



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

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

AUG 18 2016

Mr. Steve Fielden
President/COO
Container Technologies Industries, LLC
375 Marcum Parkway
Kelenwood, TN 37755

Reference No. 16-0031

Dear Mr. Fielden:

This responds to your February 19, 2016 e-mail requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180), the International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material TS-R-1, and associated IAEA advisory material TS-G1.1. Specifically, you ask several questions concerning the target for free drop tests on Type A packages. Your questions are paraphrased and answered below:

Q1. You state that the IAEA advisory material TS-G1.1 provides more detailed guidance on target construction than currently found in § 173.465(c)(5) and in the TS-R-1. Given the guidance in TS-G1.1 you ask if it would be unacceptable to have a target constructed by simply placing a loose steel plate over a paved or gravel surface with unknown soil compaction and unknown soil density as flexure and deformation of the target in the vertical direction would not be in conformance with the requirements of an unyielding surface.

A1. The IAEA advisory material TS-G1.1 is not a document currently incorporated by reference into the 49 CFR. The HMR does not specifically authorize or prohibit particular methods of preparing or assembling the target for Type A package drop tests, but rather provides criteria that must be met. Section 173.465(c)(5) requires a target to be a flat horizontal surface of such mass and rigidity that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase the damage to the specimen. It is the opinion of this Office that this target configuration may be acceptable in some cases, such as for packages with a small gross mass, but unacceptable for packages with a larger gross mass. The requirement in § 173.465(c)(5) is that the target be of such mass and rigidity that increasing its resistance to displacement or deformation upon impact

by the specimen would not significantly increase the damage to the specimen. Said another way, the target must be of sufficient mass and rigidity that if you were to change the physical properties of the target by adding more mass to or increasing the rigidity of the target there would not be a significant increase in the damage to the specimen.

Q2. You quote guidance from the IAEA advisory material TS-G1.1 that states "the combined mass of steel and concrete should be at least 10 times that of the specimen to be dropped on it." You ask if given this guidance, a free drop test target constructed using a steel plate anchored and embedded in a thick concrete slab with a reaction mass greater than 10 times the mass of the specimen to be tested can be considered in compliance with the requirements of an unyielding surface. Specifically, you ask if a 1 inch steel plate anchored to a thick concrete slab with a total reaction mass of 350,000 lbs can be considered a suitable target for drop test specimens up to 35,000 lbs.

A2. As stated in A1 above, § 173.465(c)(5) requires a target to be a flat horizontal surface of such mass and rigidity that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase the damage to the specimen. It is impossible for this Office to determine that the target mentioned in Q2 would be compliant in all possible testing scenarios. If the properties of the specimen being tested (e.g. material of construction, design configuration, etc) are such, that when utilizing the specific target mentioned in Q2, that a change in the physical properties of the target by adding more mass to or increasing the rigidity of the target would result in a significant increase in the damage to the specimen then that target would not be compliant with the requirements in § 173.465(c)(5).

I hope this information is helpful. Please feel free to contact this Office if we can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Duane A. Pfund".

Duane A. Pfund
International Standards Coordinator
Standards and Rulemaking Division

Goodall, Shante CTR (PHMSA)

Webb
173.465
Type A Packaging, test
16-0031

From: Geller, Shelby CTR (PHMSA)
Sent: Monday, February 22, 2016 9:26 AM
To: Hazmat Interps
Subject: FW: Request for Clarification Type A Drop Test Requirement
Attachments: DOT Drop Test Letter.pdf

Dear Shante and Alice,

Forwarded is a request for a formal letter of interpretation. I spoke with Mr. Fielden.

Thanks,
Shelby

From: sfielden@ctifab.com [mailto:sfielden@ctifab.com]
Sent: Friday, February 19, 2016 4:04 PM
To: INFOCNTR (PHMSA)
Subject: Request for Clarification Type A Drop Test Requirement

Dear Sir/Madam,
Please see attached letter requesting clarification of requirements for the target for a free drop test.
You may contact me for any questions using the information below.

Thank you,
Steve
Steve Fielden
President/COO
Container Technologies Ind., LLC
375 Marcum Pkwy.
Helenwood, Tn. 37755
423-569-2800 x 35
(M) 865-603-2685

2/19/2016

Office of Hazardous Materials Standards,
Pipeline and Hazardous materials Safety Administration
Attn: PHH-10
U.S. Department of Transportation
East building
1200 New Jersey Avenue, SE
Washington, DC 20590-0001
Subject: Clarification of Type A Drop Test Requirements (Target for a free drop test)

Dear Sir/Madam:

As you are aware, demonstration of compliance for the free drop test specified in Pipeline and Hazardous Materials Safety Administration (PHMSA) DOT Regulation 49 CFR 173.465 (c) requires that the Target be a rigid and non-yielding surface. Specifically, 49 CFR 173.465 (c) 5 states the following:

- (5) *The target for a free drop test must be a flat, horizontal surface of such mass and rigidity that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase the damage to the specimen"*

Unfortunately, the lack of further guidance from PHMSA with respect to the design and construction of the target leaves some question as to the correct application of this requirement. For this reason, we are seeking PHMSA concurrence with our understanding of the basis for design and construction of the free drop test target as outlined herein:

1. In recognition of the alignment between PHMSA Hazardous Materials Regulations (HMR's) and International Atomic Energy Agency (IAEA) regulations, the guidance provided in IAEA regulations [Ref. 5, TS-R- (ST-1)] and [Ref.8, TS-G-1.1 (ST-2)] can be taken as a more detailed basis for design and construction of the free drop test target. The applicable provisions from IAEA regulations are as follows.

717.1 *The target for a drop test is specified as an essentially unyielding surface. This unyielding surface is intended to cause damage to the package which would be equivalent to or greater than that anticipated for impacts onto actual surfaces or structures which might occur during transport. The specified target also provides a method for assuring that analyses and tests can be compared and accurately repeated if necessary. The unyielding target, even though described in general terms, can be repeatedly constructed to provide a relatively large mass and stiffness with respect to the package being tested. So-called real targets, such as soil, soft rock and some concrete structures, are less stiff and could cause less damage to a package for a given impact velocity. In addition, it is more difficult to construct yielding surfaces that give reproducible test results, and the shape of the object being dropped can affect the yielding character of*

the surface. Thus, if yielding targets were used, the uncertainty of the test results would increase and the comparison between calculations and tests would be much more difficult.

717.2 *The combined mass of steel and concrete should be at least 10 times that of the specimen to be dropped on it.*

2. Given the guidance from IAEA regulations, it is unacceptable to have a target constructed by simply placing a loose steel plate over a paved or gravel surface with unknown soil compaction and unknown soil density as flexure and deformation of the target in the vertical direction would not be in conformance with the requirements of an unyielding surface.
3. Given the guidance from IAEA regulations, a free drop test target constructed using a steel plate anchored and embedded in a thick concrete slab with a reaction mass greater than 10 times the mass of the specimen to be tested can be considered in compliance with the requirements of an unyielding surface. More specifically, a 1" Steel plate anchored to a thick concrete slab with total reaction mass of 350,000 lbs can be considered a suitable target for drop test specimens up to 35,000 lbs.

Thank you in advance for your prompt consideration of this request. If additional information is needed, please see contact information below.

Sincerely,



Steve Fielden

President/COO

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