

79A

FLUID BED DRYER
REACTIVE CHEMICAL
REVIEW

NOVEMBER 5, 1987

8:30 A. M.

2510 BUILDING

CONFERENCE ROOM

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DO 003719

FLUID BED DRYER PROJECT

1. INTRODUCTION
2. RAW MATERIALS AND PRODUCTS
3. INDEX FLOW SHEET
4. THERMAL STABILITY DATA
5. DUST EXPLOSION PROPERTIES OF CPE AND CALCIUM STEARATE
6. PROJECT DESIGN TO REDUCE DUST EXPLOSION HAZARDS
7. DESIGN OF SYSTEM TO REDUCE "WHAT IF" SITUATIONS
8. MATERIAL SAFETY DATA SHEETS
9. APPENDIX
10. OPEN

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RAW MATERIALS AND PRODUCTS

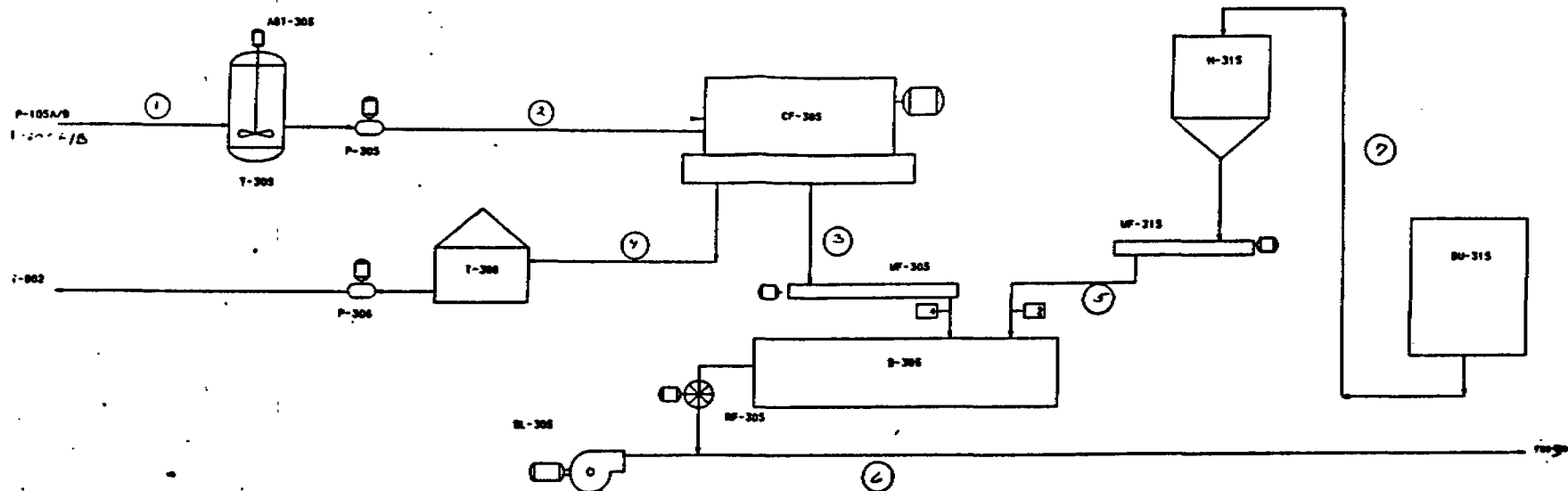
MATERIAL	PHYSICAL DATA	STABILITY	INCOMPATIBILITIES	NOTES
BETZ GCP-185	LIQUID FLASH PT > 200 F VAPOR PRESS = 18 mmHg	STABLE		CONTAINS CAUSTIC
Ca Carbonate	SOLID	STABLE		
CPE	SOLID	DECOMPOSITION AT HIGH TEMPS (> 180 C)		POSSIBLE DUST EXPLOSION HAZARD, PART SIZE < 200 MESH
Talc	SOLID	STABLE		
Calcium Stearate	SOLID	STABLE	MINERAL ACIDS ALKALINES, ORGANIC ACIDS AND AMINES	MAY FORM COMBUSTIBLE DUST CONCENTRATIONS (KST = 273)

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DO 003722

BU-315
CASE 648 UNCLAS

91-365
DRIER FEED BLWNR
1200 C/P
DISCHARGE P = 19.7 PSI
CRUSING - CI

[illegible]

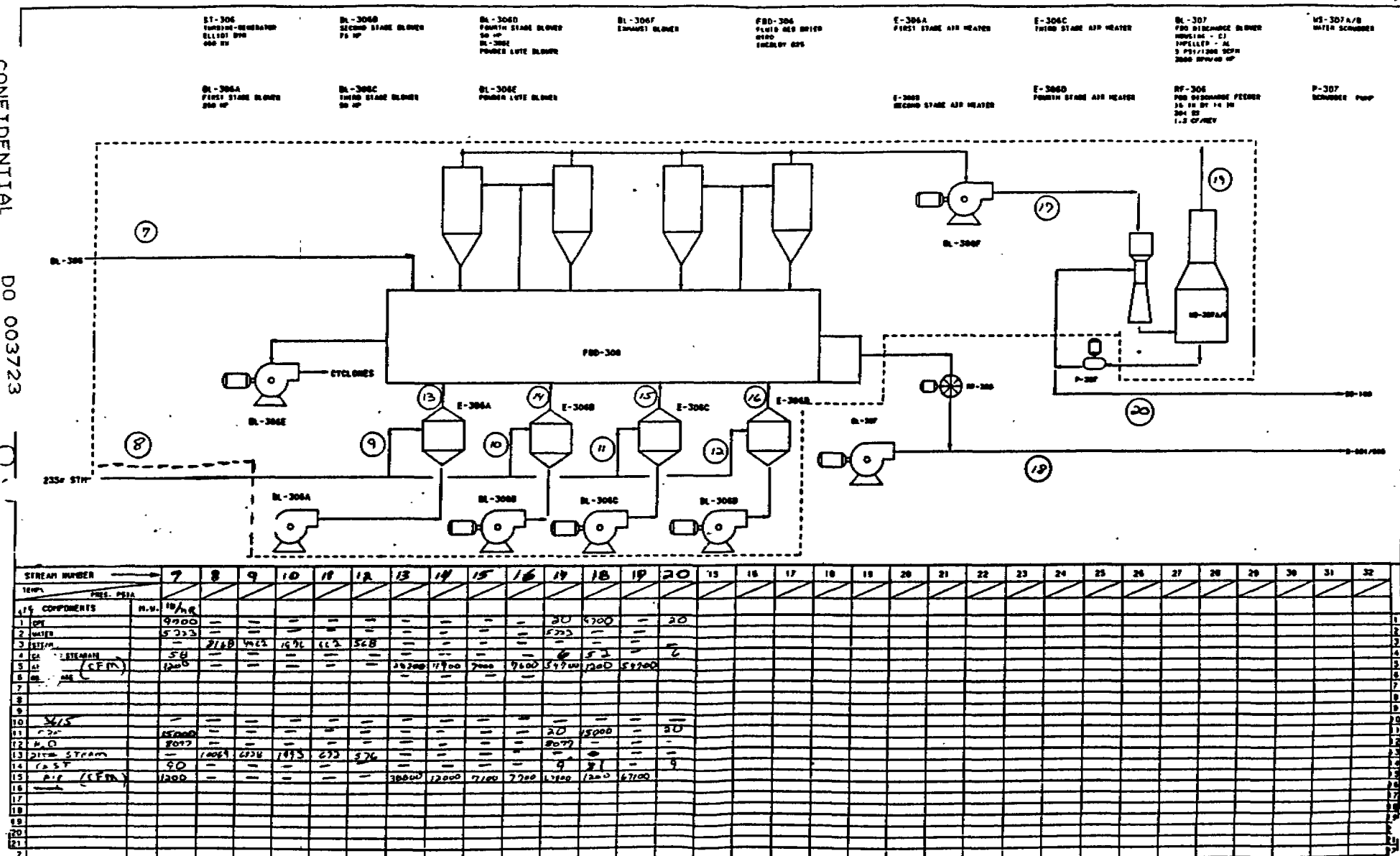
DDH CONFIDENTIAL

DESIGN CRITERIA
DESIGNED BY:
DATE: / /
DESIGNED BY:
DATE: / /
DESIGNED BY:
DATE: / /

THE DON CHEMICAL COMPANY
MATERIAL & HEAT BALANCE
DRIER UPGRADE - CAST SYSTEM
DATE: 10-10-88 LAST REVISION: 10-10-88

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NOTES:

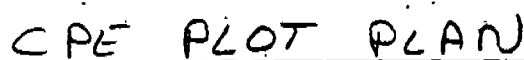
1) ALL EQUIPMENT WITHIN DASHED LINE TO BE VENDOR FURNISHED.

Anal. stream flow
for 3075 = 817 Btu/hr
.19 = 1025 Btu/hr

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DESIGN CRITERIA
FURNISHED BY:
DATE:
DESIGNED BY:
CHECKED BY:
APPROVED BY:

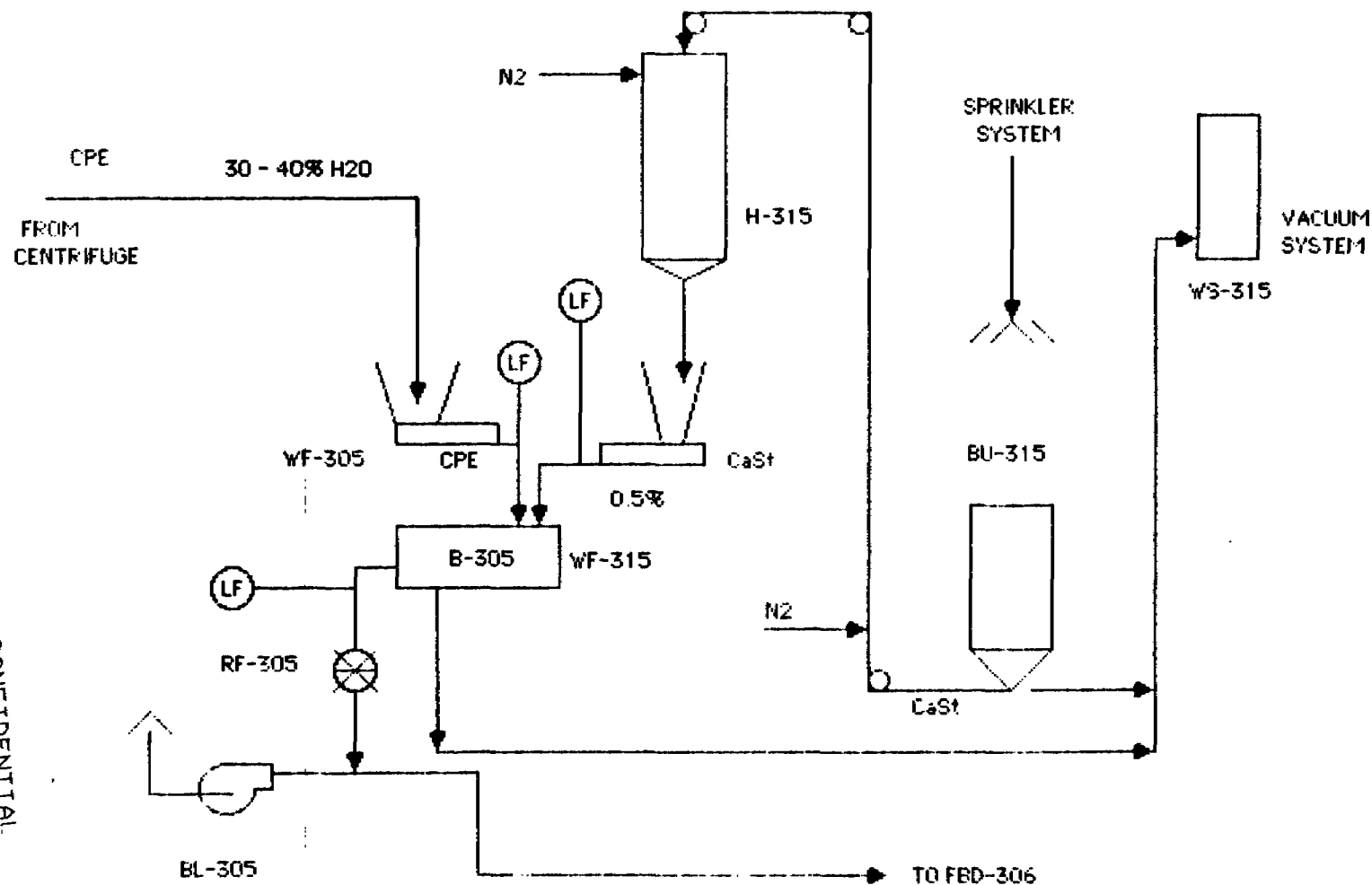
THE DOW CHEMICAL COMPANY
MATERIAL & HEAT BALANCE
DRIER UPGRADE-FLUID BED DRIER
DATE: 11-11-77



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FLUID BED DRYER PROJECT



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THERMAL STABILITY DATA

POTENTIAL PROBLEM - CPE FLAMMABILITY

TGA DATA

<u>SAMPLE</u>	<u>FIQ</u>	<u>ANTIBLOCK ADDITIVE</u>	<u>DECOMPOSITION TEMPERATURE DEGREE C</u>		
			<u>1ST</u>	<u>2ND</u>	<u>3RD</u>
CM0136	1	TALC	338	473	-
CM0566	2	TALC	345	465	-
XU63003.18	3	SF, CAST	352	467	475
XU63003.10	4	SF, CAST	333	468	-

CONCLUSION: NO MAJOR DIFFERENCE IN THERMAL STABILITY WITH THE
USE OF DIFFERENT ANTIBLOCK ADDITIVES

DTA DATA

EXOTHERMIC REACTION	START	313 DEGREE C
	PEAK	360 DEGREE C
	END	392 DEGREE C

ARC DATA

190 DEGREE C - GASING AND DECOMPOSITION*

251 DEGREE C - RUNAWAY AT LOW RATES
WHICH DO NOT SUSTAIN
THEMSELVES UP TO 300 DEGREE C*

165 DEGREE C - 1ST EMISSION OF CO

190 DEGREE C - MAX + PEAK OF CO EMISSION

220 DEGREE C - 1ST EMISSION OF BENZENE+

* = DATA FROM 10/87

+ = DATA FROM 4/86

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THERMAL STABILITY WITH RESPECT TO
RESIDENCE TIME

ARC DATA. TEST 1 - INITIAL TEMPERATURE OF 121 C.

DECOMPOSITION	TEMP C	TIME UNTIL STARTED	MATERIAL GIVEN OFF
1ST	121 C	9.8 HR	HCl
2ND	195 C	69.2 HR	CO
3RD	215 C	93.2 HR	BENZENE & OTHER ORGANICS

TEST 2 - INITIAL TEMPERATURE OF 116 C.

- A. AFTER 120 HOURS, NO THERMAL DECOMPOSITION TOOK PLACE
- B. THE TEMPERATURE WAS RAISED TO 121 C FOR 48 HOURS BUT NO THERMAL DECOMPOSITION TOOK PLACE.
- C. MATERIAL WAS OBSERVED TO BE BLACK AFTER 120 HOURS

ASSUMPTION: HCl DECOMPOSITION HAD TAKEN PLACE BUT AT SUCH A SLOW RATE (< 0.02 C TEMPERATURE INCREASE PER MIN) THAT IT WAS NOT DETECTED

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PREVENTATIVE MEASURES FOR THERMAL DECOMPOSITION IN THE FLUID BED DRYER

EXISTING

1. OPERATE AT 250 F (121 C) MAXIMUM INLET AIR TEMPERATURE.
2. HIGH TEMP ALARMS IN CYCLONE EXHAUST AIR ARE SET AT 185 F
3. EMERGENCY SHUTDOWN DEVICE THAT SHUTS DOWN THE FBD BLOWERS AND ACTIVATES A DELUGE SYSTEM (WATER)
4. ROUTINE INSPECTION OF FLUID BED DRYER INTERIER (BEDPLATE)
5. ROUTINE INSTRUMENT CALIBRATION CHECKS QUARTERLY
6. DUEL TEMPERATURE PROBES IN EACH STAGE
7. RESIN TEMPERATURE ALARMS - 165 F ON ALL STAGES.
8. WALL MOUNTED TEMPERATURE PROBES (30) IN EACH BED
9. CO MONITER ON EXHAUST AIR HEADER.

PROPOSED FOR NEW FLUID BED DRYER:

1. MORE EFFICIENT PLENUM CHAMBER.
2. MORE EFFICIENT GILL PLATE DESIGN.
3. EXPLOSION VENTS IN BED AND CYCLONES.
4. UNDERFLOW LUMP DUMP VALVE ALLOWS OVERSIZE TO BE REMOVED FROM THE BED.
5. ADDITION OF CALCIUM STEARATE AS DRYER PROCESSING AID.

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DUST EXPLOSION DATA

CALCIUM STEARATE

PRODUCT	MAX PRESS (BAR)	MAX PRESS RISE (BAR/SEC)	KST (BAR M/SEC)	EXPLOSION CLASS	PART SIZE (MICRONS)
CA ST (MIN)	5.5	434	150	1	53
CA ST (MAX)	8.3	973	273	2	53

PARTICLE SIZE 99.5% THRU 325 MESH SCREEN

MINIMUM ENERGY 0.125 JOULES (DOW RESEARCH)

MINIMUM IGNITION TEMP 400 C (752 F)

CONCENTRATION (OZ / CU FT)	MAX PRESS RISE PSI / SEC (BAR/SEC)	MAX PRESS (PSI)
0.05	-----	-----
0.10	8809 (165)	82
0.15	10425 (195)	89
0.20	8834 (165)	85
0.25	7007 (131)	80
0.50 *	4816 (90)	69
1.00 *	3318 (62)	59

* - CONSIDERABLE UNBURNED MATERIAL

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DUST EXPLOSION DATA
CALCIUM STEARATE AND TALC

SAMPLE	MINIMUM ENERGY
MISTRON EG TALC	> 20 JOULES
SUPERPFLEX * (CaCO_3)	> 20 JOULES
TALC + 10% CA ST	> 20 JOULES
TALC + 20% CA ST	> 20 JOULES
TALC + 30% CA ST	0.50 JOULES
TALC + 40% CA ST	0.125 JOULES
TALC + 50% CA ST	0.125 JOULES

OTHER DATA

20 LITER DEVICE

TALC + 20 % CA ST
140 JOULES + SPARK AT 1.002 OZ/CU FT
NO IGNITION

HARTMANN

TALC + 20 % CA ST
HOT GLOWING WIRE AT 0.8 OZ/CU FT
NO IGNITION

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DUST EXPLOSION DATA CPE

PRODUCT	MAX PRESS (BAR)	MAX PRESS RISE (BAR/SEC)	KST (BAR M/SEC)	EXPLOSION CLASS	PART SIZE (MICRONS)
36%	0	0	0	0	250
36% (2% SF)	0	0	0	0	219
XU 3.13 (2% SF)	0	0	0	0	179
XU 3.12 (2% CAST)	0	0	0	0	233
36% FINES	4.6	107	28	1	140-200
36% FINES	4.8	70	17	1	< 140
25% FINES	4.8	80	21	1	< 140
42% FINES	5.5	135	36	1	< 230
36% FINES	4.4	50	13	1	< 84
PE POWDER	6.9	240	1	1	TYP
XU 3.04 (2% CAST)	1.9	2	2	1	< 140
36% (1% CAST)	0	0	0	0	< 140
36% (5% CAST)	4.1	35	9	1	< 140
36% (10% CAST)	2.0	20	5	1	< 140

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DUST EXPLOSION DATA
80% CPE AND 20% CA ST COMPOSITION

MINIMUM ENERGY	0.125 JOULES
MAXIMUM PRESSURE	4 BARS
MAXIMUM PRESSURE RISE (dP/dt)	50 BARS/SEC
KST VALUE	13 BAR M/SEC
CONCENTRATION	0.75 OZ/CU FT

MINIMUM ENERGY

WITH 13% CA ST AND 87% CPE	ME = 20 JOULES
WITH 15% CAST AND 85% CPE	ME = 20 JOULES

NOTE- PARTICLE SIZE CPE < 80 MESH (< 180 MICRONS)
 CA ST < 200 MESH (< 60 MICRONS)

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CALCIUM STEARATE RETENTION ON CPE

% CA ST MIXED WITH CPE	% CA ST RETENTION
0.5%	92%
1.0%	94%
1.5%	93%
2.0%	91.5%
2.5%	88%
3.0%	84%
4.0%	84%

DATA FROM LAD - 678

0.5% TO 2.0%	97% TO 99%
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DATA FROM STD - 82.- 025

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PREVENTATIVE MEASURES

PREVENTION PRINCIPLES INCORPORATED INTO THE DESIGN OF THE CA ST ADDITION EQUIPMENT AND FLUID BED DRYER:

- | | |
|---------------------|--|
| 1. IGNITION SOURCES | ELIMINATE ELECTROSTATIC SPARK POTENTIAL BY GROUNDING OF ALL EQUIPMENT WITH LESS THAN 10 OHM RESISTANCE |
| | ASSIGN CA ST ADDITION SYSTEM AREA AS A CLASS 2 - DIVISION 2 - GROUP G RESTRICTED AREA |
| 2. OXYGEN SOURCES | PROVIDE NITROGEN PADDING FOR CA ST STORAGE HOPPER AND TRANSFER SYSTEM |
| | MECHANICALLY CONVEYED SYSTEM |
| 3. CONFINEMENT | TO PROVIDE ADEQUATE VENTILATION FOR CA ST HANDLING EQUIPMENT |
| | USE OF VACUUM SYSTEM/WET SCRUBBER ON CA ST EQUIPMENT FOR DUST CONTROL |

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PREVENTATIVE ACTIONS

WHAT IF PREVENTION

BUILT-IN EQUIPMENT, INTERLOCKS, AND/OR CONTROLS TO REDUCE THE POTENTIAL OF A DUST EXPLOSION FROM A SPECIFIC CAUSE

<u>PROBLEM</u>	<u>CORRECTIVE ACTIONS</u>
1. BULK BAG LOADING SYSTEM	
A. LEAKING CA ST	VACUUM SYSTEM TO REDUCE FREE FLOATING DUST
B. SPILL FROM BULK BAG	EXHAUST FANS TO KEEP CONCENTRATION DOWN H2O MIST SYSTEM TO KNOCK DOWN DUST CONCENTRATIONS IN THE AIR
2. CA ST TRANSFER SYSTEM	
A. POTENTIAL FOR DUST EXPLOSION	NITROGEN PADDED LO FLOW SHUTDOWN SWITCH WHEN TRANSFER LINE IS EMPTIED
3. CA ST STORAGE HOPPER	
A. POTENTIAL FOR DUST EXPLOSION	NITROGEN PADDED MECHANICALLY CONVEYED CA ST TO HOPPER HIGH LEVEL SHUTDOWN ON BULK BAG SYSTEM NO FLOW SHUTDOWN WHEN BULK BAG IS EMPTY
4. BLENDER 305	
A. DUST ACCUMULATION	CPE WILL BE AT 30 - 40% MOISTURE LEVEL SLIGHT VACUUM TO REDUCE FREE CA ST DUST LEVEL SWITCH TO INDICATE PLUGGED BLENDER
5. TO INSURE CORRECT CA ST FLOW TO FBD306	
A. CPE NO FLOW	SOLID FLOW SWITCH FOR CPE FROM WF - 305 SOLID FLOW SWITCH FOR CA ST FROM WF - 315 CONTROLLER INTERLOCK COMPUTER INTERLOCK SOLID FLOW SWITCH FOR TRANSFER LINE
B. INCORRECT % CA ST TO FBD-306	SAME AS ABOVE COMPUTER INTERLOCK LOGIC TO DIAGNOSE FLOWS

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PREVENTATIVE ACTIONS CONTINUED

6 FLUID BED DRYER

A POTENTIAL OF DUST EXPLOSION

1ST AND 2ND STAGE OPERATES AT DEW POINT
AIR CHANGE OUT RATE IS APPROXIMATELY
NINE TIMES PER MIN
HIGH AIR VELOCITY
RETENTION OF CA ST ON CPE PARTICLE
FBD AND CYCLONE VENTING
ROUTINE INSPECTION OF BEDPLATES
SEE ALSO PREVENTATIVE MEASURES FOR
THERMAL DECOMPOSITION

7 BLENDERS

A POTENTIAL OF DUST EXPLOSION

GROUNDING SOCKS
GROUNDING BLENDERS AND TRANSFER LINES
EXPLOSION VENTING

NOTE

1. ALL EQUIPMENT AND LINES WILL BE GROUNDED
2. ALL ELECTRICAL WILL MEET CLASS 2, DIVISION 2, GROUP G CODES
3. START - UP, ROUTINE OPERATIONS, SHUTDOWN, AND EMERGENCY PROCEDURES WILL BE GENERATED AND IMPLEMENTED FOR ALL EQUIPMENT

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PREVENTATIVE ACTIONS CONTINUED

WHAT IF THERE IS AN ACCIDENT AND A DUST EXPLOSION TAKES PLACE

1. TO PREVENT SECONDARY EXPLOSION

A. IN CA ST STRUCTURE

OBSTRUCTIONS THAT WOULD ACCUMULATE DUST
WILL BE REDUCED AS MUCH AS POSSIBLE
A MIST SYSTEM WILL BE AVAILABLE
GOOD HOUSEKEEPING WILL BE DONE ON A ROUTINE
BASIS
ADEQUATE VENTILATION SYSTEM
STRUCTURE WILL BE ENCLOSED WITH ADEQUATE
EXPLOSION RELIEF PANELS VENTED TO ISOLATED
AREA

B. IN CA ST EQUIPMENT

VESSELS WILL BE SIZED TO WITHSTAND THE
EXPLOSION OR VENTED TO AN ISOLATED AREA
NUMEROUS EQUIPMENT INTERLOCK SYSTEMS WILL
BE INSTALLED
QUENCH SYSTEMS (WATER) ON MAJOR EQUIPMENT

C. IN FLUID BED DRYER

AUTOMATED QUENCH WATER SYSTEM
EXPLOSION RELIEF VENTED TO ISOLATED AREA

2. TO OFFER MAXIMUM PERSONAL PROTECTION

A. CA ST ADDITION AREA

CA ST STRUCTURE WILL BE ISOLATED BY
PROTECTIVE WALL AND EXPLOSION RELIEF
RESTRICTED ACCESS

B. IN PROCESS AREA

VENTING DIRECTION
RESTRICTED ACCESS
MINIMUM OPERATOR INTERFACE TIME
SPRINKLER SYSTEM

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REFERENCES

1. LAD - 676
2. LAD - 1553
3. STD - 82 - 025
4. ML - AL 78 - 22411
5. G C MEATHOD DEVELOPMENT LABRATORIES , LETTER TO BARRIOS , 4-30-86
6. BRAISE, W.C. , LETTER TO J HEASLIP, 3-17-81
7. TAIT, R. , LETTER TO J HEASLIP, 3-17-81
8. TAIT, R. , LETTER TO J. HEASLIP, 5-1-81
9. BRAISE, W.C. , LETTER TO BARRIOS, 5-7-86
10. CHEMICAL HAZARD DATA SHEETS ON FILE IN CRI

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 13615

Page: 1

PRODUCT NAME: TYRIN (R) CM 0126 CHLORINATED POLYETHYLENE ELASTOMER

Effective Date: 10/15/85 Date Printed: 06/05/87

MSD: 000863

1. INGREDIENTS:

HD chlorinated polyethylene, containing
36 wt % chlorine
Talc

CAS# 064754-90-1 >95%
CAS# 014807-96-6

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: Nil
SP. GRAVITY: 1.16
APPEARANCE: Off-white powder.
ODOR: No odor.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: Not applicable
METHOD USED: Not applicable

FLAMMABLE LIMITS
LFL: Not applicable
UFL: Not applicable

EXTINGUISHING MEDIA: Water fog, foam, alcohol foam, CO2, dry chemical.

FIRE & EXPLOSION HAZARDS: Fines can create possible dust explosion hazard. Keep dust clouds away from possible ignition sources.

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

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid high temperatures - HCl gas evolved.

(Continued on Page 2)

(R) Indicates a trademark of The Dow Chemical Company

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DO 003739

M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

PRODUCT NAME: TYRIN (R) CM 0136 Product Code: 13615 Page: 2
CHLORINATED POLYETHYLENE ELASTOMER

Effective Date: 10/15/85 Date Printed: 06/05/87 MSD: 000863

4. REACTIVITY DATA: (CONTINUED)

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) No data available.

HAZARDOUS DECOMPOSITION PRODUCTS: HCl gas.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Sweep up and discard.

DISPOSAL METHOD: Burn in adequate incinerator or bury in landfill in accordance with applicable federal, state and local regulations.

6. HEALTH HAZARD DATA:

EYE: May cause slight transient (temporary) irritation with corneal injury.

SKIN CONTACT: Prolonged or repeated exposure not likely to cause significant skin irritation.

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 believed to be low. The oral LD50 for rats is >4000 mg/kg for certain chlorinated polyethylenes.

INHALATION: Single exposure to dust is not likely to be hazardous. Vapors are unlikely due to physical properties.

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects.

7. FIRST AID:

EYES: Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.

SKIN: Wash off in flowing water or shower.

(Continued on Page 3)

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 13615 Page: 3
PRODUCT NAME: TYRIN (R) CM 0136 CHLORINATED POLYETHYLENE ELASTOMER

Effective Date: 10/15/85 Date Printed: 06/05/87 MSD: 000863

7. FIRST AID: (CONTINUED)

INGESTION: Induce vomiting if large amounts are ingested.
Consult medical personnel.

INHALATION: No adverse effects anticipated by this route of
exposure incidental to proper industrial handling.

NOTE TO PHYSICIAN: No specific antidote. Supportive care.
Treatment based on judgment of the physician in response to
reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): None established.

VENTILATION: Good general ventilation should be sufficient for
most conditions.

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

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

EYE PROTECTION: Use safety glasses.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Practice reasonable care and caution.

MSDS STATUS: Revised sections 1-8.

The Information Herein Is Given In Good Faith, But No Warranty,
Express Or Implied, Is Made. Consult The Dow Chemical Company
For Further Information.

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CALCIUM STEARATE

Material Safety Data Sheet

Emergency Telephone Number
314-982-5000

Mallinckrodt, Inc.
P.O. Box 5439
St. Louis, Mo. 63147

Effective Date: 09/24/85

Product Identification:

Synonyms: Stearic acid, calcium salt; Octadecanoic acid, calcium salt

Formula CAS No.: 1592-23-0

Molecular Weight: 607 (pure)

Hazardous Ingredients:
None.

Chemical Formula: $\text{Ca}(\text{C}_{18}\text{H}_{35}\text{O}_2)-25\text{V}$

The exact product composition depends on the
purity of the tallow used.

PRECAUTIONARY MEASURES

CAUTION! MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR.
Store in a tightly closed container.
Avoid dust cloud in presence of an ignition source.
Maintain adequate ventilation.

As part of good industrial and personal hygiene and safety procedure, avoid all
unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes
and clothing.

EMERGENCY/FIRST AID

SEE SECTION 5.

DOT Hazard Class: Not Regulated

Physical Data

SECTION 1

Appearance: Fine white to yellow-white powder.
Odor: No information found.
Solubility: Insoluble in water, alcohol, ether; soluble in mineral oils, hot
pyridine.
Boiling Point: Decomposes.
Melting Point: About 155°C (311°F)
Specific Gravity: 1.03
Vapor Density (Air=1): No information found.
Vapor Pressure (mm Hg): No information found.
Evaporation Rate: No information found.

CASTA - CALCIUM STEARATE

Mallinckrodt, Inc.

DO 003742

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Fire and Explosion
Information

SECTION 2

FIRE:

As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source. Minimum dust cloud ignition temperature: 400°C (752°F).

Explosion:

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Minimum explosible concentration : 0.025 g/l (air)

Maximum explosion pressure : 97 lb/sq.in.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water or foam may cause frothing.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Pressure from the extinguishing media may cause severe dusting. Melted fatty acid can give "grease" type fire.

Reactivity Data

SECTION 3

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition
Products:

Burning may produce carbon monoxide and calcium oxide.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Mineral acids, alkalies, organic acids and amines of low molecular weight will decompose calcium stearate.

Leak/Spill Disposal Information SECTION 4

Remove all sources of ignition. Ventilate area of leak or spill. Clean-up personnel may require protection from inhalation of dust.

Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools. Pick up spill for recovery or disposal and place in a closed container.

Disposal: Whatever cannot be saved for recovery may be burned in an approved incinerator or disposed in an approved waste facility.

Ensure compliance with local, state and federal regulations.

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Health Hazard Information

SECTION 5

A. Exposure/Health Effects

Inhalation: Symptoms from excessive inhalation of dust may include coughing and difficult breathing.

Ingestion: Low level of toxicity by ingestion.

Skin contact: No information found. Not expected to be a hazard.

Eye contact: May cause mechanical irritation.

Chronic Exposure: Grossly excessive and chronic inhalation of the dust may cause a progressive chemical pneumonitis.

Aggravation of
Pre-existing Conditions: Persons with pre-existing skin disorders, impaired respiratory function, or a history of pulmonary disease should not to be exposed to dusts.

B. FIRST AID

Inhalation: Remove to fresh air. Get medical attention for any breathing difficulty.

Ingestion: Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.

Skin contact: Wash exposed area with soap and water. Get medical advice if irritation develops.

Eye contact: Wash thoroughly with running water. Get medical advice if irritation develops.

C. TOXICITY DATA (RTECS, 1982)

No LD50/LC50 information found relating to normal routes of occupational exposure.

CASTA - CALCIUM STEARATE

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Occupational Control Measures

SECTION 6

Airborne Exposure Limits:

No information found.

Ventilation System:

In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.

Personal Respirators:
(NIOSH Approved)

For conditions of use where exposure to the dust is apparent, a dust/mist respirator may be worn. For emergencies, a self-contained breathing apparatus may be necessary.

Skin Protection:

Gloves and lab coat, apron or coveralls.

Eye Protection:

Use chemical safety goggles. Contact lenses should not be worn when working with this material.

Maintain eye wash fountain and quick-drench facilities in work area.

Storage and Special Information

SECTION 7

Avoid dust dispersal.

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from incompatibilities.

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, Mallinckrodt, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, Mallinckrodt, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. NO REPRESENTATIONS, OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR TO THE PRODUCT TO WHICH THE INFORMATION REFERS.

CASTA - CALCIUM STEARATE

Mallinckrodt, Inc.

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DO 003745



Cyprus Minerals Company

MATERIAL SAFETY DATA SHEET

Health	I
Flammability	0
Reactivity	0
Personal Protection	I

I. IDENTIFICATION

Product Name: MISTRON EG

Chemical Name: TALC: HYDROUS MAGNESIUM SILICATE

Chemical Family: SILICATES

Formula: $3\text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$

II. INGREDIENTS

Mineral or Chemical Name	Weight %
TALC - A NATURAL HYDROUS MAGNESIUM SILICATE MINERAL	90-99%
DOLOMITE - A NATURAL MAGNESIUM CALCIUM CARBONATE MINERAL	100-100%
CALCITE - A NATURAL CALCIUM CARBONATE MINERAL	100-100%
CHLORITE - A NATURAL HYDROUS MAGNESIUM ALUMINUM SILICATE MINERAL	100-100%
QUARTZ - A NATURAL CRYSTALLINE SILICA MINERAL	100-100%

III. PHYSICAL DATA

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

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: 2 mg/M³ RESPIRABLE DUST OVER AN 8 HOUR EXPOSURE PERIOD

Possible Effects of a Single Overexposure	
Inhalation	ACUTE ACCIDENTAL EXPOSURE WOULD BE NON-SPECIFIC AND SIMILAR TO THE IRRITATION OF THE LUNG. 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, TALC CAN CAUSE TEMPORARY DISCOMFORT AND IRRITATION IF ACCIDENTALLY INTRODUCED INTO THE EYE.
Ingestion	NO KNOWN HAZARD.

Cyprus Industrial Minerals Company/Talc Division
Box 3419, Englewood, CO 80155/(303) 740-5440

54-1003T (Rev. 10-85)

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Possible Effects of Repeated Overexposure

THERE ARE REPORTS THAT A RELATIVELY MILD PNEUMOCONIOSIS CAN DEVELOP OVER 10-40 YEARS OF OCCUPATIONAL EXPOSURE TO MIXED DUSTS CONTAINING TALC. THE PULMONARY DISEASE WHICH DEVELOPS AFTER SUCH PROLONGED EXPOSURE MAY EXIST WITH OR WITHOUT IMPAIRMENT IN LUNG FUNCTION. PROLONGED INHALATION MAY PROVIDE A FIBROTIC RESPONSE SIMPLY BECAUSE OF THE INSOLUBLE NATURE OF THE MINERAL TALC.

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. INDIVIDUALS WITH ACTIVE PULMONARY DISEASE SHOULD NOT BE ASSIGNED TO A HEAVY TALC DUST ENVIRONMENT.

VI. REACTIVITY DATA

Stability: TALC 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 TALC 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 TALC IS PRESENT

X. ADDITIONAL INFORMATION

EMERGENCY TELEPHONE NUMBERS

Medical: (303) 740-5440

Technical: (303) 740-5700

FEDERAL HAZARD CLASSIFICATION NUMBERS

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

54-1003T (10-85) Back - Prepared by the Cyprus Industrial Minerals Product Stewardship Committee

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DO 003747

BETZ LABORATORIES, INC.
4626 SUMMITT ROAD TREVISO, PA. 19047

BETZ MATERIAL SAFETY DATA SHEET

24 HOUR EMERGENCY TELEPHONE (HEALTH OR ACCIDENT) 215/355-3300

PRODUCT: BETZ GCP 135

(PAGE 1 OF 3)
EFFECTIVE DATE 1/84

PRODUCT APPLICATION : DEPOSIT CONTROL PRODUCT.

-----SECTION 1-----HAZARDOUS INGREDIENTS-----

INFORMATION ON PHYSICAL HAZARDS, HEALTH HAZARDS, PEL'S AND TLV'S FOR SPECIFIC PRODUCT INGREDIENTS AS REQUIRED BY THE OSHA HAZARD COMMUNICATIONS STANDARD ARE LISTED. REFER TO SECTION 4 (PAGE 2) FOR OUR ASSESSMENT OF THE POTENTIAL ACUTE AND CHRONIC HAZARDS OF THIS FORMULATION.

SODIUM HYDROXIDE*** (CAUSTIC SODA); CAS#1310-73-2; CORROSIVE; TOXIC IF ORALLY
INGESTED; PEL: 2.0MG/M3; TLV: 2.0MG/M3 (CEILING).

PHOSPHONIC ACID, (1-HYDROXYETHYLIDINE) BIS-*** HEDP; CAS#2809-21-4; EYE
IRRITANT; PEL: NONE; TLV: NONE.

-----SECTION 2-----TYPICAL PHYSICAL DATA-----

PH: AS IS	(APPROX.) 13.0	ODOR: MILD
FL.PT. (DEG.F):	>200 SETA(CC)	SP.GR. (70F) OR DENSITY: 1.193
VAPOR PRESSURE (MMHG):	18	VAPOR DENSITY (AIR=1): <1
VISC CPS70F:	24	% SOLUBILITY (WATER): 100
EVAP. RATE: <1	ETHER=1	APPEARANCE: LIGHT YELLOW
PHYSICAL STATE:	LIQUID	FREEZE POINT (DEG.F): 23

-----SECTION 3-----REACTIVITY DATA-----

STABLE

THERMAL DECOMPOSITION (DESTRUCTIVE FIRES) YIELDS ELEMENTAL OXIDES.

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BETZ MATERIAL SAFETY DATA SHEET (PAGE 2 OF 3)

PRODUCT: BETZ CCP 185

-----SECTION 4-----HEALTH HAZARD EFFECTS-----

ACUTE SKIN EFFECTS *** PRIMARY ROUTE OF EXPOSURE

SLIGHTLY IRRITATING TO THE SKIN

ACUTE EYE EFFECTS ***

MODERATELY IRRITATING TO THE EYES

ACUTE RESPIRATORY EFFECTS ***

MISTS/AEROSOLS MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT

CHRONIC EFFECTS OF OVEREXPOSURE***

PROLONGED OR REPEATED CONTACT MAY CAUSE PRIMARY IRRITANT DERMATITIS.

MEDICAL CONDITIONS AGGRAVATED ***

NOT KNOWN

SYMPTOMS OF EXPOSURE ***

MAY CAUSE REDNESS OR ITCHING OF SKIN.

PRECAUTIONARY STATEMENT BASED ON TESTING RESULTS ***

MAY BE TOXIC IF ORALLY INGESTED.

-----SECTION 5-----FIRST AID INSTRUCTIONS-----

SKIN CONTACT***

REMOVE CONTAMINATED CLOTHING. WASH EXPOSED AREA WITH A LARGE QUANTITY OF SOAP SOLUTION OR WATER FOR 15 MINUTES

EYE CONTACT***

IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES. IMMEDIATELY CONTACT A PHYSICIAN FOR ADDITIONAL TREATMENT

INHALATION EXPOSURE***

REMOVE VICTIM FROM CONTAMINATED AREA TO FRESH AIR. APPLY APPROPRIATE FIRST AID TREATMENT AS NECESSARY

INGESTION***

DO NOT FEED ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSIVE VICTIM
DO NOT INDUCE VOMITING. IMMEDIATE CONTACT PHYSICIAN. DILUTE CONTENTS OF STOMACH USING 3-4 GLASSES MILK OR WATER

-----SECTION 6-----SPILL, DISPOSAL AND FIRE INSTRUCTIONS-----

SPILL INSTRUCTIONS***

VENTILATE AREA, USE SPECIFIED PROTECTIVE EQUIPMENT. CONTAIN AND ABSORB ON ABSORBENT MATERIAL. PLACE IN WASTE DISPOSAL CONTAINER. THE WASTE CHARACTERISTICS OF THE ABSORBED MATERIAL, OR ANY CONTAMINATED SOIL, SHOULD BE DETERMINED IN ACCORDANCE WITH RCRA REGULATIONS.
FLUSH AREA WITH WATER. WET AREA MAY BE SLIPPERY. IF SC, SPREAD SAND OR GRIT.

DISPOSAL INSTRUCTIONS***

WATER CONTAMINATED WITH THIS PRODUCT MAY BE SENT TO A SANITARY SEWER TREATMENT FACILITY, IN ACCORDANCE WITH ANY LOCAL AGREEMENT, A PERMITTED WASTE TREATMENT FACILITY OR DISCHARGED UNDER A NPDES PERMIT PRODUCT (AS IS)-

INCINERATE OR BURY IN APPROVED LANDFILL

FIRE EXTINGUISHING INSTRUCTIONS***

FIREFIGHTERS SHOULD WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS (FULL FACE-PIECE TYPE).

DRY CHEMICAL, CARBON DIOXIDE, FOAM OR WATER

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BETZ MATERIAL SAFETY DATA SHEET (PAGE 3 OF 3)

PRODUCT: BETZ CUP 163

SECTION 7-----SPECIAL PROTECTIVE EQUIPMENT-----

VENTILATION PROTECTION***

ADEQUATE VENTILATION TO MAINTAIN AIR CONTAMINANTS BELOW EXPOSURE LIMITS

RECOMMENDED RESPIRATORY PROTECTION***

IF VENTILATION IS INADEQUATE OR SIGNIFICANT PRODUCT EXPOSURE IS LIKELY,
USE A RESPIRATOR WITH DUST/MIST CARTRIDGES

RECOMMENDED SKIN PROTECTION***

RUBBER GLOVES

REPLACE AS NECESSARY

RECOMMENDED EYE PROTECTION***

SPLASH PROOF CHEMICAL GOGGLES

SECTION 8-----STORAGE AND HANDLING PRECAUTIONS-----

STORAGE INSTRUCTIONS***

KEEP CONTAINER CLOSED

PROTECT FROM FREEZING

HANDLING INSTRUCTIONS***

IMMEDIATELY REMOVE CONTAMINATED CLOTHING, WASH BEFORE REUSE
ALKALINE DO NOT MIX WITH ACIDIC MATERIAL.

SECTION 9-----FEDERAL REGULATIONS-----

SHA(29CFR)-FOR RESPIRATORY PROTECTION USE PROPERLY FITTED MSHA/NIOSH
APPROVED RESPIRATORY EQUIPMENT WITHIN USE LIMITATIONS. OTHERWISE, USE SUPPLIER
AIR APPARATUS.

CWA(40CFR)REPORTABLE QUANTITY: AS IS PRODUCT (HAZARDOUS SUBSTANCE)
5,635 GALS. (SODIUM HYDROXIDE)

RCRA(40CFR): IF DISCARDED, THIS MATERIAL BEARS HWI# D002

DOT(49CFR)CLASSIFICATION: NOT APPLICABLE

NFPA/HMIS : HEALTH - 2 ; FIRE - 0 ; REACTIVITY - 0 ; SPECIAL - ALK

THIS DOCUMENT IS PROVIDED TO SUPPLY ALL THE INFORMATION NECESSARY TO COMPLY
WITH CSHA HAZARD COMMUNICATIONS REGULATIONS, AND RIGHT-TO-KNOW REQUIREMENTS.
WHILE THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE BELIEVED TO
BE ACCURATE AS OF THE DATE HEREOF, BETZ LABORATORIES, INC. MAKES NO WARRANTY
WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

HAROLD M. PERSH
ENVIRONMENTAL INFORMATION COORDINATOR

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MATERIAL SAFETY DATA SHEET
COATED PRECIPITATED CALCIUM CARBONATE

Pfizer Inc.

Form 21

Product/Material: Coated Precipitated Calcium Carbonate
Manufacturer: Pfizer Inc.
Address: 235 E 42nd Street, New York, NY 10017
Emergency Tel. No.: (413) 743-0591 (ADAMS, MA PLANT)

Section I - Product Identification

Trade Name: Ultra-Pflex, Super-Pflex, Multifex MM, Multifex SC
Synonym: Calcium Carbonate (Coated)
Chemical Family: Metal Carbonate
Formula: CaCO_3
CAS Number: 1317-65-3
HMIS: H0 F0 R0

Section II - Hazardous Ingredients

None

Section III - Physical Data

Boiling Point ($^{\circ}\text{F}$): Not Applicable
Vapor Pressure (mm Hg): Not Applicable
Vapor Density: Not Applicable
Solubility in Water: Insoluble
Specific Gravity ($\text{H}_2\text{O}=1$): 2.71
Percent Volatile by Weight: 0
Evaporation Rate: 0
Appearance and Odor: White Powder, No Odor

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used): 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: Inert or Nuisance dust -
5 mg/M^3 respirable (ACGIH & OSHA)
10 mg/M^3 total dust (ACGIH)
15 mg/M^3 total dust (OSHA)

Effects of Overexposure: May cause mechanical irritation to eyes and respiratory tract.

Emergency and First Aid Procedures: Wash dust from skin with soap and water. Flush out eyes with generous amounts of water for at least 15 minutes. See a Physician.

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Section VI - Reactivity Data

Product is stable but decomposes at 600° liberating CO₂
Incompatibility: None
Hazardous Decomposition Products: None
Hazardous Polymerization will not occur.

Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled: Normal clean-up procedures. Care should be taken to avoid causing dust to become airborne. Vacuum cleaning systems are recommended.

Waste Disposal Method: Disposal must be made in accordance with Federal, State and local regulations.

Section VIII - Special Protection Information

Eye Protection (Use Most Appropriate): Safety Glasses, Goggles, Face Shield.

Skin Protection: Leather or rubber gloves.

Respiratory Protection: Use of dust respirator is recommended when exposure limits may be exceeded.

Ventilation: Local exhaust ventilation to collector or containment recommended to control dust to below exposure limits.

Section IX - Special 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.

Prepared by: M. G. Larson

Revision Date: 8/85

NOTICE: The data and recommendations presented herein are based upon data which is considered to be accurate. However, Pfizer makes no guarantee or warranty, either expressed or implied, of the accuracy or completeness of these data and recommendations.

Sample: DOW SAMPLE 36

Size: 19.51 mg

Rate: 20/MIN 30-600C 50ML AIR

Program: General Analysis V1.0

Date: 2-Sep-87 Time: 9:48:0

File: DOW36.01 TGA0587

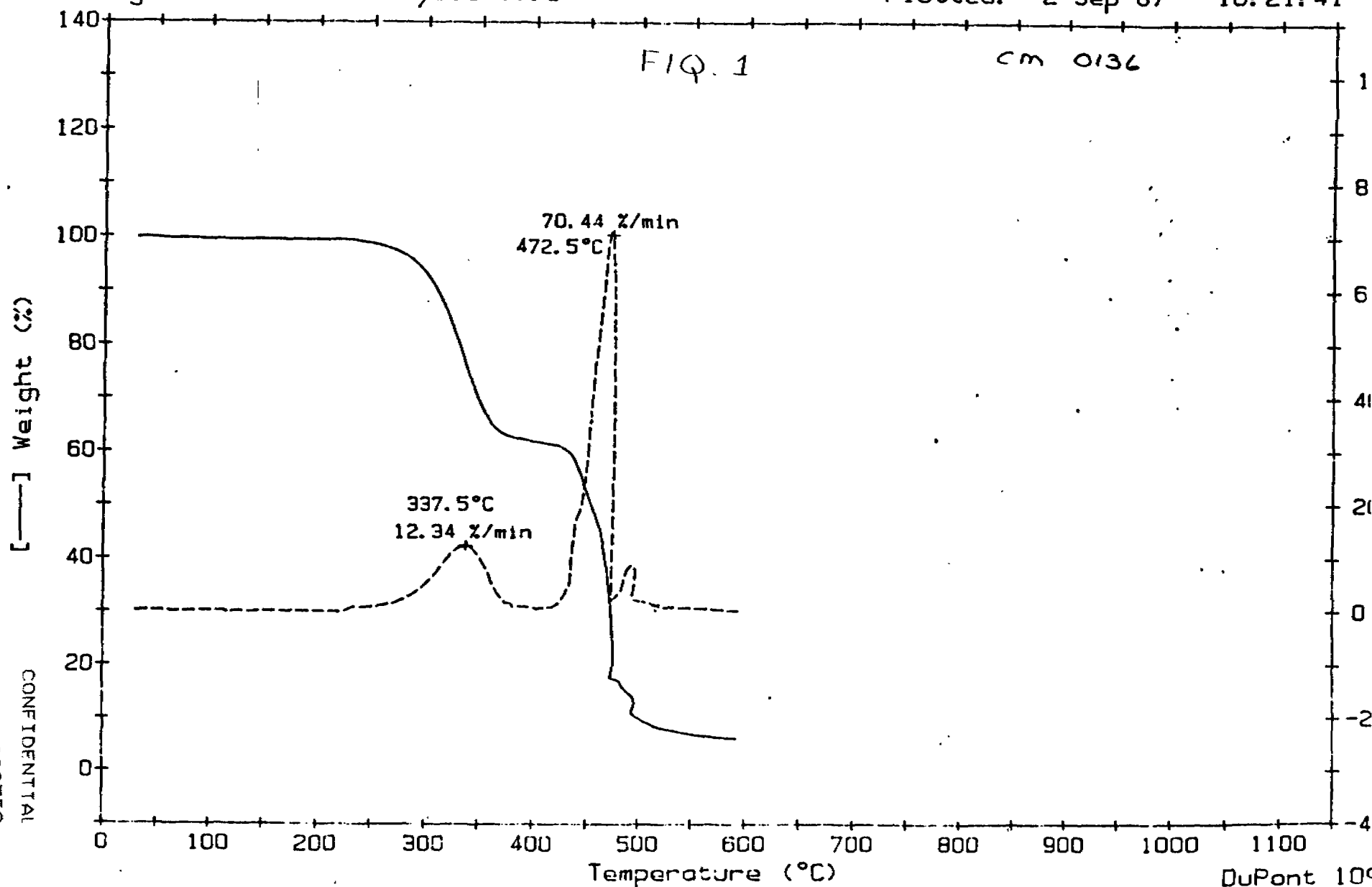
Operator: K J DUKE

Plotted: 2-Sep-87 10:21:41

TGA

FIG. 1

cm 0136



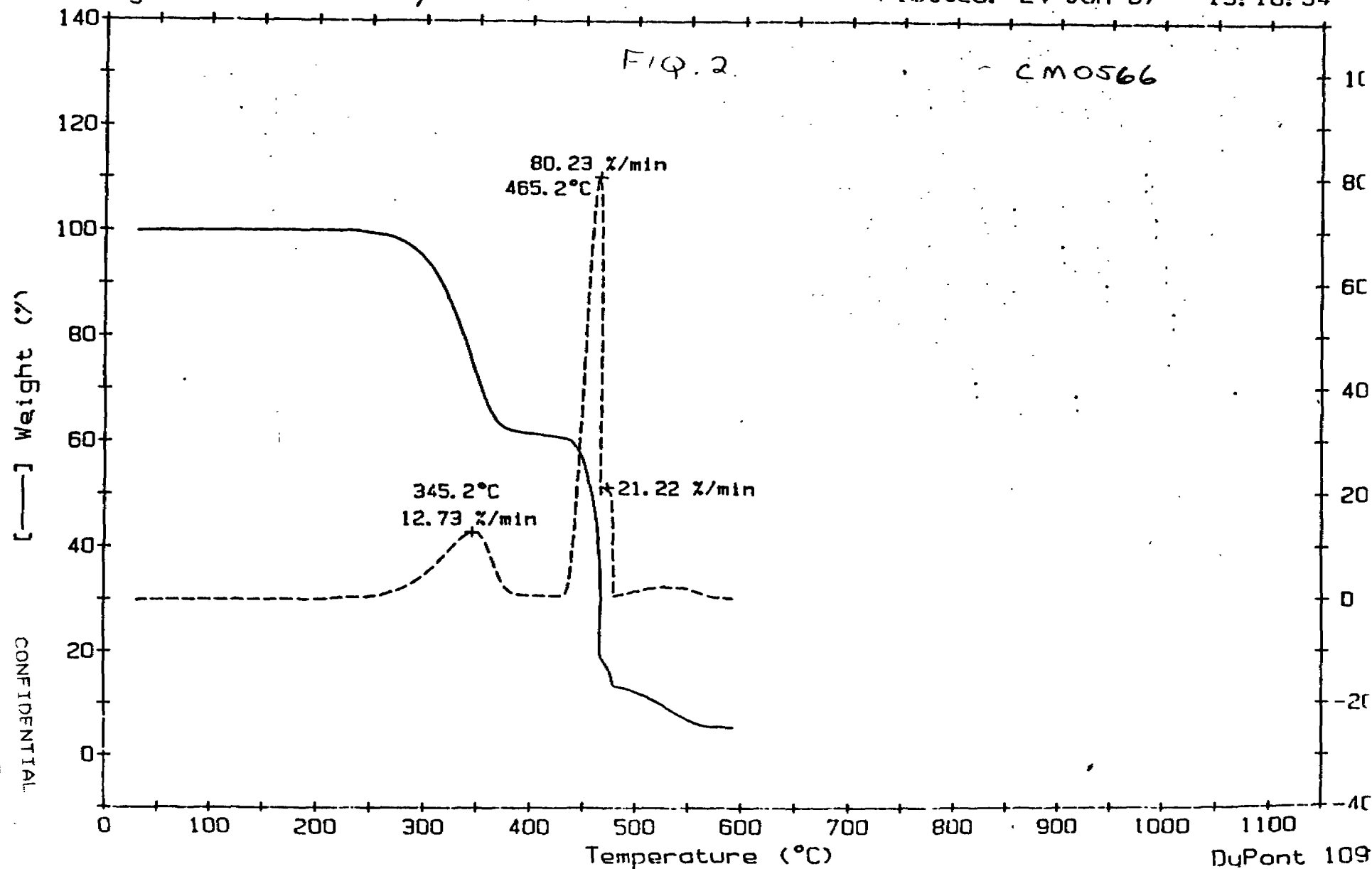
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DO 003753

DuPont 10^c

sample: CROWN W/C CMO 0566
Size: 20.05 mg.
Rate: 20C/MIN 30-600 AIR 50ML
Program: General Analysis V1.0

TGA

Date: 22-Jun-87 Time: 14:43:1
File: CROWN0566.01 JAK
Operator: KJ DUKE
Plotted: 24-Jun-87 13:10:34



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DO 003754

Sample: DOW SAMPLE 20

Size: 16.43 mg

Rate: 20/MIN 30-600C 50ML AIR

Program: General Analysis V1.0

TGA

Date: 1-Sep-87 Time: 14:18:18

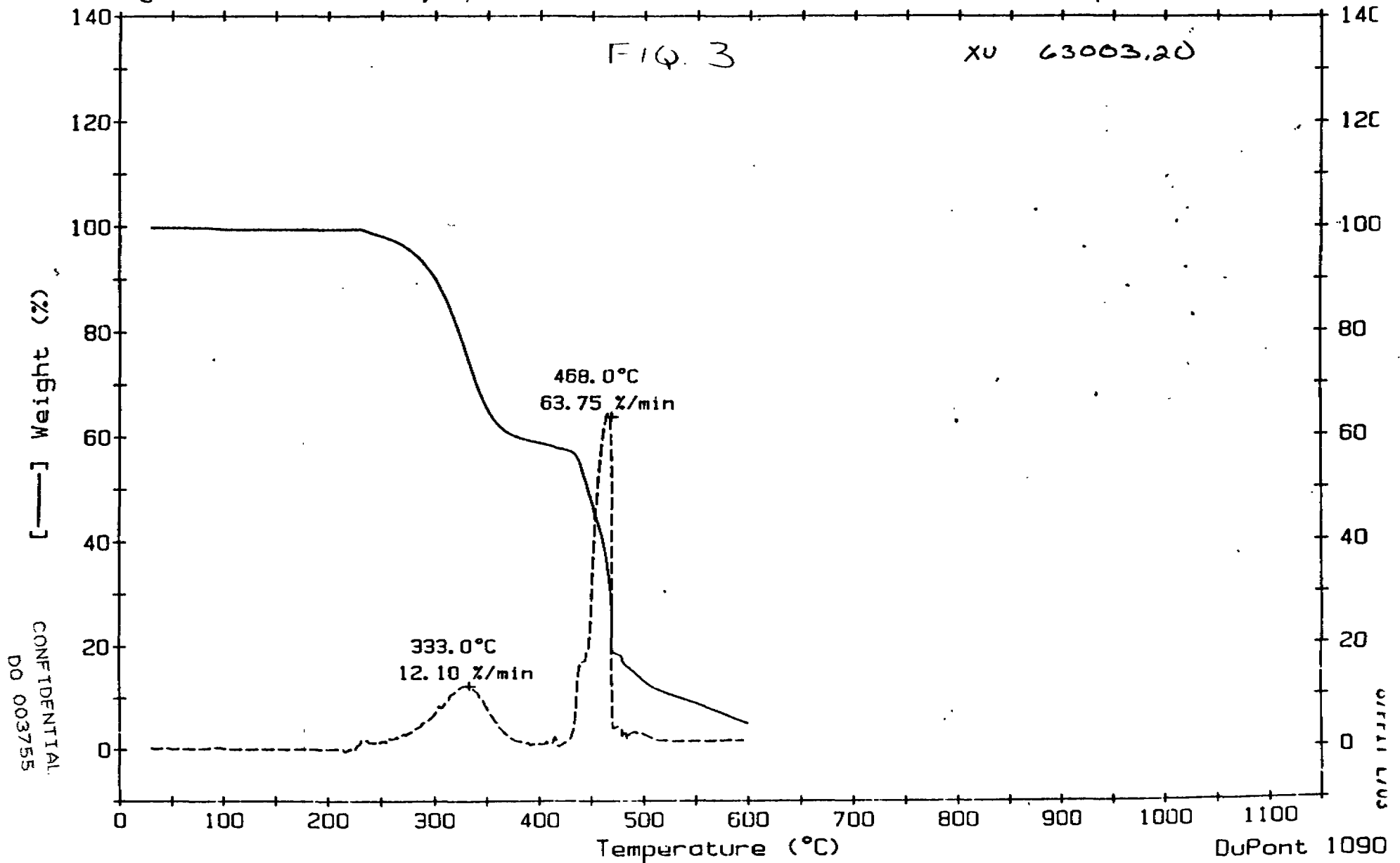
File: DOW20.01 TGA0587

Operator: K J DUKE

Plotted: 1-Sep-87 15:29:25

FIG. 3

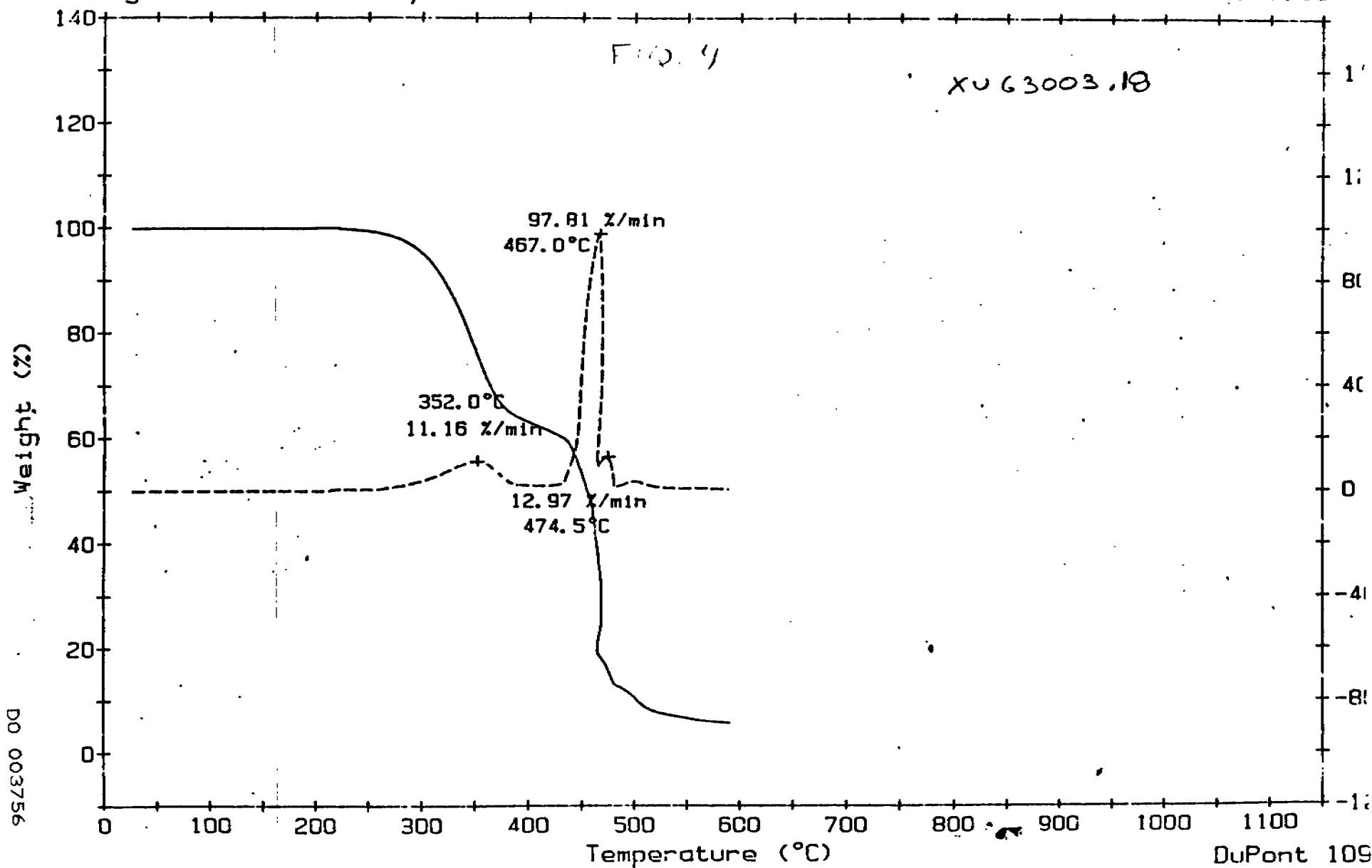
XU 63003.20



Sample: CROWN W/C 3.18
Size: 20.57 mg
Rate: 20C/MIN 30-600 AIR 50ML
Program: General Analysis V1.0

TGA

Date: 22-Jun-87 Time: 16:12:2
File: CRNXU63003.01 JAK
Operator: KJ DUKE
Plotted: 25-Jun-87 13:07:10



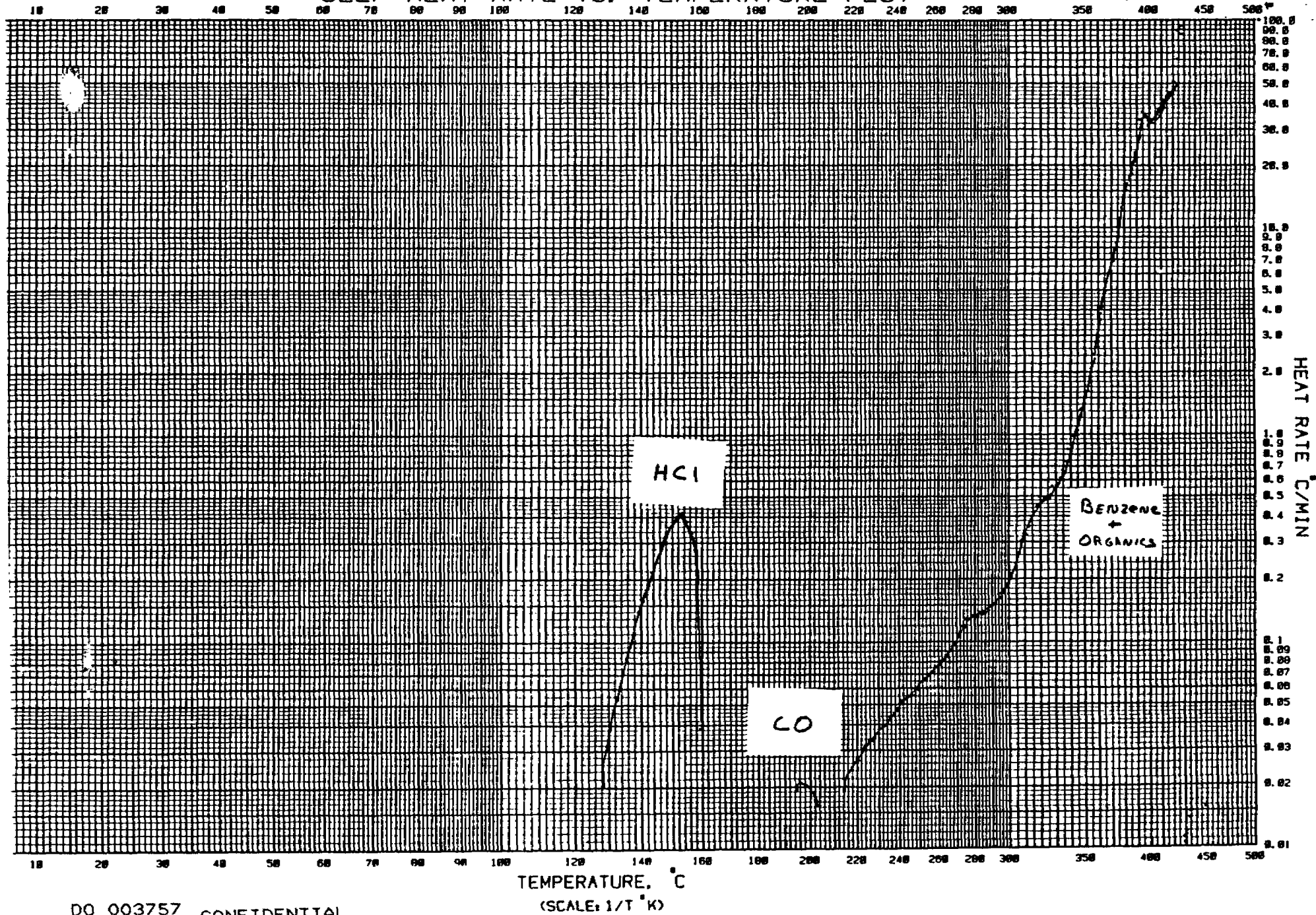
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FIG 5

ARC 335 CPE
4/23-28/86

SELF-HEAT RATE VS. TEMPERATURE PLOT

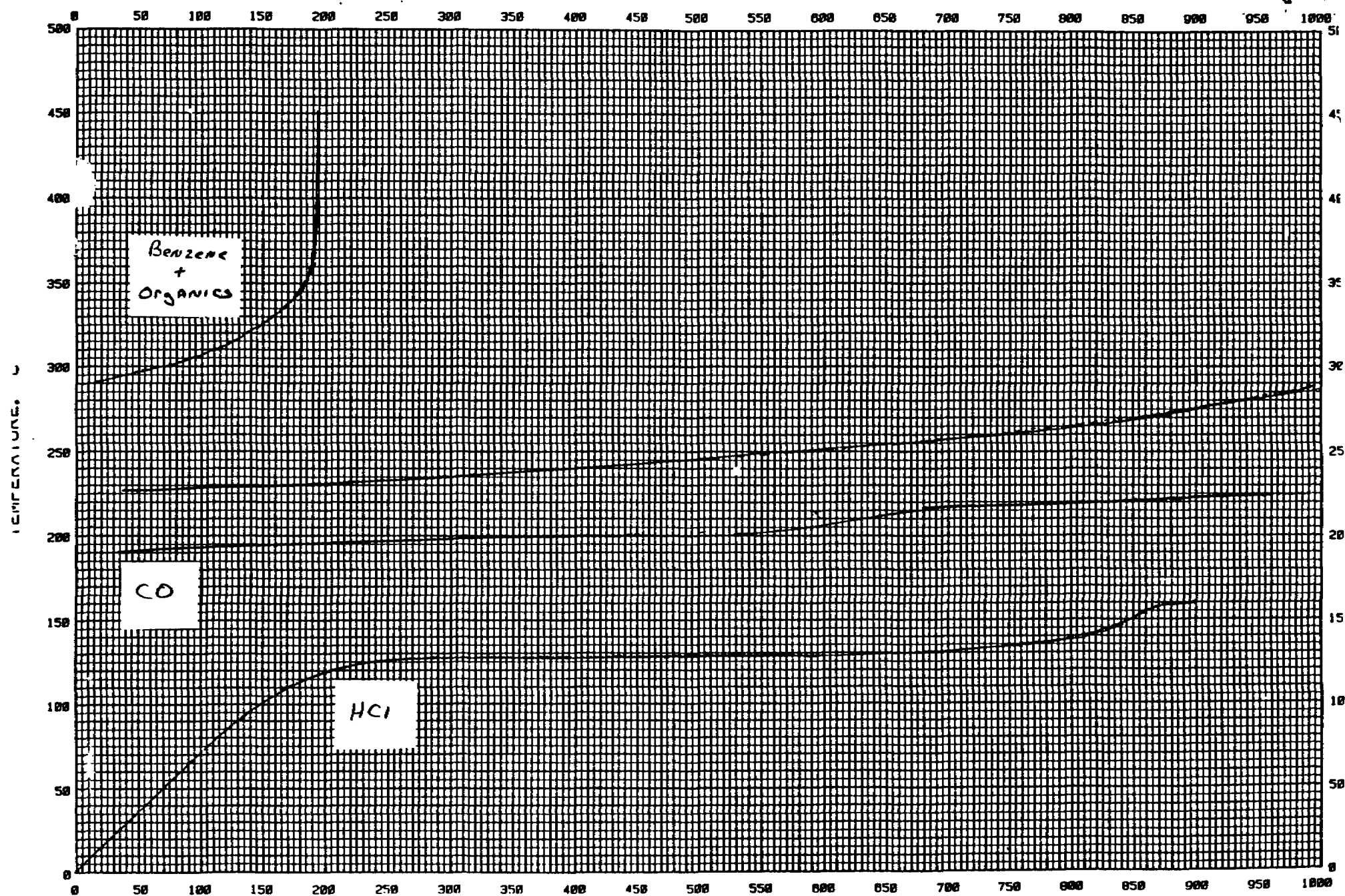


DO 003758 CONFIDENTIAL

FIG 6

ARC 335 -PE
4/23-28/86

TEMPERATURE VS. TIME PLOT



R.G. Carlson
2030 WHD Center

cc: R.L. Glomski
J.M. West

TYRIN* CPE Dust Explosion Potential

This letter is in response to your question about the explosion potential of TYRIN CPE products dried in the presence of calcium stearate (CaSt). Previous production plant problems related to CaSt dust explosions occurred in the blender area, although dryer fires have transpired in unrelated situations.

The 1981 blender incidents were caused by a failure to terminate the flow of CaSt into a blender after the dryer resin feed was stopped. A redundant interlock system is planned for the new fluid bed design to prevent feeding calcium stearate when TYRIN CPE resin is not being fed to the dryer. Pre-blending of the CPE-CaSt mixture before feeding into the fluid bed will help keep CaSt dusting to a minimum. Retention data indicates that, by pre-blending the CPE-CaSt mixture, very little free CaSt will be available to form explosive hazards. In addition, CaSt will not be added directly to the blenders in the new post-dryer addition system. The new system will blend 1.0-1.5% CaSt into the dried TYRIN-CPE resin just before final packaging.

Previous dryer fires have been attributed to "hot spots" that result from resin build-up within the fluid bed dryer. Calcium Stearate has been shown to significantly reduce the amount of dryer build-up, and combined with frequent inspections, will decrease an ignition source hazard. Other precautions that will be incorporated into the new fluid bed dryer design to minimize explosive potentials are, the proper grounding of all equipment and, the use of non-conductive filter cloth in blender filter systems.

The majority of recent explosion potential work has been coordinated by TYRIN CPE production personnel, in preparation for the upcoming post-blender calcium stearate addition system, and in response to the 1986 fluid bed dryer fire.

The Chemicals and Elastomers R&D group of LAS&TL has also generated a significant amount of data relative to calcium stearate retention on TYRIN CPE particles in support of this effort. One key reference is a report written by W.L. Young (LAD 678) entitled "Calcium Stearate Retention by CPE 3615 in a Simulated Fluid Bed". This report concludes that at or below 1.5 phr, calcium stearate forms an intimate incorporation with the TYRIN CPE resin. Specific data states that 91.8-94% of calcium stearate is retained on the resin after fluidization.

In 1986, Erhard Gillesen of DCE (working in LAS&TL), designed an experiment to further study the retention of calcium stearate. Resin was blended with 2 phr calcium stearate and fluidized for 4 hours at 60 C, then subsequently fluidized at ambient temperature for 5 hours. The results showed an 84.4% retention of calcium stearate onto the TYRIN CPE particle. This compares favorably with W.L. Young's results at 3 phr calcium stearate (84.3% retention), and supports the conclusion that once the CPE - CaSt incorporation is formed, it cannot be readily broken.

Frank Mark of DCE (Stade R&D) conducted drying trials at a European fluid bed dryer manufacturer, Sulzer Escher Wyss. These trials used water washed TYRIN 3615 resin with a 50% aqueous solution of calcium stearate as the dryer anti-block. Results showed 98-99% retention of the calcium stearate at 0.5 phr and 2.0 phr levels.

Dust explosion data has been generated on a variety of TYRIN CPE resin types, particle sizes, and calcium stearate concentrations, by Midland's Analytical Laboratories group. Results can be summarized as follows:

1. Pure calcium stearate has a Kst of 273 and a minimum energy (M.E.) of 0.125 J at 0.75 oz./cu.ft. (Explosion Class=2-3).
2. TYRIN CPE fines (<200 mesh) have a Kst of 11-13 (Explosion Class=1).
3. Other TYRIN CPE particle size ranges give Kst values of 0-36.
4. Blends of 20% calcium stearate and 80% (<80 mesh) CPE give a M.E. = 0.125 J at 0.75 oz./cu.ft..
5. Blends of 13% calcium stearate and 87% (<80 mesh) give a M.E. > 20 J (Dusts with M.E. > 20 J are generally not considered explosive).
6. Blends of 15% calcium stearate and 85% (<80 mesh) give a M.E. < 20 J.
7. A blend of normal size resin and 1% calcium stearate gave a 13 psi maximum explosion pressure at 4000 g/cu.mt. with Kst = 1.0 and classifies as a type 1 dust explosive. This blend did not ignite at lower concentrations.

In conclusion, a large amount of data has been obtained, and work continues towards defining and eliminating all dust explosion potentials within the process. Production personnel are presently preparing for the first Reactive Chemicals Review for the use of calcium stearate in the fluid bed dryer. Chemicals and Elastomers R&D will continue to support the data generation effort in this area, and will play an active role in designing the new fluid bed dryer system.

J.M. Sampson
Elastomers Research

J.B. Akers
Elastomers Research

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DO 003760

8560
L ACSDC::

December 8, 1987

Bob Armstrong
807 Bldg.

REACTIVE CHEMICALS REVIEW

Our records indicate the last Reactive Chemicals Process Review for
Poly A was April 23, 1987. Each plant is
required to do a complete process review every 2 years or when a
Superintendent change occurs. Please contact me (6283) or Robbie
Bagaley (1805) for scheduling. The reviews are usually held on a
Thursday at 8:30 a.m. in your plant's conference room.

J. Y. Pennington, Chairman
REACTIVE CHEMICALS COMMITTEE

rcb

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DO 003761

#2

11-DEC-1987 10:40:28

NEWMAIL

From: LARNDG::PENNJ "J.PENNINGTON, LASTL, 504-389-6283"
To: LACSDG::ARMSTRONG, PENNJ
Subj: NEW SUPERINTENDENT REACTIVE CHEMICALS REVIEW FOR POLY A

BOB, AS YOU KNOW, THE CORPORATE GUIDELINES FOR REACTIVE CHEMICALS REVIEWS REQUIRE A PROCESS REVIEW WITHIN 3 MONTHS OF A SUPERINTENDENT CHANGE. OUR LAST PROCESS REVIEW FOR POLY A WAS IN APRIL OF 1987. SINCE YOU ARE PROBABLY AS FAMILIAR WITH THAT PLANT AS ANYONE IN THE DIVISION, I AM WONDERING WHETHER WE REALLY NEED TO DO A REVIEW AT THIS POINT.

HAVE THERE BEEN ANY MAJOR PROCESS CHANGES SINCE LAST APRIL, OR DO YOU HAVE A NEW PRODUCTION SUPERVISOR OR OTHER NEW PEOPLE WHO WOULD BENEFIT FROM SUCH A REVIEW AT THIS TIME?

IF NOT, I AM INCLINED TO JUST WAIT FOR THE NEXT SCHEDULED 2-YEAR PROCESS REVIEW WHICH WILL BE IN APRIL OF 1989. WHAT DO YOU SUGGEST?

Press RETURN for more...

MAIL>

#2

11-DEC-1987 10:40:28

NEWMAIL

JOAN PENNINGTON
6283

MAIL>

O.K.
JMP
12/17/87

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DO 003762