

November 10, 2010

Mr. Kane Cook  
Honeywell International  
20 Peabody St.  
Buffalo, NY 14210

Dear Mr. Cook:

Enclosed you will find Laboratory Report # 10093A for Enclosed Space Ignition Testing of your sample. This is a revision to Report # 10093, dated June 2, 2010. The following revisions were made.

- 1) Section 3.1.1 Procedure: One sentence was changed from:

"After recording the weight of the can before beginning the ignition test, a dispenser is positioned upside down, in this case, to simulate the commercial use and the valve is actuated to discharge the spray through the center of the entrance hole in the drum."

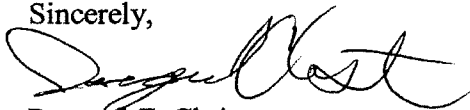
to

"After recording the weight of the can before beginning the ignition test, a dispenser is positioned right side up, in this case, to simulate the commercial use and the valve is actuated to discharge the spray through the center of the entrance hole in the drum."

- 2) Entire report, added suffix A to the report to reflect the revision.
- 3) Entire report, changed the dated from June 2, 2010 to November 10, 2010
- 4) No other revisions were made.

Sorry for any inconvenience this may have caused.

Sincerely,



Racquel Z. Christner  
Hazardous Materials Technician

rc (10093A)

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**STRESAU**  
LABORATORY, INC

*"Excellence in Energetics"*

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November 10, 2010

Mr. Kane Cook  
Honeywell International  
20 Peabody St.  
Buffalo, NY 14210

Dear Mr. Cook:

Enclosed you will find Laboratory Report # 10093A for Enclosed Space Ignition Testing of your sample. Full details are enclosed in the report.

An invoice to cover the cost of the laboratory examinations will be sent to your accounting department under separate cover.

We appreciate your repeat business and look forward to working with you in the future. If we may be of further assistance, or, if you have any questions, please call me at (715) 635-2777.

Sincerely,



Racquel Z. Christner  
Hazardous Materials Technician

rc (10093A)

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**LABORATORY REPORT # 10093A**

**"ENCLOSED SPACE IGNITION TESTING"**

November 10, 2010

for

Honeywell International  
20 Peabody St.  
Buffalo, NY 14210

USA

Attn: Mr. Kane Cook

Prepared by:



Racquel Christaer  
Hazardous Materials Technician

Reviewed by:



Michael J. Pesko  
Chief Operating Officer

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Prepared for: Honeywell International  
20 Peabody St.  
Buffalo, NY 14210

Subject: "Enclosed Space Ignition Test"

**1.0 OBJECT**

One sample, identified below, was subjected to Enclosed Space Ignition Testing in accordance with the *Code of Federal Regulations, Title 49 Part 173*, and the *United Nations Transport of Dangerous Goods, Manual of Tests and Criteria, Fifth Revised Edition (2009)*, as requested by Kane Cook of Honeywell International.

**2.0 IDENTIFICATION AND PHYSICAL APPEARANCE**

<i>SAMPLE NAME</i>	<i>STRESAU LABORATORY ID NO.</i>	<i>PHYSICAL APPEARANCE</i>
HFO 1234ze	10093	3 Dispensers of aerosol spray labeled "I", "II", and "III"

The sample arrived at Stresau at ambient temperature in commercial dispensers and was tested in the form received.

**3.0 TEST CONDUCTED**

**3.1 Enclosed Space Ignition Test**

**3.1.1 *Procedure***

The dispensers are prepared by completely submerging them in a water bath at  $20 \pm 1$  ° C for a minimum of 30 minutes. A paraffin wax candle approximately 100 mm in height is placed on a 200 mm x 200 mm metal support that is positioned midway between the two ends of a cylindrical vessel that is approximately 200 dm<sup>3</sup> (55 gallons) in volume and approximately 600 mm in diameter by approximately 720 mm in length. The cylinder has a 50 mm diameter hole drilled 100 mm from the edge. After priming the dispenser to release any non-homogenous material in the diptube, the initial rate of discharge is determined and the pressure in the can is recorded. The temperature, humidity, barometric pressure, and pressure within the can are also recorded. After recording the weight of the can before beginning the ignition test, a dispenser is positioned right side up, in this case, to simulate the commercial use and the valve is actuated to discharge the spray through the center of the entrance hole in the drum. A timer is started at the time of actuation in order to determine the time elapsed before ignition occurs if it is to

occur. The test is repeated two more times using a new can for each trial for a total of three trials. At the conclusion of testing, the data is used to:  
determine the time equivalent ( $t_{eq}$ ) needed to achieve ignition in one cubic meter, which is calculated as follows:

$$t_{eq} = \frac{1000 \times \text{discharge time(s)}}{\text{Volume of drum (dm}^3\text{)}}$$

and the deflagration density ( $D_{def}$ ) needed to achieve ignition during the test, which is calculated as follows:

$$D_{def} = \frac{1000 \times \text{Amount of product(s) dispensed (g)}}{\text{Volume of drum (dm}^3\text{)}}$$

### 3.1.2 Results:

	I (trial 1)	II (trial 2)	III (trial 3)
<i>Pressure</i>	67 psi	69.0 psi	68 psi
<i>Initial Discharge Rate</i>	3.7 g/sec	6.2 g/sec	5.6 g/sec
<i>Temperature</i>	73.0 °F	73.1 °F	73.1 °F
<i>Relative Humidity</i>	37.9 %	36.4 %	36.0 %
<i>Barometric Pressure</i>	730.9 mmHg	730.9 mmHg	730.9 mmHg
<i>Initial Weight</i>	429.2 grams	422.58 grams	428.00 grams
<i>Post Test Weight</i>	105.68 grams	106.56 grams	102.53 grams
<i>Total Mass Discharged</i>	323.52 grams	316.02 grams	325.47 grams
<i>Ignition Time</i>	N/A-no ignition occurred in 118 sec. when can appeared to be empty.	N/A-no ignition occurred in 109 sec. when can appeared to be empty.	N/A-no ignition occurred in 92 sec. when can appeared to be empty.
$t_{eq} =$	N/A no ignition was achieved	N/A no ignition was achieved	N/A no ignition was achieved
$D_{def} =$	N/A no ignition was achieved	N/A no ignition was achieved	N/A no ignition was achieved

### 3.1.3 Criteria:

An aerosol with a chemical heat of combustion less than 20 kJ/g for which no ignition occurs in the ignition distance test (see sub-section 31.4 of the UN Manual) is classified as flammable if the time equivalent is less than or equal to 300 s/m<sup>3</sup> or the deflagration density is less than or equal to 300 g/m<sup>3</sup>. Otherwise the aerosol is classified as non-flammable.

## 4.0 CONCLUSIONS

Based on the above test results, the following conclusion was made.

- 1) The material represented by sample # 10093 does not appear to be flammable by United Nations criteria for Enclosed Space Ignition testing. This is because no ignition was achieved in an enclosed space within the time that each of the dispenser's contents was discharged and the contents were discharged until no further discharging would occur. Therefore, a time equivalent less than or equal to  $300 \text{ s/m}^3$  or a deflagration density less than or equal to  $300 \text{ s/m}^3$  was not achieved.

The conclusions represent our interpretations of the test data, as defined by the listed test specifications. The conclusions contained in this report are for the customer's informational purposes only.

#### **5.0 DATA STORAGE**

The field data for this report is contained in Data Book #SLF 2010-1, and will be filed with Stresau Laboratory Document Control. No photographic or video documentation was made.

#### **6.0 TEST SERVICES**

For the benefit of our customers, Stresau Laboratory, Inc. will, on occasion, use outside testing services to either expedite or qualify our own testing capabilities.

**Report # 10093A Appendix A**

**EQUIPMENT QUALITY TRACEABILITY FORM**

Customer: Honeywell International  
Job Code: 4000  
Stresau Report #: HMT 10093A  
Procedure #: TP 253

Date: June 1, 2010

Report by: Racquel Z. Christner

Item	Mfg.	Model	Stresau Equip. #	Quality Status
TP 253				
Stopwatch	Fisher Scientific	06-662-50	1595	2
Temperature & Humidity	Dickson	TH625	1667	2
Balance	Mettler	PE 1600	0077	2
Thermocouple Thermometer	Omega	HH21	1080	2
Barometer	Princo Instruments, Inc.	453	N/A	1

Attach additional forms if needed

Equipment # = Traceable to Stresau Quality System

Status: 1 = Not in calibration system  
2 = Calibration current as of date listed.  
3 = Other. Attach MRR or other documentation as needed

FORM # 96C654

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