

# INDUSTRIAL BUBBLE-TIGHT POSITIVE SEAL DAMPERS AND VALVES

*WE REDEFINED THE MEANING OF "LOW LEAKAGE"*

**EB AIR**  
Control Inc.



**EB AIR CONTROL INC.**

MANUFACTURERS OF INNOVATIVE HVAC PRODUCTS



ISO 9001:2000 Certified  
KTA 1401 Certified  
(Nuclear Safety Standards)

## **BUBBLE-TIGHT POSITIVE SEAL DAMPERS**

### **INTRODUCTION**

EBA's unique Bubble-Tight Positive Seal Dampers and Valves are used in critical and hazardous environments, such as nuclear power plants and high risk laboratories for air isolation. They are commonly used in bag-in/bag-out filters for filter decontamination and in ventilation ducts of BSL3 and BSL4 laboratories to seal up all ventilation paths for room decontamination.

EBA's unique Bubble-Tight Isolation Dampers utilize the rotating disc principle that has proven very successful in many applications. This rugged industrial damper has also been developed for areas where leaks could result in hazardous conditions, as well as for high pressure and high temperature applications.

The primary advantages of EBA's Bubble-Tight Isolation Damper (valve) when compared to a conventional butterfly valve design are:

- Lighter weight, thereby requiring less structural support
- Unique smoother design minimizes accumulation of particulates on the seal
- Lower maintenance
- Increased reliability
- Adaptability to framing of valves.

All EBA Bubble-Tight Positive Seal Dampers are built to the highest industrial standards and will be individually tested before dispatch for zero bubble leakage against a differential pressure of 10 inches W.G. (25 Kpa) as specified in ASME N509 Standard.

EBA's Bubble-Tight Dampers are available in both circular and square housings making them adaptable to many applications.

## **BUBBLE-TIGHT POSITIVE SEAL DAMPERS**

### **TYPICAL FIELDS OF APPLICATION**

- ANIMAL VIRUS LABORATORIES
- BIOLOGICAL & PHARMACEUTICAL LABORATORIES
- CHEMICAL, BIOLOGICAL & RADIOLOGICAL FILTER SYSTEMS
- CHEMICAL LABORATORIES
- WATER TREATMENT PLANTS
- DEFENCE INDUSTRY
- MINING INDUSTRY
- NUCLEAR GENERATING STATIONS
- PETRO-CHEMICAL INDUSTRY
- SUBWAY TUNNEL VENTILATION
- FIRE DAMPERS
- BOILER APPLICATIONS

### **ULTRA LOW LEAKAGE DAMPERS**

#### **CIRCULAR INDUSTRIAL POSITIVE SEAL VALVE (DAMPER)**

EBA's 12-inch Circular Industrial Positive Seal Valve was tested for 250,000 open/close cycles by an independent testing laboratory. (This number of cycles could represent 100 years or more of normal field operation). Using the Pressure Decay Method\*, the valve's leakage test result was  $2.18 \times 10^{-5}$  cfm at 10 inch W.G. pressure differential ( $1.03 \times 10^{-8}$  m<sup>3</sup>/s at 2.5 KPa).

#### **SQUARE INDUSTRIAL POSITIVE SEAL DAMPER**

EBA's engineering team has tested a series of 4-foot x 6-foot (1219 mm x 1829 mm) damper banks each consisting of six 24-inch Positive Seal Dampers controlled by three jackshafted N.C. spring return actuators. Using the Pressure Decay Method\*, the damper's average leakage was  $1.47 \times 10^{-5}$  cfm/ft<sup>2</sup> at 10 inch W.G. pressure differential ( $7.47 \times 10^{-8}$  m<sup>3</sup>/s/m<sup>2</sup> at 2.5 KPa).

\*The Pressure Decay Method determines the leakage rate of a damper or housing by the change in air pressure within an enclosure over a period of time. The leakage rate is calculated by taking into account factors such as air temperature, barometric pressure, change in absolute pressure, air volume and duration of the test. (As per ANSI/ASME N510).

#### **HIGH PRESSURE APPLICATIONS**

EBA dampers and circular valves can both be custom built for high pressure systems above 10 inch W.G. (2.5 KPa).

#### **HIGH TEMPERATURE APPLICATIONS**

EBA dampers can be used at temperatures of up to 750° F (400° C) for continuous exposure and 1000° F (540° C) for intermittent exposure. Leakage rate at very high temperatures depend on the gasket material used.

#### **FIRE DAMPERS**

EBA Damper technology can be adapted to fire dampers for specialized nuclear and industrial applications.



# BUBBLE-TIGHT POSITIVE SEAL DAMPERS

## GENERAL DESCRIPTION

### CIRCULAR INDUSTRIAL POSITIVE SEAL DAMPER (VALVE)

EBA's Circular Industrial Positive Seal Damper (valve) is designed for sealing round ducts and pipes.

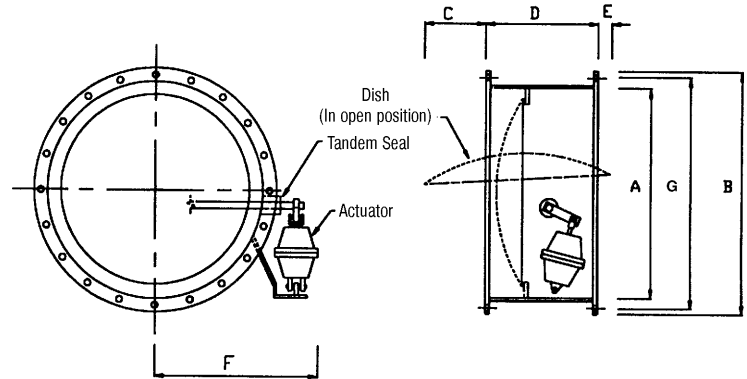
This damper is available in six standard sizes, 12, 16, 24, 36, 48 and 60-inch diameters (305, 406, 610, 914, 1219, and 1524 mm respectively). It is equipped with two flanges for easy field connection to flanges of round ducts and pipes. Special sizes and flanges can be provided.

**NOTE A:** The rotating disc is controlled by an actuator located outside of the air stream through a jackshaft sized to prevent distortion during operation. This ensures a tight seal. The integrity of the damper housing, at the point where the jackshaft penetrates, is achieved through EBA's exclusive tandem seals. The seals can be serviced from outside the damper housing.

**NOTE B:** Materials of construction.

- Casing: Mild steel or 304 stainless steel.
- Dish: Spun galvanized or 304 stainless steel.
- Shaft: 304 stainless steel.
- Linkages: 304 stainless steel and high density polyethylene.
- Gasket: Extruded neoprene or silicone.
- Bearings: Nylon.
- Tandem seal casing: 304 stainless steel.
- Tandem seals: Nitroxile
- Other special materials such as 316 stainless steel construction is available.

**NOTE C:** Left or right handed actuator mounting is available.



**Circular Industrial Positive Seal Damper (Valve). Dimensional data:**

Imperial Units

Damper Model	Dimensions (Inches)								
	A	B	C	D	E	F approx	G	Hole size	# Holes
ICPSD-12	12	15	5	12	-	12	13 <sup>13</sup> / <sub>16</sub>	7/16	12
ICPSD-16	16	19	5	12	-	14	17 <sup>1</sup> / <sub>2</sub>	7/16	12
ICPSD-24	24	27	10	12	1	19	25 <sup>7</sup> / <sub>8</sub>	7/16	20
ICPSD-36	36	39	15	12	6	27	38 <sup>1</sup> / <sub>8</sub>	7/16	30
ICPSD-48	48	54	22	18	6	36	51	11/16	40
ICPSD-60	60	66	26	20	10	47	63	11/16	50



## BUBBLE-TIGHT POSITIVE SEAL DAMPERS

### SQUARE INDUSTRIAL POSITIVE SEAL DAMPER

EBA's Square Industrial Positive Seal Damper is designed for use as a single damper in duct-work, or grouped to form a rectangular damper bank of virtually any size.

The square damper is available in four standard modules: 12, 16, 24 and 36 inches (305, 406, 610 and 914 mm respectively).

For damper banks larger than 36" x 36" (914 mm x 914 mm), multiple Positive Seal Damper modules would be assembled together within a common frame and shipped as a single assembly to ensure that the quality and integrity of the end product is maintained.

**NOTE A:** The rotating disc is controlled by an actuator located outside of the air stream through a jackshaft sized to prevent distortion during operation. This ensures a tight seal. The integrity of the damper housing, at the point where the jackshaft penetrates, is achieved through EBA's exclusive tandem seals. The seals can be serviced from outside the valve housing.

**NOTE B:** Materials of construction.

Casing: Mild steel or 304 stainless steel.

Dish: Spun galvanized or 304 stainless steel.

Shaft: 304 stainless steel.

Linkages: 304 stainless steel and high density polyethylene.

Gasket: Extruded neoprene or silicone.

Bearings: Nylon.

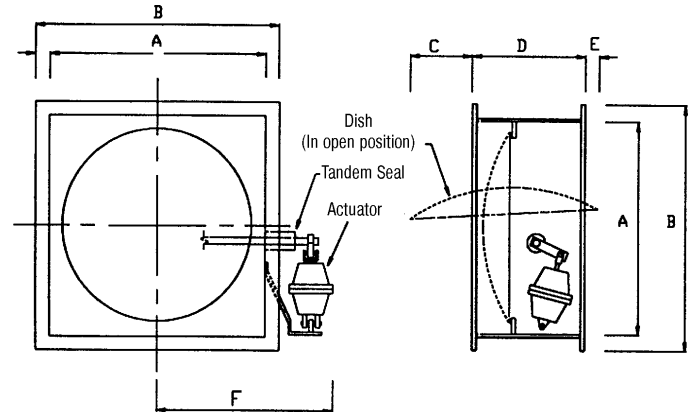
Tandem seal casing: 304 stainless steel.

Tandem seals: Nitroxile

Other special materials such as 316 stainless steel construction is available.

**NOTE C:** Left or right handed actuator mounting is available.

Pre-drilled holes can be provided on the damper flanges as an optional item.



Square Industrial Positive Seal Damper Dimensional data:

Imperial Units

Damper Model	Dimensions (Inches)					
	A	B	C	D	E	F approx
IPSD-12	12	15	5	12	-	12
IPSD-16	16	19	5	12	-	14
IPSD-24	24	27	10	12	1	19
IPSD-36	36	39	15	12	6	27

All EBA Bubble-Tight Isolation Dampers are furnished with factory drilled bolt holes in duct connection flanges to facilitate replacement if required. Bolt hole spacing is in accordance with the recommendation in ERDA 76-21, Nuclear Air Cleaning Handbook, 4" or less on centres.



## **BUBBLE-TIGHT POSITIVE SEAL DAMPERS**

### **FEATURES OF INDUSTRIAL POSITIVE SEAL DAMPERS**

#### **ULTRA LOW LEAKAGE**

Unique leakage rate of less than  $1 \times 10^{-4}$  cfm/ft<sup>2</sup> and zero bubble leakage at 10 inch W.G. ( $5 \times 10^{-7}$  m<sup>3</sup>/s/m<sup>2</sup> at 2.5 KPa) is achieved due to EBA's innovative rotating disc and extruded neoprene or silicone bulb lip seal.

#### **RUGGED CONSTRUCTION**

Construction is galvanized or stainless steel to meet customized requirements.

#### **ACTUATORS - DEPENDABLE & VERSATILE ACTUATORS IN OR OUT OF AIRSTREAM**

The standard location of the actuator is outside the airstream for easy accessibility as well as to prevent premature actuator breakdown in corrosive environments. Alternatively, actuators can be supplied in the air stream if required.

Multiple dampers can be operated with one single actuator for damper bank applications.

#### **JACKSHAFT SEALS - AIRTIGHT & DEPENDABLE**

EBA has developed a virtually leakproof seal around the jackshaft. A casing of 304 stainless steel construction for tandem nitroxile seals is continuously welded to the housing or frame of the damper. Other seal materials are available to suit the application. This sealing arrangement has been twice tested for 250,000 open/close cycles. In both tests the seals showed no deterioration upon completion.

**NOTE:** EBA excels in adapting existing products for new usages or in developing innovative systems for new or difficult applications.

## BUBBLE-TIGHT POSITIVE SEAL DAMPERS

### EXAMPLES OF APPLICATIONS

#### DAMPERS FOR THE NUCLEAR INDUSTRY

EBA's Quality Assurance Program complies with the strict requirements of CAN3-Z299.3-85. This allows EBA to supply dampers to the nuclear industry which can also be seismically qualified.

The quality of the dampers is ensured through a technically sound and innovative product design that has been rigorously tested. The resultant leakage rate, which is well below that attained by competitive products, makes EBA's Industrial Positive Seal Dampers eminently suitable for nuclear applications, such as:

- Standard Ventilation Systems
- Engineering Safety Feature Systems (ESF).



#### WHY AIRTIGHT DAMPERS?

In certain ESF Systems, both face and by-pass dampers are used. During normal operation, the bypass dampers are open and the face dampers are closed to prevent contamination of the charcoal filter banks by moisture present in the air. During emergency or incident conditions, the face dampers open to permit filtration of the contaminated air by the activated charcoal. Simultaneously, the by-pass dampers are closed to ensure that none of the contaminated air by-passes the charcoal filters.

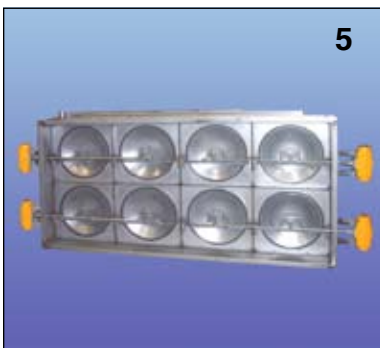
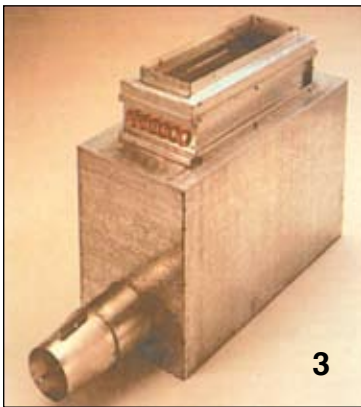
Airtight dampers thus prolong the time-interval for the change of charcoal by eliminating contamination during normal operation. Airtight dampers also ensure that none of the contaminated air by-passes the charcoal filters.

Costs associated with the replacement and disposal of the spent charcoal for an ESF System with Type III High Efficiency Carbon Absorber bed are in excess of \$100,000. More importantly, if a Power Plant has to shut down for several days to carry out the charcoal filter change, several million dollars in lost revenues can be directly attributed to poor sealing by dampers.



## OUR INNOVATIVE QUALITY PRODUCTS

1. Circular Positive Seal Valves
2. VAV Air Valve
3. Under the Window Terminal Reheat Unit
4. EBA Induction Unit
5. Damper Bank
6. EBA Ceiling Mounted Induction Unit Based System



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