



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

NOV - 6 2000

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

Mr. John Buetow
President and CEO
Buck Research Instruments, LLC
5375 Western Ave.
Boulder, CO 80301

Ref. No. 00-0133

Dear Mr. Buetow:

This responds to your letter and telephone conversation with Dr. George Cushmac of the Office of Hazardous Materials Technology regarding the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to your ionization cells that contain a trace amount of nitric oxide. You intend to offer these cells to air carriers for domestic and international air transportation and it is your opinion that they should be excepted from the HMR.

You state that the ionization cells are used in a Lyman-alpha hygrometer, a humidity measuring instrument, and are made of thick glass tubes which are 1" long and $\frac{3}{4}$ " in diameter. Each tube contains a trace (1/47.5 of an atmosphere) amount of nitric oxide under vacuum. Ten tubes are placed in an intermediate packaging with cushioning and then placed into a strong, corrugated outer packaging. In your opinion, if the tubes were to break or leak while in transportation, the nitric oxide would immediately mix with air and be rendered nontoxic.

Under the HMR, nitric oxide is classed as a Division 2.3 toxic gas. However, it is also our opinion that because of the trace amount of nitric oxide in each tube and the manner in which it is packaged, the tubes would not pose a significant hazard to health during transportation and, therefore, are not subject to the HMR.

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

Sincerely,


Edward T. Mazzullo
Director, Office of Hazardous
Materials Standards



00-0133

172.101

April 25, 2000

Edward Mazzullo
US Department of Transportation
Research and Special Programs Administration
Office of Hazmat Safety
400 7th Street SW
Washington D.C. 20590

Dear Mr. Mazzullo:

I am writing you regarding a package I was sending by air to an atmospheric research agency in Germany. The package was red flagged because the invoice listed the contents as "10 Nitric oxide ionization cells". The regulation cited was the nitric oxide, compressed listing in the hazmat table (HMR 49 CFR 172.101 and UN 1660), which is for large, highly pressurized, metal cylinders of nitric oxide (NO). The regulation forbids transport of NO cylinders by air because NO is a hazard class 2.3 gas poisonous by inhalation as defined by HMR 49 CFR 173.115. Based upon the evidence I am presenting in this letter about the size of the NO ionization cells, the amount of NO involved, the opinion of George Cushmac of RSPA, the steps we go through to protect the cells in transit, the cells' end use and the number of years they have been used without incident, I am asking for a letter of clarification of the regulations that states that these NO ionization cells are not subject to this regulation and can be safely transported via aircraft.

The NO ionization cells are thick glass tubes that are 1" long and 3/4" in diameter. These cells are first evacuated to 10-5 Torr, then backfilled with 16 Torr of NO, which is roughly 1/50th of an atmosphere. I have enclosed drawings of the tubes to show the volume of gas involved. If the tubes were to develop a leak, air would be sucked into them, diluting the NO concentration. If the tubes were to break, it is the opinion of George Cushmac (202-366-4493) of RSPA that the amount of NO contained within the tubes is insufficient to cause a danger to anyone and that they would be safe to transport by air.

We package the tubes to protect them from breakage by first wrapping the individual tubes in bubble wrap. Then we put the wrapped tubes into a coffee can and fill any voids with additional bubble wrap and/or styrofoam peanuts. Then we put the coffee can into a thick, corrugated cardboard box. Buck Research Instruments, LLC and the manufacturer (Glass Technologists of Annapolis, MD) have regularly shipped these detector tubes for a total of 25+ years. In that time, we have never had a tube break in transit.

The NO ionization cells are used to detect ultraviolet light in a Lyman-alpha hygrometer, which is a high-speed humidity measurement instrument originally developed in 1960 by the Naval Research Lab. The Lyman-alpha hygrometer has been used worldwide ever since by universities and atmospheric research agencies (e.g. NASA, NOAA and NCAR) on hundreds of different research aircraft. There has never been a safety issue with any of the people flying the research aircraft about having the NO ionization cells on their aircraft.

We want to make certain that we are working within the rules and regulations of the US DOT. Therefore we are asking for this letter of interpretation. Please expedite your reply.

Sincerely,



John Buetow
President and CEO