

2-15-92

ANALYTICAL REPORT
REACTIVE CHEMICALS LABORATORY
DOW CONFIDENTIAL INFORMATION

Report To :	Department:	Building:
Nathan Davis	Glycol II	5301

LAS&TL Analytical Labs. Dow Chemical USA	Charge Number: 76	Request # : 90256
Req. Date: 7/27/90	Prelim. Rept : 8/06/90	Final Rept: 10/02/90

T I T L E : Compatibility Of Ethylene Oxide And Aluminum

Author(s) : Gerald Barrilleaux
Phone(s) : 6052
Locations : 2511

Archival : M90-3 (File 2561)

Reviewer:

Gerald Wazene

Procedure: Aluminum filings were loaded into a glass capillary and then ethylene oxide was condensed over it by freezing the sample capillary in liquid nitrogen. The capillary was then sealed and analyzed on the Differential Scanning Calorimeter (DSC) from -25 deg.C to 250 deg.C at 10 deg./minute.

Results: An endotherm was detected which started at --15 deg.C and peaking at 5 deg.C. This is approximately the melting point of water.
An exothermic shift was detected at ~192 deg.C. The critical temperature of ethylene oxide occurs approximately at this temperature (195.8 deg.C in literature).

2.8mg ETHYLENE OXIDE + 0.95mg ALUMINUM

File: 02561.001

DSC METTLER

06-Aug-90

2.800 mg

Rate: 10.0 °C/min

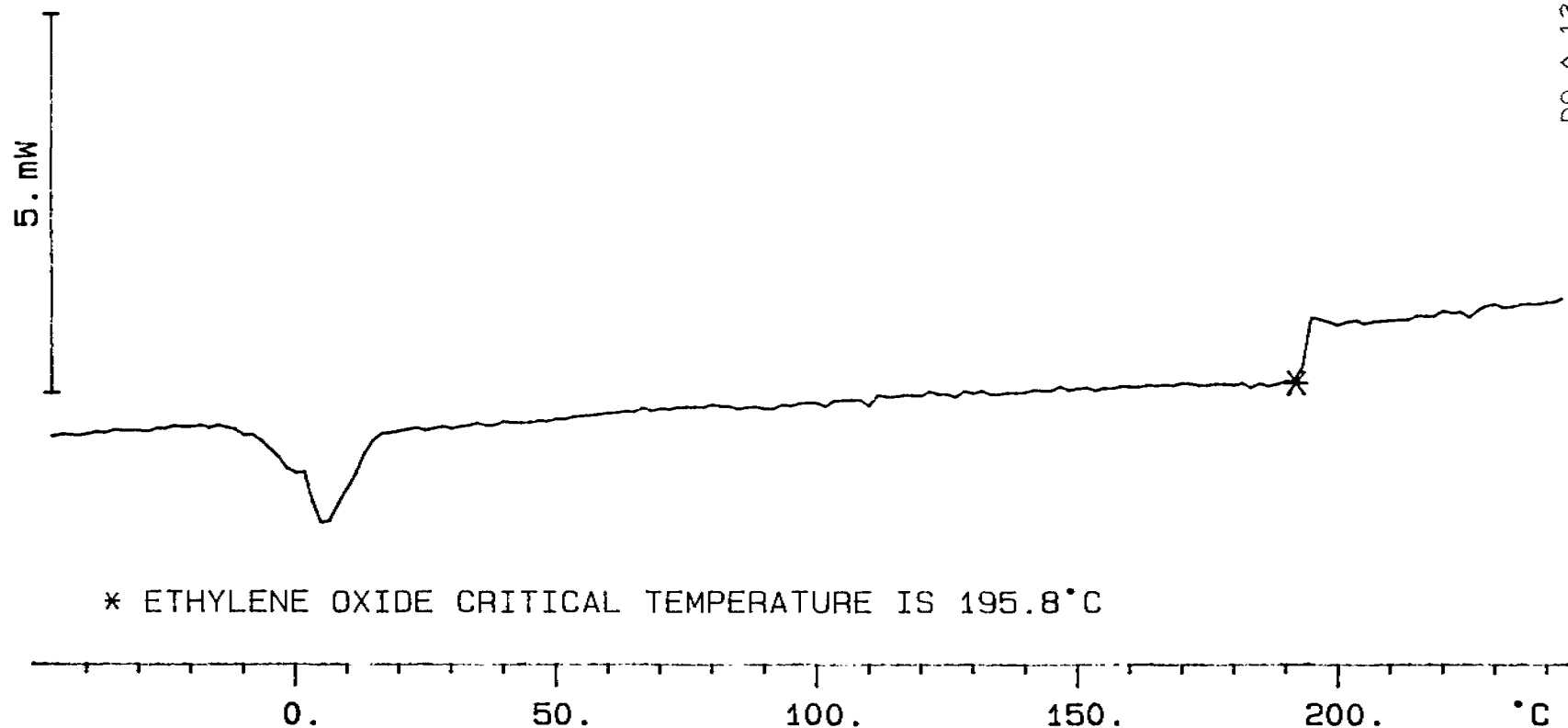
Ident: 90256.0

Mettler GraphWare TA72AT.1

exo
^

ENDOTHERM: PEAK 5°C

*EXOTHERM: START 192°C



DO A 135915
CONFIDENTIAL

Steve Milligan 5301

>>>>> Contact DALE CAMPAU, STEVE CALDWELL, or anyone in the Lab for help <<<<<
 Date (mm/dd/yy) 07 / 03 / 89 Number of Samples: 1 Emergency (Y or N) N
 Plant/Frog: GLLYCOL II Acct#: 76 CHAMPS - Outside DOWN
 Submitted By: BALDWIN Bldg. 5301 Phone: 5328
 Report To: SAME Bldg. _____ Phone: _____
 Problem or Reason for Analysis: POSSIBLE REACTIVITY PROBLEM

Composition, Hazards, etc.: NICKEL -ALUMINIDE

Sample ID: (Plant Equipment #, Data Book #, etc.)

A METCALDY

23

1

5

11

F

1.

五

1

7

>>>>>>>>>>>>>>>>>> PRESS PgDn (BLUE DOT) TO CONTINUE <<<<<<<<<<<<<<<<<

IF YOU ARE NOT CERTAIN OF THE ANALYSIS NEEDED, CONTACT
DALE CAMPAU (6559, RADIO PAGE - 106), STEVE CALDWELL (6237)
OR JACK GATHERS (1632)

PRESS F4Up (YELLOW DOT) TO RETURN TO PREVIOUS PAGE.

Analysis Needed: CONFIRM MATERIALS OF CONSTRUCTION

Area: ☐ WET/IC ☐ X-RAY ☐ GC/MS ☐ IR ☐ NMR ☒ SEM ☐ ESCA ☒ DONE
Comp: 082589 082589

>>>>>>>>>>>>>> YOU ARE FINISHED WITH SAMPLE LOGIN <<<<<<<<<<<<<<

PRESS F6 (GREEN DOT) TO PRINT YOUR LOGIN SHEET AND THEN
F3 (RED DOT) TO READY THE SYSTEM FOR THE NEXT PERSON.

SEP 05 1962

Sample Number: 2417 Report Responsibility: _____ Disposal: _____
Last Update: 07-03-89 Time: 11:51

DO A 135916
CONFIDENTIAL

ANALYTICAL REPORT
DOW CONFIDENTIAL INFORMATION

Report To : Greg Baldwin Department: Glycol 2 Building: 5301
 Steve Milligan

LAS&TL Analytical Labs. Dow Chemical USA	Charge Number: 76	Request # : 2417
Req. Date: 07-03-89	Prelim. Rept : 08-25-89	Final Rept: 08-25-89

T I T L E : Elemental determination of Metcaloy

Rob Harrell
Author(s) : Rob Harrell
Phone(s) : 1714
Locations : 2503

Archival : Kevex File 3QTR89.KVX

Reviewer:

D Barnes

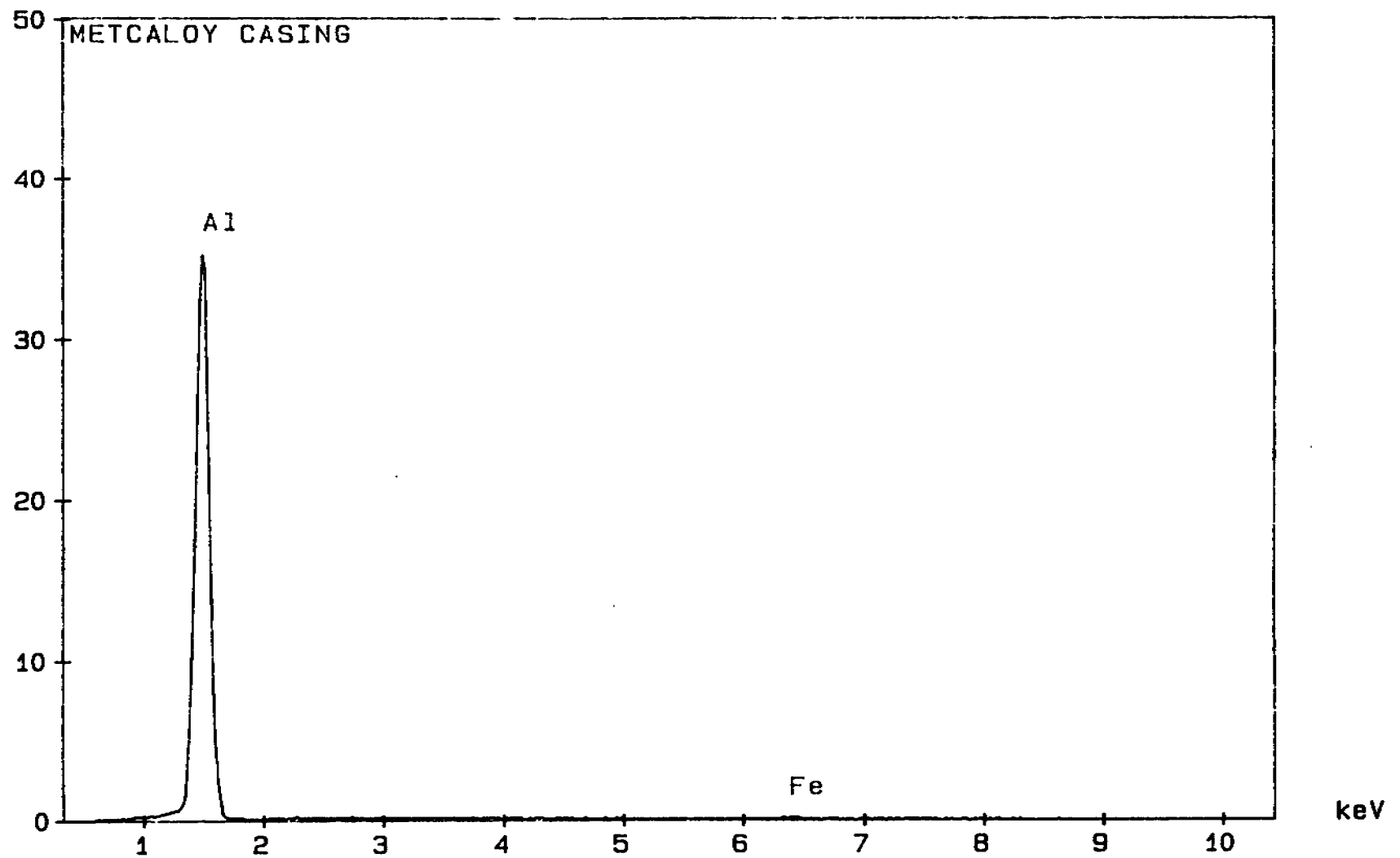
A rod of Metcaloy was submitted for examination by Energy Dispersive X-ray.
The exterior was found to be made of aluminum, while the interior was high in
both aluminum and nickel.

The elemental scans are attached.

DO A 135917
CONFIDENTIAL

2417-A1
100 secs

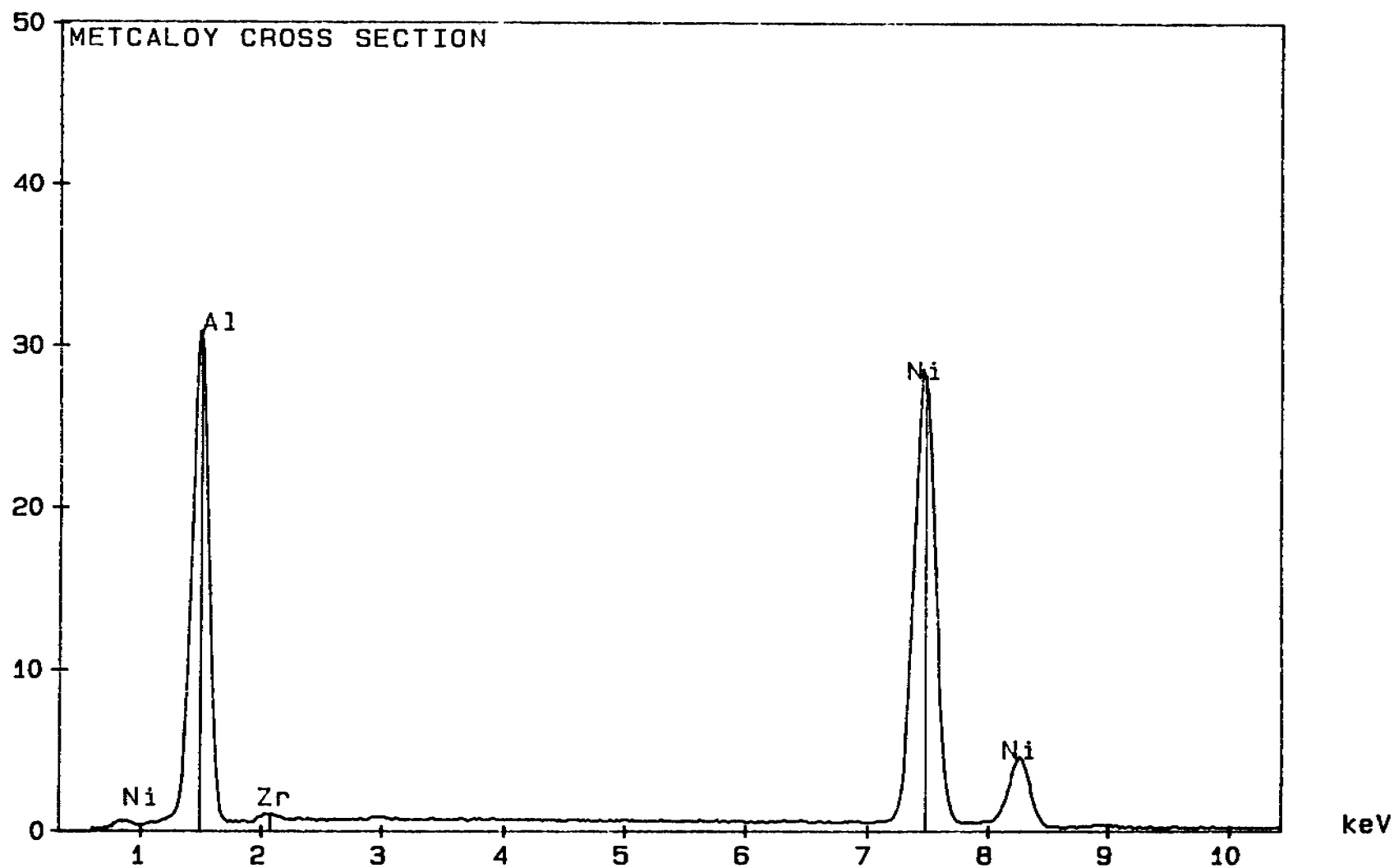
Counts X 1000



DO A 135918
CONFIDENTIAL

Counts X 1000

2417-A2
100 secs



DO A 135919
CONFIDENTIAL

MJ
7/27/90

DOW CHEMICAL U.S.A. LOUISIANA DIVISION

CELLULOSICS TECHNOLOGY CENTER
CMP/PER-TET/HCL TECHNOLOGY CENTER
DOEO TECHNOLOGY CENTER

TO: *MARCUS JAMES*
FAX NUMBER: *6835*
FROM: *W BOUNDS*
FAX NUMBER: (504) 389-8160
TOTAL NO. OF PAGES: *5* (INCLUDING COVER PAGE)
DATE: *7-20-90*

COMMENTS:

MARCUS, PER YOUR REQUEST.
WB

IF YOU DO NOT RECEIVE ALL PAGES OR IF
TRANSMISSION IS NOT LEGIBLE, PLEASE
CALL (504) 389-8487.



DOW CONFIDENTIAL
REACTIVE CHEMICAL HAZARD DATA
PROPERTIES AND PRECAUTIONS

REFERENCE NUMBER

RCL-12

DATE OF ISSUE

1-30-74

LATEST REVISION DATE

ATMOSPHERIC HAZARD DATA

Ethylene Oxide : Aluminum 5454

MOLECULAR FORMULA

MOLECULAR WEIGHT

PHYSICAL STATE

SAMPLE PURITY

Liq. Sol.

STRUCTURAL FORMULA, COMPOSITION, COMPOUNDS & MIXTURES

THERMOCHEMICAL INFORMATION

Ethylene Oxide over
filings of
Aluminum 5454

HEAT OF FORMATION
FROM THE ELEMENTS
K cal./Gram MoleHEAT OF SELF DECOM.
POSITION IN OXYGEN
K cal./100 GramsHEAT OF SELF
DECOMPOSITION
K cal./100 Grams $\Delta H_f =$ $\Delta H_o =$ $\Delta H_d =$

S L G

S L G

S L G

FLAME TEMPERATURE

DECOMPOSITION TEMP.

°C

REPORTED BY

REPORT NUMBER

LABORATORY SCREENING TESTS

WARNING: Data based on laboratory test conditions; use caution in extending to different environments.

DIFFERENTIAL THERMAL ANALYSIS

RATE OF TEMP. INCREASE

MAXIMUM TEST TEMP.

20

°C MIN.

136

°C

END

TYPE

START

°C

PEAK

°C

END

°C

SIZE

✓

90

?

~136

large

DROP-WEIGHT SHOCK SENSITIVITY

TEST METHOD

TEST TEMP.

HEIGHT

WEIGHT

NUMBER OF TESTS

POSITIVE

NEGATIVE

Solid-Liquid

°C

cm

Kg

COMMENTS

Very large peak - off scale

COMMENTS (In 30, 630)

TEST RUN BY

TEST DATE

TEST REFERENCE

TEST RUN BY

TEST DATE

TEST REFERENCE

L. D. Davis

4/16/74

FLAMMABILITY PROPERTIES

(in air or ambient pressure unless otherwise noted)

FLASH POINT

°C

°F

METHOD

METHOD

TEST RUN BY

TEST DATE

TEST REFERENCE

AUTOCIGNITION TEMPERATURE

°C

°F

TEST RUN BY

TEST DATE

TEST REFERENCE

FLAMMABLE LIMITS

LIMITS - VOL. %

PRESSURE

TEMP.

IGNITION SOURCE

LOWER

UPPER

PSIA or mmHg

°C

TEST RUN BY

TEST DATE

TEST REFERENCE

NAME OF ORIGINATOR OR OWNER OF CHEMICAL MATERIAL

DIVISION

BUILDING

PHONE

H. M. Bell

La. Div. DOE Tech.

5301

7465

++ SEVERE HAZARD ++
Severe hazard is indicated. Further testing is desirable. Consultation with the Reactive Chemicals Committee is recommended.

DO A 135921
CONFIDENTIAL



DOW CONFIDENTIAL
REACTIVE CHEMICAL HAZARD DATA
PROPERTIES AND PRECAUTIONS

REFERENCE NUMBER
RCT-521
DATE OF ISSUE
6-18-70
LATEST REVISION DATE

CHEMICAL NAME (USE C.I. NAME IF AVAILABLE)

SYNOPSIS

Ethylene Oxide + Aluminum Powder**($C_2H_4O + Al$)**

CHEMICAL FORMULA, COMPOSITION, COMPONENTS & IMPURITIES

 $CH_2=CH_2$ ethylene oxide

MOLECULAR WEIGHT

44.0 + 27.0

PHYSICAL STATE

liq/solid

SAMPLE PURITY

Mixture

THERMOCHEMICAL INFORMATION

HEAT OF FORMATION
FROM THE ELEMENTS
K cal./Gram Mole $\Delta H_f =$

S L G

HEAT OF SELF DECOM-
POSITION IN OXYGEN
K cal./100 Grams $\Delta H_d =$

S L G

HEAT OF SELF
DECOMPOSITION
K cal./100 Grams $\Delta H_d =$

S L G

FLAME TEMPERATURE

°C

DECOMPOSITION TEMP.

REPORTED BY

REPORT NUMBER

LABORATORY SCREENING TESTS

WARNING: Data based on laboratory test conditions; use caution in extending to different environments

DIFFERENTIAL THERMAL ANALYSIS

RATE OF TEMP. INCREASE

MAXIMUM TEST TEMP.

20

°C MIN.

420

°C

PZO TYPE ENDO START °C PEAK °C END °C SIZE

ENDO**160****195****210****SMALL****PZO****225****420****NOT****REMARKS****SMALL**

APPTS.

DROP-WEIGHT SHOCK SENSITIVITY

TEST
METHODTEST
TEMP.

HEIGHT

WEIGHT

NUMBER OF TESTS

POSITIVE

NEGATIVE

Solid-Liquid

°C

cm

Kg

COMMENTS (PAC, ESO)

*** HAZARD ***

Sufficient hazard is indicated
Further testing would be desirable
before handling on a large scale.

TEST RUN BY

R.P. Cowan

TEST DATE

4-20-70

TEST REFERENCE

222

TEST RUN BY

TEST DATE

TEST REFERENCE

FLAMMABILITY PROPERTIES
(for air at ambient pressure unless otherwise noted)FLASH
POINT

°C

°F

METHOD

METHOD

TEST RUN BY

TEST DATE

TEST REFERENCE

AUTOIGNITION
TEMPERATURE

°C

°F

TEST RUN BY

TEST DATE

TEST REFERENCE

FLAMMABLE LIMITS

LIMITS - VOL. %

PRESSURE

TEMP.

IGNITION

LOWER

UPPER

PSIA or mmHg

°C

SOURCE

TEST RUN BY

TEST DATE

TEST REFERENCE

NAME OF ORIGINATOR OR OWNER OF CHEMICAL MATERIAL

KENT CARLISLE

DIVISION

BUILDING

PHONE

R.P. Cowan
428
10-19-70

DO A 135922
CONFIDENTIAL

DOW CONFIDENTIAL
REACTIVE CHEMICAL HAZARD DATA
PROPERTIES AND PRECAUTIONS

REFERENCE
RCL-11
 DATE OF ISSUE
1-30-74
 LATEST REVISION DATE

MATERIAL NAME (USE C.B.I. APPROV. SYSTEMS)

Ethylene Oxide : Aluminum 5454

CHEMICAL FORMULA

MOLECULAR WEIGHT

PHYSICAL STATE

SAMPLE PURITY

Liq. - Sol.

STRUCTURAL FORMULA, COMPOSITION, COMPONENTS & IMPURITIES

THERMOCHEMICAL INFORMATION

HEAT OF FORMATION
FROM THE ELEMENTS
K cal./Gram MoleHEAT OF SELF DECOM-
POSITION IN OXYGEN
K cal./100 GramsHEAT OF SELF
DECOMPOSITION
K cal./100 Grams ΔH_f ΔH_d ΔH_d

S L G

S L G

S L G

REPORTED BY

REPORT NUMBER

**74 Ethylene Oxide over
 filmings of
 Aluminum 5454**

LABORATORY SCREENING TESTS

WARNING: Data based on laboratory test conditions. Use caution in extending to different environments.

DIFFERENTIAL THERMAL ANALYSIS

RATE OF TEMP. INCREASE

MAXIMUM TEST TEMP.

20

°C MIN

136

°C

DROP-WEIGHT SHOCK SENSITIVITY

TEST
METHODTEST
TEMP.

HEIGHT

WEIGHT

NUMBER OF TESTS

EXO

TYPE

ENDO

90

°C

PEAK

°C

END

°C

SIZE

Solid-Liquid

°C

cm

Kg

POSITIVE

NEGATIVE

REMARKS:

COMMENTS (H₂O, E₂O)

TEST RUN BY

TEST DATE

TEST REFERENCE

TEST RUN BY

TEST DATE

TEST REFERENCE

FLAMMABILITY PROPERTIES
 (in air at ambient pressure unless otherwise noted)

FLASH
POINT

°C

°F

METHOD

°C

°F

METHOD

TEST RUN BY

TEST DATE

TEST REFERENCE

AUTOIGNITION
TEMPERATURE

°C

°F

TEST RUN BY

TEST DATE

TEST REFERENCE

FLAMMABLE LIMITS

LIMITS - VOL. %

PRESSURE

TEMP.

IGNITION

LOWER

UPPER

PSIA or mmHg

°C

SOURCE

++ SEVERE HAZARD ++
 Severe hazard is indicated. Further
 testing is desirable. Consultation with
 the Reactive Chemicals Committee
 is recommended

DO A 135923
 CONFIDENTIAL

TEST RUN BY

TEST DATE

TEST REFERENCE

NAME OF ORIGINATOR OR OWNER OF CHEMICAL MATERIAL

DIVISION

EQUIPMENT

PROJECT

HM Bell

Ladiv DOD Tech. Cent.

5301

7465



DOW CONFIDENTIAL
REACTIVE CHEMICAL HAZARD DATA
 PROPERTIES AND PRECAUTIONS

REFERENCE NUMBER
RCL-13
 DATE OF ISSUE
1-30-74
 LATEST REVISION DATE

MATERIAL NAME (and C.I. No., name if available)

Ethylene Oxide: Aluminum 3003

MOLECULAR FORMULA

MOLECULAR WEIGHT

PHYSICAL STATE

SAMPLE PURITY

Sol. - Lig.

STRUCTURAL FORMULA, COMPOSITION, COMPONENTS & IMPURITIES

**Ethylene Oxide over
 filings of
 Aluminum 3003**

THERMOCHEMICAL INFORMATION

HEAT OF FORMATION
FROM THE ELEMENTS
K cal./Gram MoleHEAT OF SELF DECOM-
POSITION IN OXYGEN
K cal./100 GramsHEAT OF SELF
DECOMPOSITION
K cal./100 Grams ΔH_f ΔH_d ΔH_d

S L G

S L G

S L G

PLAME TEMPERATURE

DECOMPOSITION TEMP.

°C

REPORTED BY

REPORT NUMBER

LABORATORY SCREENING TESTS

WARNING Data based on laboratory test conditions. Use caution in extending to different environments.

DIFFERENTIAL THERMAL ANALYSIS

RATE OF TEMP INCREASE

MAXIMUM TEST TEMP

20 °C/MIN.

145 °C

BZC

TIME

END

START

°C

PEAK

°C

END

°C

SIZE

✓

PT

7

144

mm

DROP-WEIGHT SHOCK SENSITIVITY

TEST METHOD

TEST TEMP.

HEIGHT

WEIGHT

NUMBER OF TESTS

Solid - Liquid

°C

cm

kg

POSITIVE

NEGATIVE

REMARKS

COMMENTS, etc., Etc.

TEST RUN BY

TEST DATE

TEST REFERENCE

TEST RUN BY

TEST DATE

TEST REFERENCE

AD Louis
1/16/74

FLAMMABILITY PROPERTIES
(In air at ambient pressure unless otherwise noted)

FLASH POINT

°C

°F

METHOD

FLASH POINT

°C

°F

METHOD

TEST RUN BY

TEST DATE

TEST REFERENCE

AUTOIGNITION TEMPERATURE

°C

°F

TEST RUN BY

TEST DATE

TEST REFERENCE

FLAMMABLE LIMITS

LIMITS - VOL. %

PRESSURE

TEMP.

IGNITION

LOWER

UPPER

PSIA or mmHg

°C

SOURCE

++ SEVERE HAZARD ++
 Severe hazard is indicated. Further testing is desirable. Consultation with the Reactive Chemicals Committee is recommended.

DO A 135924
 CONFIDENTIAL

TEST RUN BY

TEST DATE

TEST REFERENCE

NAME OF ORIGINATOR OR OWNER OF CHEMICAL MATERIAL

DIVISION

BUILDING

PHONE

Ham Bell

La Dio Tech. Cent. 5301

7465

