



U.S. Department  
of Transportation

**Pipeline and Hazardous  
Materials Safety  
Administration**

1200 New Jersey Avenue SE  
Washington, DC 20590

OCT 19 2012

Mr. P. Yohanne Gupta  
Director of Research and Development  
CEO  
IQ Products Company  
16212 State Highway 249  
Houston, TX 77086

Reference No.: 12-0227

Dear Mr. Gupta:

This is in response to your September 27, 2012 letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to aerosol containers. You provide extensive background information and ask two questions relating to hot water bath testing of metal aerosol containers. Your questions are paraphrased and answered below:

- Q1. During the filling and testing process of the hot water bath test, the flat-cup valve assembly permanently deforms. Does this occurrence render the container unsuitable for transportation?
- A1. The answer is yes. Section § 173.306(a)(3)(v) of the HMR specifies that when subjected to the hot water bath test, no leakage or permanent deformation of a container may occur. When the aerosol container is assembled, the valve mounting cup becomes part of the container. If the valve mounting cup exhibits permanent deformation as a result of filling and the hot water bath test, the container is not in compliance with § 173.306(a)(3)(v).
- Q2. If your company knowingly transports non-compliant, defective aerosol cans at the customer's insistence, would you be considered in violation of the HMR?
- A2. The answer is yes. While non-compliance with the HMR is determined on a case-by-case basis, § 171.1(c) provides that the requirements of the HMR apply to the transportation of hazardous material in commerce and to each person who transports hazardous material in commerce. Accordingly, as detailed in your incoming letter, you have correctly advised your customer of the safety issues.

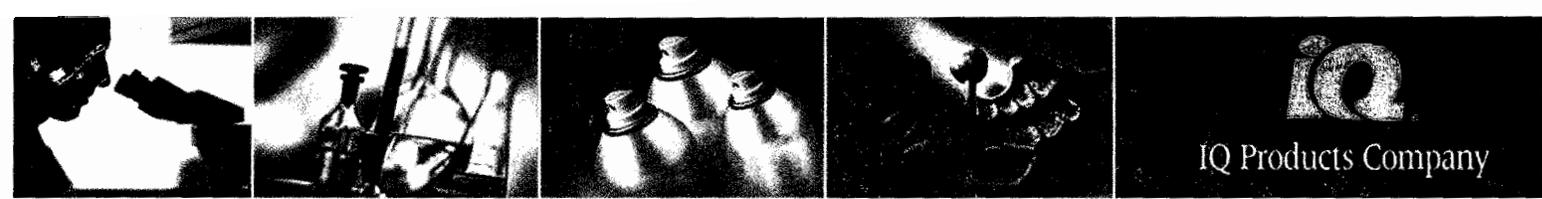
The continued manufacturing and/or transportation of a defective container constitutes a knowing and possible willful violation of the HMR which could be subject to civil and criminal sanctions that include penalties up to \$500,000 and imprisonment for not more than 10 years.

I trust this satisfies your inquiry. Please contact us if we can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Charles E. Betts", with a large, stylized flourish at the end.

Charles E. Betts  
Director,  
Standards and Rulemaking Division



**IQ**  
IQ Products Company

16212 State Highway 249  
Houston, Texas 77086-1014 U.S.A.  
Tel: (281) 444-6454  
Fax: (281) 444-0185  
Website: www.iqproducts.com

September 27, 2012

U.S. Department of Transportation  
Pipeline and Hazardous Materials Safety  
Administration  
East Building, 2nd Floor  
Mail Stop: E21-317  
1200 New Jersey Ave., SE  
Washington, DC 20590

*Babich*  
*§ 173.306*  
*Limited Quantity*  
*of Compressed Gases*  
*12 - 0227*

Office of Engineering and Research, PHH-20  
Attn: Dr. Carole LeBlanc, Director  
Richard Boyle, Acting Chief, Sciences, PHH-21  
Cheryl West Freeman, Acting Chief, Engineering, PHH-22  
James Simmons, Acting Chief, R&D, PHH-23

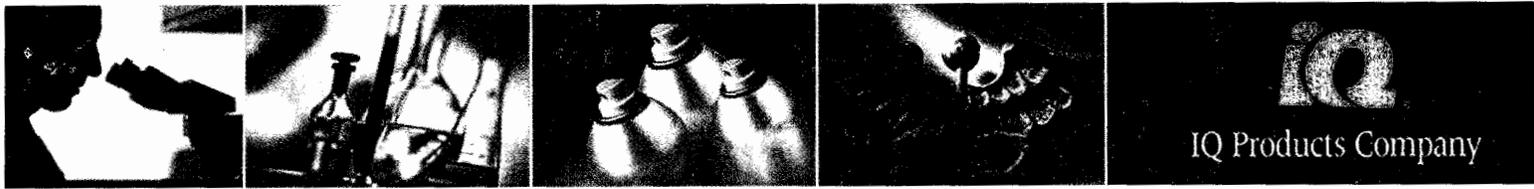
Office of Standards and Rulemaking, PHH-10  
Attn: Charles Betts, Director  
Ben Supko, Acting Chief, Standards Development, PHH-11  
Glenn Foster, Chief, Regulatory Review, PHH-12

Re: Specific Clarification of the Testing Methods and Compliance Requirements  
Described in 49 CFR 173.306, Limited Quantities of Compressed Gases

Dear Madam/Sir:

I write you this letter with the utmost sense of urgency and grave concern. IQ Products Company (IQPC) is a major manufacturer and packager of aerosol and non-aerosol consumer products based in Houston, Texas, in continuous business since the late 1950s through its sister companies.

A recent Engineering Methods and Manufacturing Process audit that we conducted at our facility exposed the use of improperly developed specifications and unacceptable manufacturing practices by one of our third party contract packaging business segment customers that were resulting in aerosol products that did not meet DOT's minimum requirements. Consequently, immediately upon becoming aware and confirming the facts, we ceased production of the affected products. In my capacity as the Director of



Research & Development (R&D) at IQPC, I am writing to respectfully request specific clarification of the testing methods and compliance requirements described in 49 CFR 173.306 to affirm the merit in the decision to cease production of said noncompliant products.

### **Background and Theory**

Aerosol containers can be described from a scientific perspective as “pressurized vessels”. Mandatory regulations, such as 49 CFR 173.306 ensure public safety by requiring that a minimum level of established scientific and engineering principles are utilized in the design and manufacturing of pressurized vessel (aerosol) products, making them safe when being transported in commerce and when being used by the consumer.

For example, the 130 °F hot water bath equilibrium testing relates to the instances when transporting aerosol products by highway. It is feasible that a transport trailer is subjected to high summer temperatures such that the interior contents are subjected to an adiabatic thermal equilibrium condition ( $\Delta Q=0$ ) at a constant temperature of 130 °F. This is foreseeable if a transport trailer is parked in the sun on a hot summer day or if an aerosol container is left in the hatchback of a car wherein the interior car temperature can reach 130 °F or more.

The DOT standard was thus established to enhance public safety by preventing aerosol containers from bursting under normally anticipated conditions. This safety standard is achieved by the mandatory requirement that each aerosol container is manufactured with (a) properly developed chemical compositions and (b) properly specified and selected package components, to prevent bursting due to internal content pressure that exists at 130 °F, as a minimum.

### **IQPC Manufacturing Process for IQPC Branded Products**

- I. In the beginning Research & Development (R&D) phase for IQPC’s Branded Products, we establish the chemical composition of any given product by empirically determining the (a) net concentrate to be filled to meet the stated label claim for weights and measures; (b) selection and amount of the propellant required to expel said concentrate; (c) the internal fill volume; (d) flammability of the product by testing in accordance to ASTM standards; (e) pressure-temperature profile up to burst (failure) end point for said composition in the selected container size, which also determines the 130 °F thermal equilibrium pressure condition in the laboratory. Our R&D Group then specifies the package components such as whether the aerosol container should be 2P or 2Q based on empirical data, and whether the aerosol valve should be flat-cup or conical-cup. After storage stability and requirements of various other tests and protocols have been met and satisfied, our R&D Group conducts a production line run of a few

thousand containers to establish "Product Specifications" for each new product by establishing the (a) chemical composition (weights and measures); (b) package component specifications; and (c) production line manufacturing methods, including Quality Assurance (QA) testing requirements.

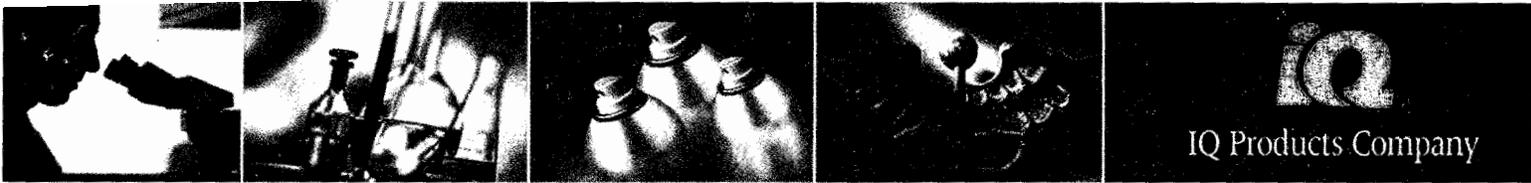
- II. The R&D Group determines the submerged residence time within the hot water bath on any given production line for a given production line speed. It then determines the hot water bath temperature to achieve the pressure inside each can that would be equivalent to the compositions pressure at 130 °F equilibrium condition that was earlier determined empirically in the laboratory. NOTE: Depending on the line speed and submerged residence time, the hot water bath temperature may exceed 130 °F, in most cases.
- III. In a test run, the R&D Group confirms whether each aerosol container exiting the hot water bath is reaching the 130 °F equivalent pressure. While submerged, inspectors look for bubbles from leaking cans and promptly remove them, if found. And, each can is visually inspected to ensure the absence of any deformation of any part of the aerosol container including the aerosol valve base and the aerosol can bottom, and if found, the cans are rejected. During this test run, if more than 1 or 2 cans are found to fail, the R&D Group stops the test run and returns to the laboratory to evaluate the chemical composition and the packaging component specifications and selection.

The test run is repeated until all concerns are addressed and results are found acceptable. After all these R&D exercises are completed satisfactorily, the new "Product Specifications" are formalized and approved for actual production.

- IV. Production is scaled up slowly and manufacturing process specifications are adjusted, if needed, over the first few production runs, to address unanticipated abnormalities unique to each new chemical composition.

### **Manufacturing Process at IQPC for Third Party Contract Packaging**

Unlike with our own branded products, product composition and packaging component specifications are developed and supplied by our contract packaging customers with said responsibility confirmed in writing by contract. In such circumstances, our R&D Group is not engaged for establishing Product Specifications, as our scope of work only involves following customer supplied specifications. IQPC ensures that it follows DOT regulations in its role as a packager and shipper of such items, but we rely on the affirmative representations of our customers when they affirm product composition and packaging component specifications are compliant with existing regulations and statutes.



## **Results of the Engineering Methods and Manufacturing Process Audit**

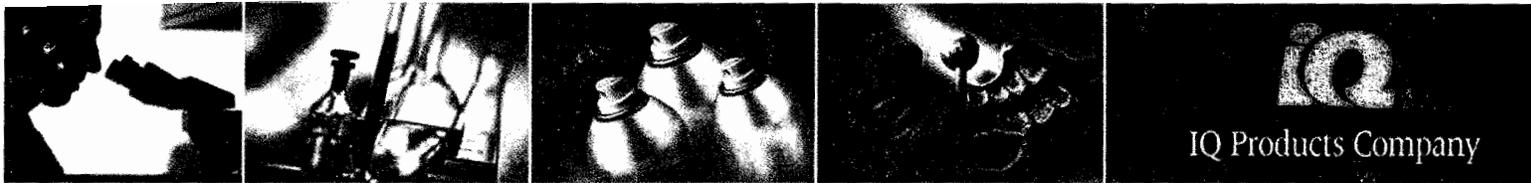
The audit conducted at IQPC was deemed necessary because of unusual and abnormal production results that occurred using the Customer's specifications over several months before we made the decision to cease production. The Customer dictated production composition and packaging component specifications to IQPC for the packaging process. In the case of this particular product that we had been manufacturing under contract for the Customer, the liquid concentrate is a flammable solvent and the propellant is Carbon Dioxide (CO<sub>2</sub>) gas. Selection and specifications for the chemical composition and package components were the responsibility of our Customer by written agreement, of which we were repeatedly assured. Furthermore, IQPC is indemnified against any damages arising out of product failure, whether resulting from defects in the chemical composition or packaging components.

Our audit revealed that:

- (a) the Customer's Product Specifications have not been properly developed using scientific and engineering principles;
- (b) the Customer's specifications result in internal aerosol container pressures that are too high when tested using minimum DOT standard requirements; and most alarmingly
- (c) that the Customer's selection of "flat-cup" aerosol valve in this high-pressure composition rendered the product defective because during and after the filling process, the flat-cup of the metal valve was "deforming permanently" in violation of 49 CFR 173.306(a)(3)(v), which states "No leakage or permanent deformation of a container may occur."

## **First Request for Clarification from DOT:**

We submit that in any aerosol container, metal deformation (i) will only occur at the weakest structural part of the container; (ii) will be permanent because the pressures inside the aerosolized container will always be greater than atmospheric pressure; and (iii) will result in metal fatigue at the deformation that, if further stressed, will be the point of rupture (failure). We submit that the high CO<sub>2</sub> pressure during filling and testing causes the "flat-cup" valve to deform permanently, rendering the product noncompliant and unsuitable for transport or sale. Is our interpretation of the referenced DOT standard regarding permanent deformation of the container correct?



**Second Request for Clarification from DOT:**

IQPC has refused to continue packaging our Customer's product that has defective specifications. Although we are indemnified by our Customer, if we were to knowingly transport these noncompliant, defective aerosol cans at the customer's insistence, would IQPC be considered in violation of DOT requirements?

**Conclusion:**

We have advised our Customer of our concerns and urged them to advise the DOT and the Consumer Product Safety Commission (CPSC) repeatedly since May 2012, which they have refused to do. Additionally, we have advised our Customer of the DOT requirements and the applicable penalties for knowingly transporting and selling noncompliant products, which they have elected to ignore. It is our understanding that our Customer has at least two other contract manufacturers in the United States making products using the same undeveloped or improperly developed Product Specifications with undoubtedly the same results of noncompliance due to failing the 49 CFR 173.306(a)(3)(v) "no permanent deformation" DOT standard. As a result, millions of cans of defective aerosol products continue to be introduced into commerce in the United States, compromising public safety. A large number of the noncompliant products previously made by IQPC remain in our warehouses.

IQPC is not willing to wait any longer out of courtesy to our Customer and we intend to meet and notify the DOT and the CPSC, urgently. In the interest of public safety, if the DOT must proactively act, we are willing to come up to Washington, D.C. to meet and bring the underlying facts to enable your team to take the next steps as you deem necessary. Please contact us with the earliest date when we can meet in your offices.

I request and await your prompt response.

Sincerely,  
IQ PRODUCTS COMPANY

P. Yohanne Gupta  
Director of Research & Development  
CEO

YG/JTB/MY/lc  
cc: TK, MW