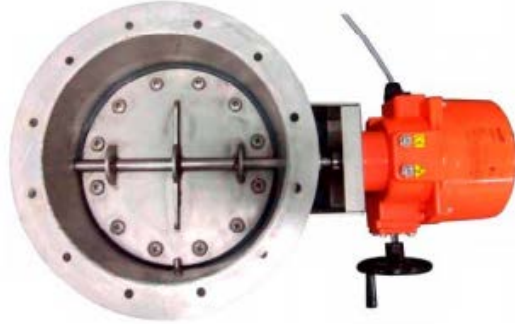




**Bubble Tight Damper  
BTD**

**DESCRIPTION:**

The Gmcair model BTD series are bubble-tight dampers that are designed for isolation applications. Bubble-tight means the damper has the lowest possible leakage rating. The silicone blade seal and double gland axle seals provide bubble-tight performance up to 7000 Pa differential pressure.

The Gmcair BTD dampers are manufactured under a quality assurance program that meets all the requirements of ASME NQA-1, "Quality Assurance Program Requirements for Nuclear Facilities". All welding procedures, welders and welder operators are qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX.

BTD-S : Rectangular Bubble Tight Damper

BTD-R : Circular Bubble Tight Damper

**MATERIAL :**

- Stainless Steel 316
- Stainless Steel 304
- Painted Steel

**FUNCTION :**

- Robust construction
- Continuously welded at all pressure barrier points
- Manual, pneumatic or electric operation
- Pre-drilled bolt holes in out-turned standing flanges

**FINISHING**

- Mill Finish
- Powder Baked Epoxy

**INSTALLATION :**

- Screw



### STANDARD SIZES (mm):

#### TYPE BTD-R

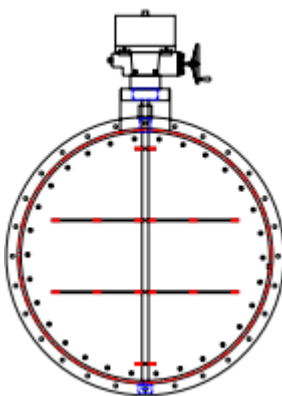
TYPE BTD-R AVAILABLE SIZES (mm)	
NECK DIAMETER	
Minimum	Maximum
Ø150mm	Ø760mm

#### TYPE BTD-S

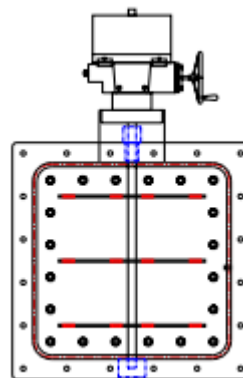
BTD-S AVAILABLE SIZES (mm)		
	WIDHT	
HEIGHT	Minimum	Maximum
	150	760
150	X	X
760	X	X

### DRAWING

Type BTD-R



TYPE BTD-S





## CONSTRUCTION

### FRAME

The heavy duty flanged frame is constructed of steel with thickness from minimum 3mm. Minimum 38mm wide by 4mm thick flange with pre-punch  $\Phi 11$ mm holes for connection to match your duct flanges are provided. Bolt hole spacing is in accordance with the recommendation in ERDA 76-21, Nuclear Air Cleaning Handbook (100 mm or less on centers).

### AXLE SEAL

Double gland seals are standard and prevent leakage around the damper's axles.

### BLADE

The blade consist of two steel plates (from 4mm minimum thick) sandwich with a blade seal is heavily reinforced and engineered to be rigid up to 7000 Pa. The blade is bolted to the axles and is easily removable for maintenance.

### BLADE SEALS

A silicone rubber blade seal is standard and eliminates leakage around the blade. The seal is field removable for easy maintenance.

### FACTORY TESTED

Every Gmcair BTD is leakage tested in accordance with ANSI/AMCA 500-D-07 figure 5.8 (Bubble Test Setup) before it leaves the factory to ensure bubble-tight performance

### CYCLING TEST

The damper is cycle tested for 2000 cycles. The operation of the damper is controlled by the actuator unit modified to give repeated opening and closing cycles. One cycle comprises of the damper starting from the closed position, fully opened and then completely closed.

### AIR LEAKAGE TEST

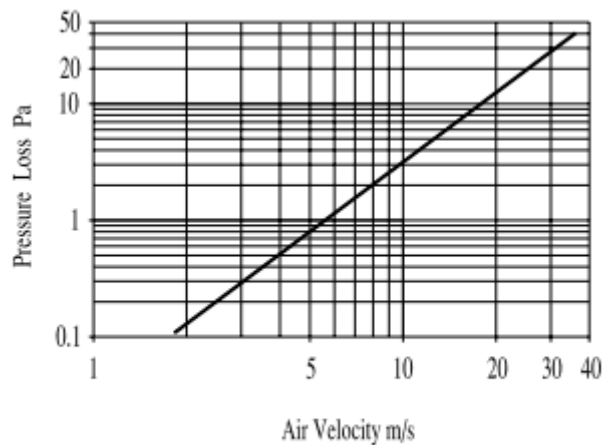
The complete pressure boundary of the damper housing shall be leak tested at 3800 Pa per the "Pressure Decay Method" in accordance with ASME N510-1995 "reaffirmed", "Testing of Nuclear Air Treatment Systems", Paragraphs 6 and 7. Pressure readings are recorded once a minute until pressure decays to 75% of the test pressure or for 5 minutes. The housing shall not exceed a leak rate of 0.0005 CFM per cubic foot of housing volume.

The damper blade and shaft seals shall be tested in the closed position at 2500 Pa and shall be bubble-tight when tested in accordance with ASME N509-1996 class 1. The blade shall not exceed a leakage rate of 0.029 CFM per inch of circumference of blade.



## PRESSURE DROP DATA

This pressure drop data was conducted in accordance with ANSI/AMCA Standard 500-D. All data has been corrected to represent standard air at a density of 1.2 kg/m<sup>3</sup>. Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system



Pressure Drop [30 in. (760mm) dia. Damper]

## ACTUATORS

### MANUAL (M)

Manual actuators shall be worm geared actuator with hand wheel. Rated output torque shall be 226 Nm up to diameter  $\Phi$ 550 mm size dampers with a gear ration of 30:1 (790 Nm on diameters  $\Phi$ 600 to  $\Phi$ 750 size damper, with a gear ration of 40:1). Actuator shall be fully lubricated and self locking to hold at any position, and equipped with a visual indicator to show the damper position.

Dyna torque Actuator





### **PNEUMATIC (P)**

Pneumatic actuator shall be rotary type with flow control valves. (Customer to specify available air pressure)

### **ELECTRIC (E)**

Electric rotary actuator shall have rugged, high torque, integral, single-phase, reversible capacitor run motors and shall be equipped with factory set travel limit switches. The actuator shall also be equipped with motor brake.

Specific models and options for various output torque and speed are available. (Customer to specify speed and voltage)

Belimo Actuator

- Model: SY...-230 Series
- Power Supply: 1Φ AC 230V 50/60Hz

