colored liquid.	

IV. FIRE AND EXPLOSION HAZARD DATA

Flash point: Not Applicable	Flammable Limits: Not Applicable
Extinguishing Media: Not Applicable	
Special Fire Fighting Procedures: Not Applicable	
Unusual Fire and Explosion Hazards: Not Applicable	

V. HEALTH HAZARD DATA

Threshold Limit Value: 5 mg of respirable dust per cubic meter of air	
Possible Effects of a Single Overexposure	
Inhalation	Irritation of respiratory tract with cough, shortness of breath, wheezing. NUISANCE DUST.
Skin Contact	Of no general concern. May cause irritation or rash in susceptible individuals.
Eye Contact	As with any particulate material, Kaolin Clay can cause temporary discomfort and irritation if accidentally introduced into the eye.
Ingestion	No known hazard.

Possible Effects of Repeated Overexposure

Long term exposure to Airborn Kaolin dust in excess to the Threshold Limit Value(TLV) without proper respiratory protection may produce X-ray evidences of dust on the lungs. Continued long term exposure may affect respiratory function in some individuals. Clay maintained in a slurry form remains non hazardous. Limit inhalation of dust if slurry is allowed to dry. Effects of dust exposure are aggravated by cigarette smoking.

Emergency and First Aid Procedures

Inhalation	Remove to fresh air. If breathing is difficult give oxygen and call a physician. Drink water to clear throat and blow nose.
Skin Contact	Of no general concern. Wash gently with soap and water.
Eye Contact	Flush with water for 15 minutes. If irritation persists, call a physician.
Ingestion	No treatment necessary.

Notes to Physician

Treatment should be directed at the control of symptoms and the clinical conditions. Effects of continued exposure to dust should be considered in cases of active pulmonary disease.

VI. REACTIVITY DATA

Stability: Stable and inert	Incompatibility: None
Hazardous Decomposition Products: None	Conditions to Avoid: None
Hazardous Polymerization: None	

VII. SPILL OR LEAK PROCEDURES

Steps to be taken if Material is Released or Spilled: Vacuum, sweep or flush away with water.

Waste Disposal Method: Any convenient means which avoids dust.

VIII. SPECIAL PROTECTION INFORMATION *

Respiratory Protection: NIOSH/OSHA approved dust respirator when TLV is exceeded. Not necessary in slurry form.

Ventilation: Local exhaust recommended. Follow OSHA 1910.94. Not necessary in slurry form.

Protective Gloves: Not required.

Eye Protection: Goggles or face shield recommended.

Other Protective Equipment: Respirable dust levels should be monitored regularly. Dust exposure levels in excess of appropriate TLV's should be reduced by all feasible engineering and/or administrative controls.

IX. SPECIAL PRECAUTIONS

Precautions to be taken in Handling and Storage

- As with any powder, limit the creation & inhalation of dust.
- Wet floors may become extremely slippery when clay is present.

X. ADDITIONAL INFORMATION**EMERGENCY TELEPHONE NUMBERS**

Medical: (912) 552-6994
Technical: (912) 552-6994

FEDERAL HAZARD CLASSIFICATION NUMBERS

- DOT Hazard Classification - Not Listed
- RCRA Hazardous Waste No. - Not Listed
- CERCLA (Superfund) Reportable Quantity - Not Listed



OLD HICKORY CLAY COMPANY

P. O. Box 66

Hickory, Kentucky 42051-0066

Phone (502) 247-3042

0500

Material Safety Data Sheet

Section I

MANUFACTURER'S NAME
Old Hickory Clay Company

EMERGENCY TELEPHONE NUMBER
(502) 247-3042
Joe A. Powell

ADDRESS (Number, Street, City, State and ZIP Code)
P. O. Box 66, Hickory, KY 42051

C.A.S. No.
1332-58-7

DATE PREPARED JANUARY 26, 1988

NAME Joe A. Powell

CHEMICAL NAME, IDENTITY
Ball Clay

FORMULA
 $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$

TITLE General Manager

SIGNATURE

CHEMICAL FAMILY, SYNONYMS, ETC.
Silicates - Hydrous Aluminum Silicate

TRADE NAME

BERRY, AIRFLOATED

Section II —

INGREDIENTS

Material or Component	%	C.A.S. No.
Ball Clay	65-95	1332-58-7
Free Silica (Quartz)	5-30	14808-60-7

Section III — PHYSICAL DATA

BOILING POINT (°F)	N.A.	SPECIFIC GRAVITY (H₂O = 1)	2.4 - 2.65
VAPOR PRESSURE (mmHg.)	N.A.	PERCENT VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR = 1)	N.A.	EVAPORATION RATE (..... = 1)	N.A.
SOLUBILITY IN WATER	INSOLUBLE		
APPEARANCE	WHITE TO CREAM POWDER		
ODOR	EARTHY ODOR, ESPECIALLY WHEN WET		

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	NON-FLAMMABLE	FLAMMABLE LIMITS	NONE	LeI	Uel
				N.A.	N.A.
EXTINGUISHING MEDIA	N.A.				
SPECIAL FIRE FIGHTING PROCEDURES	NONE				

UNUSUAL FIRE AND EXPLOSION HAZARDS NONE

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0200
Calcined Talc
#2801



WHITTAKER, CLARK & DANIELS, INC.

MINERALS, COLORS, CHEMICALS

MATERIAL SAFETY DATA SHEET

ORDER# 372354

PRODUCT/MATERIAL	TALC
MANUFACTURER/DISTRIBUTOR	WHITTAKER, CLARK & DANIELS, INC.
ADDRESS	1000 COOLIDGE STREET SOUTH PLAINFIELD, NJ 07080
EMERGENCY TELEPHONE NO.	(908) 561-6100

SECTION I - PRODUCT IDENTIFICATION

TRADE NAME	TALC
SYNONYM	SOAPSTONE
CHEMICAL FAMILY	MAGNESIUM SILICATE HYDRATE
FORMULA	$3\text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$
CAS NUMBER	14807-96-6
HMIS	HEALTH 1 FLAMMABILITY 0 REACTIVITY 0

SECTION II - HAZARDOUS INGREDIENTS

TALC (NON-ASBESTIFORM)

TALC CONTAINS CRYSTALLINE SILICA AT LEVELS GREATER THAN 0.1%, BUT LESS THAN 1.0%. THESE LEVELS ARE "TYPICAL" AND MAY CHANGE SLIGHTLY WITH DIFFERENT LOTS. IARC HAS DETERMINED SILICA TO BE A CLASS 2A CARCINOGEN, AND NTP HAS CLASSIFIED CRYSTALLINE SILICA AS A SUBSTANCE REASONABLY ANTICIPATED TO BE A CARCINOGEN.

SECTION III - PHYSICAL DATA

BOILING POINT (F)	NOT APPLICABLE
VAPOR PRESSURE (mmHg)	NOT APPLICABLE
VAPOR DENSITY	NOT APPLICABLE
SOLUBILITY IN WATER	INSOLUBLE
SPECIFIC GRAVITY	2.5 - 2.8
PERCENT VOLATILE BY WEIGHT	0
EVAPORATION RATE	0
APPEARANCE AND ODOR	WHITE TO OFF-WHITE POWDER, ODORLESS.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	NON-FLAMMABLE
FLAMMABLE LIMITS	LEL - NON-FLAMMABLE UEL - NON-FLAMMABLE
EXTINGUISHING MEDIA	WATER
SPECIAL FIRE FIGHTING PROCEDURES	NONE
UNUSUAL FIRE AND EXPLOSION HAZARDS	NONE

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUES	20 mppcf (OSHA PEL)
(TWA - 8 HOUR PERIOD)	2 mg/m ³ , RESPIRABLE DUST (ACGIH)
EFFECTS OF OVEREXPOSURE	ACUTE HEALTH EFFECTS-MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT. ABRASION

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WHITTAKER, CLARK & DANIELS, INC.

MINERALS, COLORS, CHEMICALS

TARGET ORGAN

PRIMARY ENTRY ROUTES

CARCINOGENICITY

EMERGENCY AND FIRST-AID PROCEDURES:

EYE CONTACT

SKIN CONTACT

INHALATION

INGESTION

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

CANADIAN WHMIS CLASSIFICATION

SECTION VI - REACTIVITY DATA

INCOMPATIBILITY

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO TAKE IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

ECOLOGICAL INFORMATION

SECTION VIII - SPECIAL PROTECTION INFORMATION

EYE PROTECTION (USE MOST APPROPRIATE)

SKIN PROTECTION

RESPIRATORY PROTECTION

VENTILATION

SECTION IX - SPECIAL PRECAUTIONS

MAY CAUSE EYE AND SKIN IRRITATION. INGESTION CAUSES GASTROINTESTINAL IRRITATION, NAUSEA, AND DIARRHEA.

CHRONIC HEALTH EFFECTS - REPEATED EXPOSURE TO HIGH AMOUNTS OF TALC CAN CAUSE TALCOSIS, A PULMONARY FIBROSIS, WHICH MAY LEAD TO SEVERE AND PERMANENT DAMAGE TO THE LUNG-POSSIBLY RESULTING IN DISABILITY OR DEATH.

LUNGS, EYES AND SKIN.

INHALATION, INGESTION, EYE AND SKIN CONTACT.

NOT LISTED WITH NTP, IARC OR OSHA AS A KNOWN OR SUSPECTED CARCINOGEN.

FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION.

WASH FROM SKIN WITH MILD SOAP AND WATER.

REMOVE FROM THE EXPOSURE AREA.

IF CONSCIOUS, GIVE LARGE QUANTITIES OF WATER TO INDUCE VOMITING. GET MEDICAL ATTENTION.

PERSONS SUFFERING FROM CHRONIC RESPIRATORY DISEASES MAY BE AT INCREASED RISK.

CLASS D, DIVISION 2, SUBDIVISION A.

PRODUCT IS STABLE

NONE

NONE

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

NORMAL CLEAN UP PROCEDURES. CARE SHOULD BE TAKEN TO AVOID CAUSING DUST TO BECOME AIRBORNE. VACUUM CLEANING SYSTEMS ARE RECOMMENDED. DO NOT FLUSH TO SEWER.

DISPOSAL MUST BE MADE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. BE SURE TO CONTACT APPROPRIATE GOVERNMENT ENVIRONMENTAL AGENCIES IF FURTHER DISPOSAL GUIDANCE IS REQUIRED. OF THE DISPOSAL METHODS CURRENTLY AVAILABLE, A METHOD SHOULD BE SELECTED BASED UPON ENVIRONMENTAL ACCEPTABILITY FOLLOWING THE ORDER OF PREFERENCE:

1.) RECYCLE OR REWORK IF FEASIBLE.

2.) LANDFILL AT AN APPROVED FACILITY.

NO HARMFUL EFFECTS KNOWN OTHER THAN THOSE ASSOCIATED WITH SUSPENDED INERT SOLIDS IN WATER.

SAFETY GLASSES, GOGGLES, FACE SHIELD.

LEATHER OR RUBBER GLOVES.

USE OF A NIOSH APPROVED DUST RESPIRATOR IS RECOMMENDED WHEN EXPOSURE LIMITS MAY BE EXCEEDED.

LOCAL EXHAUST VENTILATION TO COLLECTOR OR CONTAINMENT RECOMMENDED TO CONTROL DUST TO BELOW EXPOSURE LIMITS.

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WHITTAKER, CLARK & DANIELS, INC.

MINERALS, COLORS, CHEMICALS

HANDLING AND STORAGE:

GOOD INDUSTRIAL HYGIENE PRACTICE REQUIRES THAT EMPLOYEE EXPOSURE BE MAINTAINED BELOW THE RECOMMENDED TLV. THIS IS PREFERABLY ACHIEVED THROUGH THE PROVISION OF ADEQUATE VENTILATION WHERE NECESSARY. WHERE DUST CANNOT BE CONTROLLED IN THIS WAY, PERSONAL RESPIRATORY PROTECTION SHOULD BE EMPLOYED. STORE IN A DRY AREA AT AMBIENT TEMPERATURE.

TRANSPORTATION:

THIS MATERIAL IS CLASSIFIED AS "NON-HAZARDOUS" ACCORDING TO U.S. AND INTERNATIONAL SHIPPING REGULATIONS.

REGULATORY:

TSCA STATUS - ALL INGREDIENTS IN THIS PRODUCT ARE INCLUDED IN THE EPA'S TSCA INVENTORY.

CANADIAN DSL - THIS MATERIAL IS CONSIDERED TO BE A NATURALLY OCCURRING SUBSTANCE AS DEFINED IN THE CANADIAN ENVIRONMENTAL PROTECTION ACT AND IS THEREFORE CONSIDERED TO BE LISTED ON THE CANADIAN DSL.

CERCLA, 40 CFR 117, 302 - NOTIFICATION OF SPILLS OF THIS MATERIAL IS NOT REQUIRED.

RCRA, 40 CFR 261 - DOES NOT MEET THE CRITERIA FOR A HAZARDOUS WASTE AS DEFINED BY THE ACT.

SARA: SECTION 302 - THIS MATERIAL DOES NOT CONTAIN INGREDIENTS CLASSIFIED AS EXTREMELY HAZARDOUS SUBSTANCES.

SECTION 311 AND 312 - THIS MATERIAL DOES CONTAIN SUBSTANCES REGULATED UNDER 29 CFR 1910.1200.

SECTION 313 - THIS MATERIAL DOES NOT CONTAIN TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF 40 CFR 372.

ISSUED: 5/93

SUPERCEDES: 2/93



Cyprus Minerals Company

MATERIAL SAFETY DATA SHEET

Health

0

Flammability

0

Reactivity

0

Personal Protection

E

I. IDENTIFICATION

Product Name:

SIERRALITE II

Chemical Name: CHLORITE; HYDROUS MAGNESIUM ALUMINUM SILICATE

Chemical Family: SILICATES

Formula: $2\text{MgO} \cdot 2\text{SiO}_2 \cdot \text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$

II. INGREDIENTS

Mineral or Chemical Name(s)	Weight %	CAS #
CHLORITE - A NATURAL HYDROUS MAGNESIUM ALUMINUM SILICATE MINERAL	97-99%	None
TALC - A NATURAL HYDROUS MAGNESIUM SILICATE MINERAL	less than 2%	14807-96-6
QUARTZ - A NATURAL CRYSTALLINE SILICA MINERAL	less than 1%	14808-60-7

III. PHYSICAL DATA

Boiling Point: NOT APPLICABLE	Freezing Point: NOT APPLICABLE
Vapor Pressure: NOT APPLICABLE	Vapor Density: NOT APPLICABLE
Evaporation Rate: NOT APPLICABLE	% Volatile: NOT APPLICABLE
Specific Gravity (water = 1): 2.7 - 2.8	Solubility in Water: NEGLIGIBLE
Appearance and Odor: A WHITE POWDER WITH AN EARTHY ODOR	pH: 7.5 - 9.5

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: NOT APPLICABLE	Flammable Limits: NOT APPLICABLE
Extinguishing Media: NOT APPLICABLE	
Special Fire Fighting Procedures: NOT APPLICABLE	
Unusual Fire and Explosion Hazards: NOT APPLICABLE	

V. HEALTH HAZARD DATA

Threshold Limit Value: $5\text{mg}^3/\text{M}$ RESPIRABLE DUST (NUISANCE DUST)

Possible Effects of a Single Overexposure

Inhalation	ACUTE ACCIDENTAL EXPOSURE WOULD BE NONSPECIFIC AND SIMILAR TO THE INHALATION OF ANY DUST. SUCH SYMPTOMS MIGHT INCLUDE COUGHING, WHEEZING, DIFFICULT BREATHING AND UPPER RESPIRATORY TRACT IRRITATION.
Skin Contact	NO ADVERSE EFFECTS ARE KNOWN AS A CONSEQUENCE OF APPLICATION TO UNBROKEN SKIN.
Eye Contact	AS WITH ANY PARTICULATE MATERIAL, CHLORITE CAN CAUSE TEMPORARY DISCOMFORT AND IRRITATION IF ACCIDENTALLY INTRODUCED INTO THE EYE.
Ingestion	NO KNOWN HAZARD.

Possible Effects of Repeated Overexposure

NO KNOWN HAZARD.

Emergency and First Aid Procedures

Inhalation	REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN AND CALL A PHYSICIAN.
Skin Contact	OF NO GENERAL CONCERN. BROKEN SKIN CAN BE CLEANSED WITH SOAP AND WATER.
Eye Contact	FOR ACUTE EXPOSURE, FLUSH WITH WATER. IF IRRITATION OR DISCOMFORT PERSISTS, CALL A PHYSICIAN.
Ingestion	NO TREATMENT NECESSARY.

Notes to Physician

THERE ARE NO SPECIFIC ANTIDOTES TO ACUTE OVEREXPOSURE. TREATMENT SHOULD BE DIRECTED AT THE CONTROL OF THE SYMPTOMS AND THE CLINICAL CONDITION.

VI. REACTIVITY DATA

Stability: CHLORITE IS STABLE AND INERT

Incompatibility: NONE

Hazardous Decomposition Products: NONE

Hazardous Polymerization: NONE

Conditions to Avoid: NONE

VII. SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled

VACUUM CLEAN OR WET SWEEP SPILLAGE

Waste Disposal Method

WASTE SHOULD BE DISPOSED OF IN CLOSED CONTAINERS TO PREVENT DUST

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection	NIOSH APPROVED DUST RESPIRATORS FOR EXPOSURE TO POTENTIALLY HIGH CHLORITE DUST ENVIRONMENTS.		
Ventilation	LOCAL EXHAUST VENTILATION RECOMMENDED		
Protective Gloves	NOT REQUIRED	Eye Protection	SAFETY GLASSES
Other Protective Equipment	NOT REQUIRED		

IX. SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storage

- AS WITH ALL POWDERS, LIMIT THE CREATION AND INHALATION OF DUST
- WET FLOORS MAY BECOME EXTREMELY SLIPPERY WHEN CHLORITE IS PRESENT

X. ADDITIONAL INFORMATIONEMERGENCY TELEPHONE NUMBERS

Cal: (303) 740-5440

Technical: (303) 740-5700

FEDERAL HAZARD CLASSIFICATION NUMBERS

- DOT Hazard Classification - Chlorite not listed
- RCRA Hazardous Waste No. - Chlorite not listed
- CERCLA (Superfund) Reportable Quantity - Chlorite not listed

#0020

STEAWHITE 200 TAL

MATERIAL SAFETY DATA SHEET

GROUP-01

Luzenac America, Inc.
Post Office Box 6601
Englewood, Colorado 80155-6601
1-800-325-0299

For MEDICAL EMERGENCY Information
Contact: 1-303-623-5716 (24 HRS)
ROCKY MTN POISON CONTROL CENTER

SUBSTANCE INFORMATION

CAS-Number 14807-96-6
RTEC-Number WW2710000

SUBSTANCE: TALC.

SYNONYMS: Talcum, Soapstone, Steatite.

PRODUCT NAMES: Act II 200, Act II 200 USP, Act II 300, Act II 400, Act II 500, AF 200, AF 300, AF 400, AF 500, Alpha-Fil 200, Alpha-Fil 300, Alpha-Fil 400, Alpha-Fil 500, Alpha-Glide 200, Alpha-Glide 300, Altalc 200, Altalc 200 USP, Altalc 300, Altalc 325, Altalc 400, Altalc 500, Altalc 600, August 200, August 325, Aura 200, Aura 250, Aura 300, BHC-200, Beaverwhite 200, Beaverwhite 325, Brillante, Castle 65, Cimflx 606, Cimpact 500, Cimpact 510, Cimpact 600, Cimpact 610, Cimpact 699, Cimpact 700, Cimpact 710, Dover 50-A, Dynasty 200, Dynasty 300, Dynasty 400, Dynasty 500, Dynasty 600, Empress 200, Empress 300, Empress 400, Empress 500, Imperial FEM, Maximix 4, Mistrion II, Mistrion 400, Mistrion 500, Mistrion 600, Mistrion CF5A, Mistrion CP, Mistrion EG, Mistrion Frost, Mistrion Mist, Mistrion Monomix, Mistrion RCS, Mistrion RCS-BH, Mistrion Superfrost, Mistrion Ultramix, Mistrion Vapor, Mistrion Vapor-A, Mistrion Vapor-Compacted, Mistrion Vapor-Densified, Mistrion Vapor-R, Mistrion ZSC, Olympic, PA-100, Regal 200, Regal 300, Regal 400, Regal 500, Silverbow, Steawhite 200, Stellar 200, Stellar 210, Stellar 300, Stellar 310, Stellar 400, Stellar 410, Stellar 500, Stellar 510, Stellar 600, Stellar 610, Stellar A, Stellar EX, Supra, Supra A, Supra AA, Supra EF, Supra EF-A, Suprafino, Suprafino A, Supreme, Supreme 400, Supreme USP, Top Note 200, Top Note 300, Ultrafino, Vertal 200, Vertal 200 ZSC, Vertal 300, Vertal 300 USP, Vertal 310, Vertal 350, Vertal 360, Vertal 700, Vertal 710, Vertal 1000, Vertal 1000 USP, Vertal 1500, Vertal 1500 USP, Vertal 1510, Vertal C-1, Vertal C-2, Vertal C-2 USP, Vertal C-O, Vertal C-O Plus, Vertal PC, Windsor Grade 66, Windsor Grade 96, Windsor Grade 910, XP 300, YB 200, Yellowstone.

CHEMICAL FAMILY: Silicate.

MOLECULAR FORMULA: $3\text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$.

CERCLA RATINGS (scale 0-3): Health = U, Fire = 0, Reactivity = 0, Persistence = 3.

NFPA RATINGS (Scale 0-4): Health = U, Fire = 0, Reactivity = 0.

COMPONENTS

MAJOR COMPONENT: Talc, CAS #14807-96-6.

CONCENTRATION: 90-100%.

MINOR COMPONENTS: Talc is a naturally occurring mineral which may, depending on the product, contain varying minor amounts of the following non-talc minerals:

Dolomite, CAS #16389-88-1	CONCENTRATION: 0-10%,
Chlorite, CAS #1318-59-8	0-10%,
Calcite, CAS #13397-26-7	0-10%,
Magnesite, CAS #546-93-0	0-10%,
Quartz, CAS #14808-60-7	0-1%.

EXPOSURE LIMIT

TALC: 2 mg/m³ OSHA TWA (respirable dust),
2 mg/m³ ACGIH TWA (respirable dust).
DOLOMITE, CHLORITE, CALCITE, MAGNESITE (Nuisance Particulates):
5 mg/m³ OSHA TWA (respirable dust),
10 mg/m³ ACGIH TWA (total dust).
QUARTZ: 0.1 mg/m³ OSHA TWA (respirable dust),
0.1 mg/m³ ACGIH TWA (respirable dust),
50 mg/m³ NIOSH Recommended 10-Hour TWA.

PHYSICAL DATA**TALC**

DESCRIPTION: Slight earthy odor, white to grayish-white, fine powder.
DECOMPOSITION TEMPERATURE: 1652°-1832°F (900°-1000°C). **LOI @ 1000°C:** 4.8%.
SPECIFIC GRAVITY: 2.7-2.8.
SOLUBILITY IN WATER: Insoluble. **PH:** Slightly alkaline.
OTHER SOLVENTS (Solubility, solvents): Soluble in concentrated, hot phosphoric acid; insoluble in cold acids and alkalis.
HARDNESS: 1.0-1.5 MOHS.

FIRE AND EXPLOSION DATA**TALC**

FIRE AND EXPLOSION HAZARD: None.
FIRE FIGHTING MEDIA: None.
FLASH POINT: None.

REACTIVITY SECTION**TALC**

REACTIVITY: Stable under normal temperatures and pressures.
INCOMPATIBILITIES: No data available.
DECOMPOSITION: None hazardous.
POLYMERIZATION: Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

TOXICITY**TALC**

TOXICITY DATA: Tumorigenic data (RTECS).
CARCINOGEN STATUS: Human inadequate evidence, animal inadequate evidence
(IARC Group 3).

QUARTZ

TOXICITY DATA: Tumorigenic data (RTECS).
CARCINOGENIC STATUS: Human limited evidence, animal sufficient evidence
(Respirable quartz: IARC Group-2A).

This product does not contain quantifiable concentrations of asbestos; asbestiform or non-asbestiform tremolite, actinolite, or anthophyllite when analyzed by high-intensity x-ray diffraction and polarized light microscopy--in accordance with CTFA Method J4-1.

HEALTH EFFECTS AND FIRST AID

INHALATION TALC

ACUTE EXPOSURE: Exposure to a large concentration of air-born dust of this material may cause mechanical irritation of the mucous membranes and respiratory tract.

CHRONIC EXPOSURE: Repeated or prolonged inhalation of air-born dust of this material may cause scarring of the lungs (pulmonary fibrosis), with shortness of breath, chronic cough, and respiratory assisted heart failure. Prolonged exposure to talc can produce a mild symptomatic pneumoconiosis.

RESPIRABLE QUARTZ A CARCINOGEN

ACUTE EXPOSURE: Exposure to high concentrations of *respirable* crystalline silica may cause physical discomfort of the upper respirator tract.

CHRONIC EXPOSURE: Inhalation of very high concentrations of finely divided--*respirable*--crystalline silica dust may cause a rapidly developing silicosis. Smoking can increase the risk of injury.

FIRST AID: Remove from exposure area to fresh air. If breathing has stopped, perform artificial respiration, and get medical attention immediately. Keep person warm and at rest. Treat symptomatically and supportively.

SKIN CONTACT TALC

ACUTE EXPOSURE: Direct contact may cause slight dryness, or may cause mild irritation if an allergic predisposition exists.

CHRONIC EXPOSURE: Prolonged contact may cause slight dryness of the skin, or may cause mild irritation if an allergic predisposition exists.

FIRST AID: Apply common skin moisturizers to relieve dryness. Irritations are uncommon; however, if irritation or redness develops, seek medical attention. Broken skin can be cleansed with mild soap and water.

EYE CONTACT TALC

ACUTE EXPOSURE: Direct contact with dust may cause mechanical irritation of the eyes.

CHRONIC EXPOSURE: Repeated exposure may cause conjunctival inflammation.

FIRST AID: Wash eyes with large amounts of water or normal saline solution. If irritation or redness develops, seek medical attention.

INGESTION TALC

ACUTE EXPOSURE: This material is considered to be harmless and inert when ingested.

CHRONIC EXPOSURE: Repeated ingestion of large doses of talc for 13 and 10 successive days by rabbits and mice, respectively, revealed negative teratogenic and carcinogenic results.

FIRST AID: Treat symptomatically and supportively. If vomiting occurs, keep head lower than hips to prevent aspiration.

ANTIDOTE: No specific antidote. Treat symptomatically and supportively.

STORAGE AND DISPOSAL

Talc is not considered a hazardous waste by RCRA criteria (40 CFR 261). Observe all federal, state and local regulations when storing or disposing of this substance. For assistance, contact the district director of the Environmental Protection Agency.

STORAGE: Preserve in sealed containers to prevent dispersion of dust in air.

WASTE DISPOSAL: Dry material can be landfilled. Wet material can be sewerred, if quantities are small and diluted enough that slurries or gels will not cause drain system blockage.

CONDITIONS TO AVOID

Prevent dispersion of dust in air.

ACCIDENTAL SPILLS

OCCUPATIONAL SPILL: For large spills, shovel or sweep up (while keeping dispersion of dust in air to a minimum) and place into suitable sealed containers for reclamation or later disposal. Residue should be cleaned up using a high-efficiency particulate filter vacuum. The use of water washdown is not recommended. Wet material can cause a surface used for walking to become extremely slippery.

PROTECTIVE EQUIPMENT

VENTILATION: Provide local exhaust or process enclosure ventilation to meet published exposure limits.

RESPIRATOR: The following maximum-use concentrations and respirators are recommendations by the U.S. Department of Health and Human Services; NIOSH Pocket Guide to Chemical Hazards; NIOSH criteria documents; or by the U.S. Department of Labor, 29 CFR 1910 subpart Z. The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator, and be jointly approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA).

TALC

Maximum-Use

Concentration

Respirator

10 mg/m³ Any dust and mist respirator.

20 mg/m³ Any dust and mist respirator except single-use and quarter-mask respirators.

50 mg/m³ Any powered air-purifying respirator with a dust and mist filter.
Any supplied-air respirator operated in a continuous flow mode.

QUARTZ

0.25 mg/m³ Any dust and mist respirator.

0.5 mg/m³ Any dust and mist respirator except single-use and quarter-mask respirators.

Any supplied-air respirator.

Any self-contained breathing apparatus.

1.25 mg/m³ Any powered air-purifying respirator with a dust and mist filter.

Any supplied-air respirator operated in a continuous flow mode.

2.5 mg/m³ Any air-purifying full face-piece respirator with a high efficiency particulate filter.

Any self-contained breathing apparatus with a full face-piece.

Any powered air-purifying respirator with a tight-fitting face-piece and a high-efficiency particulate filter.

Any supplied-air respirator with a full face-piece.
 Any supplied-air respirator with a tight-fitting face-piece operated in
 a continuous flow mode.
 50 mg/m³.....Any supplied-air respirator with a half mask and operated in a pressure-
 demand or other positive pressure mode.

CLOTHING: Protective clothing is not required.

GLOVES: Protective gloves are not required, but may be worn to prevent skin dryness or irritation due to skin allergy.

EYE PROTECTION: Employees should wear dust-resistant safety goggles to prevent eye contact with bulk quantities or high concentrations of air-borne dust of this substance.

EMERGENCY EYE WASH: Where there is a possibility that an employee's eyes may be exposed to bulk quantities or high concentrations of air-borne dust of this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

SECTION 313 SUPPLIER NOTIFICATION

This product does not contain 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.

ADDITIONAL INFORMATION

NATIONAL PAINT AND COATINGS ASSOCIATION -- HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD: 1--slight.

FLAMMABILITY HAZARD: 0--minimal.

REACTIVITY HAZARD: 0--minimal.

PERSONAL PROTECTION: E--glasses, gloves, dust respirator.

DOT CLASS: This substance is not regulated as hazardous material by DOT.

TSCA STATUS: All ingredients are included on the TSCA Inventory of Chemical Substances.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCES LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS): Quartz, p. 113; Talc, p.119.

DISCLAIMER

The information contained herein is based on data available to Luzenac America and is believed to be correct. However, Luzenac America makes no warranty, expressed or implied, regarding the accuracy or completeness of this information or the results to be obtained from the use thereof.

ISSUED BY: Michael Clark
 Quality Assurance Department
 Luzenac America, Inc.
 Phone: 1-303-643-5575
 updated July, 1992

Material Safety Data Sheet

#0010

#2802 MONTANA TALC

Barretts Minerals Inc.
P.O. Box 1147
South of Dillon MT 59725-1147

Product: CERCRO - MONTANA TALC

MSDS No: BMI / BMI002
Revision: 01/26/93
Date: October, 1992

National Paint
and Coatings
Association

Hazardous Material
Identification
System

HEALTH HAZARD	1 - Slight
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	E - Glasses, Gloves, Dust Resp

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: CERCRO - MONTANA TALC

Description: Talc, Magnesium Silicate Hydrate

Other Designations: MB 96-67, MB 96-68, MB 9901, MP 45-29, MP 95-27, MP 95-28, MP 97-30, MP 98-25, MP 99-22, MP 99-24, MP 99-48, MP 99-54, MP 9900.

CAS: 14807-96-6

Chemical Name: $Mg_3H_2(SiO_3)_4$

Wilson's RISK Scale of Material Hazards

(Scale: 1-4 higher numbers indicate increased hazard)

R 1 (Reactivity)

I 2 (Inhalation)

S 1 (Skin Contact)

K 1 (Kindling/Fire)

Manufacturer: Barretts Minerals Inc.
Subsidiary of Minerals Technologies
Inc.
P.O. Box 1147
South of Dillon MT 59725-1147

Phone: (406) 683-4231

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	CAS Number:	Percent:	Exposure Limits:
Talc	14807-96-6	Major	ACGIH TLV & OSHA PEL: 2 mg/M ³ , 8 hr. TWA, Respirable Dust (Talc containing no asbestos fibers).
Chlorite	71949-90-1	Approx. 3%	ACGIH TLV: 10 mg/M ³ 8 hr TWA
Silica - Quartz	14808-60-7	Less than 1%	ACGIH TLV & OSHA PEL: 0.1 mg/M ³ 8 hr TWA, Respirable Dust

Toxicity Data:

Rat inhalation, TC₁₀=11 mg/M³ administered intermittently over a year produces a

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Material Safety Data Sheet

Barretts Minerals Inc.
P.O. Box 1147
South of Dillon MT 59725-1147

Product: CERCROX - MONTANA TALC

MSDS No: BMI / BMI002
Revision: 01/26/93
Date: October, 1992

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: May cause irritation to the upper respiratory tract. Abrasion may cause eye and skin irritation. Long term, excessive exposure may cause severe and permanent damage to the lungs.

Medical conditions which may be aggravated by contact: Pre-existing lung disease may be aggravated with exposure to dusts.

Target organs: Lungs, eyes and skin.

Primary entry route(s): Inhalation, ingestion, eye and skin contact.

Acute effects: May cause irritation to upper respiratory tract. Abrasion may cause eye and skin irritation. Ingestion causes gastrointestinal irritation, nausea, and diarrhea.

Chronic effect(s): Long term excessive exposures may cause Talcosis, a pulmonary fibrosis which in turn may lead to severe and permanent damage to the lung.

Talc is not characterized as a carcinogen by NTP, IARC, ACGIH and OSHA. After reviewing the available toxicological information on talc, IARC concluded that there was insufficient evidence of carcinogenicity (Volume 42, 1987).

First aid:

Eye contact: Flush eyes with plenty of water for at least 15 minutes.
If irritation persists, seek medical attention.

Skin contact: Wash from skin with mild soap and water.

Inhalation: Remove from the exposure area.

Ingestion: If conscious, give large quantities of water to induce vomiting. Get medical attention.

Talc may contain crystalline silica at levels greater than 0.1% but less than 1%. IARC has determined that there is limited evidence for the carcinogenicity of crystalline silica to humans and sufficient evidence for experimental animals.

In the Sixth Annual Report on Carcinogens (1991), the National Toxicology Program characterized respirable crystalline silica as a substance "reasonably anticipated" to be a carcinogen.

While the NTP did not define "respirable," the literature indicates that particles less than 10 microns in aerodynamic diameter are regarded as such.

Canadian WHMIS Classification - Class D, Division 2, Subdivision A.

Material Safety Data Sheet

Barretts Minerals Inc.
P.O. Box 1147
South of Dillon MT 59725-1147

Product: CERCROX - MONTANA TALC

MSDS No: BMI / BMI002

Revision: 01/26/93

Date: October, 1992

SPECIAL PROTECTION INFORMATION continued from page 4

Other: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

SECTION IX. SPECIAL PRECAUTIONS

Storage segregation: Store in containers with tight closure and protect from physical damage. Close empty containers to retain residues. Provide ventilation in storage areas and prevent dust-generating conditions. Avoid inhaling the dust.

Special handling / storage: None

Other precautions: Good industrial hygiene practice requires that employee exposure be maintained below the recommended TLV. This is preferably achieved through the provision of adequate ventilation where necessary. Where dust cannot be controlled in this way, personal respiratory protection should be employed.

California Proposition 65 - There are extremely small, but detectable amounts of substances regulated under California's Safe Drinking Water and Toxic Enforcement Act.

Arsenic - less than 2 ppm
Beryllium - less than 1 ppm
Cadmium - less than 1 ppm
Chromium (acid soluble) - 3 ppm (includes hexavalent)
Lead - 1 ppm
Mercury - less than 1 ppm
Nickel - 2 ppm

Crystalline Silica - less than 1 %
These levels are "typical" quantities and may change slightly with different lots. The term "less than" indicates that the substance was detected, but the amount was less than the quantifiable limit.

Heavy Metals Restrictions (CONEG Model Legislation)
There are no Cadmium, Hexavalent Chromium, Lead or Mercury additives. These products incidentally contain only trace amounts of these metals, far below the final 100 ppm combined level.

DOT Class: Not regulated as hazardous material by DOT

Prepared/revised by: M. G. Larson (212) 573-2156

January 26, 1993

The data and recommendations presented herein are based upon a review of Barretts Minerals Inc. files, published MSDS's, and standard toxicological reference sources. Barretts Minerals Inc. makes no guarantee or warranty, either express or implied as to the accuracy or completeness of these data and recommendations.