



DAMPERS FOR SEVERE ENVIRONMENTS

Dampers in the HVAC system are designed to perform various functions such as volume control, directional airflow, shutoff and isolation in case of eventualities. Severe operating environments warrant special materials and construction, higher leakage ratings and better operational capabilities, in addition to satisfactory performance of the above functions.

Our in-house air performance testing facility as per AMCA guidelines enables us to design and test dampers most challenging process control applications..

THE TYPICAL SEVERE ENVIRONMENTS

Most common severe environments may include but not restricted to the following

- **Refineries & Power Plants**
- **Nuclear Fuel Fabrication**
- **Hospitals**
- **Academic Research**
- **Ships or other Marine Vessels**
- **Offshore Installations**
- **Petrochemical Complexes**

UNDERSTANDING THE BASIC SYSTEM REQUIREMENTS

Typical operating environments call for certain pre-requisites for system design as well as dampers in such applications.

ALARA (As low as reasonably achievable) : its not about not just meeting the regulatory requirements, since the operating environments vary from critical to severe, especially in case of incidents where less than optimum containment can have drastic implications.

Optimal Physical Layout of HVAC Systems : oversizing of equipment or travel length of ducting and piping increases surfaces and crevices, thereby raising prospects and probability of



accumulation of contaminating particles or materials, thus further compounding an already complex situation.

Corrosion Resistant Materials : Critical applications warrant uninterrupted operation, higher availability and standby capacity. Choice of construction materials and mechanisms therefore is key.

Effective isolation : In the event of accidents, the nature of operating environments presents a necessary case for containment of contamination and/or damage to affected areas alone. Leakage parameters become critical in this case.

Shut off control : For uninterrupted plant operations during routine or preventive maintenance.

Blast & Explosion protection : Certain environments have a possibility of such severe incidents, the equipment therefore must be designed to operate and mitigate damage in such instances.

NBC (Nuclear, Biological, Chemical) Filtration : Specific material handling and their operating environments have special filtration requirements.

A. ISOLATION, SHUTOFF AND CONTROL

These dampers are designed to provide superior airflow control in severe environments. Designed and sized for application specific pressure and flow requirements, control and shut-off applications, these dampers are available in heavy duty rectangular or round construction.

Isolation dampers are designed for applications where leakage is critical. The zero leakage and bubble-tight configuration are available to provide the highest levels of isolation possible.

This product family encompasses a wide range of configurations, options, accessories, and actuators.

Selection Criteria

1. Material

Stainless Steel 316, 304

Galvanised Steel

Aluminium

When tested against 140 different corrosive environments, 316 stainless steel demonstrated an excellent rating for over 115 of these environments.



2. Construction

Various damper models are available for every application pressure and flow requirements as indicated in the Tables 1 & 2 below.

3. Leakage

A key selection criteria. Leakage ratings are specified as per AMCA 511 or EN 1751 for the intended use and application are illustrated in Table 3 & Figure 4 ahead.

Construction	Pressure		
	2 kPa	4 kPa	10 kPa
Fabricated 1.5 mm thick 3V Blade; 2 mm thick Frame	✓		
Fabricated 3 mm thick Round Blade; 2 mm thick Frame	✓		
Fabricated 1 mm thick Airfoil Blade; 2 mm thick Frame	✓		
Fabricated 2.5 mm thick 3V Blade; 2 mm thick Frame		✓	
Fabricated 4 mm thick Round Blade; 3 mm thick Frame		✓	
Fabricated 1.5 mm thick Airfoil Blade; 2 mm thick Frame		✓	
Extruded 2 mm thick(eq) Airfoil Blade; 2 mm thick(eq) Frame		✓	
Fabricated 2 mm thick Airfoil Blade; 3 mm thick Frame			✓

Table1

Actuator options for these dampers are available in manual, automatic two-mode, or modulating control



Geared Quadrant

Having bevel and worm gear for manual operation of dampers at high pressure (upto 5,000 Pa).

Pneumatic Rotary Actuator

Two way or spring return rotary actuator, suitable for potentially explosive atmosphere.

Electric Explosion Proof Actuator

For potentially explosive atmosphere, hazardous locations in Zone 1, Zone 2, Zone 21, Zone 22.

High Torque 3-phase Actuator

Rotork or Auma make IEEE qualified electric actuators for nuclear power industries.

Velocities	Blade Construction		
	3V	Airfoil	Round
Upto 4000 fpm	✓		
Upto 6000 fpm		✓	✓

Table 2

Allowable Air Leakage to achieve Classification	Maximum Allowable Leakage cfm/sq. ft		
	at 0.25 kPa	at 1 kPa	at x kPa
1A	3	N/A	N/A
1	4	8	$\sqrt{X \times 4}$
2	10	20	$\sqrt{X \times 10}$
3	40	80	$\sqrt{X \times 40}$

Table 3

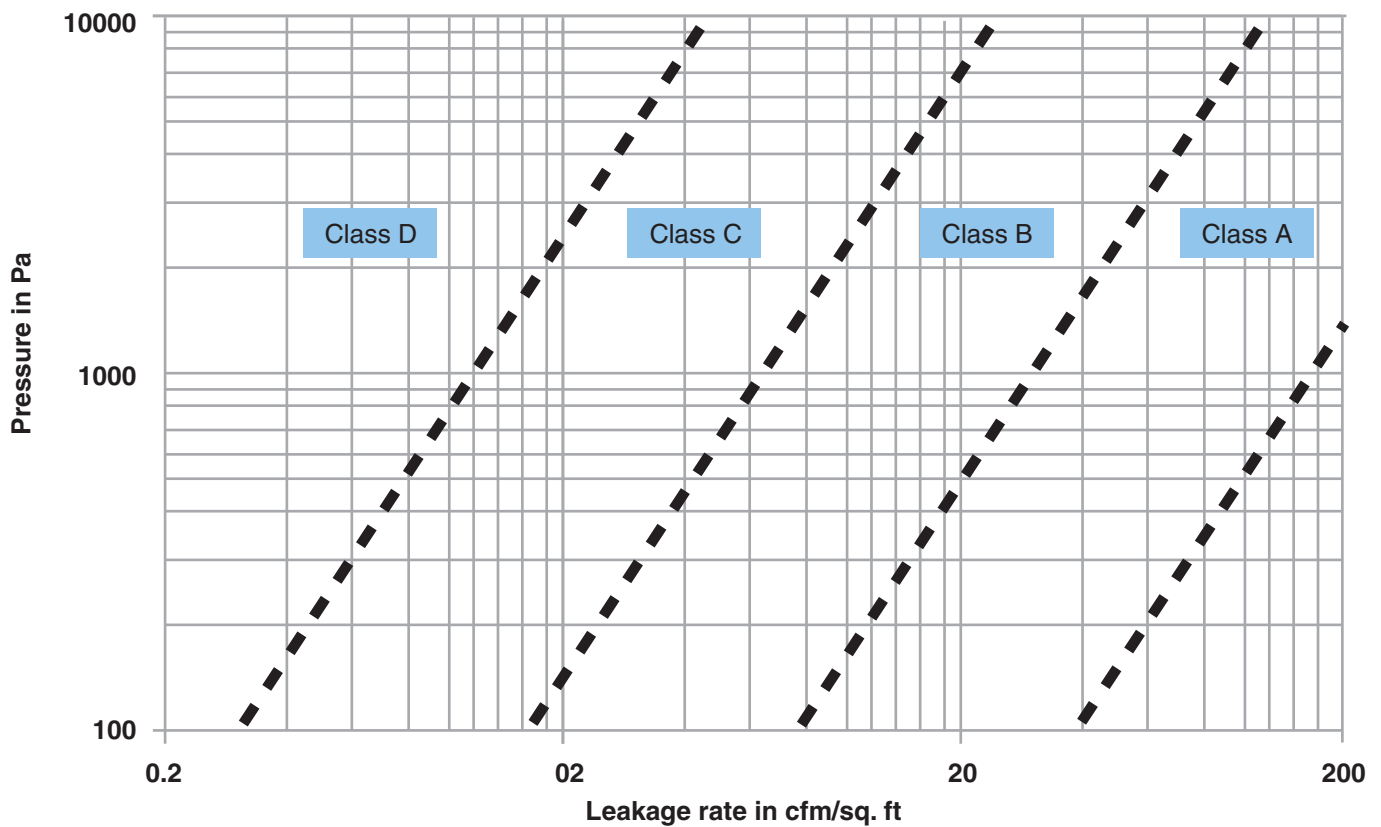


Figure 4
Leakage as per EN 1751

The damper is classified as Isolation/Bubble-tight damper, when it offers zero leakage at 2.5 kPa and complies with the requirement of ASME AG-1 DA, N509, “Code on Nuclear Air and Gas Treatment”

B. FIRE & GAS DAMPER

Used to prevent the spread of flame and smoke within ventilation and air conditioning system for severe environments. These dampers are SOLAS type, approved in class A0-A60. Minimum leakages are specified as Class I as per AMCA 511 & Class C as per EN 1751.

Operating range

- ATEX - Velocity upto 3000 fpm, Pressure(max) 3KPa
- SAFE - Velocity upto 5000 fpm, Pressure(max) 3KPa

Selection criteria mentioned in Table 5 below.

Velocities	Blade Construction	
	A0	A60
Fabricated 1.5 mm thick Airfoil Blade; 3 mm thick Frame	✓	
Fabricated 1.5 mm thick Airfoil Insulated Blade; 3 mm thick Frame		✓
Fabricated 2 mm thick Airfoil Blade; 3 mm thick Frame	✓	
Fabricated 2 mm thick Airfoil Insulated Blade; 3 mm thick Frame		✓

Table 5

C. PRESSURE RELIEF DAMPER

Intended for use in pressurisation systems, gas fire extinguishing systems, internal spaces with explosive atmospheres or transformer substations. Also available in construction which complies with the requirement of ASME AG-1 DA, N509

- Air leakage with back pressure to Class I as per AMCA 500D
- Maximum pressure loading of 5000 Pa
- Adjustable differential pressure from 50 – 1000 Pa
- Made out of salt-water resistant AlMg3, Galvanised Steel

Blades open when the maximum differential pressure is exceeded and close automatically when the pressure drops.

Blade locking with permanent magnet. Robust, Maintenance-free construction. Available in standard and many intermediate sizes

Temperature resistant up to 150 °C

D. BLAST SUPPRESSION DAMPER

Heavy duty double flanged channel frame style dampers with double thickness fabricated airfoil blades. They are designed to protect against blasts and rapid pressure changes. Qualified to pressures as high as 5.77 psi cover many applications in Unified Facilities Criteria (UFC) and General Services Administration (GSA) codes and standards, including Charge Weight II at 82 feet.



E. CUSTOM DAMPERS

Our in- house air performance testing facility as per AMCA guidelines enables us to design and test dampers most challenging process control applications..



DAMPERS FOR WORLD'S BIGGEST COMPRESSOR INSTALLATION AT A POWER PLANT IN SOUTH AFRICA

Description: A grid of 20 Dampers of size 3x3 m each

Application: Shut off Dampers, Pressure rating 2000 PA

Specifications: Class I leakage as per AMCA 511, manufactured in SS 316.

Watch video at: https://youtu.be/1_TheKVBK2c



DAMPERS FOR OFFSHORE RECEIVING AREA INSTALLATION AT OCTP IN GHANA, AFRICA

Description: Dampers for critical environment in Oil & Gas sector

Application: Fire & Gas Dampers, fast running (closes in 3 sec) for isolation in case of emergencies, Pressure rating 2000 PA.

Specifications: Fire & Gas rated to A60, manufactured in SS 316.

Watch videos at: <https://youtu.be/mduAi40v0BQ>

<https://youtu.be/22gW1LvZHLc>



DAMPERS FOR VOLUME CONTROL AT A FOOD PROCESSING FACILITY IN UZBEKISTAN

Description: Dampers size 4x3 m with single shaft operation for manual and motorised operation.

Application: Volume Control Dampers, Pressure rating 2000 PA.

Specifications: Leakage Class I as per AMCA 511, manufactured in SS 304.

Watch video at: <https://youtu.be/kVaysXyVZHK>

**NEED MORE
INFORMATION?**

If you have found this information useful and wish to know more about dampers for specific applications, please get in touch to set up a meeting or a presentation.



+91 99 904 84500



info@conaire.in