



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

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

APR 24 2002

Mr. John Terry
Aerostatic Engineering
495 East Brokaw Road
San Jose, CA 95112

Reference No. 00-0117

Dear Mr. Terry:

This is in response to your letter concerning the purging of a propane cylinder that will be offered for transportation by aircraft under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). You enclosed materials on outline your procedures for purging cylinder to a point where the fuel to air ratio is below 2 percent. You inquired how far under 2 percent is purging required. We apologize for the delay in responding and regret any inconvenience it may have caused.

As you state, § 173.29(b)(2)(ii) requires that a cylinder be sufficiently cleaned of residue and purged of vapor to remove any potential hazard to be considered as not regulated under the HMR. The methods and limits used for determining what qualifies as a "cleaned and purged" under the HMR are intentionally not defined because they vary greatly depending on the properties of the particular hazardous material and type of packaging. In the case of propane, other variables such as purge medium, temperature conditions and cylinder volume are also factors. We would consider a propane cylinder to be sufficiently cleaned and purged when the vapors in the cylinder are no longer capable of sustaining combustion. Of course, when a cleaned and purged cylinder is offered for transportation by aircraft, the cylinder valve must be left open to preclude internal pressure buildup, as prescribed in packing instruction 200 of the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air.

I hope this satisfies your request.

Sincerely,

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



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U. S. Department of Transportation
Research and Special Programs Administration
Office of Hazardous Material Standards DHM-10
400 7th. St. SW
Washington DC 20590

Dear Mr. Edward Mazzuilo

I operate an FAA certified hot air balloon repair station (T4YR452N) in San Jose, California. As one of the services provided by the repair station, I prepare hot air balloon systems for air shipment.

I have had a number of customers comment on trouble they have had with recent air shipments. Hot air balloons have propane fuel tanks, usually four tanks of 10 to 18 gallon capacity. FAA and ICAO rules require the tanks be empty and purged with the service valves open.

With twenty years experience working on balloons, I know how to safely empty a tank. I also know how to purge a tank. All the purging processes I know of leave some residual propane vapor in the tank. Propane has a flammable range of approximately 2 to 10 percent. That means that when the fuel/air ratio is less than 2 percent the mixture will not burn.

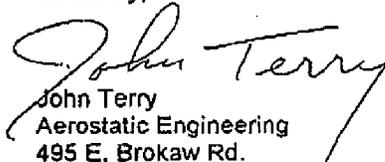
NO ONE HAS BEEN ABLE TO TELL ME HOW FAR UNDER 2% I NEED TO PURGE FOR AIR SHIPMENT. I have conducted a number of tests with various purging methods and various purging gases. The resultant data defines how much purging is required to reach a desired percent fuel/air ratio. (Data attached)

I have read your "Interpretation Letter" on tank purging and found it totally inadequate. There are no specific numbers for propane purging, therefore a person doing the purging has no idea if he has met the requirements.

Could you please provide a more definitive "Interpretation Letter" that defines a "safe" purged propane tank in terms of an "Acceptable percentage remaining propane vapor"? Those of us who ship propane tanks would be glad to comply with whatever requirement is indicated, but we need a specific quantitative definition of a satisfactorily purged propane tank.

Thank you for your help in this matter.

Sincerely,


John Terry
Aerostatic Engineering
495 E. Brokaw Rd.
San Jose, CA 95112

cc:
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