



WEAVER CONSTRUCTION MANAGEMENT, INC.
 3679 S. Huron St., Suite 404
 Englewood, CO 80110
 Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITTAL

December 15, 2011

WGC Submittal No: 15800-004

PROJECT: **Harold Thompson Regional WRF**
 Birdsell Rd.
 Fountain, CO 80817
 Job No. 2908

ENGINEER: **GMS, Inc.**
 611 No. Weber St., #300
 Colorado Springs, CO 80903
 719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan
 Sewage Disposal District**
 901 S. Santa Fe Ave.
 Fountain, CO 80817
 719-382-5303 James Heckman

CONTRACTOR: **Kuck Mechanical Contractors, LLC.**
 395 West 67th Street
 Loveland, CO 80593
 970-461-3553 Melanie Peterson

SUBJECT: Aluminum Low Leakage Control Damper with Actuator

SPEC SECTION: 15800 - Heating & Ventilating

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES X NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver General Construction and approved with respect to the means, methods, techniques, & safety precautions & programs incidental thereto. Weaver General Construction also warrants that this submittal complies with contracted documents and comprises on deviations thereto:

<p>Contractor's Stamp:</p> <p>Date: 12/15/11 Reviewed by: H.C. Myers <input checked="" type="checkbox"/> Reviewed Without Comments <input type="checkbox"/> Reviewed With Comments</p> <p>ENGINEER'S COMMENTS:</p>	<p>Engineer's Stamp:</p>
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395 West 67th Street
P.O. Box 388
Loveland, CO 80539-0388
Phone: (970) 461-3553
Fax: (970) 461-3443

DATE: 08/10/11
SENT TO: Weaver General Contractors
Attn: John Jacob
JOB: Harold D. Thompson WRF (#01135)
CO

SUBMITTAL NO.: 00003
SUBMITTAL DUE:
PACKAGE: n/a

VENDOR NAME: CFM

SPECIFICATION #: 15800

SUBJECT: Low Leakage Damper

REVIEW DETAILS:

Review #: 1	Received: 08/10/11	Priority: Normal
Desc: Low Leakage Damper	Sent: 08/10/11	Status: Open
Reviewer: John Jacob	Returned:	Sepias: 0
Weaver General Contractors	Forwarded:	Prints: 0

Sent for the following action(s):

- For Approval**

 For Distribution

 For Your Use/Files

 As Req'd per

Action Needed:

Sincerely,
Melanie Peterson

Kuck Mechanical Contractors
PM Assistant
395 W. 67th Street
Loveland, CO 80538



CFM COMPANY

AIR CONDITIONING / HEATING / VENTILATING EQUIPMENT

413D North Highway 287 - Ft. Collins, CO 80524

Phone: (970) 493-7293 / Fax: (970) 493-7297

Harold Thompson WTP

TAG:

Aluminum Low Leakage Control Damper with Actuator

Submittal Date: 7/28/2011

Submitted by: Eric Larsen

SUBMITTAL

Job Title: **Wastewater Treatment Plant**

Engineer: Plant Engineering Consultant

Consultant: Mr. Chris Freer

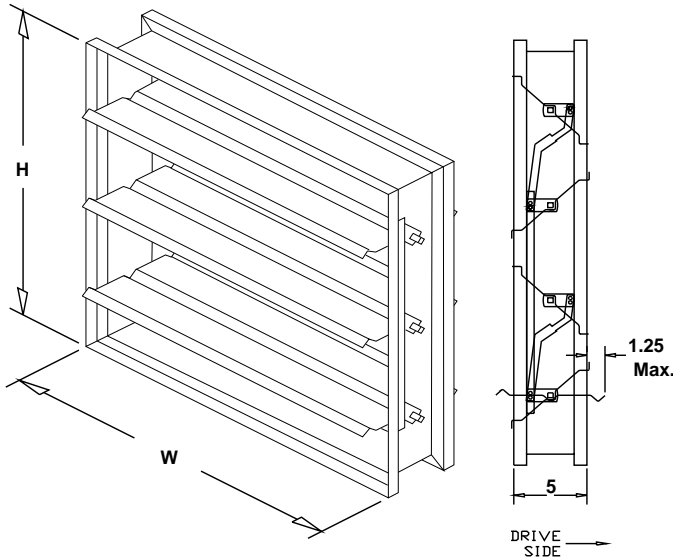
Elevation: (ft) 6,000

Date: 07/28/11

CFM COMPANY
413D NORTH HWY 287
FORT COLLINS , CO 80524-1346
US
Phone: (970)493-7293
Fax: (970)493-7297
Email Address: samh@cfmcompany.com



P.O. Box 410 Schofield, WI 54476 (715) 359-6171 FAX (715) 355-2399 www.greenheck.com



VCD-23

Low Leakage Control Damper

Application & Design

The model VCD-23 is a ruggedly built low leakage control damper for application as an automatic control or manual balancing damper. A wide range of electric and pneumatic actuators are available. Non-jackshafted dampers will be supplied with a blade drive lever for internal actuator mounting unless external actuator mounting is specified in which case an extension pin with clip kit will be provided. Note: The extension pin with clip kit includes the extension pin and clip. The VCD-23 is intended for applications in low to medium pressure and velocity systems.

- FRAME: Galvanized, 5 in x 1 in hat channel, reinforced corners, low profile head and sill on dampers 17 in high and smaller.
- BLADES: Galvanized, reinforced with 3 longitudinal structurally designed v's.
- LINKAGE: Side linkage out of air stream.
- AXLES: 0.5 in dia.

Notes: All dimensions shown are in units of inches.

W & H furnished approximately 0.25 in undersized and only refer to damper dimensions (sleeve thickness is not included).

Electrical accessory wiring terminates at the accessory.
Field wiring is required to individual components.

CONSTRUCTION FEATURES

Blade Action:	Opposed	Sizing:	Nominal
Frame Type:	Channel	Frame Thickness (in):	0.125
Material:	Aluminum	Actuator Type:	120 VAC
Axle Material:	304 SS	Actuator Mount:	External Kit
Axle Bearings:	304 SS	Actuator Location:	Left Side
Linkage Material:	304 SS	Fail Position:	Closed
Blade Seal:	Silicone	Cycle:	60 Cycle
Jamb Seal Mat.:	304 SS		



ID #	Tag	Qty	W (in)	H (in)	Drive Arr.	Actuator	Act. Qty.
6-1		1	60.000	88.000	22-2FEL-2	AFBUP	2

Tags:

Pressure Drop Data

VCD-23

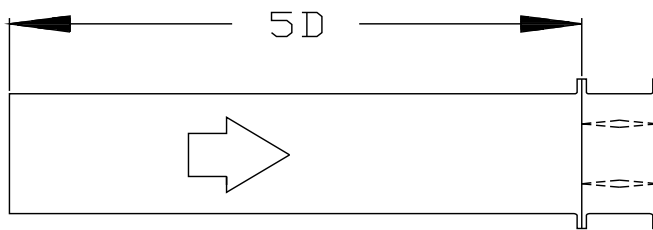
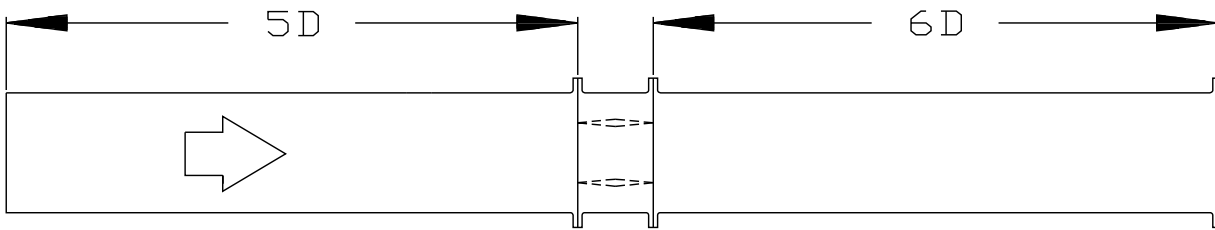
This pressure drop testing was conducted in accordance with AMCA Standard 500 using the three configurations shown. All data has been corrected to represent standard air at a density of 0.075 lb/ft³. Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information 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.

AMCA Test Figures

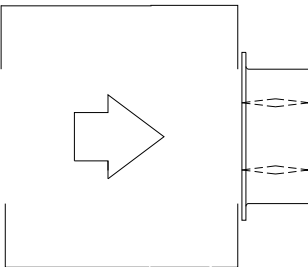
Figure 5.3 Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

Figure 5.2 Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

Figure 5.5 Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

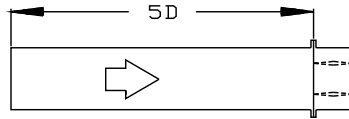


$$D = \sqrt{\frac{4(W)(H)}{3.14}}$$

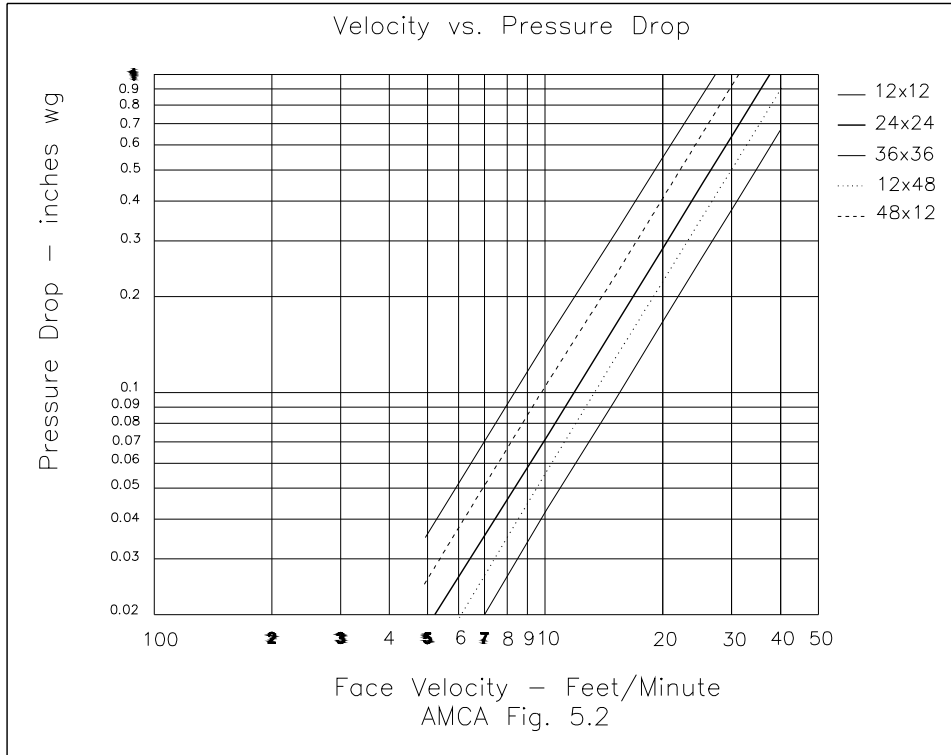


AMCA 5.2 Pressure Drop

VCD-23



$$D = \sqrt{\frac{4(W)(H)}{3.14}}$$



12 x 12 (305mm x 305mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.14
1500	0.31
2000	0.55
2500	0.86
3000	1.24
3500	1.69
4000	2.20

24 x 24 (610mm x 610mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.07
1500	0.16
2000	0.29
2500	0.45
3000	0.65
3500	0.89
4000	1.16

36 x 36 (914mm x 914mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.36
3500	0.49
4000	0.64

12 x 48 (305mm x 1219mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.13
2000	0.23
2500	0.36
3000	0.52
3500	0.70
4000	0.92

48 x 12 (1219mm x 305mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.10
1500	0.23
2000	0.41
2500	0.63
3000	0.91
3500	1.24
4000	1.62

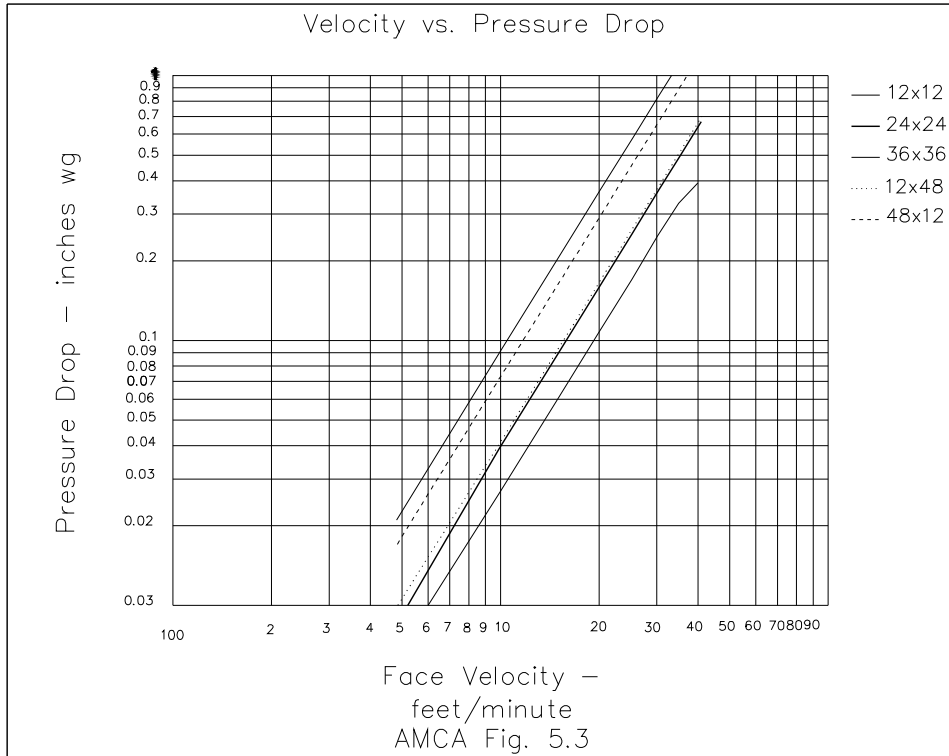
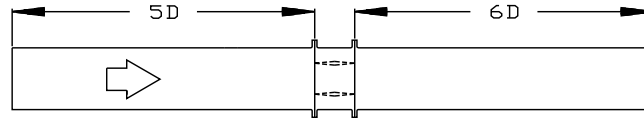


Greenheck certifies that the model VCD-23 shown herein is licensed to bear the AMCA seal.

The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs.

AMCA 5.3 Pressure Drop

VCD-23



12 x 12 (305mm x 305mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.09
1500	0.20
2000	0.36
2500	0.56
3000	0.81
3500	1.10
4000	1.44

24 x 24 (610mm x 610mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.35
3500	0.48
4000	0.63

36 x 36 (914mm x 914mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.11
2500	0.17
3000	0.24
3500	0.33
4000	0.42

12 x 48 (305mm x 1219mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.10
2000	0.17
2500	0.27
3000	0.39
3500	0.53
4000	0.70

48 x 12 (1219mm x 305mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.07
1500	0.16
2000	0.29
2500	0.45
3000	0.64
3500	0.88
4000	1.14

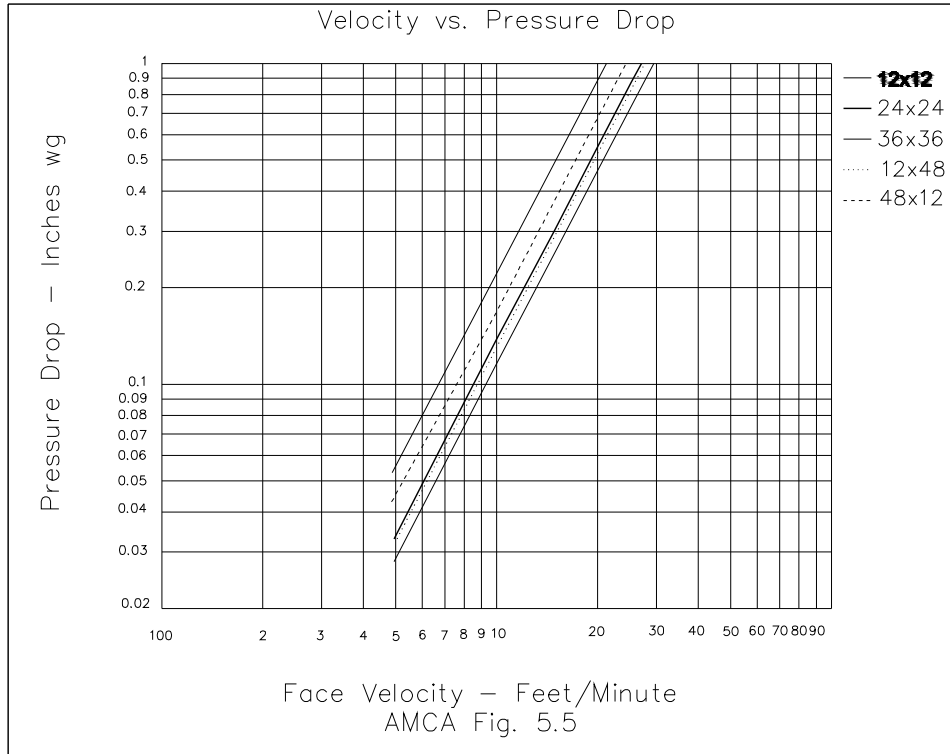
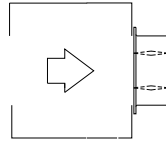


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The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs.

AMCA 5.5 Pressure Drop

VCD-23



12 x 12 (305mm x 305mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.06
1000	0.22
1500	0.50
2000	0.89
2500	1.39
3000	2.00
3500	2.72
4000	3.55

24 x 24 (610mm x 610mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.14
1500	0.31
2000	0.54
2500	0.85
3000	1.22
3500	1.66
4000	2.17

36 x 36 (914mm x 914mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.26
2000	0.46
2500	0.73
3000	1.05
3500	1.42
4000	1.86

12 x 48 (305mm x 1219mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.13
1500	0.30
2000	0.53
2500	0.83
3000	1.19
3500	1.62
4000	2.11

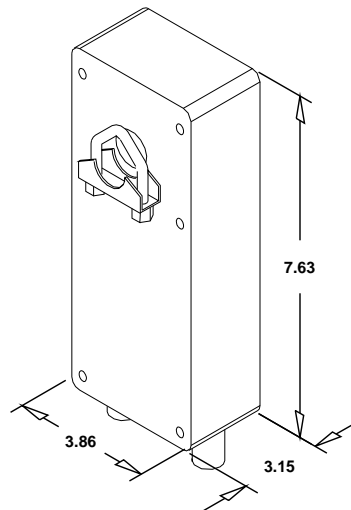
48 x 12 (1219mm x 305mm)	
Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.17
1500	0.38
2000	0.67
2500	1.04
3000	1.50
3500	2.05
4000	2.67



Greenheck certifies that the model VCD-23 shown herein is licensed to bear the AMCA seal.

The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs.

Belimo AFBUP Actuator



To verify dimensions, see www.belimo.us

All Dimensions shown are in units of inches.

Actuator wiring terminates at the actuator. Field wiring is required to individual actuator(s).

The AFBUP actuator provides true spring return operation for reliable fail-safe application and positive close off on air tight dampers. The spring return system provides consistent torque to the damper with and without power applied to the actuator. The AFBUP-S version is provided with 2 built in auxiliary switches.

- * Power supply: 24 to 240Vac, 50/60Hz or 24 to 125Vdc
- * Power Consumption Running: 7 Watts
- * Power Consumption Holding: 3.5 Watts
- * Rated Torque: 180 in-lb
- * Locations: NEMA Type 2 enclosure, indoor drip-proof

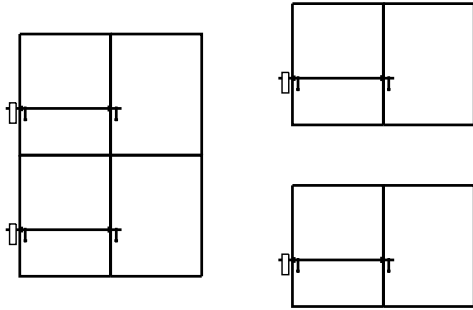
AMCA



AMCA Licensed for Air Performance

GreenheckFanCorporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs.

Damper Drive Arrangements



22-2FEL-2 or 22-2CEL-2