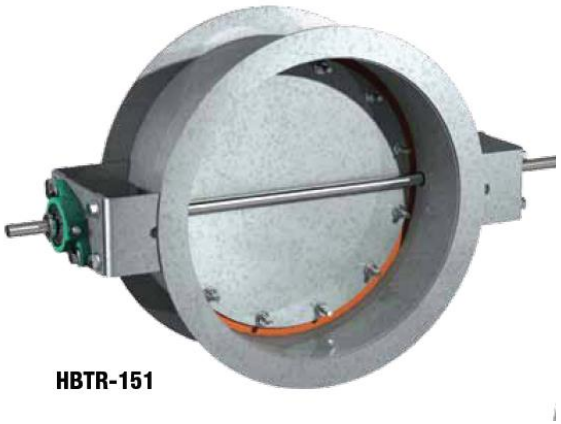
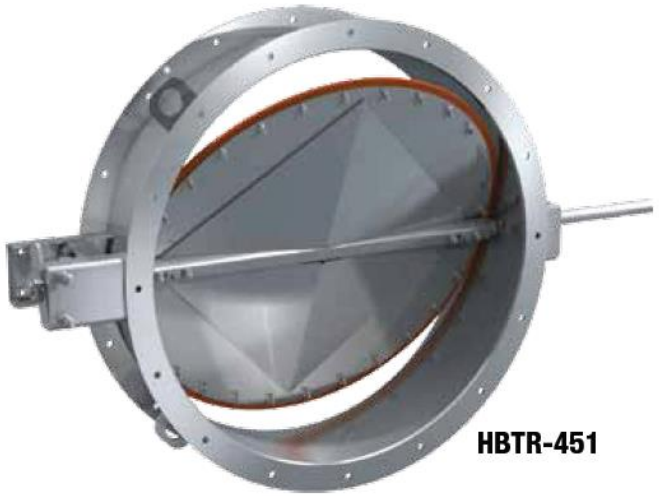
Bubble Tight and Isolation Dampers



Presented by:

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Regional Sales Manager



Bill Lampkin

Industrial Damper Product Manager

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Introduction

Steve Worster

- Regional Sales Manager Asia Pacific
- BS in Mechanical Engineering
  - Michigan Technological University
- 3 years as Technical Sales Engineer for Kitchen Ventilation Systems (Greenheck)

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Overview

- What is an isolation/bubble tight damper
- Where are isolation dampers used
- Available Greenheck models
- Greenheck factory testing procedures
- Greenheck specification compliance
  - (AMCA-500D, ASME-N509, ASME-N510)
- Project references in Singapore

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What Is A Bubble Tight Damper

- A bubble tight damper is a heavy duty damper designed to meet the requirement for ZERO leakage
- Flanged frame damper
- Carbon steel or stainless steel frames, blades, and axles
- Silicone blade seal
- Double gland axle seals
- Round frame construction
  - Square transitions available by SDR



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What Does It Do?

- A bubble tight dampers primary function is to create a barrier to eliminate the probability of the air, and air stream particles, from escaping a zone

- Provides a positive seal to seal up all ventilation paths for room decontamination, emission control system change out, shut downs, or testing

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What Does It Do?

- Ensures the safety of personnel working during shutdowns and change outs
- Prevent contamination of research, consumer goods, etc.
- Prevent exhaust of harmful contaminants to environment

NOTE: Bubble tight dampers should not be used as a means of controlling airflow

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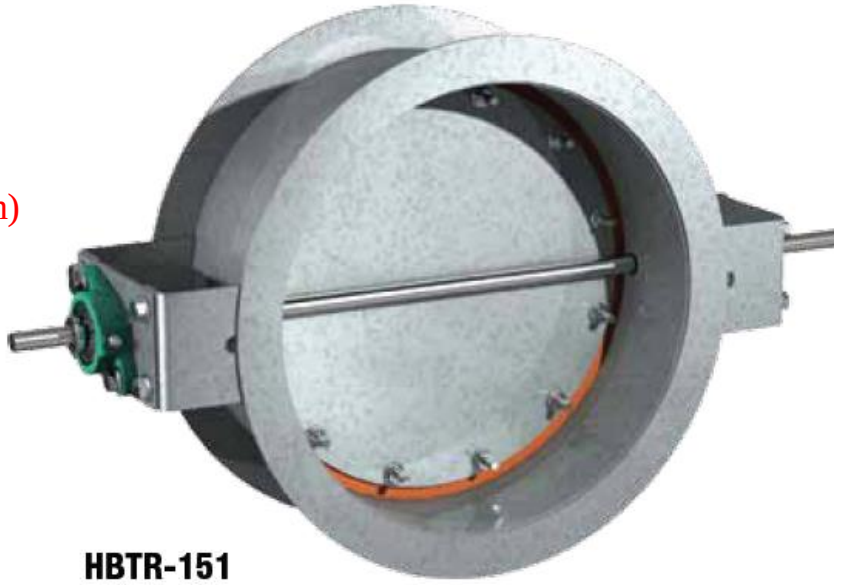
Where They Are Used

- Generally used in critical and hazardous environments
  - Nuclear Power Plants
  - BSL3/BSL4 Laboratories
  - Pharmaceutical Laboratories
  - Chemical Laboratories
  - Mining Industry
  - Petro-Chemical Industry
  - Chemical or Biological Filter Systems
  - Food Processing Industry
  - Defense Industry

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HBTR-151

		HBTR-151
Maximum Pressure		10 in. wg (2.5 kPa)
Maximum Velocity		3900 ft/min. (33 m/s)
Minimum Temperature		-40°F (°C)
Maximum Temperature		250°F (121°C)
Maximum Leakage		Zero at 10 in. wg (2.5 kPa)
Minimum Size		6 in. (152 mm)
Maximum Size		~~24 in. (610 mm)~~ 36 in (914mm)
Material	Painted Steel	•
	304SS	O
	316SS	O
Paint Finishes	Mill Finish SS	O
	Permatector™	•
	Hi Pro Polyester	O
	Industrial Epoxy	O
	Epoxy	O

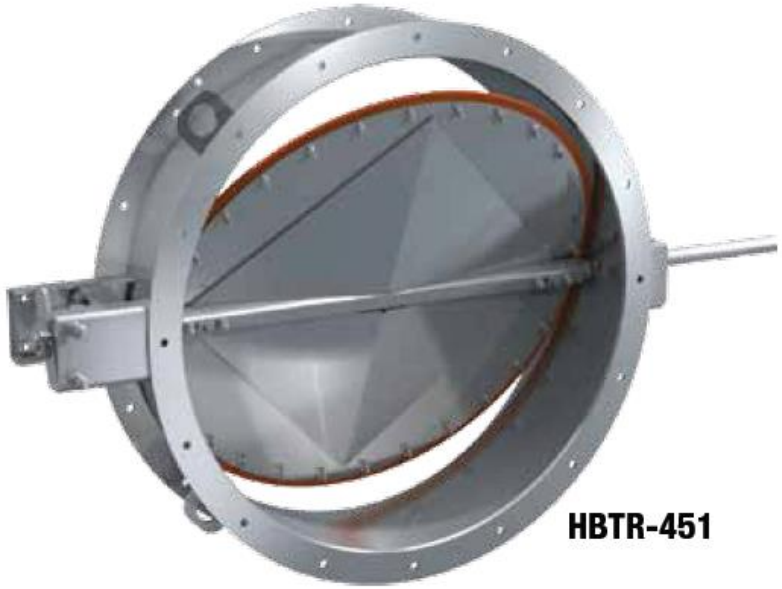


HBTR-151

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HBTR-451

		HBTR-451
Maximum Pressure		30 in. wg (7.5 kPa)
Maximum Velocity		6500 ft/min. (33 m/s)
Minimum Temperature		-40°F (°C)
Maximum Temperature		250°F (121°C)
Maximum Leakage		Zero at 30 in. wg (7.5 kPa)
Minimum Size		6 in. (152 mm)
Maximum Size		48 in. (1219 mm)
Material	Painted Steel	•
	304SS	O
	316SS	O
Paint Finishes	Mill Finish SS	O
	Permatector™	•
	Hi Pro Polyester	O
	Industrial Epoxy	O
	Epoxy	O



HBTR-451

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HCDR-351

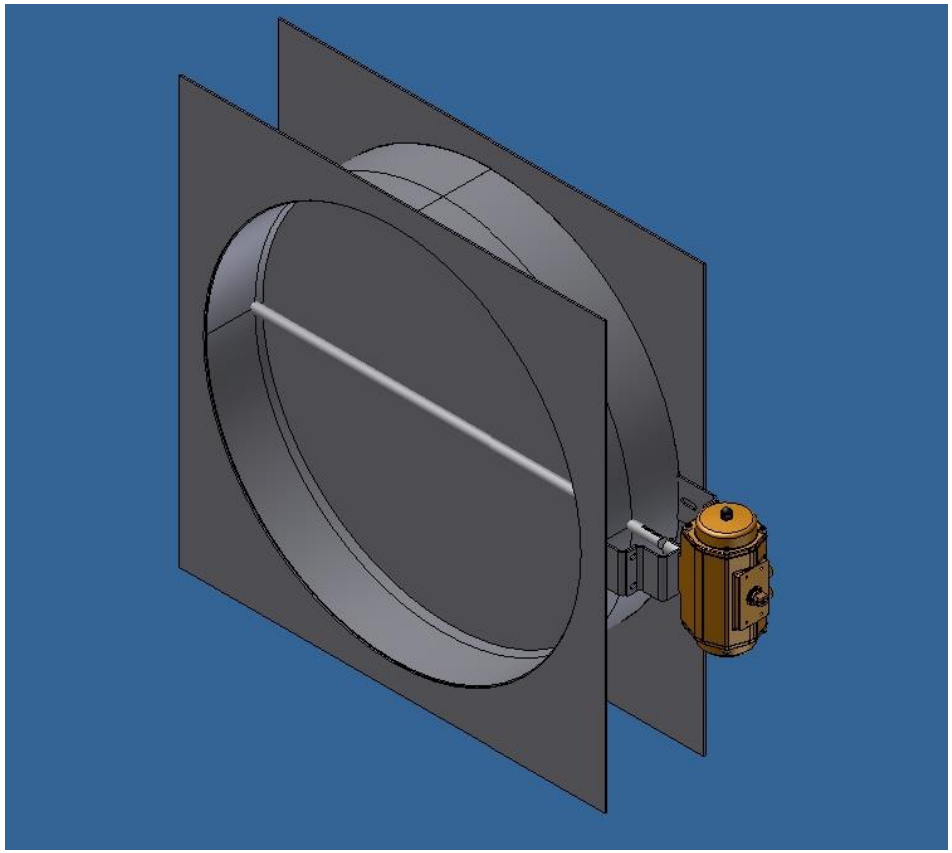
- Heavy Duty isolation damper designed to provide tight shutoff with very low leakage
- Leakage rating
  - .029 CFM per inch of perimeter @ 10”w.g.

	Standard	Optional
Frame Material	Painted Steel	304SS, 316SS
Frame Type	Flanged Channel	
Blade Material	Painted Steel	304SS, 316SS
Blade Seals	Silicone	EPDM
Blade Type	Round, Formed Steel-Removable	
Axle Bearing	External Bronze	External Relubricable Ball
Axle Material	Plated Steel	303SS, 316SS
Axle Seals	O-ring	-
Paint Finishes	Hi Pro Polyester	Epoxy, Hi Temperature Aluminum, Hi Temperature Silver, Industrial Epoxy



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SDR Rectangle/Square Flange



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Factory Bubble Tight Testing

- ALL bubble tight dampers are factory tested to AMCA 500D for bubble tightness prior to shipment



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Factory Bubble Tight Testing



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Factory Bubble Tight Testing

- AMCA 500D (6.2.2.5.5)
  - The size of the bubble formation shall also be recorded by noting if any bubbles exceed 1.6 mm diameter (1/16 in.) in 1 second or if any bubbles exceed 7mm (1/4 in.) diameter in 1 minute.
  - **Greenheck tests to zero bubbles**, therefore we do comply, and surpass, the above requirements.

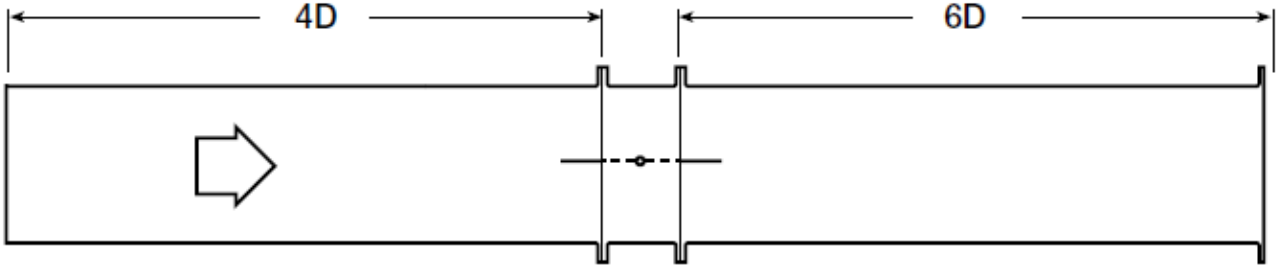
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Factory Bubble Tight Testing

AMCA Test Figure 5.3

Figure 5.3 Illustrates a fully ducted damper. This configuration has low pressure drop because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

AMCA Test Figure 5.3



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Factory Bubble Tight Testing

- Sample Test Report
- What We Test:
  - All frame weld joints
  - Axle penetration through the frame
  - Blade seal at frame
  - All fasteners protruding through the blade
- Test in both directions

BUBBLE TIGHT DAMPER LEAKAGE TEST REPORT

Tested in accordance with AMCA Standard 500-D and AMCA Figure 5.8 using the bubble test method.

Greenheck Fan Corporation ☐ Facility 13, 102 Northern Road
Schofield, WI 54476 - 0410 ☒ Facility 5 Laboratory, 525 Western Road

Greenheck Sales Order: 6442704 Saved as: 6442704- 2
SAP Line Number: 20
Production File & ID No.: 31212682-2
Customer Tag No.: BTD-01
Damper Diameter 31.49 in. 800 mm
Model: ☐ HBTR-151 ☒ HBTR-451 ☐ Other
No. of Cycles Open & Close 10 (minimum 10 times required)

Test Direction:	**Back-to-Front**	**Front-to Back**	**Not Applicable**
Test Pressure (in.wg)	32.38 (8.1)kPa	32.29 (8)kPa	(0)kPa
Frame Seam	☒ Pass	☒ Pass	☐
Frame Flange	☒ Pass	☒ Pass	☐
Stuffing Box Plate	☒ Pass	☒ Pass	☐
Stuffing Box Perimeters	☒ Pass	☒ Pass	☐
Blade Seal	☒ Pass	☒ Pass	☐
Blade Fasteners	☒ Pass	☒ Pass	☐
Leakage Rate (cfm)	None	None	None
Minimum Test Duration	60 sec.	60 sec.	sec.

Comment

Pressure Measurement Instrumentation

	☒	☐	☐
Greenheck ID:	E5020	E5021	E5022
Range:	0-40 in.wg	0-19.99 in.wg	0-19.99 in.wg
Manufacturer:	Dwyer	Dwyer	Dwyer
Model no.:	477-2 FM	475-1 Mark III	475-1 Mark III
Serial No.:	N47T	N46K	N37K
Last Calibration:	2/24/2011	2/24/2011	2/24/2011
Next Calibration:	2/24/2012	2/24/2012	2/24/2012

Tested By: Julson/Abel
Date: 20-Jan-12

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Specification Compliance

- ASME N509 / ASME N510
  - Both reference leakage criteria given by ASME AG-1
  - AG-1 allows up to 1/16” (1.5875mm) dia. bubble in one second or 9/32” (7.1501mm) dia. bubble in 1 minute. If either of these is found, it is determined a leak exists.
  - **Greenheck tests to zero bubbles**, therefore we do comply with the above requirements.

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Specification Compliance

- For an overview of the most common specifications, and an in depth look at the specifications, please visit www.Greenheck.com and visit our HBTR FAQ's

HBTR FAQ's

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ISO 9001-2008

- All Greenheck Industrial Dampers are manufactured under an ISO9001 Quality Assurance Program.
- Industrial Dampers is the first business unit at Greenheck to pursue and obtain this certification



EAGLE Registrations Inc.
SERVICE • INTEGRITY • VALUE
123 Webster Street, Suite 300 | Dayton, OH 45402 | USA
www.eagleregistrations.com

ANAB ACCREDITED
Accredited by member of the IAF MLA for QMS

Certificate No. 4545 (Recertified February 25, 2015 - 2 Copies)
April 30, 2015 through April 30, 2018

Certificate of Registration

This is to certify that the Quality Management System of

Greenheck Fan Corporations
Heavy Duty/Industrial Damper Division

102 Northern Road, Schofield, Wisconsin 54476 USA

Has been assessed by **EAGLE Registrations Inc.** and conforms to the following standard:

ISO 9001:2008

Scope of Registration

Design and Manufacturing of Heavy Duty/Industrial Dampers

Senior Certification Manager

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Thank you for your time.

Questions?

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The mission of Greenheck is to be the market leader in the development, manufacture and worldwide sale of quality air moving and control equipment with total commitment to customer service.

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Contact Local Representative



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