



U.S. Department  
of Transportation

**Pipeline and Hazardous  
Materials Safety  
Administration**

1200 New Jersey Avenue, SE  
Washington, D.C. 20590

JUN 19 2012

Mr. Andrew Stephan, Ph.D.  
Material Innovations, Inc.  
11020 Solway School Road  
Suite 108  
Knoxville, TN 37931

Ref. No.: 10-0047 and 10-0057

Dear Mr. Stephan:

This responds to your letters regarding transportation of hermetically sealed stainless steel neutron radiation detectors (electron tubes) containing various small quantities of Boron trifluoride, 2.3, UN1008, Hazard Zone B at atmospheric pressure or less under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

We have reviewed the information submitted in both of your letters. In your first letter, hermetically sealed stainless steel neutron radiation detectors (electron tubes) contain not more than one (1) gram of Boron trifluoride filled to atmospheric pressure or less, and packaged in specially- designed packaging. In the follow-up letter, the hermetically sealed stainless steel neutron radiation detectors (electron tubes) contain up to three (3) grams of Boron trifluoride filled to atmospheric pressure or less, and packaged in specially-designed packaging.

PHMSA regulates the transportation in commerce of materials it determines are hazardous in that "the amount and form [of the material] may pose an unreasonable risk to health and safety or property." 49 U.S.C 5103, as delegated to PHMSA in 49 C.F.R 1.53(b). Based on the information provided in your letters, including form and quantity of Boron trifluoride contained in the radiation detector tubes, the specifications of the detector, and the specially-designed packaging it is our determination the radiation detectors (electron tubes) containing not more than one (1) gram of Boron trifluoride, filled to atmospheric pressure or less, and packaged in the specially-designed packaging you described, are not in a quantity and form that pose an unreasonable risk to health, safety or property during transportation and, therefore, are not subject to regulation under the HMR. However, the radiation detectors (electron tubes) containing more than one (1) gram, including those containing up to three (3) grams of Boron trifluoride, although packaged in specially-designed packaging, are in a form and quality that may pose an unreasonable risk and, therefore, are subject to the HMR and regulated for purposes of transportation in commerce.

You may wish to apply for a special permit in accordance with the requirements in § 107.105 to ship the radiation detectors (electron tubes) containing three (3) grams or more of Boron trifluoride.

I hope this information is helpful. If we can be of further assistance, please contact us.

Sincerely,

A handwritten signature in black ink, appearing to read "Charles E. Betts", written in a cursive style.

Charles E. Betts

Director

Standards and Rulemaking Division

Mrs. Hattie L. Mitchell  
Chief, Regulatory Review and Reinvention  
U.S. DOT / PHMSA PHH-12  
1200 New Jersey Avenue, SE  
East Building, 2nd Floor  
Washington, DC 20590

March 15, 2010

Engrum  
§ 172.101  
Applicability  
10-0054

**Re: Request for Letter of Interpretation – Transportation of Small Quantities of BF<sub>3</sub> Gas**

Dear Mrs. Mitchell,

I am writing to request a DOT/PHMSA Letter of Interpretation regarding transport of small quantities of BF<sub>3</sub> gas.

Material Innovations, Inc. is developing neutron radiation detectors (electron tubes) containing small amounts of BF<sub>3</sub> (boron trifluoride, UN1008, Division 2.3, Hazard Zone B), BF<sub>3</sub> being essential to their operation. Besides BF<sub>3</sub>, they do not contain any hazardous materials nor pose any other special risk.

DOT/PHMSA has issued the following Letters of Interpretation and a Letter of Clarification to other companies confirming their BF<sub>3</sub>-based detectors are exempt from the HMR. These include:

- Letter of Interpretation Reference No. 07-0093 dated May 18, 2007 from Hattie L. Mitchell to Marjory Crawford, N. Wood Counter Laboratory, Inc.
- Letter of Interpretation (no reference number given) dated February 9, 1984 from Alan I. Roberts (Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau, DOT) to Marjory Crawford, N. Wood Counter Laboratory, Inc.
- Letter of Interpretation Reference No. 06-0241 dated April 18, 2007 from Hattie L. Mitchell to Spencer Neyland, LND, Inc.
- Letter of Clarification Reference No. 07-0089 dated May 16, 2007 from Hattie L. Mitchell to Spencer Neyland, LND, Inc.

Some of our detectors require up to three grams of BF<sub>3</sub>. To ensure their safety during transportation and operation, we have designed them with additional safety features that we believe make them safer than those referenced in the above mentioned letters, even with a total of three grams of BF<sub>3</sub> gas. These safety features are described in detailed in the attachments to this letter for your review and determination.

We hereby request a Letter of Interpretation stating that our detectors, when containing three grams or less of BF<sub>3</sub> at atmospheric pressure or less, pose no unreasonable risk to health, public safety or property during transport and thus are not subject to the HMR when designed and packaged per the specifications described in Attachment A: Detector Design and Packaging.

We also request Confidential Treatment as per 49CFR105.30 as this submission contains confidential information as per the Freedom of Information Act, 5 U.S.C. 552 and 18 U.S.C. 1905. A Request for Confidential Treatment is included as a separate letter attached to this one.

The following documents are included as attachments to this letter:

- Request for Confidential Treatment.
- Attachment A: Detector Design and Packaging.

**CONFIDENTIAL**



*Material Innovations, Inc.  
11020 Solway School Road, Suite 108  
Knoxville, TN 37931  
Phone: (865) 927-9807  
Fax: (865) 927-9809*

- Attachment B: BF<sub>3</sub> Detector (Electron Tube) Safety. (Historical data relevant to our request.)
- Attachment C: Classification and Properties of Boron Trifluoride. (Included for the convenience of DOT.)

We are submitting two copies of this package of documents; one copy contains all our confidential information, while the other copy has the confidential information redacted.

The primary use of our detectors is for national security applications, e.g. scanning vehicles and cargo containers entering the US for nuclear weapons / weapons material being smuggled by terrorists. The detectors currently used are going to become unavailable due to materials supply issues, which will severely impact the Department of Homeland Security's portal monitor deployment program beginning this summer if no suitable replacement technology is found. While other manufacturers' BF<sub>3</sub> detectors are not very suitable, ours have much better performance and can meet this critical national need. Due to the urgency and importance of this matter, we would greatly appreciate as fast a response as you can provide.

Please feel free to contact me ([andrew.stephan@materialinnovations.com](mailto:andrew.stephan@materialinnovations.com)) with any questions.

Sincerely,

A handwritten signature in black ink that reads "Andrew C. Stephan". The signature is fluid and cursive.

Andrew Stephan  
Material Innovations, Inc.

List of Attachments:

- Request for Confidential Treatment
- Attachment A: Detector Design and Packaging
- Attachment B: BF<sub>3</sub> Detector (Electron Tube) Safety
- Attachment C: Classification and Properties of Boron Trifluoride

Mrs. Hattie L. Mitchell  
Chief, Regulatory Review and Reinvention  
U.S. DOT / PHMSA PHH-12  
1200 New Jersey Avenue, SE  
East Building, 2nd Floor  
Washington, DC 20590

March 4, 2010

Engrum  
§ 172101  
Applicability  
10-0047

**Re: Request for Confidential Treatment Concerning Attached Request for Letter of Interpretation**

Dear Mrs. Mitchell,

We hereby request that DOT/PHMSA treat our request (dated March 4, 2010 and attached to this letter) for a Letter of Interpretation related to transportation of our BF<sub>3</sub> detectors (electron tubes) as confidential. This Request for Confidential Treatment is made under 49CFR105.30.

We have marked the appropriate pages as confidential and are submitting two copies of our submission package, one containing confidential information and the other with the confidential information redacted. The specific documents containing confidential information are this letter and Attachment A: Detector Design and Packaging.


The identified information is confidential based on exemption from public disclosure under the Freedom of Information Act, 5 U.S.C. 552 and due to being information referred to in 18 U.S.C. 1905.

Reasons for this include:

- The drawings of our detectors and accompanying explanations [REDACTED]
- The drawings of our detectors and accompanying explanations [REDACTED]
- Our confidential information was developed at our own expense.
- Public release of the identified confidential information would cause substantial damage to our company, such as by harming our competitive position, jeopardizing our ability to obtain patent coverage of our detector design innovations, impairing our ability to maintain certain pieces of information as trade secrets and causing material financial damage to our company.

Please feel free to contact me ([andrew.stephan@materialinnovations.com](mailto:andrew.stephan@materialinnovations.com)) with any questions.

Sincerely,

  
Andrew Stephan  
Material Innovations, Inc.