



MATERIAL SAFETY DATA SHEET

A Bayer USA INC. COMPANY

MOBAY CORPORATION
INORGANIC CHEMICALS DIVISION
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Pittsburgh, PA 15205-9741

NOV 03 1992

TRANSPORTATION EMERGENCY
CALL CHEMTREC: 800-424-9300
DISTRICT OF COLUMBIA: 202-483-7616

MOBAY NON-TRANSPORTATION
EMERGENCY PHONE.....: (412) 923-1800

I. PRODUCT IDENTIFICATION:

PRODUCT NAME.....: P-4D-79-P
PRODUCT CODE.....: OI58
CHEMICAL FAMILY.....: Leadless Ceramic Powder
CHEMICAL NAME.....: Frits, Chemical
SYNONYMS.....: Silicate Glasses
CAS NUMBER.....: 65997-18-4
FORMULA.....: Mixture

II. HAZARDOUS INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
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Frits are produced from the chemical reactions which occur during the high temperature smelting of various raw materials to form a molten glass. This glass is rapidly cooled to produce granules or flakes. These may subsequently be milled to produce a powdered frit. Frit (glass) is an essentially insoluble substance which can contain some or all of the following hazardous chemicals (as defined in OSHA's Hazard Communication Standard):

Calcium Oxide 1305-78-8	OSHA : 5.000 mg/m3 TWA ACGIH: 2.000 mg/m3 TWA	Proprietary %
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Aluminum Oxide 1344-28-1	OSHA : 15.000 mg/m3 *TWA-Total Dust 5.000 mg/m3 *TWA-Respirable Dust ACGIH: 10.000 mg/m3 *TWA	10 %
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* Aluminum (as Al)

Boron Oxide 1303-86-2	OSHA : 10.000 mg/m3 TWA-Total Dust 5.000 mg/m3 TWA-Respirable Dust ACGIH: 10.000 mg/m3 TWA	Proprietary %
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II. HAZARDOUS INGREDIENTS (Continued)

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Silicon Dioxide (Amorphous)		
7631-86-9	OSHA : 6.000 mg/m3 TWA	Proprietary %
	ACGIH: 10.000 mg/m3 TWA-Total Dust	
Zinc Oxide		
1314-13-2	OSHA : 10.000 mg/m3 TWA-Total Dust	14 %
	5.000 mg/m3 TWA-Respirable Dust	
	ACGIH: 10.000 mg/m3 TWA	

III. PHYSICAL PROPERTIES:

PHYSICAL FORM.....: Powder; Flakes; Granules
 COLOR.....: Variable
 ODOR.....: Odorless
 PH.....: Not Applicable
 BOILING POINT.....: Not Applicable
 MELTING/FREEZING POINT.....: Greater than 1500 F (815 C)
 SOLUBILITY IN WATER.....: Essentially Insoluble
 SPECIFIC GRAVITY.....: 2 to 3
 BULK DENSITY.....: Not Established
 % VOLATILE BY VOLUME.....: Not Applicable
 VAPOR PRESSURE.....: Not Applicable

IV. FIRE AND EXPLOSION DATA:

FLASH POINT.....: Not Applicable
 AUTO-IGNITION TEMPERATURE.....: Not Established
 EXTINGUISHING MEDIA.....: Water; Dry Chemical; Carbon Dioxide; Foam
 SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes. Avoid dusting.

V. HUMAN HEALTH DATA:

ROUTE(S) OF ENTRY.....: Eye Contact; Skin Contact; Inhalation

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE INHALATION.....: The hazardous ingredients listed for this product are incorporated into the glass structure of the frit, chemically reacted in the form of silicates or other essentially insoluble complexes. Exposure to the hazardous ingredients can occur if frit dust is inhaled and the ingredients dissolve out of the glass. Because of the chemical

V. HUMAN HEALTH DATA (Continued)

stability of frit and its resistance to attack by acids or alkali, this is anticipated to occur very slowly. As with all dusty materials, inhalation may cause respiratory irritation, sneezing, coughing and runny nose. To date there is no significant evidence of adverse effects from industrial exposures.

ACUTE SKIN CONTACT.....: Due to the abrasiveness of this powdered frit mechanical irritation of the skin can occur, particularly if exposure is prolonged or repeated. Good personal hygiene and the use of protective creams will minimize this effect. Metal oxides in this product can cause skin irritation with symptoms such as redness and swelling.

ACUTE EYE CONTACT.....: Certain components are listed as hazardous ingredients because they are considered to be nuisance particulates. Nuisance particulates can cause unpleasant or uncomfortable deposits in the eyes, with symptoms of reddening and swelling, but do not cause any toxic effect or disease.

ACUTE INGESTION.....: The hazardous ingredients listed for this product are incorporated into the glass structure of the frit, chemically reacted in the form of silicates or other essentially insoluble complexes. Exposure to the hazardous ingredients can occur if frit dust is ingested and the ingredients dissolve out of the glass. Because of the chemical stability of frit and its resistance to attack by acids or alkali, this is anticipated to occur very slowly. Metal oxides can cause mucous membrane irritation, with symptoms such as redness and swelling. To date there is no significant evidence of adverse effects from industrial exposure..

CHRONIC EFFECTS OF EXPOSURE...: Prolonged inhalation of amorphous silica may produce x-ray changes in the lungs without disability.

CARCINOGENICITY.....: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS

AGGRAVATED BY EXPOSURE.....: Persons with preexisting eye or skin conditions or impaired pulmonary function may be more susceptible to the effects of this product.

EXPOSURE LIMITS.....: Although no exposure limit has been established for this product, the OSHA-PEL for nuisance dust of 15 mg/m³-total dust, 5 mg/m³-respirable dust is recommended. In addition, the ACGIH-TLV for fibrous glass dust of 10 mg/m³ is recommended.

VI. EMERGENCY AND FIRST AID PROCEDURES:

FIRST AID FOR EYES.....: In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritation occurs.

VI. FIRST AID PROCEDURES (Continued)

FIRST AID FOR SKIN.....: In case of skin contact, immediately flush skin with water. Wash clothing before reuse. Call a physician if irritation occurs.
FIRST AID FOR INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
FIRST AID FOR INGESTION.: If swallowed, call a physician.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS:

EYE PROTECTION REQUIREMENTS.....: Chemical safety goggles.
SKIN PROTECTION REQUIREMENTS.....: Chemically resistant gloves and clothing are recommended to minimize skin contact. Employees should wash their hands and face before eating, drinking or using tobacco products.
RESPIRATOR REQUIREMENTS.....: Work ambient concentrations should be monitored and if the recommended exposure limit is exceeded, a NIOSH/MSHA approved dust respirator should be worn.
VENTILATION REQUIREMENTS.....: Use local ventilation if dusting is a problem, to maintain air levels below the recommended exposure limit.
ADDITIONAL PROTECTIVE MEASURES.....: Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of hazardous chemicals.

VIII. REACTIVITY DATA:

STABILITY.....: This is a stable material.
HAZARDOUS POLYMERIZATION...: Will not occur.
INCOMPATIBILITIES.....: None Known
INSTABILITY CONDITIONS.....: None Known
DECOMPOSITION TEMPERATURE..: Not Established
DECOMPOSITION PRODUCTS.....: Combustion gases and process gases formed during the firing up of enameled or glazed parts may contain potentially toxic fumes.

IX. SPILL AND LEAK PROCEDURES:

SPILL OR LEAK PROCEDURES.....: Utilize recommended protective clothing and equipment. Spills should be swept up and placed in containers. Spill area can be washed with water. Collect wash water for approved disposal. Keep from entering water or ground water.
WASTE DISPOSAL METHOD.....: Waste disposal should be in accordance with existing federal, state and local environmental regulations.

X. SPECIAL PRECAUTIONS & STORAGE DATA:

STORAGE TEMPERATURE(MIN/MAX): Ambient/122 F (50 C)
SHELF LIFE.....: Unlimited in closed container.
SPECIAL SENSITIVITY.....: None known.
HANDLING/STORAGE PRECAUTIONS: Avoid breathing dust. Avoid getting in eyes or
on skin. Wash thoroughly after handling. Store in a dry place away from
excessive heat. Avoid contact with moisture. Reseal containers
immediately after use. Store away from food and beverages.

XI. SHIPPING INFORMATION:

D.O.T. SHIPPING NAME.....: None
TECHNICAL SHIPPING NAME.....: Frit
D.O.T. HAZARD CLASS.....: Non-Regulated
U.N./N.A. NUMBER.....: None
PRODUCT RQ (lbs.): None
D.O.T. LABEL.....: Non-regulated
D.O.T. PLACARD.....: Non-regulated
FREIGHT CLASS BULK.....: Frit (Glazing Compound)
FREIGHT CLASS PACKAGE.....: Frit (Glazing Compound)
PRODUCT LABEL: General Purpose Label #99

XII. ANIMAL TOXICITY DATA:

NO ANIMAL TOXICITY INFORMATION AVAILABLE

XIII. FEDERAL REGULATORY INFORMATION:

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

TSCA STATUS.....: On TSCA Inventory

CERCLA REPORTABLE QUANTITY...: Zinc and Compounds - no RQ has been established
for this generic class.

SARA TITLE III:

SECTION 302 EXTREMELY

HAZARDOUS SUBSTANCES...: None.

Product Code: OI58
Approval date: 06/14/90

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XIII. FEDERAL REGULATORY INFORMATION (Continued)

SECTION 311/312

HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard

SECTION 313

TOXIC CHEMICALS.....: Aluminum Oxide, CAS# 1344-28-1, 10 %;
Barium Compounds, 6 % (Total Ba);
Zinc Compounds, 14 % (Total Zn).

RCRA STATUS.....: When discarded in its purchased form, this product meets the criteria of EP toxicity, and should be managed as a hazardous waste. (40 CFR 261.20-24) - contains Barium.

XIV. OTHER REGULATORY INFORMATION:

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE
Calcium Oxide 1305-78-8	Proprietary %	PA1, MA, NJ1, CN1
Potassium Oxide 12136-45-7	Proprietary %	NJ1
Sodium Oxide 1313-59-3	Proprietary %	PA3
Aluminum Oxide 1344-28-1	10 %	PA1, NJ1, CN1
Boron Oxide 1303-86-2	Proprietary %	PA1, MA, NJ1, CN1
Silicon Dioxide (Amorphous) 7631-86-9	Proprietary %	PA1, MA, NJ1, CN1
Barium Oxide (Insoluble) 1304-28-5	6 %	PA1, NJ1
Strontium Oxide 1314-11-0	Proprietary %	PA3
Zinc Oxide 1314-13-2	14 %	PA1, MA, NJ1, CN1

MA = Massachusetts Hazardous Substance List
NJ1 = New Jersey Hazardous Substance List
PA1 = Pennsylvania Hazardous Substance List
PA3 = Pennsylvania Non-hazardous present at 3% or greater.
CN1 = Canada WHMIS Ingredient Disclosure List over 1%.

CALIFORNIA PROPOSITION 65

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XIV. OTHER REGULATORY INFORMATION (Continued)

To the best of our knowledge, this product contains no levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.

XV. APPROVALS:

REASON FOR ISSUE.....: Individual MSDS for Series; Add SARA; Update onto
Flow
PREPARED BY.....: D. P. Kelly
APPROVED BY.....: D. R. Hackathorn
APPROVAL DATE.....: 06/14/90
SUPERSEDES DATE.....: 08/15/86
MSDS NUMBER.....: 07903

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