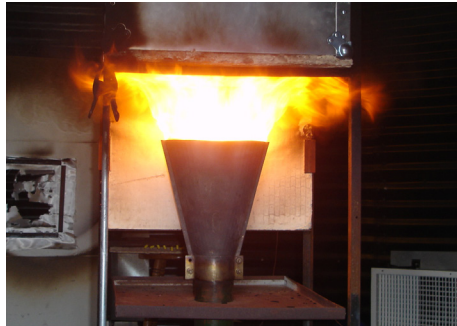
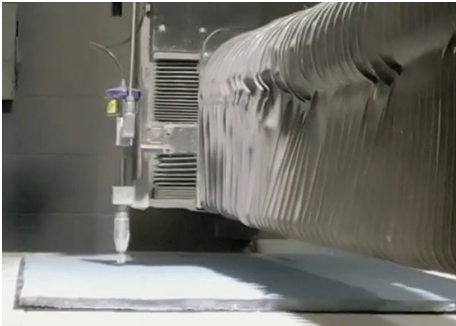


## AKROTHERM: ENGINEERING A NEW STANDARD FOR FIRE-RESISTANT, REGULATORY-COMPLIANT PACKAGING

### OVERVIEW

AKROTHERM is an advanced packaging material engineered to provide superior fire resistance and thermal management for containers shipping flammable hazardous goods. It has become essential for transporting oxygen and other sensitive materials, particularly in high-risk environments such as aerospace and logistics. Designed to comply with strict packaging regulations, AKROTHERM excels in fire resistance and thermal control, passing the Flame Penetration and Thermal Resistance tests. Americase developed AKROTHERM through a strategic partnership with AkroFire, a phase change materials and rigid foams expert, raising the bar on the safe air transportation of oxidizers. AKROTHERM use in protective packaging solutions has been expanded from oxygen packaging to containers for shipping and storing lithium-ion batteries.



### THE PROBLEM

After the 1996 ValuJet crash, the U.S. Department of Transportation (DOT) / Pipeline and Hazardous Materials Safety Administration (PHMSA) introduced rigorous regulations for oxidizer containers, requiring them to pass Flame Penetration, Thermal Resistance, and ATA-300 Drop Tests. Meeting these standards required materials with exceptional fire resistance and heat stability, without adding excessive weight or complicating workflows. Most traditional fiberboard or plastic packaging options failed to meet the new demanding requirements. Additionally, most traditional packaging was susceptible to issues like condensation, debris, and mold, compromising safety and performance. The industry required a robust, innovative solution.

### THE SOLUTION

Americase collaborated with AkroFire—specialists in phase-change materials and rigid foams—to create AKROTHERM. This material absorbs and redistributes heat to form a fireproof, insulated barrier. Lighter than alternatives, it offers superior flame resistance and heat management, validated by rigorous testing and compliance data. Americase's AKROTHERM-based packaging meets these standards:

- 49 CFR 173.302 / 49 CFR 173.608
- ATA 300 Category 1
- UN Packing Group 1

## OVERCOMING CHALLENGES

Developing AKROTHERM required solving material science and regulatory hurdles, including integrating phase-change technology for thermal and flame management, and conducting extensive performance and compliance testing. Close collaboration with AkroFire accelerated development and enabled design refinements that minimized waste and improved material efficacy. Subsequently, Americase transitioned AKROTHERM manufacturing in-house, enabling faster iterations, lower costs, and more flexibility in meeting customer and regulatory demands.

## RESULTS

AKROTHERM has bolstered Americase's leadership in hazardous materials packaging by delivering enhanced solutions that address key industry needs through innovative design and performance. It provides:

- **Safety & Compliance:** Fully satisfies the stringent requirements for flame and heat protection, ensuring reliable adherence to critical regulatory standards.
- **Durability & Efficiency:** Lighter, stronger construction with no shelf life limitations, allowing products to endure 10+ years in demanding field conditions while streamlining operations.
- **Sustainability:** Designed and refined for minimal waste and long-term performance, enhancing environmental responsibility through smart material use.
- **Market Impact:** Accelerated broader adoption across aerospace and logistics sectors, helping Americase exceed standards and quickly and effectively respond to evolving regulations and dynamic industry demands.

## CONCLUSION

Americase pioneered AKROTHERM by converting stringent regulatory demands into a high-performance, durable packaging material that sets new industry benchmarks. Via strategic partnerships, thorough testing, and continuous enhancements, AKROTHERM ensures outstanding safety, longevity, and compliance for oxidizer transport and storage across demanding applications. AKROTHERM use has also been expanded to lithium-ion battery packaging, meeting and exceeding robust safety and compliance requirements for battery shipping and storage.

As regulations and customer needs evolve, Americase refines AKROTHERM to cut waste, improve thermal and fire capabilities, broaden its applications in diverse sectors, and maintain its edge in innovation—solidifying it as a reliable, forward-thinking solution for mission-critical packaging challenges.

### 49 CFR 173.168: The Regulation that Advanced the Development of AKROTHERM

After the ValuJet Flight 592 tragedy in 1996, PHMSA established strict performance-based requirements for air transport of Compressed Oxygen (UN1072) and Chemical Oxygen Generators (UN3356). According to the 49 CFR (Title 49 of the Code of Federal Regulations) 173.168, packaging must successfully withstand:

- **Flame Penetration:** 1,700 °F (927 °C) for 5 minutes.
- **Thermal Resistance:** 400 °F (204 °C) oven for 3 hours.
- **Impact Resistance:** 280 drops from varying heights.

AKROTHERM was engineered specifically to **exceed the flame penetration and thermal resistance criteria** while remaining lighter and more cost-effective than existing solutions.

Americase containers using AKROTHERM remain among the few globally certified and widely accepted for safe oxidizer air shipment.