UnitedEnertech

THE ENERTECH EDGE

Fire & Air: The Damper Series

By Kent Maune

United Enertech AMCA Leakage-Rated Dampers

Introduction

In today's HVAC market, damper performance is no longer defined solely by airflow—it's also about energy efficiency, system control, and long-term building performance. One of the most critical, yet often overlooked, factors is damper leakage.

AMCA leakage class ratings provide a standardized method for measuring how effectively a damper seals when closed. But for engineers, contractors, and building owners, the real question is:

How does leakage impact performance – and which manufacturer consistently delivers?

That's where United Enertech (UE) stands apart.

What Are AMCA Leakage Class Ratings?

AMCA leakage class ratings are defined under AMCA Standard 500-D, which establishes a consistent method for testing air control dampers. These ratings quantify how much air passes through a closed damper at a specified pressure differential, typically 1 in. w.g. (250 Pa).

Leakage is measured in cubic feet per minute per square foot (cfm/ft²) of damper area. The lower the leakage value, the tighter the damper seal.

AMCA Leakage Classes Explained

Class 1A (Ultra-Low Leakage)

- Leakage: **3 cfm/ft² at 1 in. w.g. or lower**
- Highest level of leakage control available for standard control dampers
- Typically requires blade edge seals, jamb seals, and precision-engineered construction

Class 1

- Leakage: **4 cfm/ft² at 1 in. w.g. or lower**
- Very low leakage performance
- Commonly used where energy efficiency and precise system control are critical

Class 2

- Leakage: **10 cfm/ft² at 1 in. w.g. or lower**
- Moderate leakage control
- Common in commercial HVAC systems where some leakage is acceptable

Class 3

- Leakage: **40 cfm/ft² at 1 in. w.g. or lower**
- Basic leakage control
- Typically used in less critical applications

The Problem with “Good Enough” Dampers

Many projects default to Class 2 dampers to reduce upfront costs. On paper, this may satisfy the specification—but in real-world operation:

- Energy loss increases due to air bypass
- Building pressurization becomes inconsistent
- Outside air systems become more difficult to control
- Long-term operating costs increase

In short, initial savings often become long-term costs.

Where Each Leakage Class Is Applied

Class 1A and Class 1 Applications

These classifications are used where tight shutoff is essential:

- **Hospitals and healthcare facilities**: Isolation rooms, operating rooms, and spaces requiring strict pressure control
- **Laboratories and cleanrooms:** Preventing cross-contamination and maintaining controlled environments
- **Data centers:** Maintaining precise airflow and temperature control
- **High-performance buildings:** Energy-efficient designs where minimizing air leakage reduces operating costs
- **Outside air and relief air dampers:** Especially in applications where infiltration and exfiltration impact energy performance

Class 2 Applications

Class 2 is the most commonly specified leakage class for general commercial use:

- Office buildings
- Retail spaces
- Schools and universities
- General HVAC zoning applications

Class 2 provides a balance between performance and cost, making it suitable for most comfort HVAC systems.

Class 3 Applications

Class 3 dampers are typically used in applications where leakage is less critical:

- Warehouses
- Industrial facilities
- Mechanical rooms
- Return air systems with low pressure sensitivity

These applications can tolerate higher leakage rates without significant impact on system performance.

Code and Specification Considerations

While AMCA defines leakage classes, building codes and industry standards often influence which class is required:

- Energy codes increasingly push toward Class 1 or better for outside air dampers
- High-performance building standards (LEED and similar programs) favor low-leakage designs
- Engineers frequently specify leakage class requirements directly in project documents

It is also important to note that fire and smoke dampers are governed by separate standards – **UL 555 and UL 555S** – and have their own leakage classifications.

“While AMCA defines leakage classes, building codes and industry standards often influence which class is required”

The United Enertech Difference

United Enertech differentiates itself by delivering:

- Verified performance
- Consistent, repeatable quality
- Application-driven solutions

UE AMCA-Certified Leakage Class Models

- CD-110 — Leakage Class 1A
- CD-120 — Leakage Class 1A
- CD-150 — Leakage Class 1A
- CD-160 — Leakage Class 1A
- CD-170 — Leakage Class 1A
- TB-155 — Leakage Class 1A

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