

We redefined the meaning of “LOW LEAKAGE”



# BUBBLE TIGHT ISOLATION DAMPER

- No Rubbing of Gasket and Metal Dish resulting in long gasket life with tight seal
- Bulb Seal Gasket acts as a spring back mechanism seating tight against metal lip of the frame for low leakage.
- Linkage parts hides under convex dish in fully open position resulting in low pressure drop.
- Unique smooth design to minimize accumulation of particulates on the seal
- Light Weight- requiring less structural support
- Lower Maintenance with few moving parts only.
- Increased reliability as constructed with highest standard materials.
- Custom size and design adapting to most applications
- The tight seal design allows higher retention of energy thereby saving energy, which otherwise would be lost.
- Adaptability to Framing Valves

EB Air Control (EBA) offers unique Bubble Tight Isolation Damper that are used in different applications for strict leakage criteria with robust performance. The unique design is geared to tackling issues that cannot be handled by standard low leakage dampers. EBA's unique Bubble Tight Isolation damper utilize the rotating disc principle that has unique advantage and precision over available design and technology. The damper can be used on rugged applications and areas where leak could spill to hazardous conditions. The damper is also suited to high pressure and temperature applications. The most desired advantages of EBA Bubble Tight Damper when compared to conventional design are.

The EBA Bubble Tight Isolation Dampers are built to the highest quality in the industry and individual tested in accordance to various international standards such as Frame Leakage Class A and Seat Leakage Class 0, per section DA Article 5000-ASME AG-1, AMCA 500-D-18 Section : 6.2.3.2, ASME AG-1-2015: DA -5141 / ASME 509/510, ASME NQA-1, EN 12266-1 & EN 12266-2 , DIN 3230 -BO, DIN 25496

**EBA Bubble Tight Isolation Dampers are manufactured under strict quality assurance program which meets ISO 9001: 2015 and KTA 1401 (Quality Assurance Program Requirements for Nuclear Facilities). All welding procedures, welders and welder operators are qualified to ASME Boiler and Pressure Vessel Code section IX or EN729-2 & 287-1.**

**Bubble Tight Isolation Damper shall comply to air tightness on site according to DIN 25496 (leakage less than  $3 \times 10^{-5}$  of nominal air flow at 2kPa) as well under 250,000 open/-close cycle test.**

## TYPICAL FIELDS OF APPLICATION

- Hospital and Health Care Facilities
- Bio Safety Laboratory Class 2, 3
- Isolation Room in critical patient care
- Shut Off Applications for Fumigation (food process)
- Wastewater Treatment Plant
- Process Facilities Air handler.
- Defence Industry
- Mining Industry
- Nuclear Power Plant and related
- Tunnel Ventilation
- Chemical, Biological and Radiological Filter System
- Bag in Bag out (BIBO) Filtration Housing

## HIGH PRESSURE APPLICATION

EBA Bubble Tight Isolation Damper both Square and Circular design can be custom built to suit high pressure applications above 10-inch WG (> 2.5KPa) pressure differential.

EBA Bubble Tight Isolation Damper have been tested under 0.5bar (50.0 kPa) pressure differential and passed test successfully.

## ULTRA BUBBLE TIGHT ISOLATION DAMPER BOTH ROUND AND SQUARE

Damper of both size variations has undergone severe test and validation for leak tightness and control. EBA Bubble Tight Isolation Damper was tested for rigorous 250,000 Open/Close cycles by an independent testing laboratory. (This is real life situation could be 50+ years cycle in field operation). Using the Pressure Decay Method, the damper'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).

The company also tested 4ft x 6ft (1219 mm x 1829 mm) damper banks each consisting of 24-inch Bubble Tight Isolation Damper controlled by spring return actuators. It was determined using 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 damper or housing by the change in air pressure within an enclosure over a period. The leakage rate is calculated by considering factors such as air temperature, barometric pressure and change in absolute air pressure, air volume and duration of the test. (Per ANSI/ASME N510).

## **HIGH TEMPERATURE APPLICATION**

EBA Bubble Tight Isolation Damper can be used for temperatures up to 750 °F (400 °C) for continuous exposure and 1000 °F (540 °C) for intermittent exposure. However special materials are available and used to supplement abnormal condition applications.

## **NUCLEAR INDUSTRY APPLICATION**

Most Industrial Bubble Tight Isolation Dampers have been used in nuclear certified area mainly for reactor cooling, duct work bringing chemical laden gas or air that requires to be handled carefully and diverted with utmost care and precaution. EBA's dampers are nuclear rated and company's quality assurance program complies with requirements of CAN3-Z299. 3.85. The company also meets certification of KTA-1401 nuclear rating (German Standard) - For details on this certification, please contact factory.

## **WHY GAS TIGHT/BUBBLE TIGHT ISOLATION DAMPER?**

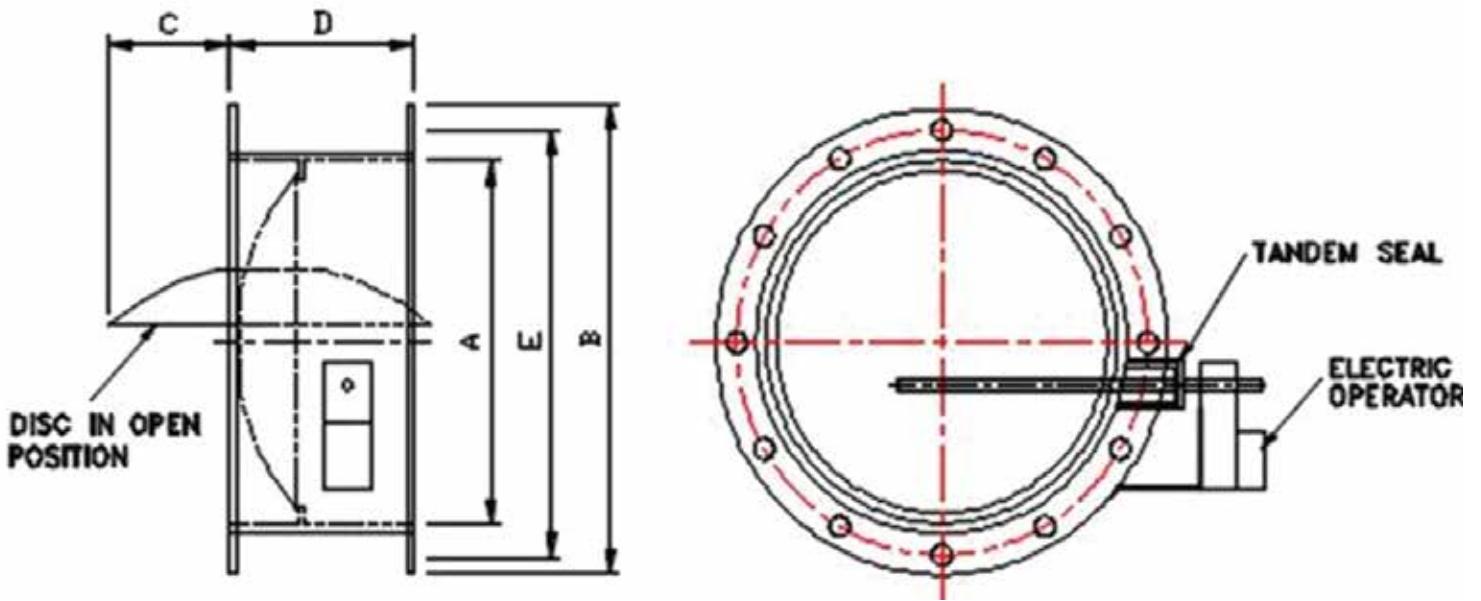
In certain ESF (Engineering Safety Feature Systems) both face and bypass dampers reused. During normal operation, the bypass dampers are open, and the face dampers are closed to prevent contamination of the charcoal filter banks by moisture present in the air.

During emergency or incident conditions, the face dampers open to permit filtration of the contaminated air by the activated charcoal. Simultaneously, the bypass dampers are closed to ensure that none of the contaminated air by passes the charcoal filters.

Bubble Tight Isolation Dampers thus prolong the time interval for the change of charcoal by eliminating contamination during normal operation. Bubble Tight Dampers also ensure that none of the contaminated air by passes the charcoal filters.

Costs associated with replacement and disposal of the spent charcoal of 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.

Similarly, EBA Bubble Tight Isolation Damper are applied in the Bag in Bag Out (BIBO) housings as a preventative isolation of harmful toxic substances inside containment housing during filter change outs. EBA Bubble Tight Isolation Damper are used as a part of decontamination of system during filter change procedure. Being ZERO LEAKAGE, these Dampers provide the best seal.



Industrial Circular Bubble Tight Isolation Damper  
dimensional data:

Damper Model	Dimensions (Inches)						
	A	B	C	D	E	Hole Size	# Holes
ICPSD-8	8	11	4	9	9 <sup>1/2</sup>	7/16	8
ICPSD-10	10	13	4	9	11 <sup>1/2</sup>	7/16	8
ICPSD-12	12	15	5	12	13 <sup>1/2</sup>	7/16	12
ICPSD-14	14	17	5	12	15 <sup>1/2</sup>	7/16	12
ICPSD-16	16	19	5	12	17 <sup>1/2</sup>	7/16	12
ICPSD-18	18	21	6	12	19 <sup>1/2</sup>	7/16	12
ICPSD-20	20	23	7 <sup>1/2</sup>	12	21 <sup>1/2</sup>	7/16	20
ICPSD-24	24	27	10	12	25 <sup>1/2</sup>	7/16	20
ICPSD-30	30	33	12 <sup>1/2</sup>	12	31 <sup>1/2</sup>	7/16	20
ICPSD-36	36	39	15	12	37 <sup>1/2</sup>	7/16	30
ICPSD-48	48	54	22	18	51	11/16	40
ICPSD-60	60	66	26	20	63	11/16	50

## GENERAL DESCRIPTION

### INDUSTRIAL CIRCULAR BUBBLE TIGHT ISOLATION DAMPER (ICPSD)

They are designed to sealing round ducts and pipes. The Damper is available in standard sizes, 8, 10, 12, 14, 16, 18, 20, 24, 30, 36, 48 and 60-inch diameters (203, 254, 305, 355, 406, 457, 508, 610, 762, 914, 1219, 1524 mm respectively). It is equipped with two flanges for easy field connection to flanges of round ducts and pipes. Special sized flanges can also be provided.

### INDUSTRIAL SQUARE BUBBLE TIGHT ISOLATION DAMPER (IPSD)

They are designed to use as a single damper in the duct work or grouped to form a rectangular damper bank of virtually any size.

Square Bubble Tight Isolation Damper is available in standard sizes like 8, 10, 12, 14, 16, 18, 20, 24, 30, 36, 48 & 60 inch (203, 254, 305, 355, 406, 457, 508, 610, 762, 914, 1219, 1524 mm respectively). For Isolation Damper banks, larger than 36" x 36" (914mm x 914mm) multiple Square Bubble Tight Isolation Damper modules would be assembled within a common frame and shipped as a single assembly to ensure that the quality and integrity of the product is maintained.

**NOTE A:** The rotating disc is controlled by an actuator located outside of the air stream through a jack shaft 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 EBAs exclusive tandem seals. The seals can be serviced from outside the damper housing.

#### **NOTE B: Materials of construction**

**Casing:** Mild Steel or 304/316 Stainless Steel

**Dish:** Spun galvanized or 304/316 Stainless Steel

**Shaft:** 304/316/ Stainless Steel

**Linkages:** 304/316 Stainless Steel and high-density polyethylene

**Gasket:** Extruded neoprene or silicone

**Bearings:** Nylon

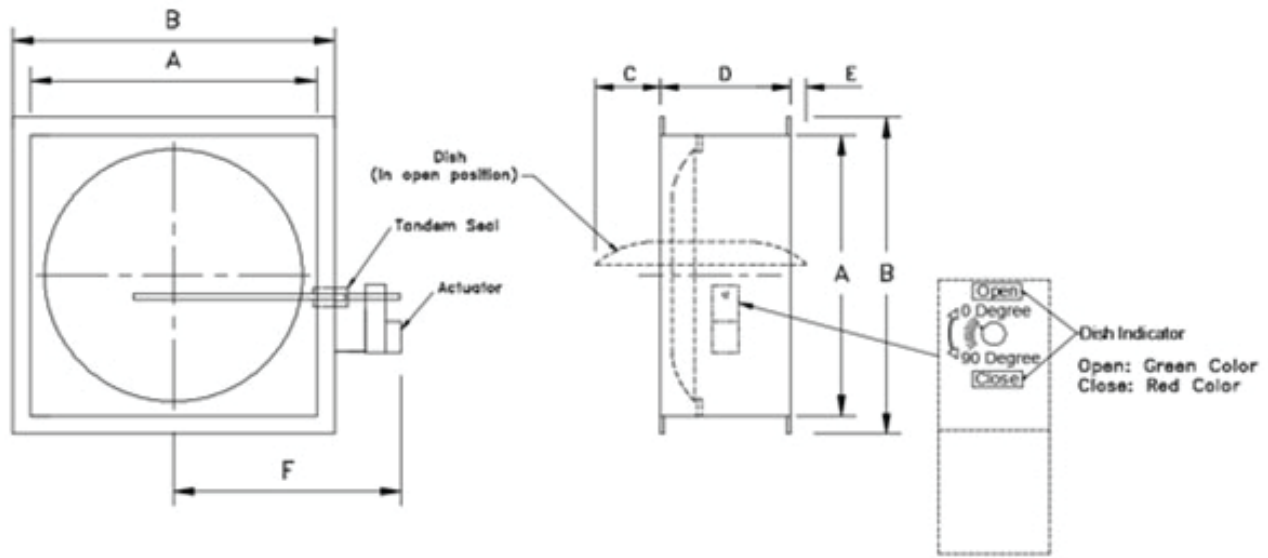
**Tandem seal casing:** 304/316 Stainless Steel

**Tandem Seal:** Urethane / Nitroxile

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

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

# INDUSTRIAL SQUARE BUBBLE TIGHT POSITIVE SEAL DAMPER



**Square Industrial Positive seal Damper Dimensional Data:**  
Imperial Units

Damper Model (Square)	Dimensions (Inches)						
	A	B	C	D	E	F (Appr.)	Weight (LBS)
IPSD-8	8	11	4	9	-	11	24
IPSD-10	10	13	4 <sup>1/2</sup>	9	-	12	28
IPSD-12	12	15	5	12	-	12	35
IPSD-14	14	17	5 <sup>1/2</sup>	12	-	14	40
IPSD-16	16	19	6	12	-	16	45
IPSD-18	18	21	6 <sup>1/2</sup>	12	-	18	52
IPSD-20	20	23	7 <sup>1/2</sup>	12	-	19	60
IPSD-20.5	20.5	23.5	7 <sup>1/2</sup>	12	-	19	61
IPSD-24	24	27	10	12	1	20	66
IPSD-30	30	33	12 <sup>1/2</sup>	12	5	22	110
IPSD-31.5	31.5	34.5	12 <sup>1/2</sup>	12	5	22	113
IPSD-36	36	39	15	12	6	28	130
IPSD-39.37	39.37	42.5	15	12	6	32	145
IPSD-48	48	54	22	18	6	36	400
IPSD-60	60	66	26	20	10	48	550

# FEATURES OF INDUSTRIAL BUBBLE TIGHT ISOLATON DAMPER

## ULTRA LOW LEAKGE

Unique leakage rate of less than  $1 \times 10^{-4}$  cfm / ft<sup>2</sup> and zero bubble leakage at 10-inch WG. ( $5 \times 10^{-7}$  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 meeting the requirement of the application. Special coating can also be applied on instances.

## CUSTOM DESIGN AND APPLICATION

Dampers can be sized for any opening either through a single unit or combination in form of a bank to meeting leak tightness. Damper bank/array can work to covering a bigger area and in case of AHU application, bank opening can be synced to fan energizing and air flow control (more details please contact factory)

## ACTUATORS - IN OR OUT OF AIRSTREAM

Depending on the application actuators can be inside or outside the air stream thus alleviating problems at job site from servicing the motors/ actuators in case of failures or keeping motors outside corrosive environment. Multiple dampers can be operated with one single actuator for damper bank applications.

## JACK SHAFT SEALS – AIRTIGHT AND DEPENDABLE

These dampers come with virtually leak-proof seal around the jack shaft. A casing of 304 stainless steel construction for tandem urethane seals is continuously welded to the housing or frame of the damper. Other seal materials are available to suit the application.

The sealing arrangement was earlier tested for 250,000 open/close cycles. Upon such test, seals showed no deterioration or breakdown in integrity

However, with years of operation in the field, these dampers have shown no breakdown, high maintenance, or failure in operation. Comparisons have shown that this damper seal far better than any available design in the market.

## DAMPER BANK APPLICATION

Damper bank is a unique arrangement that is designed with multiple square Isolation Dampers to allow covering a larger face area or air tunnel that is normally cannot be handled by a single damper. The arrangement of multiple dampers in a frame/ array highlights the ability to sequence operation of all or partial dampers based on air flow/ pressure and discharge of air downstream of the bank. By spreading the mechanical operation amongst multiple bodies, it prevents abrupt failures or shutdowns when compared to a single body damper. Controls sequence allows open/close of dishes based on fan operation allowing modulation of air flow dependent on building requirement.



## SUGGESTED SPECIFICATION

EBA Bubble Tight Isolation Damper shall be round, dish type tested to be (ZERO LEAKAGE) per ASME N510-1995 reaf-firmed. EBA damper shall be manufactured under a quality assurance program that meets all requirements of ASME NQA-1, “Quality Assurance Program Requirements for Nuclear Facilities”

EB Air Control affirms that all pressure retaining weld joints and seams shall be continuously welded with no porosities allowed. Joints and seams requiring only intermittent welds such as reinforcement members, shall be intermittently welded. Damper shall be free from burrs and sharp edges. All weld joints and seams that are a portion of any gasket sealing surface (duct connection flanges), shall be ground smooth and flush with adjacent base metals. All welding procedures, welders and welder operators shall be qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX. All welded joints and seams are wire brushed to remove heat discoloration.

Dampers shall have a 1<sup>1/2</sup>-inch-wide, 10-11 gage flange on the inlet and outlet with predrilled mounting holes. Bolt hole spacing is in accordance with recommendation in ERDA76-21 “Nuclear Air Cleaning Handbook” (4 inches or less in centers). The damper, housing and shaft penetration shall be adequately reinforced to withstand a negative or positive pressure of 15 inches water gage.

## ACTUATORS/MOTORS

Various types of actuators/ motors complying to the specification of engineers / consultants and owners. EBA Bubble Tight Isolation damper can be installed with simple ON/OFF to Modulating. Actuators can be selected with various options like spring return, end switches, fail safe position including built in thermistor with NEMA ratings. For high pressure applications, actuators with higher torque can be selected which may work to open/-close at quick speed succession.

**For specific application and actuator selection, please contact factory for details. Manual quadrant, sprocket gear are also options with damper**

