



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

March 27, 2025

Ms. Carolyn Norris
Project Manager
AECOM Technical Services, Inc.
5438 Wade Park Boulevard
Suite 200
Raleigh, NC 27607

Reference No. 24-0104

Dear Ms. Norris:

This letter is in response to your October 24, 2024, letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to classification of Division 4.2 self-heating substances. Specifically, is the alternative to the testing method described in the United Nations (UN) Manual of Tests and Criteria described in your letter have technical merit in this Office's opinion? According to your letter, the material to be tested exhibits the characteristic of a self-heating material; though, the exact test as described in the UN Manual of Tests & Criteria cannot be performed.

Yes. The method described in the UN Manual of Tests and Criteria, Test N.4—test method for self-heating substances—requires testing of samples in 25 mm and 100 mm cubes at discrete temperatures to establish whether a material meets the definition of a Division 4.2 self-heating material and to determine the packing group. You state that your alternative method mimics the test set out in the UN Manual of Tests and Criteria for the Division 4.2 self-heating material except that—due to the form of the material—you did not use a 25 mm or 100 mm sample cube. You state that the test was performed as a thin layer on a substrate measuring 152.5 mm x 152.5 mm—the form it will be in when offered for transportation. You note that your testing demonstrated that in this form, the material exhibits self-heating behavior.

In accordance with § 173.22 of the HMR, it is the shipper's responsibility to classify a hazardous material. This Office generally does not perform this function. However, based on the test data as described in your letter, we agree with your determination that it is appropriate to class the material—when offered as a thin layer on a substrate measuring 152.5 mm x 152.5 mm—as a Division 4.2 self-heating material.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

A handwritten signature in blue ink that reads "T. Glenn Foster". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

T. Glenn Foster
Chief, Regulatory Review and Reinvention Branch
Standards and Rulemaking Division

From: [INFOCNTR \(PHMSA\)](#)
To: [Dodd, Alice \(PHMSA\)](#)
Cc: [Hazmat Interps](#)
Subject: FW: Request for DOT PHMSA Regulatory Interpretation Division 4.2 Self Heating Substance UN Test
Date: Friday, October 25, 2024 12:13:56 PM
Attachments: [Request for DOT PHMSA Interpretation Self Heating Substance UN Test 10242024.pdf](#)

Hello Hazmat Interps,

Please see the attached request for a letter of interpretation.

Thanks,
Janaye

From: Norris, Carolyn <carolyn.norris@aecom.com>
Sent: Thursday, October 24, 2024 11:26 AM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Subject: Request for DOT PHMSA Regulatory Interpretation Division 4.2 Self Heating Substance UN Test

CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Mr. Shane Kelley and Hazardous Materials Information Center:

See attached request for a formal DOT PHMSA Interpretation letter concerning the Division 4.2 Self Heating Substance UN Test.

Let me know if you have any questions.

Thanks,

Carolyn E. Norris, DGSA
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October 24, 2024

Mr. Shane Kelley
Director, Office of Hazardous Materials Standards and Rulemaking Division
U.S. Department of Transportation/Pipeline and Hazardous Materials Safety Administration (PHH-10)
East Building, 2nd Floor
1200 New Jersey Avenue, SE
Washington, DC 20590-0001
Phone: (202) 366-8553
E-mail: infocntr@DOT.gov

Subject: Request for concurrence that due to the limitation of form, testing conducted on a solid material (substrate with Material A applied in a thin layer) rather than in a 25 millimeter (mm) or 100 mm sample cube may be used to establish whether a solid material should be classified as a Division 4.2 self-heating substance.

Dear Mr. Kelley:

In 49 CFR 173.124(b)(2), a Division 4.2 self-heating material is defined as:

A self-heating material is a material that through a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion. A material of this type which exhibits spontaneous ignition or if the temperature of the sample exceeds 200°C (392°F) during the 24-hour test period when tested in accordance with the UN Manual of Tests and Criteria...is classed as a Division 4.2 material.

We have a high surface-area substrate with Material A applied in a thin layer that *as shipped* behaves like a Division 4.2 Self-heating material PGII. However, we cannot perform the test set out in the most current UN Manual of Test & Criteria for the Division 4.2 Self-heating Substances (33.4.3.3) because we cannot form the material into the cube of the material (25 mm or 100 mm sample cube) as required by the test due to its form (thin layer applied on a substrate). The only variation from the UN test is not forming it into this cube.

Note that Material A itself has been tested by the manufacturer and does not meet the UN test criteria as a Division 4.2 self-heating material. The inert substrate alone does not meet the UN test criteria as a Division 4.2 self-heating material. Only when Material A is applied in a thin layer on the substrate does it exhibit these self-heating properties at a temperature exceeding 60°C. Note also that we eliminated any pyrophoric characteristic through testing. This substrate with Material A applied only exhibits Division 4.2 self-heating properties.

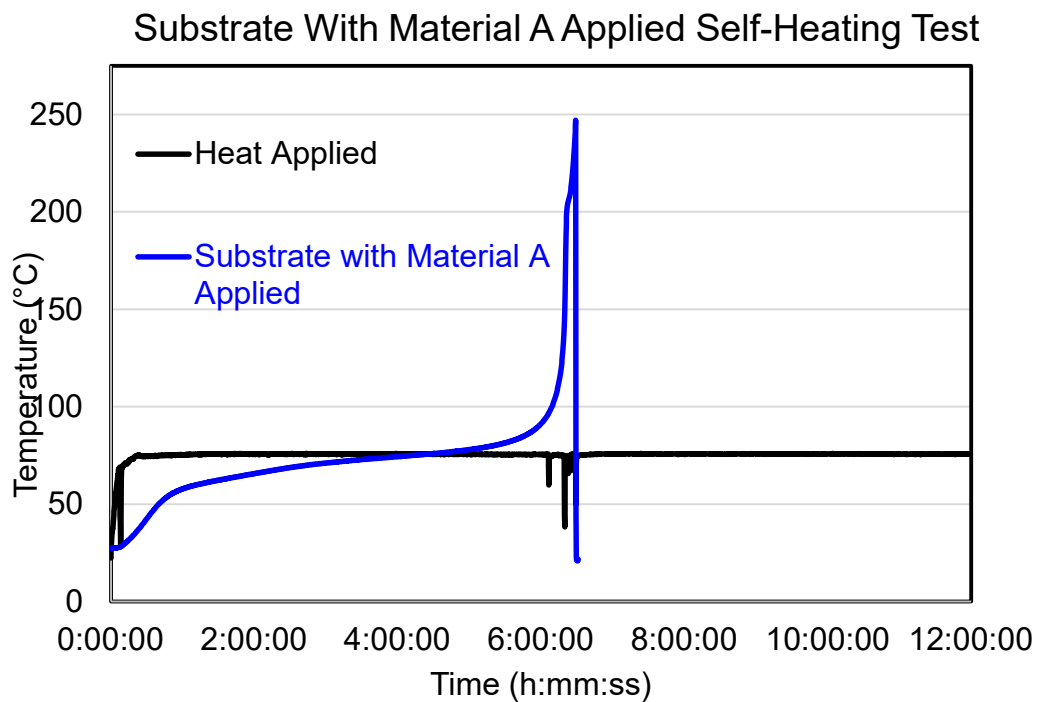
The test we ran mimics the test set out in the UN Manual of Test & Criteria for the Division 4.2 self-heating material except we did not use a 25 mm or 100 mm sample cube due to the form of the material. We ran the test on Material A applied as a thin layer on the substrate (15.25 centimeter (cm) x



Mr. Shane Kelley
Director, Office of Hazardous Materials Standards and Rulemaking
October 24, 2024

15.25 cm cube), as it would be shipped, and found it exhibits self-heating behavior. (See graphs of test results below.) May the test we conducted be used to support the Division 4.2 self-heating classification of this material, even though the exact test as described in the UN Manual of Tests & Criteria was not followed?

Note that there is a letter of interpretation (08-0214) that allows an alternative test for classifying as a self-heating material, although it was used to support classification as not self-heating, rather than self-heating.



We appreciate your consideration and response to this regulatory interpretation request.

Sincerely,
AECOM Technical Services, Inc.

Carolyn Norris
Project Manager