U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

JUL 10 2003

Ms. Barbara Konrad
Manager, Transportation Safety
Honeywell
P.O. Box 1057
Morristown, NJ 07962-1052

Ref. No. 02-0318

Dear Ms. Konrad:

This is in response to your letter, e-mail, and telephone conversation with Sandra Webb of my staff regarding the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to hermetically sealed sensing elements. Specifically, you request confirmation that the sensing elements once incorporated into their final product, may be transported without being subject to the HMR. I apologize for the delay in responding and hope it has not caused any inconvenience.

According to your letter, each sensing elements is a copper metal capsule that contains approximately 11 - 20 ml of certain flammable liquids and other gases listed below:

- Toluene, 3, UN 1294, PG II
- Ethyl ether, 3, UN 1155, PG I
- Flammable liquid, n.o.s. (Isopropyl alcohol), 3, UN 1993, PG III
- Isobutane, 2.1, UN 1969
- Ethyl chloride, 2.1. UN 1037

You further state that most of the sensing elements in the group contain toluene. However, all of the materials listed above function as a temperature sensing fluid inside the element.

You question the following scenario:

> The sensor elements are constructed (point A), "aged" and shipped to your assembly plant in accordance with the small quantity exception in § 173.4. At the assembly plant (point B), the sensor elements are incorporated into the final product. Each final product is placed in an intermediate packaging with cushioning and then placed into a strong, corrugated outer packaging and shipped to your distribution facility (point C). At the distribution facility, the outer packaging is broken down and the final products are placed with other non-hazardous materials and once again placed in a strong, corrugated outer packaging and shipped to customers (point D). In your opinion, because of the small quantities of hazardous materials, the sensor design, construction, and protective packaging, the sensors in the final products

shipped from point B to point C and point C to point D do not pose a significant hazard to health during transportation and, as a result, the sensors should not be subject to the HMR.

Based on the information you submitted and the information available to us, the final products containing the sensing elements are subject to the HMR for the following reasons:

1. Small quantities of Class 3, Division 4.1, Division 4.2 (PG II and III), Division 4.3 (PG II and III), Division 5.1, Division 5.2, Division 6.1, Class 7, Class 8, and Class 9 materials that also meet the definition of one or more of these hazard classes, are eligible for the small quantity exceptions in § 173.4. However, as noted, the Isobutane, 2.1, UN 1969 and Ethyl chloride, 2.1, UN 1037 sensors are Division 2.1 flammable gases and are not eligible to be transported under the small quantity exceptions in §173.4. These sensors must be transported as follows:

   a. With regard to the Isobutane sensor, it must be packaged in accordance with §§173.306 or 173.304 as designated in column 8A or 8B of the Hazardous Materials Table. However, you may take advantage of the limited quantities exception for compressed gases in § 173.306 provided all of the provisions are met. In addition, Isobutane packaged as a limited quantity, in accordance with § 173.306, that meets the definition of a consumer commodity may be reclassed as an ORM-D material and transported as a consumer commodity.

   b. With regard to the Ethyl Chloride sensor, there are no packaging exceptions authorized in Column 8A of the HMT. Therefore, it must be packaged in accordance with § 173.322 as designated in Column 8B of the HMT.

2. With regard to the Toluene, Ethyl ether and Flammable liquid, n.o.s. (Isopropyl alcohol) sensors, it is our opinion that they may be transported under the small quantity exceptions provided the quantity of the Class 3 material in the inner packaging does not exceed thirty (30) ml and all other provisions of § 173.4 are met. However, you may choose to take advantage of the limited quantities exceptions for flammable liquids in § 173.150 provided all of those provisions are met. In addition, if a flammable liquid is packaged as a limited quantity, in accordance with § 173.150, and meets the definition of a consumer commodity, it may be reclassed as an ORM-D material and transported as a consumer commodity.

I trust this satisfies your request. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

Susan Gorsky
Senior Regulation Specialist
Office of Hazardous Materials Standards

Honeywell

Honeywell
P.O. Box 1057
Morristown, NJ 07962-1057

Webb
§ 172.101 e
§ 172.101, F
Applicability
03-03/18

Pages = 3

VIA FAX (202) 366-3012

US Department of Transportation
Office of Hazardous Materials Standards
400 7th Street SW
Washington, DC 20590

Attention: ED MAZZULLO, DHM-10

Re: Request For Clarification On Applicability Of HMR To Hermetically-Sealed Copper Sensing Elements

Dear Mr. Mazzullo:

I am writing to you on behalf of Honeywell for guidance on the applicability of the Hazardous Materials Regulations (HMR; 49 C.F.R. Parts 171-80) to a group of hermetically-sealed copper sensing elements that contain small quantities (< 20 ml) of toluene or other fill materials. Because of the design, construction, and packaging of this group of sensing elements, Honeywell believes that the hazardous materials present in the elements do not pose a significant hazard to health during transportation and, as a result, that the group should not be subject to the HMR. The purpose of this letter is to describe the sensing elements and to seek clarification as to whether the group of elements is excepted from the HMR.

Description Of Sensing Elements. Each sensing element is a copper metal capsule, ranging from 2 to 4 inches in length and from 0.375 to 0.50 inches in width. A small amount (< 20 ml) of certain flammable liquids and/or gases (listed below) is introduced into each capsule. After each sensing element is hermetically sealed, the element is subjected to an aging process in which it is heated in an oven for 40 hours at temperatures ranging from 115 to 190 degrees Fahrenheit. During this process, no hazardous materials are released from the element, nor is there deformation or degradation of the element. The sensing elements cannot be broken apart absent the deliberate use of a tool.

The vast majority of elements in the group contain toluene (3, UN1294, PG II), which functions as a temperature sensing fluid inside the element. The following fill materials, with identical functions, also are contained in a minority of the sensing elements:

- Ethyl ether, 3, UN1155, PG I
- Flammable liquid, nos (isopropyl alcohol), 3, UN1993, PG III
- Isobutane, 2.1, UN1969
- Ethyl chloride, 2.1, UN1037

Packaging And Transport. The elements are offered for transportation by motor vehicle and cargo aircraft. As protection during transport, the sensing elements are first shipped in sturdy plastic bins. Once the elements are assembled into final products, they are shipped in strong outer packages. Both the sensing elements and the plastic bins in which they are transported have passed drop tests from 1.8 meters. Additionally, all of the elements subjected to compressive load tests passed without incident. The hermetically-sealed sensing elements have passed these rigorous tests and cannot be opened absent deliberate use of a tool. Therefore, the risk is negligible that hazardous materials will be released from the elements under conditions normally incident to transportation.

Conclusion And Summary. The design, construction, and shipment of Honeywell's class of sensing elements remove virtually all risk of leakage during transport. Honeywell therefore believes that the class of elements can be transported safely without being subject to the HMR.

For your reference, we have attached a letter of clarification dated November 6, 2000, in which you determined that certain sealed glass tubes containing trace gases were not subject to the HMR. We believe that the reasoning in that letter applies equally to Honeywell's group of sensing elements. Honeywell's sensors, in fact, are less hazardous to health during transportation because they are made of copper, not glass, and thus are effectively non-breakable.

We respectfully request that you confirm that Honeywell's group of elements is excepted from the HMR. We appreciate your attention to this matter. Should you have any questions or require additional information regarding Honeywell's sensing elements, please do not hesitate to call me at (973) 455-4009 or email me at barbara.konrad@honeywell.com.

Sincerely,

Barbara Konrad

Attachment

U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

JUL 10 2003

Ms. Barbara Konrad
Manager, Transportation Safety
Honeywell
P.O. Box 1057
Morristown, NJ 07962-1052

Ref. No. 02-0318

Dear Ms. Konrad:

This is in response to your letter, e-mail, and telephone conversation with Sandra Webb of my staff regarding the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to hermetically sealed sensing elements. Specifically, you request confirmation that the sensing elements once incorporated into their final product, may be transported without being subject to the HMR. I apologize for the delay in responding and hope it has not caused any inconvenience.

According to your letter, each sensing elements is a copper metal capsule that contains approximately 11 - 20 ml of certain flammable liquids and other gases listed below:

- Toluene, 3, UN 1294, PG II
- Ethyl ether, 3, UN 1155, PG I
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- Isobutane, 2.1, UN 1969
- Ethyl chloride, 2.1. UN 1037

You further state that most of the sensing elements in the group contain toluene. However, all of the materials listed above function as a temperature sensing fluid inside the element.

You question the following scenario:

> The sensor elements are constructed (point A), "aged" and shipped to your assembly plant in accordance with the small quantity exception in § 173.4. At the assembly plant (point B), the sensor elements are incorporated into the final product. Each final product is placed in an intermediate packaging with cushioning and then placed into a strong, corrugated outer packaging and shipped to your distribution facility (point C). At the distribution facility, the outer packaging is broken down and the final products are placed with other non-hazardous materials and once again placed in a strong, corrugated outer packaging and shipped to customers (point D). In your opinion, because of the small quantities of hazardous materials, the sensor design, construction, and protective packaging, the sensors in the final products

shipped from point B to point C and point C to point D do not pose a significant hazard to health during transportation and, as a result, the sensors should not be subject to the HMR.

Based on the information you submitted and the information available to us, the final products containing the sensing elements are subject to the HMR for the following reasons:

1. Small quantities of Class 3, Division 4.1, Division 4.2 (PG II and III), Division 4.3 (PG II and III), Division 5.1, Division 5.2, Division 6.1, Class 7, Class 8, and Class 9 materials that also meet the definition of one or more of these hazard classes, are eligible for the small quantity exceptions in § 173.4. However, as noted, the Isobutane, 2.1, UN 1969 and Ethyl chloride, 2.1, UN 1037 sensors are Division 2.1 flammable gases and are not eligible to be transported under the small quantity exceptions in §173.4. These sensors must be transported as follows:

   a. With regard to the Isobutane sensor, it must be packaged in accordance with §§173.306 or 173.304 as designated in column 8A or 8B of the Hazardous Materials Table. However, you may take advantage of the limited quantities exception for compressed gases in § 173.306 provided all of the provisions are met. In addition, Isobutane packaged as a limited quantity, in accordance with § 173.306, that meets the definition of a consumer commodity may be reclassed as an ORM-D material and transported as a consumer commodity.

   b. With regard to the Ethyl Chloride sensor, there are no packaging exceptions authorized in Column 8A of the HMT. Therefore, it must be packaged in accordance with § 173.322 as designated in Column 8B of the HMT.

2. With regard to the Toluene, Ethyl ether and Flammable liquid, n.o.s. (Isopropyl alcohol) sensors, it is our opinion that they may be transported under the small quantity exceptions provided the quantity of the Class 3 material in the inner packaging does not exceed thirty (30) ml and all other provisions of § 173.4 are met. However, you may choose to take advantage of the limited quantities exceptions for flammable liquids in § 173.150 provided all of those provisions are met. In addition, if a flammable liquid is packaged as a limited quantity, in accordance with § 173.150, and meets the definition of a consumer commodity, it may be reclassed as an ORM-D material and transported as a consumer commodity.

I trust this satisfies your request. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

Susan Gorsky
Senior Regulation Specialist
Office of Hazardous Materials Standards

Webb, Sandra

From: Konrad, Barbara (MTO) [barbara.konrad@honeywell.com]
Sent: Friday, February 21, 2003 1:40 PM
To: 'sandra.webb@rspa.dot.gov'
Cc: Schmolke, Colleen (MN10)
Subject: SENSOR INTERP


HON ethyl chloride sensor insi...


HON ethyl chloride sensor finl...


SENSOR SMALL QTY PKG.JPG

Sandra,

Thanks for speaking with me today. I understand your position on the sensors leaving our manufacturing facility in the plexiglass bins being subject to the HMR (small quantity exception 173.4) but would like an opportunity to explain in greater detail why the HMR should NOT APPLY to the sensors once they are incorporated into final products.

SENSOR TRANSPORTATION FLOW:

* Sensors elements are constructed (point A), "aged" (see below) then placed into rigid fiberglass bins for shipment to the assembly plant. You already have photos of the sensor elements. We will continue to ship these sensors, in the bins, in accordance with the small quantity exception in 49 CFR 173.4.
* At the assembly plant (point B) the sensor elements are incorporated into the final product. You already have a photo of the final product. These final products are wrapped in bubble wrap, placed into a Honeywell product box (cardboard) and then placed into an overpack (fibreboard box). These are then shipped to a distribution facility (point C) A copy of this packaging is provided below. We do not believe the shipment of the sensors from point B to point C should be covered under the HMR.
* At the distribution facility, the boxes are broken down and the individually packaged final products are placed (with other non-hazardous materials) an overpack (fibreboard box) for shipment to final customers (point D). We do not believe the shipment of the sensors from point C to point D should be covered under the HMR.

The facts supporting the non-applicability of the HMR are these:

* Sensors contain approximately 11 - 20 ml of hazardous material, a very small amount
* Sensors are made of metal and are hermetically sealed. It is virtually impossible for any hazardous material to escape from the sensors under conditions normally incident to transportation.
* Prior to shipment they are subjected to rigorous testing. This includes "aging" them in an oven at either 115F or 190F for a minimum of 40 hours. During this aging process, the sensors do not release any hazardous material and are not deformed in any way. This would indicate that even in an upset condition during transportation, hazardous material would not be released.
* The final products (with the sensor inside) are packaged one to a box with bubble wrap cushioning surrounding the product. This is then placed inside a Honeywell product box.
* These product boxes are packed 24 to a "case" (strong, solid fibreboard box). when shipped to our distribution

facility.
* From the distribution facility, each individual product box is packed (with other items ordered by our
customers) into a new overpack (strong, solid fibreboard box) and shipped to the customer.

Here are photos of the :

bubble wrapped sensor
<<Bubble wrapped sensor.JPG>>
the product box (containing the bubble wrapped sensor)

<<HON sensor product box.JPG>>

the overpack into which the product boxes are placed for shipment

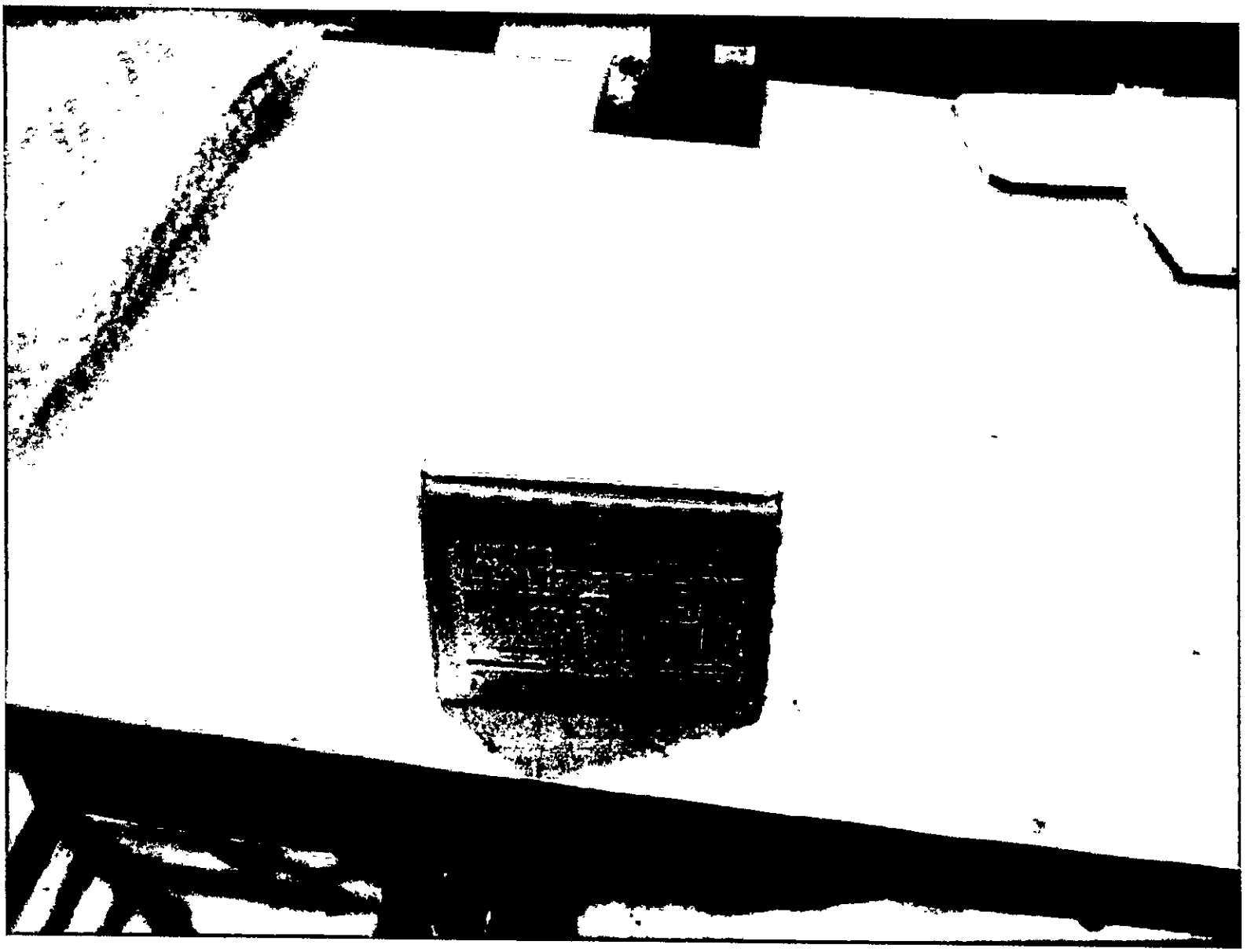
<<SENSOR OVERPACK.JPG>>

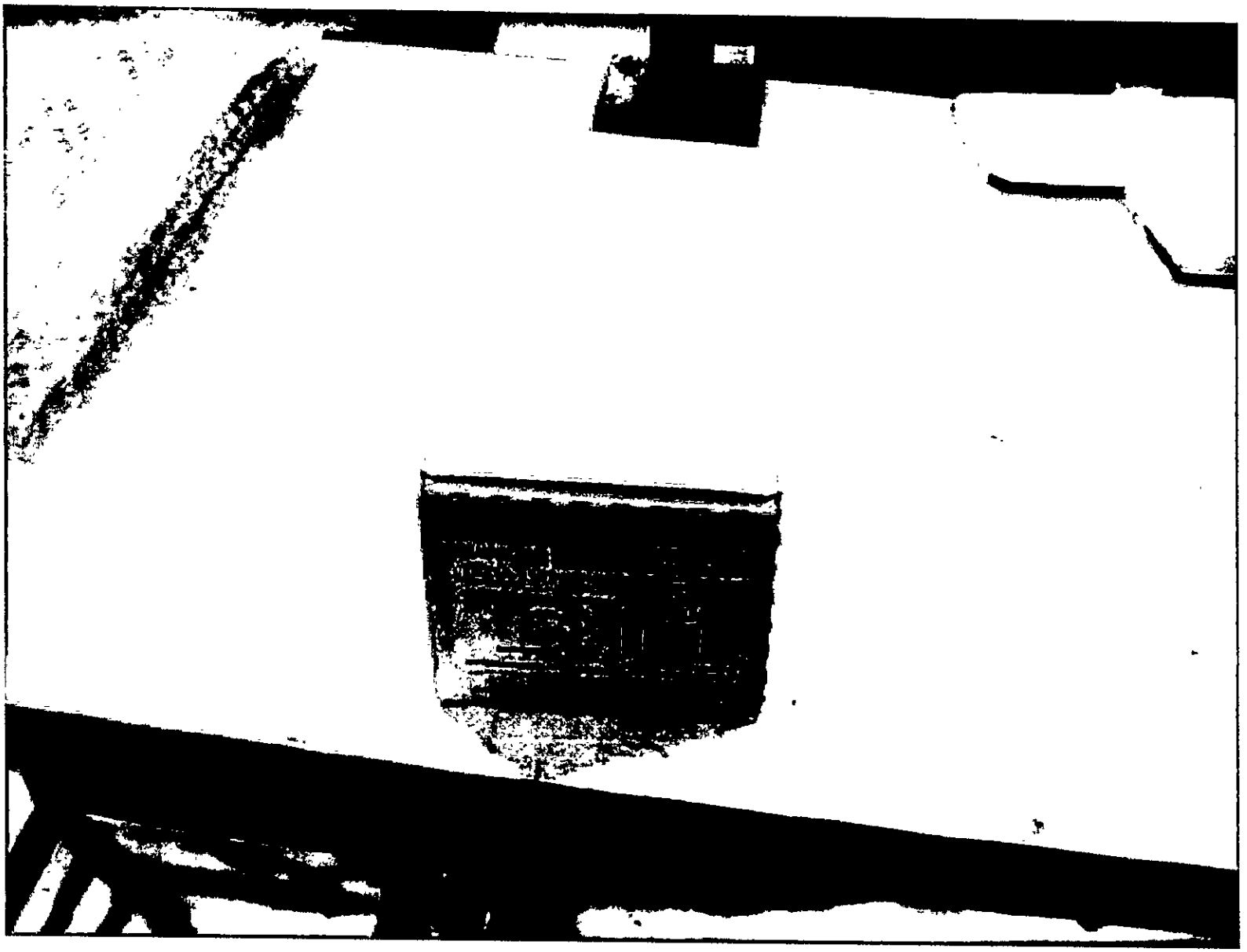
I hope this provides you with the additional information you need to determine that because of the small quantities, the
sensor designs and the protective packaging, the sensors in the final products are not subject to the HMR.

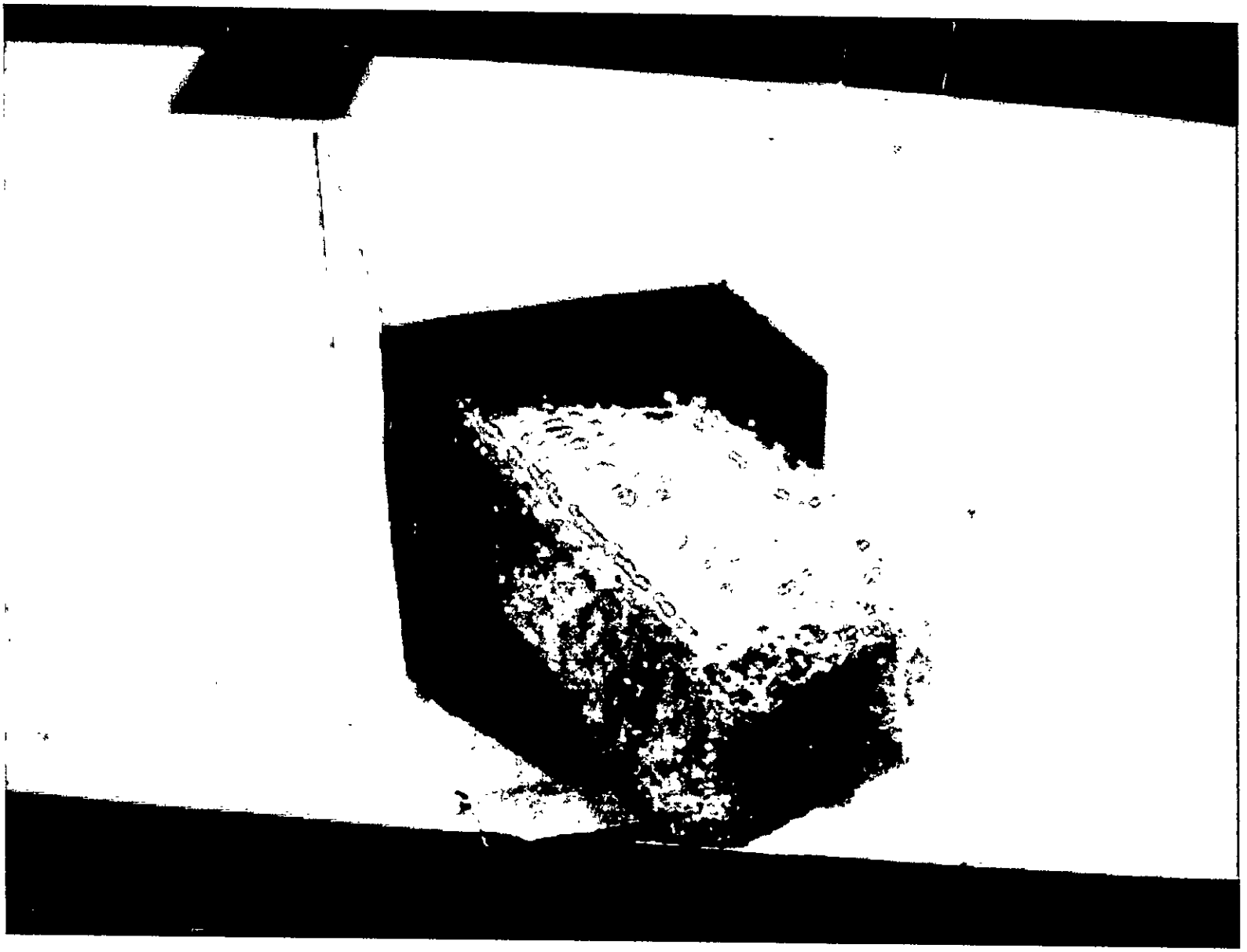
If you have any questions, please give me a call so we can discuss. I appreciate your comments and will work with you
in any way we can to resolve this issue. Thanks!

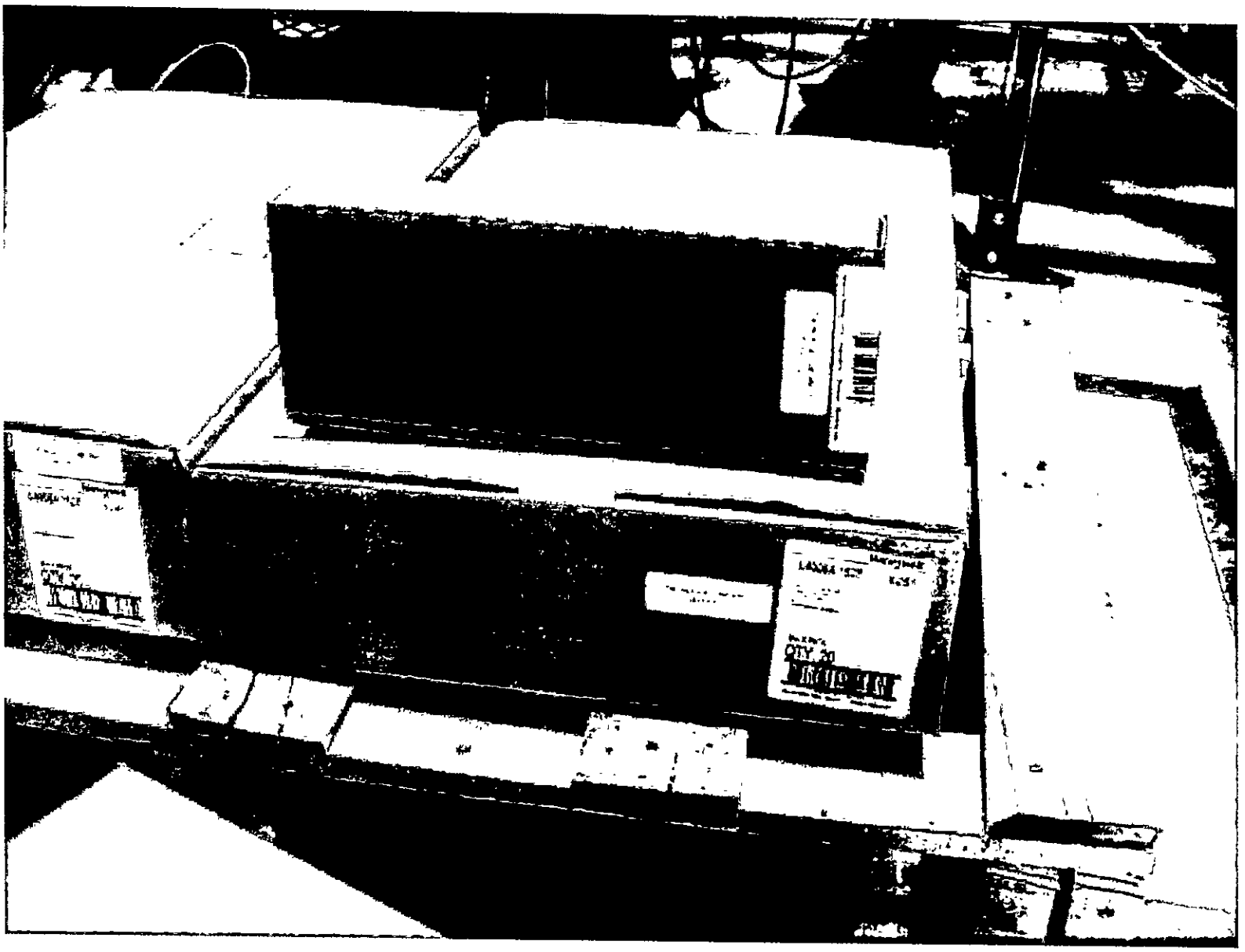
Barb

Barbara Konrad
Manager, Transportation Safety
973-455-4009 (phone) 973-722-2574 (cellular)
617-344-3093 (fax to PC) 973-455-3491 (alternate fax)









Honeywell

Honeywell
P.O. Box 1057
Morristown, NJ 07962-1057

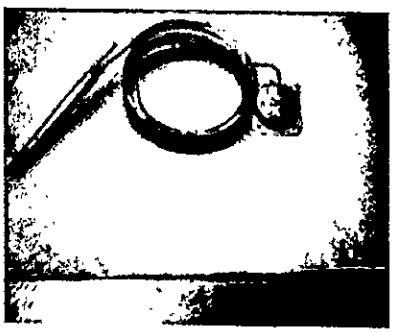
Via e-mail: sandra.webb@rspa.dot.gov

December 19, 2002

Associate Administrator for Hazardous Materials Safety
Research and Special Programs Administration
US Department of Transportation
400 7th Street, SW
Washington, DC 20590-0001
Attention: SANDRA WEBB - INTERPRETATIONS

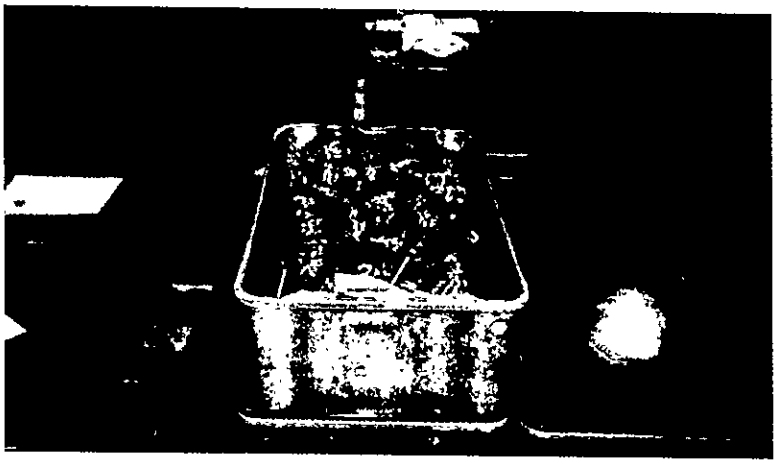
Re: Photos of Toluene Sensors and Shipping Bins

As a follow up to Honeywell's request for a formal interpretation on the applicability of the Hazardous Materials Regulations (HMR) to hermetically sealed sensing elements, we are providing photos of the sensing elements, the shipping bins and the final product which contains the sensing element.

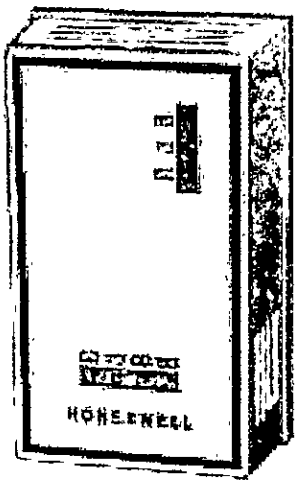


THIS IS A PHOTO OF THE SENSING ELEMENT AT MANUFACTURING FACILITY

The toluene is contained in the 3" long capsule in the left of the photo. These sensors are loaded into plastic bins (with covers) for shipment to final assembly facility. There the parts are incorporated into the final temperature sensing / control device.



These are the plastic bins into which are placed the temperature sensors. The covers at then snapped into place before shipping to the final product assembly location.



Each tempertaure sensor is assembled into the final products, individually boxed within final product packaging, and then shipped to a distribution center for shipment to customers.

The distribution center overpacks these devices into fibreboard boxes, usually with other non-regulated items.

As a separate attachment to this e-mail, I am including the .pdf engineering specification for the toluene sensors, which is identified as "ES05142".

I hope that this additional information is helpful. We look forward to hearing of your decision that these sensors are not subject to the HMR because they (1) contain such small amounts of hazardous material; (2) are constructed of solid, leak-proof metal; and (3) are over packed for shipment in either leak-proof plastic bins or in fibreboard boxes.

Should you require any additional information, please don't hesitate to call me at 973-455-4009 or via e-mail at barbara.konrad@honeywell.com.

Happy Holidays!

Barbara Konrad
Manager, Transportation Safety

Cc: Colleen Schmolke

H O N E Y W E L L

No. ES 15042

ENGINEERING SPECIFICATION

SOLID FILLED DIAPHRAGM TYPE SENSING ELEMENTS

Current Issue Date: 11/30/93 Released to Production: / /
Original Issue Date: 11/30/93 Supersedes: 04/23/85

Development No._____

	APPROVAL	DATE
DESIGN MANAGER (Section I):	D. M. Saunderson	
PROCESS MANAGER (Section II):	D. M. Putnam	
QUALITY MANAGER:		
REVIEWED BY:		

DISTRIBUTION	
ARL HTS	X
MEXICO	X
TOKYO	X
TORONTO	X

REVISION HISTORY

DATE	ECO	PAGES REVISED	DATE	ECO	PAGES REVISED	DATE	ECO	PAGES REVISED
Revised & 11/30/93	Retyped 92-1189	Supersedes 04/23/85						

SECTION I - GENERAL DESIGN SPECIFICATIONS

Current Issue Date 11/30/93

A. General Description of Device

These elements consist of a diaphragm head assembly with a capillary tube leading to a temperature sensing capsule. An averaging type element does not have a capsule, but has a large enough volume in the capillary so that it is the temperature sensing part of the element. These elements are completely filled with a thermal sensing fluid which expands with an increase in temperature. This volume increase in the fluid causes the diaphragm of the element to have its "Travel."

The specific characteristics of the elements are set forth in tabulation form on the element prints.

B. Definition of Terms

- The ranges listed on the element prints are not necessarily the limits of the elements but could be the limits of the requirements of the device for which an element is intended.
- The nominal diaphragm travel per degree F of change in temperature at the capsule is a reference value and is not to be checked.
- The active temperature is the temperature at which the diaphragm will not be more than .030" below the standard reference position taking into consideration the diaphragm position tolerance under filling conditions. At this temperature, the diaphragm must still be free to travel and not stop by the bottoming of the diaphragm housing.
- The maximum temperature is the highest temperature to which the element should be subjected. Higher temperatures could cause a calibration shift in the device to which the element is applied and/or a shortening in the life of the diaphragm if cycled to these temperatures.
- The maximum deflection at the maximum temperature is the travel above the standard reference position at this temperature. It is calculated from the element travel and the diaphragm position and tolerance under fill conditions. The diaphragm travel per degree is a reference value and so the maximum deflection is also for information purposes and not to be checked.
- The standard reference position is defined as the diaphragm position when the inside surface of the flat pad in the center of the diaphragm is in the same plane as a plane tangent to the lowest inside surface of the outermost convolution. This position and travel from this position is to be observed without diaphragm load.
- Deflection is the perpendicular distance, the center flat portion is moved from this plane. Deflection toward the housing is considered to be negative and away from the housing positive.

ATTN: BARBARA KONRAD

FROM: COLLEEN SCHMOLKE

0.0031 gallons Toluene / capsule = 11.73 mL Toluene

This number is an assembly number for liquid filled sensing element assemblies consisting of a powerhead assembly, a capillary, a capsule assembly, and fill range. Refer to DR 5362 for assembly details.

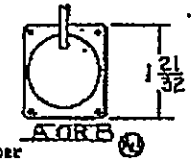
The addition of letters from a code will be used to indicate what constitutes the complete assembly. This number with three letters will indicate a complete assembly before filling.

The addition of a fourth letter will indicate a complete filled assembly applicable to a certain temperature range. With less than three letters, this number means nothing.

The code letters shall always be added in the following order:

(1) Powerhead Assembly (includes diaphragm & housing)
(2) Capillary
(3) Capsule Assembly (includes capsule, plug, and fill tube)
(4) Range (includes fill material and fill F.S.)

Following is a tabulation of the code:



POWERHEAD ASSEMBLY

A - Top Connecting Capillary
B - Top Connecting Capillary
C - Top Connecting Capillary & Welded Pad.

CAPILLARY

A	6-5/8" Copper	H	96" Copper	R	18' Copper
B	7-1/4" Copper	J	30" Copper	S	39-3/8" Copper (Kuwait only)
C	8-1/2" Copper	K	4' Copper (Amsterdam only)		
D	12" Copper	L	43-1/4" Copper	T	124' Copper
E	66" Copper	M	102' Copper	U	244' Copper
F	16-1/2" Copper	N	42" Copper	V	4-1/4" Copper
G	5-1/4" Copper	P	9-1/4" Copper	W	39-1/4" Copper
				Y	33-1/4" Copper
				Z	21-1/4" Copper

CAPSULE ASSEMBLY

A - Swaged Capsule - (125583 Ref.) — SWAGED CAPSULE - (125583 REF.) AND 2" MIN FILL TUBE
B - Flanged Straight Capsule - (197002-MAS.)
C - Flat Flanged Straight Capsule - (197001-Ref.)
D - Swaged Capsule - (123914 Ref.)

RANGE

	FILL MAT'L.	FILL F.S.	RANGE
A	Toluene (441)	15042	100° to 240°F
C	Silicone (1130)	15042	110° to 290°F
D	Toluene (441)	15042	60° to 200°F
F	Toluene (441)	15042	-30° to 70°F
H	Toluene (441)	15042	-40° to 140°F*
J	Toluene	15042	80° to 220°F
K	Toluene	15042	30° to 190°F
L	Toluene	15042	40° to 180°F
M	Tri-Nuc(P6D1K)	15042	0 to 100 F
N	Silicone Oil (1130)	15042	120 to 350°F.
P	TOLUENE (441)	15042	150° TO 270°F
Q	TOLUENE (441)	15042	110° TO 250°F

123914 Capsule for Range 120 to 350°F.
Note: THIS STRING CONTINUED ON 137936

* INACTIVE

AS	2-17-54	94-209	
AT	2-17-72	93-146	
AP	9-2-82	85-1327	
AU	3-31-87	8083-440	
REV	TITLE	E.O.	

AH	ADD(2) SPECS				
AK	ADD(1) SPEC				
AL	REVISED				
AM	ADD(1) SPEC				
AN	ADD(2) SPECS				
AP	ADD NOTE				
AR	ADD 4 SPECS				
AS	ADD W &Y SPECS				
AT	ADD V SPECS				
AU	REDRAWN-REVISED				
SYMBOL	REVISION	DATE	E.O.		

HONEYWELL INC.

Ref. No.
DR 5362
MD 4438

ELEMENT ASSEMBLY

DATE 7-23-69 DRWN B NELSON
CHKD. APPD
SUPERSEDES 11-22-55
SUPERSEDED BY Same

First used on L4005

108032XXXX

Toluene

SECTION II - FACTORY SPECIFICATIONS Current Issue Date 11/30/93

A. Process Requirements (cont.)

3. Instructions for Filling (cont.)

The evacuation chamber must be 400 mm Hg minimum before starting to measure evacuation times. The following equation may be used to calculate minimum pump times:

$$\text{Minimum time} = \frac{8.0 \times 10^{-6} VL}{D^3}$$

where:

time is in minutes
V = volume in cubic inches of the inside volume of the capillary plus the volume of the system to be evacuated through the capillary
L = the length of the capillary in inches
D = the inside diameter of the capillary in inches

Note: Use nominal piece part dimensions for this calculation.

d. Seal fill tube per element print.

4. Aging of Filled Elements

a. Age elements for 40 hours minimum in an oven at 115° ± 10°F or 190° ± 10°F. Select the temperature which is closer to and lower than the maximum temperature of the element, as specified on the element drawing. Do not exceed the maximum temperature of the element.

b. Reject all elements that do not meet the diaphragm deflection at standard temperature requirements.

Honeywell

Honeywell
P.O. Box 1057
Morristown, NJ 07962-1057

202-366-3012

Fax = 2 pages.

Via e-mail: sandra.webb@rspa.dot.gov

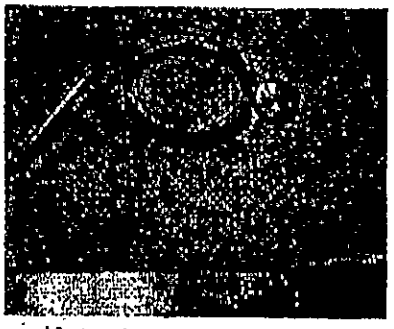
December 19, 2002

Associate Administrator for Hazardous Materials Safety
Research and Special Programs Administration
US Department of Transportation
400 7th Street, SW
Washington, DC 20590-0001
Attention: SANDRA WEBB - INTERPRETATIONS

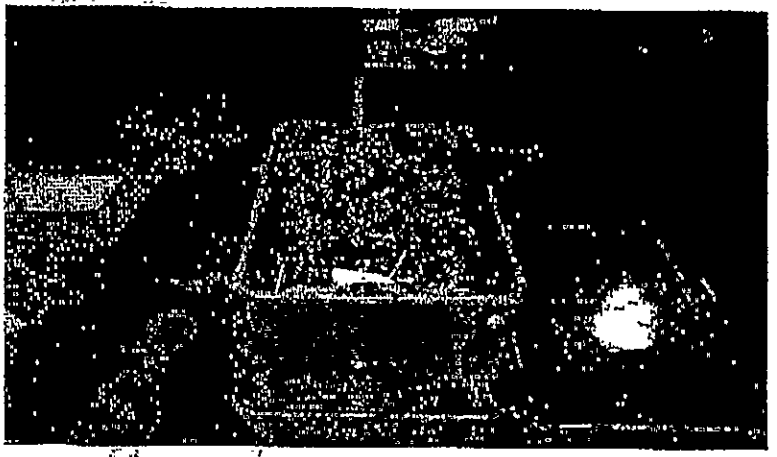
Re: Photos of Toluene Sensors and Shipping Bins

As a follow up to Honeywell's request for a formal interpretation on the applicability of the Hazardous Materials Regulations (HMR) to hermetically sealed sensing elements, we are providing photos of the sensing elements, the shipping bins and the final product which contains the sensing element.

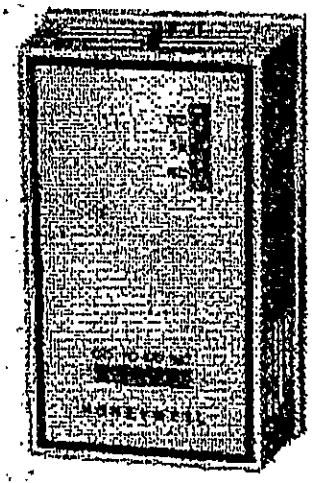
THIS IS A PHOTO OF THE SENSING ELEMENT AT MANUFACTURING FACILITY



The toluene is contained in the 3" long capsule in the left of the photo. These sensors are loaded into plastic bins (with covers) for shipment to final assembly facility. There the parts are incorporated into the final temperature sensing / control device.



These are the plastic bins into which are placed the temperature sensors. The covers at then snapped into place before shipping to the final product assembly location.



Each tempertaure sensor is assembled into the final products, individually boxed within final product packaging, and then shipped to a distribution center for shipment to customers.

The distribution center overpacks these devices into fibreboard boxes, usually with other non-regulated items.

As a separate attachment to this e-mail, I am including the .pdf engineering specification for the toluene sensors, which is identified as "ES05142".

I hope that this additional information is helpful. We look forward to hearing of your decision that these sensors are not subject to the HMR because they (1) contain such small amounts of hazardous material; (2) are constructed of solid, leak-proof metal; and (3) are over-packed for shipment in either leak-proof plastic bins or in fibreboard boxes.

Should you require any additional information, please don't hesitate to call me at 973-455-4009 or via e-mail at barbara.konrad@honeywell.com.

Happy Holidays!

Barbara Konrad
Manager, Transportation Safety

Cc: Colleen Schmolke