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

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

MAR 24 2004

Mr. H. Perry Hock
gh Package & Product Testing
and Consulting, Inc.
325 Commercial Dr.
Fairfield, OH 45014

Ref. No. 02-0232

Dear Mr. Hock:

This is in response to your letter requesting clarification of the requirements of the Hazardous Materials Regulations (HMR: 49 CFR Parts 171-180) regarding the marking and testing of a combination packaging. Your questions are paraphrased and answered below.

Q1. One combination packaging consists of an outer 4G fiberboard box and an inner metal can with a gross mass of 7.3 kg. Another combination packaging consists of an identical outer 4G fiberboard box and an inner glass bottle with a gross mass of 5.3 kg. May the packagings be marked with the highest gross mass tested, or must the packaging be dual marked with both the higher and the lower gross weights?

A1. For a packaging containing the inner glass packaging, in accordance with § 178.503(a)(3), it is not appropriate to mark the packaging to a higher gross weight than for which it was tested. The packagings may be marked with both specification markings. However, unless the non-applicable marking is covered or obliterated, the dual marks may cause confusion and could result in a violation of the regulations. The conditions for use would have to be clearly set forth in the notification to users required by § 178.2(c).

Q2. When testing a combination packaging and the specific gravity of the liquid is unknown, may we use the formula "PG drop height X desired gross mass ÷ actual package gross mass = adjusted drop height," which is based on the desired gross mass of the packaging, to determine the adjusted drop height under § 178.603(e)(2)(ii)?

A2. The formula you presented in your letter is not in accordance with the formula provided in § 178.603(e)(2)(ii) of

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178.503, 178.602

the HMR. Based upon the formula and the information provided in your letter the minimum acceptable drop height can be calculated without knowing the maximum specific gravity of the product that will be packaged. The correct formula derived from the revised drop height calculations presented in § 178.603(e)(2)(ii) is as follows:

H = (M-T) X D/W

Where

H = Drop height
M = Certified gross mass
T = Tare weight of packaging
D = Variable for correcting Packing Group (1.5, 1.0 or .67 meters)
W = Weight of water in kg or Volume of water in liters

Using the example from your letter (after converting to kg) the correct calculation is:

H = Drop height
M = 6.4 kg
T = 0.7 kg
D = 1.0 for Packing Group II
W = 3.8 liters or kg

H = (6.4-0.7) X 1.0/3.8 = 1.5 meters

Your formula provides for a drop height of:

H = 1.2 X 6.4/4.5 = 1.7 meters

If in all cases your formula provides for a height that is greater than the minimum required by the HMR, it is acceptable to use the greater height for package testing as the HMR provide the minimum requirements for testing a package.

I hope this information is helpful. If you have additional questions, please contact this office.

Sincerely,

Hattie L. Mitchell

Hattie L. Mitchell
Chief, Regulatory Review and Reinvention
Office of Hazardous Materials Standards

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McIntyre
§178.503
§178.602.
Marking + Testing
Packaging
02-0232

September 10, 2002

To: Mr. Edward T. Mazzullo
Director, Office of Hazardous Materials Standards
U.S. DOT/RSPA (DHM-10)
400 7th Street S.W.
Washington, DC 20590-0001

From: Mr. H. Perry Hock
Technical Director
gh Package & Product Testing and Consulting, Inc.

Subject: Marking and testing of Non–bulk performance-oriented packaging.

Dear Mr. Mazzullo,

I have several questions regarding the marking and testing of non-bulk packagings.

I have a client who has a 4G pack that is group I and weighs 7.3 kg. The inner packaging is a 4 liter metal can, 5 7/8" diameter with a height of 10 inches. The nozzle has a 0.887" opening and a screw cap with a liner is the closure of the can (specifics are not important).

The customer also packs in that 4G box an amber glass bottle with a screw cap that holds 1 gallon of a group I material. The maximum weight that the shipper places in the glass pack is 5.3 kg.

The shipper wants to know if he can use the UN/4G/X7.3/S/USA/+AP1234 (example mark) mark for both packs or do they need to dual mark the exterior pack UN/4G/X5.3/S/USA/+AP9876 (example mark). If the packing instructions are defined and clear enough that the packer knows that the amber bottle pack cannot exceed 5.3 kgs, could they then use the UN/4G/X7.3?

My second question is about the drop test and combination packs.

Currently, to determine the drop height on a combination pack filled with water or anti-freeze, one must know the specific gravity of the material of landing. Instead of determining the drop height based on the specific gravity, could a mathematical equivalent be used based on the marked gross mass? Using a ratio, you can determine the drop height based on the marked gross mass of the combination pack.

Group Level Drop Height x Desired Pack Weight = Adjusted Drop Height x Actual Pack Weight

Or re-written as:

$$\frac{GroupLevelDropHeight \times DesiredPackWeight}{ActualPackWeight} = AdjustedDropHeight$$

This actually yields a higher drop height since this not only takes into account the specific gravity of the lading, but the pack weight as well.

Example:

You have 1 gallon of a substance that is group II and the substance has a SG of 1.5, and the packaging materials weigh 1.6 lbs. The desired gross mass of the pack is 6.4 kg. The actual gross mass of the pack filled with water is 4.51 kg.

Using §178.603 (e)(2)(ii), the drop height is 1.5 X 3.3 feet = 4.95 feet

Using the ratio, the drop height would be:

$$\frac{GroupLevelDropHeight(3.9\,feet) \times DesiredPackWeight(6.4kg)}{ActualPackWeight(4.51)} = AdjustedDropHeight$$

$$5.53\,feet = AdjustedDropHeight$$

Allowing the use of the ratio would allow us as a testing facility to perform or tasks with alacrity.

I look forward to your response. If you need clarification or have questions regarding this letter, please call me at 513.870.0080.

Yours Truly,

H. Perry Hock
Technical Director
gh Package & Product Testing and Consulting, Inc.

HPH/hph