U.S. Department
of Transportation
Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Ave., S.E.
Washington, DC 20590

DEC 12 2008

Mr. Ken Broussard
President
Climate Controlled Containers, Inc.
P.O. Box 667
Groves, TX 77619

Ref. No. 08-0206

Dear Mr. Broussard:

This responds to your letter concerning the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to a cargo container that includes an independent and automatic cooling and heating system powered by two rechargeable, non-spillable, lead-acid electric storage batteries. The container would either be placed into a unit load device (ULD) or secured to a pallet for loading into the cargo compartment of an aircraft. It is your understanding that such a cargo container containing regulated hazardous materials operating in flight as part of a process is subject to the HMR and may also be subject to operations and certification standards required by the Federal Aviation Administration (FAA).

Your understanding of the HMR requirements is correct. The HMR except hazardous materials required aboard an aircraft in accordance with applicable airworthiness requirements (e.g., fuel, batteries) and operating regulations (e.g., supplemental crew oxygen, oxygen generators, emergency egress systems). The cargo container you describe does not fall into either category. The non-spillable batteries used to power the cargo container are excepted from the requirements of the HMR under the conditions specified in § 173.159(d). However, the pressurized, non-flammable and non-toxic refrigerant (R134) used in the cooling system is fully subject to the requirements of the HMR, including marking and labeling of the cargo container, shipping papers (including certification), and emergency response information.

I suggest that you contact the FAA for other applicable requirements. I trust this adequately addresses your concerns. Please contact us if we can be of further assistance.

Sincerely,

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

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KEN BROUSSARD
409 963 2137

~~08 (274)~~

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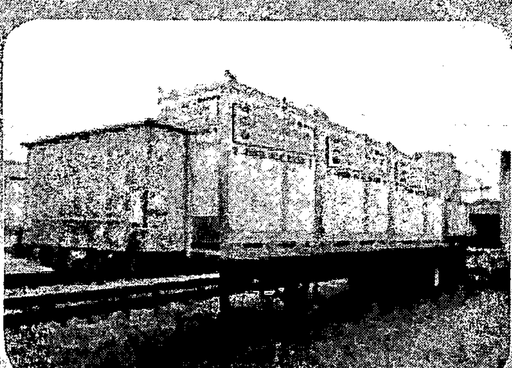

Climate Controlled Containers

RPS-60-100 Refrigerated Shipping Container 60 Cu. Ft.

This Container employs a high-efficiency, CFC-free refrigeration system for cooling when the outside is warmer than the payload, and electrical heating elements to prevent payload freezing when the outside is colder. Temperature control is ±1.8°F (±1°C) for the most critical payloads. High performance vacuum panel insulation technology allows thin sidewall and door construction for maximum cargo area. Standard control point is 39°F (4°C), with setting options available. It will accept either our custom reusable aluminum pallets or standard 48" x 40" GMA pallets, yielding over 60 cubic feet of payload space.

The Container may be run or recharged from any 115/230 VAC, 10A/5A power outlet, and will run on it's internal batteries for up to 100 hours*. It may optionally be equipped with temperature recording or communication and tracking capability to verify your shipment has been at the required temperature while in transit.

The Climate Controlled Containers refrigerated pallet sized shipping unit allows you to pay only for the refrigerated space you need. It may be consolidated with non-refrigerated cargo to eliminate expensive refrigerated LTL shipment costs. It may be used as stationary battery backed-up cold storage for critical materials.

*Based on 39°F (4°C) control point set to ±3.6°F (2°C) control bandwidth with full charge and day-night cycle averaging 90°F, no door openings. Other control points will have different hold times in the same conditions.

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Features

- Precise temperature control ±1.8°F (±1°C) in ambient temperatures of -4°F (-20°C) to 110°F (43°C)
- Multiple units allow multiple payload temperatures on one truck
- Units are stackable three high and lockable with truck door style 2-point cam latch
- Accepts durable aluminum or standard 48" x 40" GMA pallets
- Can run on AC line power or internal batteries
- Easily handled with forklift – 3-way access from door end and both sides
- Environmentally friendly! No dry ice contamination. No hazmat CO_2 or exhaust emissions. No truck engine idle required.
- Optional Position Tracking & Temperature Logging and Reporting via Internet subscription
- Ship and drop loads during off-hours with fewer traffic issues.

Main Specifications

Internal Temperature Set Point: 39°F(4.0°C) ±1.8°F (1.0°C) in ambient conditions of -4°F(-20°C) to 110°F(43°C)

Max operating temp: 120°F (49°C) ambient

Dimensions: External: 81.25"H x 47.5"W x 88L (including latches). Internal: 54"H x 41.5"W x 52"D

Cargo Capacity: 60 ft³ (1.8 m³), 3000 lbs

Empty Weight: 1850 lb with full battery set

Power Input: 115 VAC (50-60 Hz) at 10A, or 230 VAC (50-60 Hz) at 5A

Hold Time: Internal battery, 100 hours in 90°F (32°C) ambient with wide control bandwidth of ±3.6°F (±2°C) or 90 hours with narrow bandwidth of ±1.8° (1°C)

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Materials Safety
Administration**

JUN 26 2007

1200 New Jersey Ave., S.E.
Washington, DC 20590

Mr. Marshall S. Filler
Obadal, Filler, MacLeod
& Klein, P.L.C.
117 North Henry Street
Alexandria, VA 22314-2903

Ref. No. 07-0051

Dear Mr. Filler:

This responds to your letter dated January 16, 2007, concerning the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to a cargo container that includes an independent and automatic cooling system powered by a rechargeable lithium-ion battery. The cargo container, identified as the Kelvinbox Tracking Environmental Deviation System (T.E.D.S.), is loaded into the cargo compartment of an aircraft. It is your understanding of § 175.8(a)(2) of the HMR that such a cargo container (LD3) containing regulated hazardous materials operating in flight as part of a process would be excepted from the HMR as "hazardous materials required aboard an aircraft in accordance with the applicable airworthiness requirements and operating regulations."

Your understanding is not correct. The HMR except hazardous materials required aboard an aircraft in accordance with applicable airworthiness requirements (e.g., fuel, batteries) and operating regulations (e.g., supplemental crew oxygen, oxygen generators, emergency egress systems). The T.E.D.S. unit you describe does not appear to fall into either category. As such, the lithium-equivalent content of the lithium-ion battery (42 grams) used to power the T.E.D.S. cargo container would indicate that it is fully regulated under the HMR. See 49 CFR 173.185. In addition, the gross weight of the lithium-ion battery (41.3 kg) would indicate that it is forbidden on passenger-carrying and cargo-carrying aircraft. See Column (9B) of the "lithium battery" entry in the § 172.101 Hazardous Materials Table and § 172.102, Special Provision A100.

we are also aware that the T.E.D.S. cargo containers may be subject to operations and certification standards required by the Federal Aviation Administration.

You may suggest that your client apply for a special permit as provided in § 107.105 of the HMR. The Special Permits office may be reached at (202) 366-4535.

I trust this adequately addresses your concerns. Please contact us if we can be of further assistance.

Sincerely,

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

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§175.8
Exceptions
07-0051

Obadal, Filler, MacLeod & Klein, P.L.C.

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Telephone Extension 114

January 16, 2007

VIA E-MAIL TO:

John J. Hickey
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Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591-0004

James J. Ballough
Director, Flight Standards Service (AFS-1)
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591-0004

Robert A. Richard
Acting Associate Administrator for
Hazardous Materials Safety (PHH-1)
Department of Transportation
400 Seventh Street, SW
Washington, DC 20590-0001

Re: Refrigerated Cargo Container

Dear Sirs:

We represent Tednologies, Inc. We are writing to request Federal Aviation Administration (FAA) and Pipeline and Hazardous Materials Safety Administration (PHMSA) concurrence in the following plan for obtaining approval of a cargo container that includes an independent and automatic cooling system powered by a rechargeable lithium-ion battery. Once FAA approval has been obtained, we believe the unit would be excepted from the Hazardous Materials Regulations (HMR) as required equipment pursuant to 49 CFR § 178.8(a)(2).[1]

Background

The unit, presently identified as the Kelvinbox Tracking Environmental Deviation System (T.E.D.S.), is essentially an LD3 cargo container. Its purpose is to transport temperature sensitive goods as freight aboard passenger and cargo aircraft.

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[1] Which provides, in part, that:

(a) Operator equipment. This subchapter does not apply to—

...

(2) Hazardous materials required aboard an aircraft in accordance with the applicable airworthiness requirements and operating regulations. Items of replacement for such materials must be transported in accordance with paragraph (a)(3) of this section. *(Emphasis added)*

A prime application of this technology is the shipment of pharmaceuticals which are extremely susceptible to heat during loading and unloading of aircraft, and therefore difficult to transport as air cargo. We have also received a great deal of interest from those involved in delivering perishable goods to remote locations, primarily within the state of Alaska.

While the T.E.D.S. container is covered by FAA Technical Standard Order (TSO) TSO-C90c, titled "Cargo Pallets, Nets, and Containers," the integrated cooling system is not.

We have learned in recent conversations with FAA personnel that the Aircraft Certification Service (AIR) and Flight Standards Service (AFS) have been reviewing this matter. Our understanding is that the issues being discussed relate primarily to the manner of obtaining a design approval and how maintenance would be performed on the units.

Kelvinbox T.E.D.S. Description

The container is a rigid and insulated structure designed to meet the requirements of FAA TSO-C90c. In this regard, it is similar to many containers approved through this TSO.

The distinctive feature is the integrated autonomous cooling system. Unlike "passive" cooling of containerized cargo using dry ice, gel packs or other cooling media, the container is "active" in that it monitors and maintains a pre-determined temperature using a traditional mechanically operated refrigerant cooling system.

Power for the cooling and monitoring system is provided by a rechargeable lithium-ion battery. This battery is only charged on the ground by plugging a cord into a conventional electrical outlet; the process will not take place while the container is on-board the aircraft. The design includes protective circuitry – a "fuse" to prevent a rapid discharge (external load) and cell to cell "fuses" to cut off an internal (battery) short.

Certification and UN Testing History

Initial steps toward certification under TSO-C90c were taken through ASW-190 (TSO application SP8352SC-Q). That application is dormant and will be withdrawn in the near future as we finalize the design and manufacturing details.

Because exclusive production of the container will occur in Alaska, the application under TSO-C90c will be submitted to the Anchorage, Alaska ACO and the manufacturing quality system will be under the jurisdiction of the Wichita MIDO.

In addition to operational testing of the air conditioning module itself, the following tests have been successfully completed on the container assembly and documented accordingly:

- Temperature variation
- Temperature and altitude
- Ultimate load
- Rapid decompression
- Electromagnetic emissions
- Crash safety impulse
- Operational shock
- Burning rate

The lithium-ion battery has passed all required testing pursuant to United Nations/International Civil Aviation Organization HAZMAT requirements.

Proposed Plan

Design approval issues: We propose that Notice 8150.4, titled "Non-TSO Function(s) Integrated into TSO Articles," (Notice), be used to evaluate the design of the integrated cooling system as further described below. This would be accomplished during the Technical Standard Order Authorization (TSOA) application process under TSO-C90c and the criteria set forth in the Notice.

There is no aircraft to ULD interface other than the usual aircraft restraint or locking device. Based on the criteria set forth in paragraph 4 of the Notice (see below), we believe that all pertinent design issues can be resolved through the above process and without the necessity for a Supplemental Type Certificate (STC).

Operations and maintenance issues: Operational issues would be addressed as outlined in Advisory Circular (AC) 120-85 titled "Air Cargo Operations." Specifically, each operator would be responsible for ensuring that the carriage of these containers was authorized in accordance with its Weight and Balance and/or Cargo Loading Manuals. Since the TSOA process requires an applicant to provide instructions for maintaining the units and other pertinent continued airworthiness information, that issue can also be resolved within the proposed framework.

Hazardous Materials Regulations

Once FAA approval has been granted, the lithium-ion battery would then be excepted from the Hazardous Materials Regulations (HMR) as "required equipment" under 49 CFR § 175.8(a)(2).[2]

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[2] See *supra* note 1.

As noted in the preamble to the final rule titled "Prohibition of Oxygen Generators as Cargo in Passenger Aircraft" by the predecessor agency to PHMSA, the Research and Special Programs Administration (RSPA): "RSPA does not regulate, and the HMR do not apply to, components of the aircraft itself."[3]

Approval of Non-TSO Functions

Although the project has thus far resulted in some confusion among ASW-190 staff about how the container should be approved, Notice 8150.4[4] sets forth the pertinent guidance. Specifically, paragraph 4, titled "Policy" provides as follows:

> **a. Definition of a Non-TSO Function.** A non-TSO function is one that is not covered by a TSO-approved minimum performance standard (MPS), does not support or affect the hosting article's TSO function(s), and could technically be implemented outside of the TSO article. A manufacturer may choose to integrate a non-TSO function into a TSO article to support a foreign airspace requirement; minimize the amount of line replaceable units and interconnect wiring systems in an aircraft installation; address a specific customer/industry need; or for product differentiation. Non-TSO function(s) may be included and accepted on a non-interference basis, as part of a manufacturer's TSO submittal, and a TSO authorization issued for the article, if the manufacturer demonstrates that it meets all of the following conditions:
>
> (1) The hosting article is eligible for TSO authorization and meets the applicable TSO performance requirements, per FAA Order 8150.1B, Paragraph 17a(1) and 17a(2);
>
> (2) There is no applicable TSO for the non-TSO function;
>
> (3) The added non-TSO function does not affect or interfere with the hosting TSO article's required MPS or violate any limitations imposed by the hosting TSO; and,
>
> (4) The hosting TSO article's environmental qualification, hardware and software design assurance levels adequately support the non-TSO function. *(Emphasis added)*

The non-TSO cooling function should therefore be accepted as part of the TSO submittal because it meets this definition and satisfies the stated conditions: It is not addressed in the relevant TSO; its presence has no impact on the TSO-C90c performance standard; and the container, or "hosting article," meets the standard. The

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[3] 61 FR 68952, December 30, 1996.

[4] The Order is dated September 29, 2006, with a cancellation date of September 29, 2007.

final stated condition is inapplicable because there is no design interface between the cooling system and the container structure other than structural support.

FAA Engineering Review

The same paragraph in the Notice also provides guidance for an engineering evaluation:

> **d. ACO Evaluation Criteria.** If, following early coordination between the ACO and the manufacturer, it is determined that the non-TSO function is of a simple nature where the performance is easily understandable, ACO review of the manufacturer's declared performance requirements should simply become part of the normal TSO data application evaluation. However, the ACO should require a concurrent Type Certificate (TC) or Supplemental Type Certificate (STC) project evaluation if it is determined that the added non-TSO function(s): (*Emphasis added.*)
>
> (1) Is complex and difficult to review and fully understand without a concurrent installation evaluation;
>
> (2) Has a high degree of system flight deck to pilot interface;
>
> (3) Are of a simple nature individually but combined in such a way or in sufficient quantities to meet the criteria of 4d(1); or
>
> (4) Incorporates new or novel technology.

The non-TSO cooling function is of basic design. It is not complex individually or when combined with other such containers, it has no flight crew interface, and it is a not new or novel technology.

In fact, a similar version of the most technologically advanced aspect of container, the lithium-ion battery, is currently approved to power the emergency lighting system on the Airbus A380 aircraft.[5] Concerns identified in granting that approval are largely inapplicable in our situation. Specifically, the risks associated with overcharging will not apply because the container is not recharged on the aircraft; reduced capacity that results from over-discharging would only result in reduced cooling capacity; and the battery does not utilize flammable liquid electrolyte.

Since there will be no unique interface with the airplane, evidence that an STC is not necessary can be found in paragraph 315 of AC 120-85, which states, in part, that:

> As appropriate to the type design, the specification of which ULDs are compatible with the particular airplane should be identified in the airplane

[5] See, "Special Conditions: Airbus Model A380-800 Airplane, Lithium-Ion Battery Installation," docket No. NM352; Special Conditions No. 25-339-SC.

> weight and balance or cargo loading document. This is the primary means for ensuring the proper ULDs are used in the operation of the airplane. *(Emphasis added)*

As such, installation of the container would be governed by the Weight and Balance Manual and/or Cargo Loading Manual of the aircraft on which it is loaded.

Finally, Notice 8150.4, Appendix 2, paragraph 5 specifically states that:

> **Q: Is a deviation request (reference 14 CFR §21.609) required when a manufacturer incorporates a non-TSO function in a TSO article?**
>
> A: No. The addition of a non-TSO function is not considered a deviation to the hosting TSO article. In fact, the policy of this Notice requires the manufacturer to demonstrate to the TSOA-issuing ACO that the non-TSO function in no way impacts the required performance of the hosting TSO article.

In summary, we propose that the FAA evaluate the design of the T.E.D.S. container under TSOA-C90c (as supplemented by Notice 8150.4) without the necessity of an STC. We will work closely with the FAA during the TSOA process to ensure that appropriate continuing airworthiness information is provided. Further, because the equipment would be carried in accordance with the airworthiness, operations and maintenance rules, we submit that it would be excepted from the HMR under 49 CFR § 175.8(a)(2).

We hope this letter explains the article and clarifies the issues related to the anticipated application under TSO-C90c with the Anchorage ACO. Please let me know if you have any questions or require further information.

Sincerely,

Marshall S. Filler

Marshall S. Filler

cc: Dave Cann (AFS-300)
Dave Hempe (AIR-100)
Ali Bahrami, Manager, Transport Airplane Directorate (ANM-100)
Gregory J. Holt, Manager, Anchorage ACO (ACE-115N)
Margaret Kline, Manager, Wichita MIDO (ACE-115W)