



Dampers

[Aluminum Dampers](#)

[Steel Dampers](#)

[Round Dampers](#)

[Industrial Dampers](#)

[Backdraft Dampers](#)

[Multizone Dampers](#)

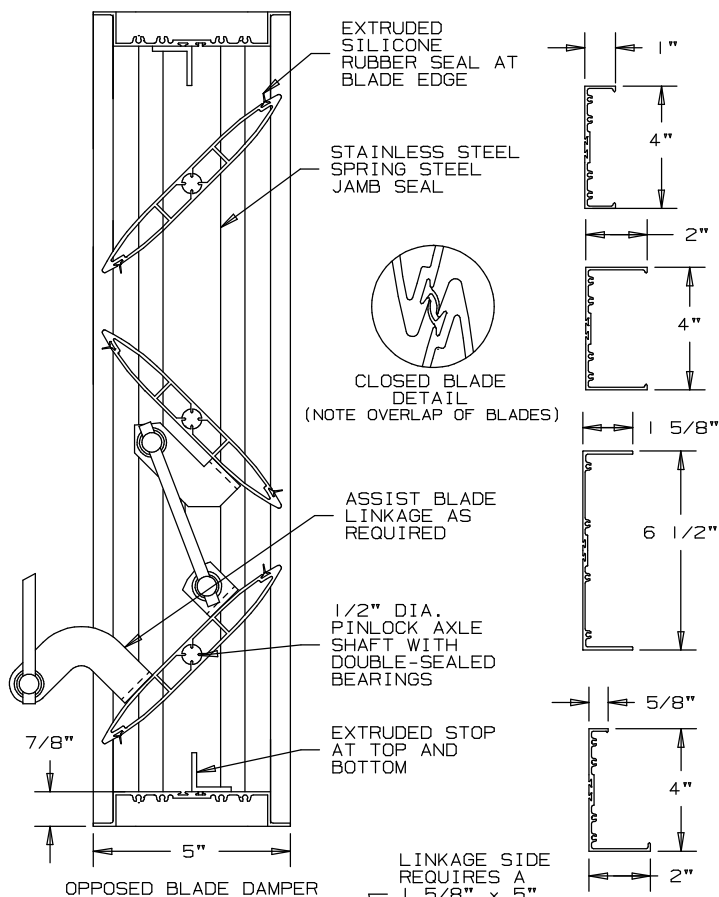


Aluminum Dampers

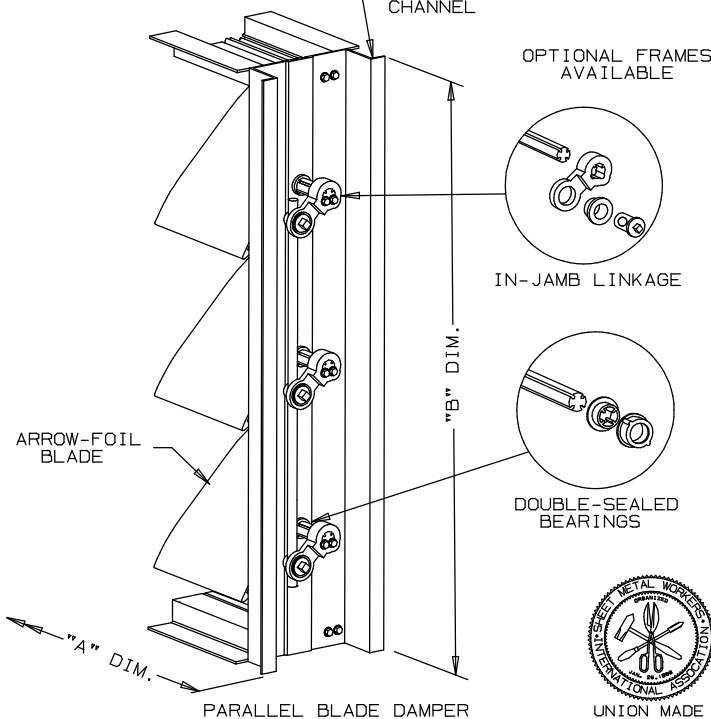
- AFD20 [Ultra Low Leak Air-Foil Control Damper](#)
- AFRTI25 [Ultra Low Leak Insulated Air-Foil Control Damper](#)
- AFDTI25LT [Ultra Low Leak Insulated Thermally Broken Control Damper](#)
- AF (206/207) [Aluminum Air-Foil Damper with Extruded Silicone Blade and Jamb Seals](#)
- PL (506/507) [Extruded Aluminum Pin-Lock Damper](#)
- SB28 [Single Blade Aluminum Damper](#)

ARROW EXTRUDED ALUMINUM ARROW-FOIL DAMPERS CLASS "IA" AIR LEAKAGE RATED

TYPE AFD-20



OPPOSED BLADE DAMPER



PARALLEL BLADE DAMPER

SPECIFICATIONS

DAMPERS SHALL BE ARROW-FOIL DAMPER MODEL AFD-20 AS MANUFACTURED BY ARROW UNITED INDUSTRIES, WYALUSING, PA 18853. LOW LEAKAGE DAMPER SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR AIR LEAKAGE AND AIR PERFORMANCE, HAVING LEAKAGE THROUGH A 60"x36" DAMPER AT 4" WATER GAUGE PRESSURE DIFFERENTIAL EQUAL TO CLASS I LEAKAGE.

FRAMES AND BLADES TO BE A MINIMUM 12 GA (.081") EXTRUDED ALUMINUM. BLADES TO BE A SINGLE UNIT ARROW-FOIL DESIGN, 6" WIDE WITH THE PIN-LOCK AN INTEGRAL SECTION WITHIN THE BLADE CORE.

OVERLAP BLADES AND SEALS (NOT JUST OVERLAP SEALS) ASSURE MINIMUM AIR LEAKAGE. SILICONE SEALS FIT INTO RIBBED GROOVE INSERT IN BLADES WITH A FORMED STAINLESS STEEL, SPRING STEEL SEAL AT THE JAMB.

FRAMES TO BE EXTRUDED ALUMINUM "HAT-SHAPED" CHANNEL WITH REINFORCING BOSSES AND GROOVE INSERTS FOR SILICONE SEALS. STANDARD FRAMES ARE 5" WIDE "HAT-SHAPED" FRAMES TYPICAL (4) SIDES.

AXLE SHAFTS TO BE 1/2" DIA. EXTRUDED ALUMINUM, PIN-LOCK DESIGN INTERLOCKING INTO BLADE SECTION. BEARINGS TO BE "DOUBLE-SEALED" TYPE WITH CELCON INNER BEARING ON AXLE RIDING IN POLYCARBONATE OUTER BEARING INSERTED IN FRAME SO THAT OUTER BEARING CANNOT ROTATE.

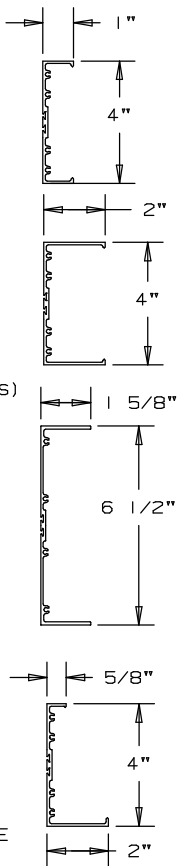
AXLE BEARINGS TO BE DESIGNED SO THAT THERE SHALL BE NO METAL-TO-METAL OR METAL-TO-BEARING RIDING SURFACES. INTERCONNECTING LINKAGE TO HAVE CELCON BEARINGS TO ELIMINATE FRICTION IN LINKAGE.

LINKAGE CONTAINED WITHIN THE JAMB CONSISTS OF A HEAVY, ALUMINUM CRANK-ARM PERMANENTLY LOCKED TO THE BLADE SHAFT BY TWO STAINLESS STEEL FASTENERS. THE CRANK-ARM CONTAINS A 1/2" DIA., CADMIUM PLATED & CHROMATE TREATED MACHINED STEEL TRUNNION RIDING IN A CELCON BEARING. A PLATED STEEL 1/4-20 SET SCREW WITH LOCKING PATCH, TIES THE PIVOT TO THE 5/16" DIA. ALUMINUM LINKAGE ROD. THE LINKAGE OF EACH DAMPER IS INDIVIDUALLY ADJUSTED.

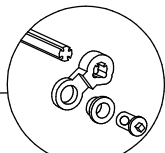
MIN. SIZE: 12"W X 12"H - SINGLE BLADED
MIN. SIZE: 12"W X 14 5/8"H - 2 BLADE OPP.
MAX. SIZE: 60"W X 72"H - MULTIPANEL SECTIONS FOR LARGER THAN MAX. SINGLE PANEL SECTION IS RECOMMENDED.

PLEASE SPECIFY WHETHER PARALLEL OR OPPOSED OPERATION IS REQUIRED. NOT RECOMMENDED FOR BLADES INSTALLED VERTICALLY.

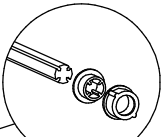
NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.



OPTIONAL FRAMES AVAILABLE



IN-JAMB LINKAGE




DOUBLE-SEALED BEARINGS



UNION MADE

SCHEDULE

ITEM	QTY.	"A" DIM.	"B" DIM.
 ARROW UNITED INDUSTRIES A DIVISION OF MESTEK, INC. 314 RIVERSIDE DRIVE WYALUSING, PA 18853 TEL: (570) 746-1888 FAX: (570) 746-9286			
AGENT: _____			
ARCH./ENG. :			
CONTR. :			
PROJECT :			
EDR:	ECN:	JOB:	
DATE:	DWN.:	DWG.:	

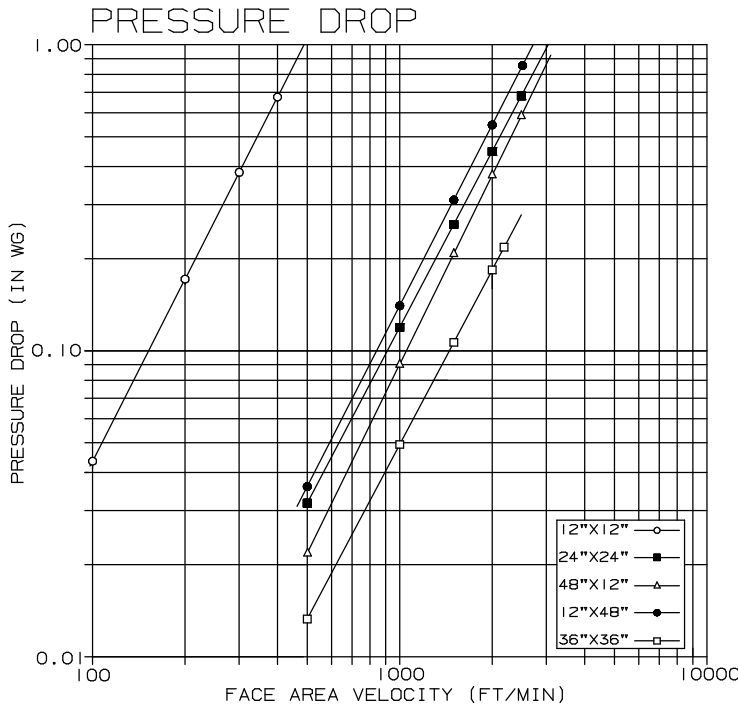
DAMPER MODEL AFD-20

EXTRUDED ALUMINUM - PARALLEL - OPPOSED

PERFORMANCE DATA

PRESSURE DROP

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



12" x 12"	
FACE AREA VELOCITY (ft/min)	PRESSURE DROP (in wg)
100	0.04
200	0.16
300	0.38
400	0.69
500	1.00

24" x 24"	
FACE AREA VELOCITY (ft/min)	PRESSURE DROP (in wg)
500	0.03
1000	0.12
1500	0.25
2000	0.45
2500	0.68

12" x 48"	
FACE AREA VELOCITY (ft/min)	PRESSURE DROP (in wg)
500	0.04
1000	0.14
1500	0.31
2000	0.56
2500	0.85

48" x 12"	
FACE AREA VELOCITY (ft/min)	PRESSURE DROP (in wg)
500	.02
1000	.09
1500	.20
2000	.38
2500	.58

36" x 36"	
FACE AREA VELOCITY (ft/min)	PRESSURE DROP (in wg)
500	0.01
1000	0.05
1500	0.10
2000	0.18
2200	0.21

LEAKAGE

AIR LEAKAGE REQUIREMENTS MEET INTERNATIONAL ENERGY CONSERVATION CODE (IECC) BY LEAKING LESS THAN 3 CFM/SQ.FT. AT 1" OF STATIC PRESSURE AND IS AMCA LICENSED AS A CLASS "IA" DAMPER.

DAMPER SIZE WIDTH x HEIGHT	1 IN W.G. CLASS	4 IN W.G. CLASS
12" x 12"	IA	I
24" x 24"	IA	I
36" x 36"	IA	I
12" x 48"	IA	I
48" x 12"	IA	I
60" x 36"	IA	I

LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.5 AT AN OPERATION TEMPERATURE RANGE BETWEEN 50°F & 104°F. DATA ARE BASED ON A SEATING TORQUE OF 40 LB/IN. FOR DAMPERS LESS THAN 4 SQ. FT. IN SIZE. DAMPERS ABOVE 4 SQ. FT., 5 LB/IN/SQ.FT. IS APPLIED TO HOLD THE DAMPER IN THE CLOSED POSITION.

DAMPER AIR LEAKAGE CLASSIFICATION

CLASS	PRESSURE	LEAKAGE, CFM/FT ²	
		REQUIRED RATING	
		1 IN. W.G.	4 IN. W.G.
IA		3	NA
I		4	8
2		10	20
3		40	80



ARROW UNITED INDUSTRIES CERTIFIES THAT THE MODEL AFD-20 DAMPER 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 PROGRAM. THE AMCA CERTIFIED RATING SEAL APPLIES TO AIR PERFORMANCE/AIR LEAKAGE ONLY.

DAMPER MODEL AFD-20

EXTRUDED ALUMINUM - PARALLEL - OPPOSED

PERFORMANCE DATA

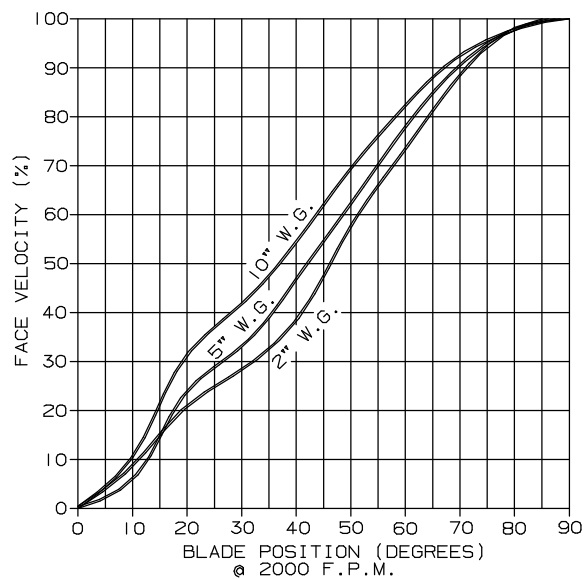
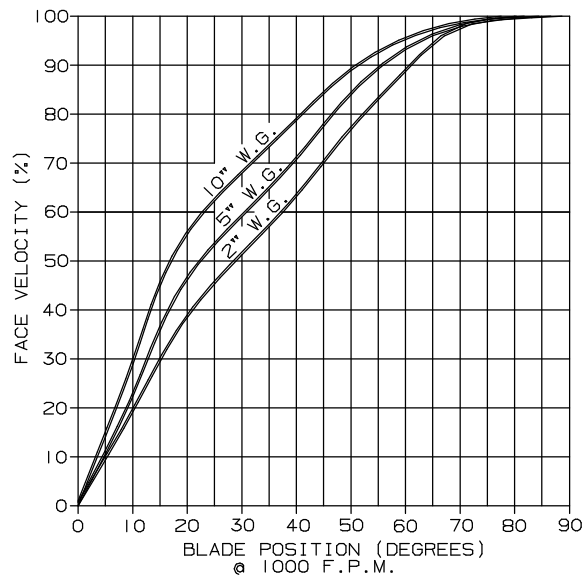
LINEAR AIR FLOW CHARACTERISTICS

ARROW UNITED INDUSTRIES HAS TESTED A VARIETY OF ARROWFOIL BLADE WIDTHS 4", 5", & 6" IN VARIOUS ARRANGEMENTS FROM ALL PARALLEL, ALL OPPOSED, AND COMBINATIONS OF PARALLEL AND OPPOSED BLADES IN A COMMON FRAME FOR A SINGLE DAMPER INSTALLED IN A DUCT.

TEST UNITS WERE INSTALLED IN DUCTWORK WITH DUCT UPSTREAM AND DOWNSTREAM PER AMCA TEST SET-UP FIG. 5.3. USING MOST COMMON APPROACH VELOCITIES AND FAN STATIC PRESSURES TO CONDUCT LINEAR AIR FLOW TEST.

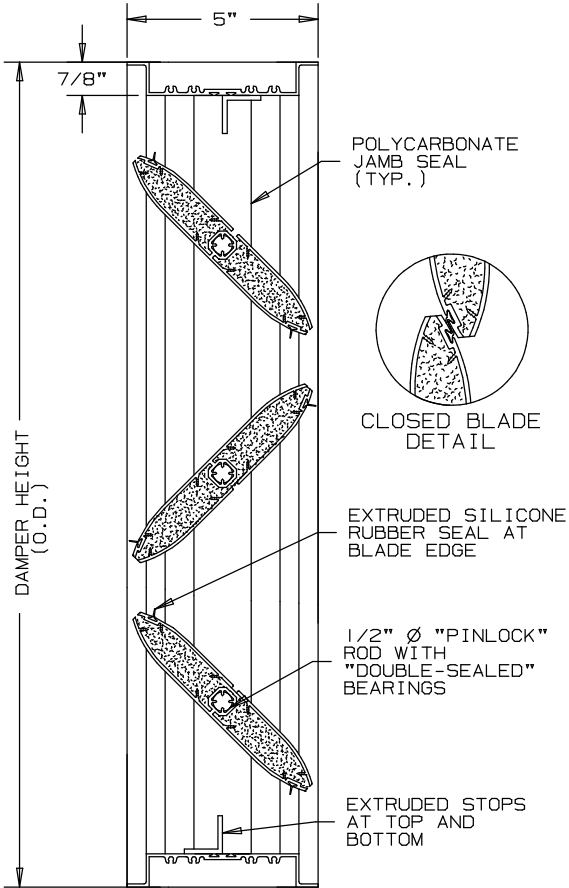
THE RESULTS OF THE TESTS SHOW THAT FAN STATIC PRESSURE DOES HAVE AN EFFECT ON THE LINEAR AIR FLOW CHARACTERISTICS OF A DAMPER. GRAPHS BELOW WILL IDENTIFY THE SIMULATED SYSTEM CONDITIONS USED FOR THE SINGLE DAMPER IN DUCT SYSTEM APPLICATION.

CURVES SHOWN IN THE GRAPHS BELOW SHOW THAT MODEL AFD-20 ALL OPPOSED, "AS STANDARDLY BUILT", IS A VERY EFFECTIVE CONTROL DAMPER FOR USE IN A VARIETY OF VELOCITIES AND PRESSURES.

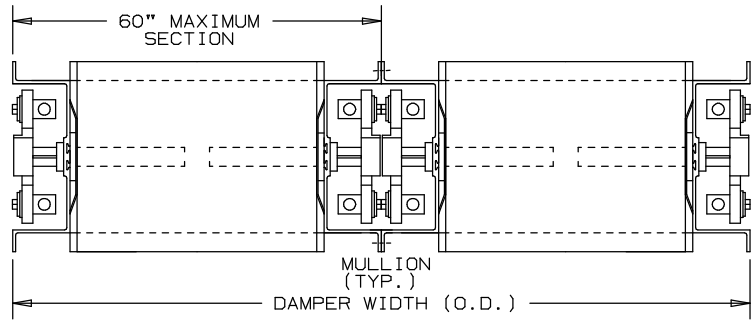


ARROW EXTRUDED ALUMINUM THERMAL BREAK DAMPERS

TYPE AFDTI-25



OPPOSED BLADE DAMPER (SHOWN)
PARALLEL BLADE DAMPER AVAILABLE



SPECIFICATIONS

FRAME: 5" WIDE, 6063T6/T52 EXTRUDED ALUMINUM "HAT-SHAPED" CHANNEL, .080" NOMINAL, .125" OPTIONAL WALL THICKNESS.

BLADE: 6" WIDE, 6063-T6/T52 EXTRUDED ALUMINUM .080" NOMINAL WALL THICKNESS. AIRFOIL PROFILE INJECTED WITH A TWO PART POLYURETHANE (CFC) FREE FOAM, AND DEBRIDGED FOR THERMAL ISOLATION.

AXLE: 1/2" DIAMETER EXTRUDED ALUMINUM "PIN-LOCK" DESIGN, INTERLOCKING INTO BLADE SECTION.

LINKAGE: CONCEALED IN JAMB OF HEAVY ALUMINUM. CRANK ARM PERMANENTLY LOCKED TO BLADE AXLE BY TWO STAINLESS STEEL FASTENERS. THE CRANK ARM CONTAINS A 1/2" DIAMETER METAL PIVOT RIDING IN A CELCON BEARING. A 1/4"-20 SET SCREW WITH LOCKING PATCH TIES THE 5/16" DIAMETER ALUMINUM LINKAGE ROD. THE LINKAGE OF EACH DAMPER IS INDIVIDUALLY ADJUSTED.

BEARINGS: "DOUBLE-SEALED" TYPE WITH CELCON INNER BEARING RIDING INSIDE A POLYCARBONATE OUTER BEARING POSITIVELY LOCKED INTO FRAME, DESIGNED SO THAT THERE SHALL BE NO METAL-TO-METAL OR METAL-TO-BEARING RIDING SURFACES.

SEALS: EXTREME LOW TEMPERATURE SEAL SYSTEM, EXTRUDED SILICONE RUBBER BLADE EDGE SEAL THAT FITS INTO A RIBBED GROOVE INSERT IN BLADES WITH AN EXTRUDED POLYCARBONATE SEAL AT JAMBS.

TEMPERATURE RATINGS: -40°F TO +200°F, AFDTI-25

FINISH: MILL.

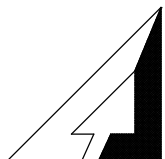
MODEL AFDTI-25

SIZES: MADE TO EXACT SIZES AS REQUESTED.
MINIMUM PANEL SIZE - 6" x 8 7/8" SINGLE BLADE
MAXIMUM PANEL SIZE - 60" x 72" PARALLEL/OPPOSED

FOR DAMPER PERFORMANCE
- SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	PAR.	OPP.	ACTUATOR MODEL	INT.	EXT.	N.C.	N.O.	TAGGING	UNION MADE
		DAMPER SIZE (O.D.)					LOCATION	FUNCTION				



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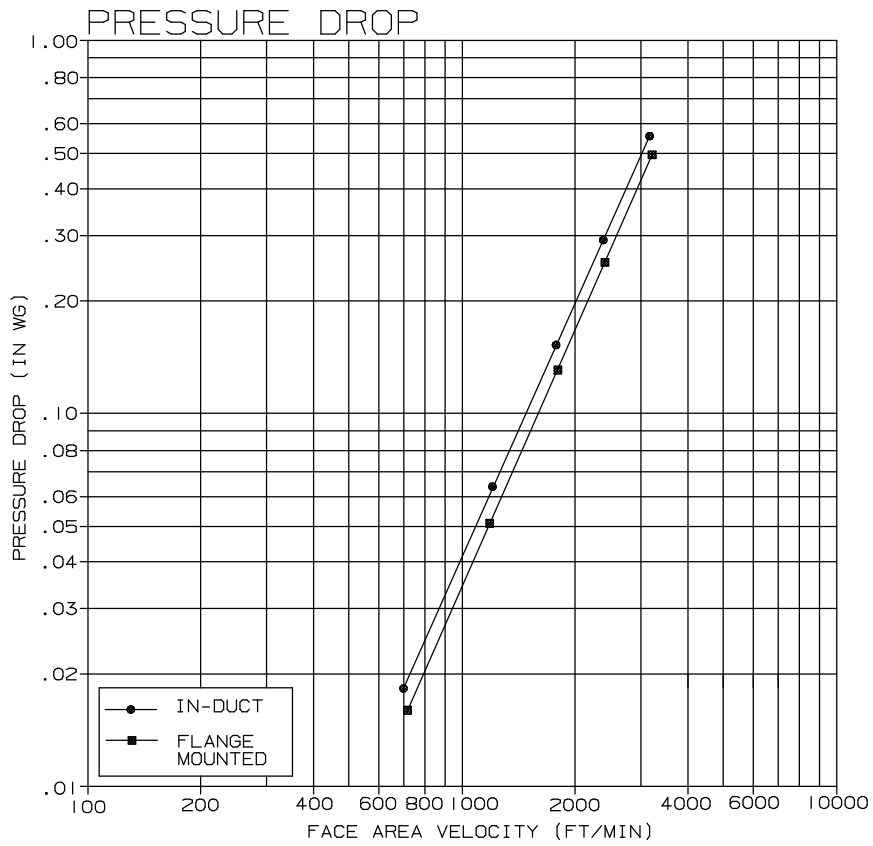
DAMPER MODEL AFDTI-25

EXTRUDED ALUMINUM - PARALLEL - OPPOSED

PERFORMANCE DATA

MODEL AFDTI-25 DAMPER SIZE 36" x 36"

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500-D-97 USING TEST SET-UP FIG. 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB/CU FT AIR DENSITY.



DAMPER MODEL AFDTI-25

EXTRUDED ALUMINUM - PARALLEL - OPPOSED

PERFORMANCE DATA

LEAKAGE

TOTAL CFM LEAKAGE AT 1" W.G.
STATIC PRESSURE DIFFERENTIAL

DAMPER HEIGHT (INCHES)	DAMPER WIDTH (INCHES)				
	12"	24"	36"	48"	60"
12"	2	4	6	8	10
18"	3	6	9	12	15
24"	4	8	12	16	20
30"	5	10	15	20	25
36"	6	12	18	24	30
42"	7	14	21	28	35
48"	8	16	24	32	40
54"	9	18	27	36	45
60"	10	20	30	40	50
66"	11	22	33	44	55
72"	12	24	36	48	60

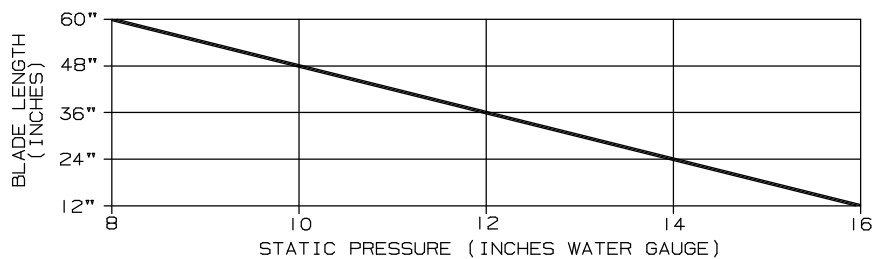
LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500-D-97 USING TEST SET-UP FIG. 5.4. DATA IS BASED ON A CLOSING TORQUE OF 5 IN-LB/SQ.FT. FOR DAMPERS LESS THAN 6 SQ. FT. HAVING A CLOSING TORQUE OF 40 IN-LB. DAMPER CLOSING TORQUE IS APPLIED TO DAMPER OPERATING SHAFT.

LEAKAGE CORRECTION FACTOR

DAMPER WIDTH (INCHES)	STATIC PRESSURE (INCHES WATER GAUGE)						
	2"	3"	4"	5"	6"	7"	8"
12"-60"	1.44	1.64	2.00	2.22	2.44	2.64	2.82

USE OF CORRECTION FACTORS WILL GIVE LEAKAGE VALUES AT GREATER THAN 1" PRESSURES

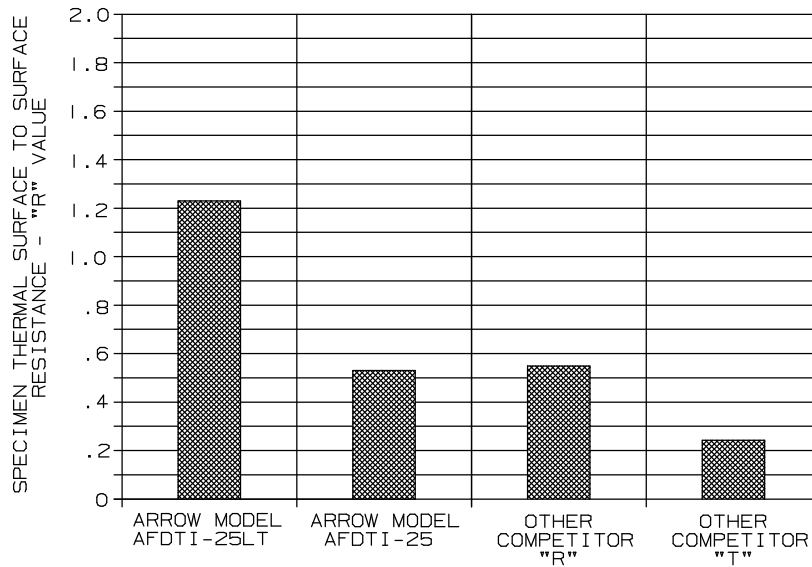
AFDTI-25 DAMPER LIMITATIONS



MODEL AFDTI-25 DAMPER DESIGN AT REDUCED LENGTHS CAN WITHSTAND HIGHER STATIC PRESSURE LIMITS WITHOUT SACRIFICING DAMPER OPERATION AND PERFORMANCE. STATIC PRESSURES ABOVE 8" W.G. WILL AFFECT OPERATION TORQUE VALUE.

DAMPER MODEL AFDTI-25 EXTRUDED ALUMINUM - PARALLEL - OPPOSED PERFORMANCE DATA

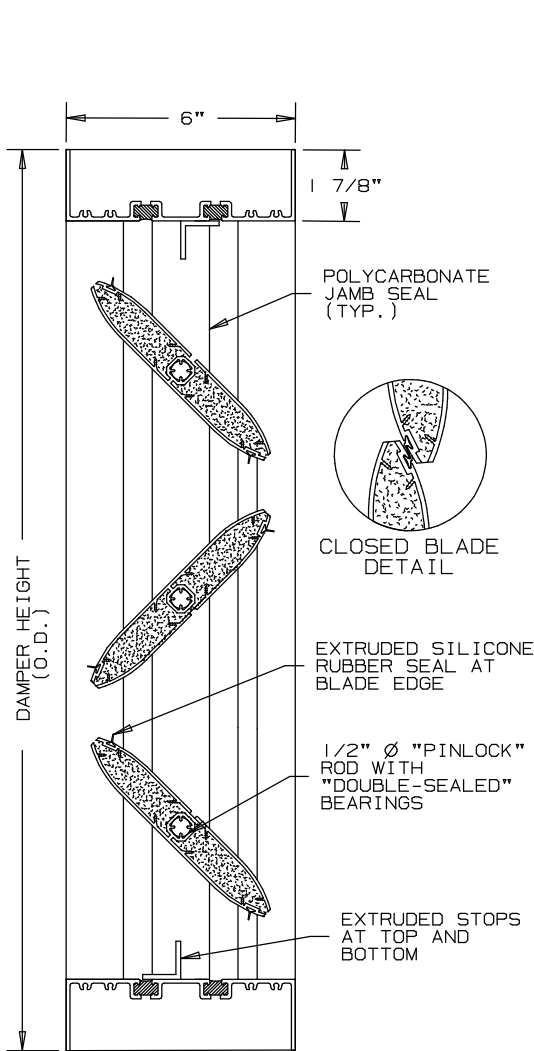
ARROW MODEL AFDTI-25 THERMAL PERFORMANCE



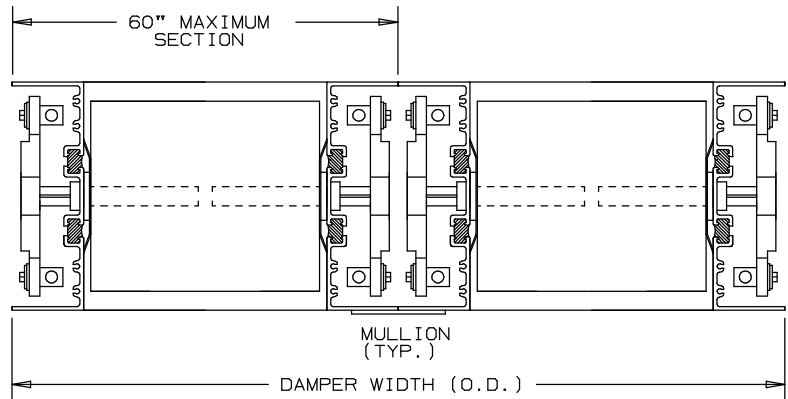
DAMPER ASSEMBLY THERMAL PERFORMANCE RATING TESTED TO ASTM C-1363-97, STANDARD TEST METHOD FOR THERMAL PERFORMANCE OF BUILDING ASSEMBLIES BY MEANS OF A HOT BOX APPARATUS AND (REPLACES C-236 AND C-976 TEST METHODS).

ARROW EXTRUDED ALUMINUM THERMAL BREAK DAMPERS

TYPE AFDTI-25LT



OPPOSED BLADE DAMPER (SHOWN)
PARALLEL BLADE DAMPER AVAILABLE



SPECIFICATIONS

FRAME: 6" WIDE X 1 7/8" HIGH, 6063-T6/T52 EXTRUDED ALUMINUM WITH .125" NOMINAL WALL THICKNESS, AND TWO THERMAL BREAKS FILLED WITH POLYURETHANE AND DEBRIDGED FOR THERMAL ISOLATION.

BLADE: 6" WIDE, 6063-T6/T52 EXTRUDED ALUMINUM .080" NOMINAL WALL THICKNESS, AIRFOIL PROFILE INJECTED WITH A TWO PART POLYURETHANE (CFC) FREE FOAM, AND DEBRIDGED FOR THERMAL ISOLATION.

AXLE: 1/2" DIAMETER EXTRUDED ALUMINUM "PIN-LOCK" DESIGN, INTERLOCKING INTO BLADE SECTION.

LINKAGE: CONCEALED IN JAMB OF HEAVY ALUMINUM. CRANK ARM PERMANENTLY LOCKED TO BLADE AXLE BY TWO STAINLESS STEEL FASTENERS. THE CRANK ARM CONTAINS A 1/2" DIAMETER METAL PIVOT RIDING IN A CELCON BEARING. A 1/4-20 SET SCREW WITH LOCKING PATCH TIES THE 5/16" DIAMETER ALUMINUM LINKAGE ROD. THE LINKAGE OF EACH DAMPER IS INDIVIDUALLY ADJUSTED.

BEARINGS: "DOUBLE-SEALED" TYPE WITH CELCON INNER BEARING RIDING INSIDE A POLYCARBONATE OUTER BEARING POSITIVELY LOCKED INTO FRAME, DESIGNED SO THAT THERE SHALL BE NO METAL-TO-METAL OR METAL-TO-BEARING RIDING SURFACES.

SEALS: EXTREME LOW TEMPERATURE SEAL SYSTEM, EXTRUDED SILICONE RUBBER BLADE EDGE SEAL THAT FITS INTO A RIBBED GROOVE INSERT IN BLADES WITH AN EXTRUDED POLYCARBONATE SEAL AT JAMBS.

TEMPERATURE RATINGS: -70°F TO +200°F

FINISH: MILL.

MINIMUM PANEL SIZE - 8" x 10 7/8" SINGLE BLADE
MAXIMUM PANEL SIZE - 60" x 72" PARALLEL/OPPOSED

FOR DAMPER PERFORMANCE
- SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	PAR.	OPP.	ACTUATOR MODEL	INT.	EXT.	N.C.	N.O.	TAGGING	UNION MADE
		DAMPER SIZE (O.D.)					LOCATION	FUNCTION				



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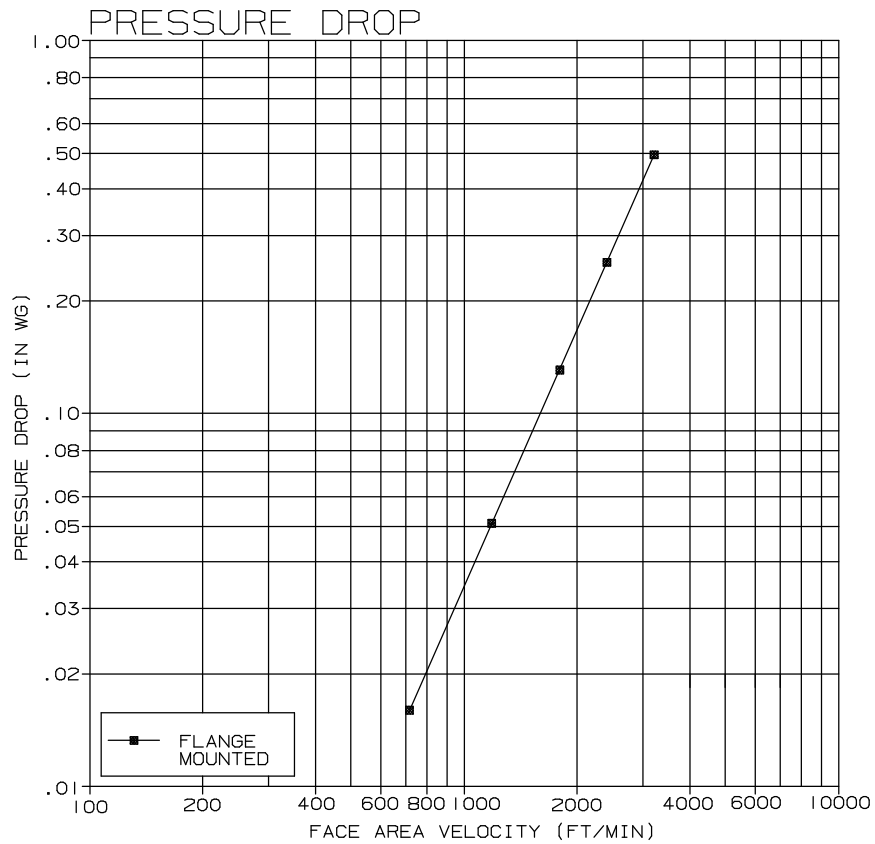
DAMPER MODEL AFDTI-25LT

EXTRUDED ALUMINUM - PARALLEL - OPPOSED

PERFORMANCE DATA

MODEL AFDTI-25LT DAMPER SIZE 36" x 36"

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500-D-97 USING TEST SET-UP FIG. 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB/CU FT AIR DENSITY.



DAMPER MODEL AFDTI-25LT

EXTRUDED ALUMINUM - PARALLEL - OPPOSED

PERFORMANCE DATA

LEAKAGE

TOTAL CFM LEAKAGE AT 1" W.G.
STATIC PRESSURE DIFFERENTIAL

DAMPER HEIGHT (INCHES)	DAMPER WIDTH (INCHES)				
	12"	24"	36"	48"	60"
12"	2	4	6	8	10
18"	3	6	9	12	15
24"	4	8	12	16	20
30"	5	10	15	20	25
36"	6	12	18	24	30
42"	7	14	21	28	35
48"	8	16	24	32	40
54"	9	18	27	36	45
60"	10	20	30	40	50
66"	11	22	33	44	55
72"	12	24	36	48	60

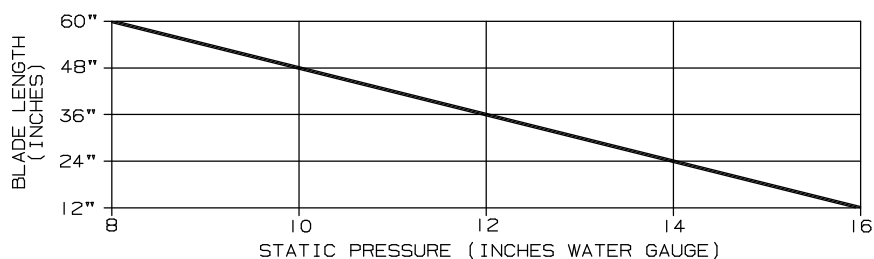
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LEAKAGE CORRECTION FACTOR

DAMPER WIDTH (INCHES)	STATIC PRESSURE (INCHES WATER GAUGE)						
	2"	3"	4"	5"	6"	7"	8"
12"-60"	1.44	1.64	2.00	2.22	2.44	2.64	2.82

USE OF CORRECTION FACTORS WILL GIVE LEAKAGE VALUES AT GREATER THAN 1" PRESSURES

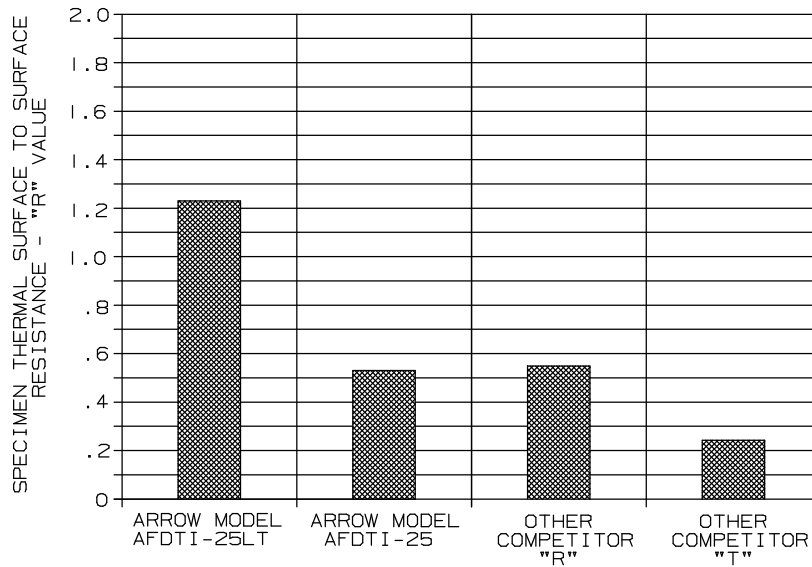
AFDTI-25LT DAMPER LIMITATIONS



MODEL AFDTI-25LT DAMPER DESIGN AT REDUCED LENGTHS CAN WITHSTAND HIGHER STATIC PRESSURE LIMITS WITHOUT SACRIFICING DAMPER OPERATION AND PERFORMANCE. STATIC PRESSURES ABOVE 8" W.G. WILL AFFECT OPERATION TORQUE VALUE.

DAMPER MODEL AFDTI-25LT EXTRUDED ALUMINUM - PARALLEL - OPPOSED PERFORMANCE DATA

ARROW MODEL AFDTI-25LT THERMAL PERFORMANCE

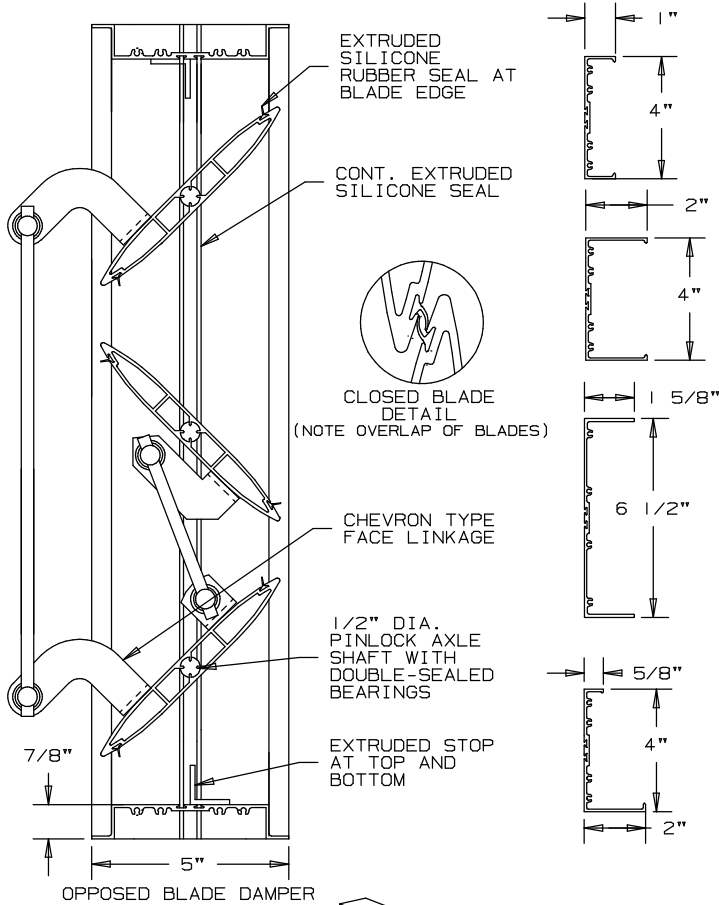


DAMPER ASSEMBLY THERMAL PERFORMANCE RATING TESTED TO ASTM C-1363-97, STANDARD TEST METHOD FOR THERMAL PERFORMANCE OF BUILDING ASSEMBLIES BY MEANS OF A HOT BOX APPARATUS AND (REPLACES C-236 AND C-976 TEST METHODS).

ARROW EXTRUDED ALUMINUM ARROW-FOIL DAMPERS

TYPE PBD AF-206 & OBD AF-207

ARROW-FOIL DAMPERS WITH BLADE LINKAGE



SPECIFICATIONS

DAMPERS SHALL BE ARROW-FOIL DAMPER OBD AF-207 (OPPOSED) OR PBD AF-206 (PARALLEL) WITH BLADE LINKAGE AS MANUFACTURED BY ARROW UNITED INDUSTRIES, WYALUSING, PA 18853.

FRAMES AND BLADES TO BE A MINIMUM 12 GA (.081") EXTRUDED ALUMINUM. BLADES TO BE A SINGLE UNIT ARROW-FOIL DESIGN, 6" WIDE (4" AND 5" WIDE AVAILABLE) WITH THE PIN-LOCK AN INTEGRAL SECTION WITHIN THE BLADE CORE.

OVERLAP BLADES AND SEALS (NOT JUST OVERLAP SEALS) ASSURE MINIMUM AIR LEAKAGE. EXTRUDED SILICONE SEALS FIT INTO DOVETAIL SHAPED SLOTS ON BOTH FRAMES AND BLADES.

FRAMES TO BE EXTRUDED ALUMINUM "HAT-SHAPED" CHANNEL WITH REINFORCING BOSSES AND GROOVE INSERTS FOR SILICONE SEALS. STANDARD FRAMES ARE 5" WIDE "HAT-SHAPED" CHANNELS ON (4) SIDES.

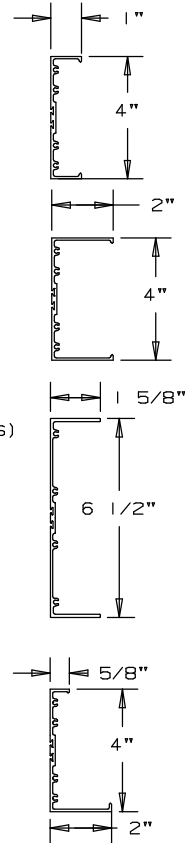
AXLE SHAFTS TO BE 1/2" DIA. EXTRUDED ALUMINUM, PIN-LOCK DESIGN INTERLOCKING INTO BLADE SECTION. BEARINGS TO BE "DOUBLE-SEALED" TYPE WITH CELCON INNER BEARING ON AXLE RIDING IN POLYCARBONATE OUTER BEARING INSERTED IN FRAME SO THAT OUTER BEARING CANNOT ROTATE.

AXLE BEARINGS TO BE DESIGNED SO THAT THERE SHALL BE NO METAL-TO-METAL OR METAL-TO-BEARING RIDING SURFACES. INTERCONNECTING LINKAGE TO HAVE A SEPRATE CELCON BEARING TO ELIMINATE FRICTION IN LINKAGE.

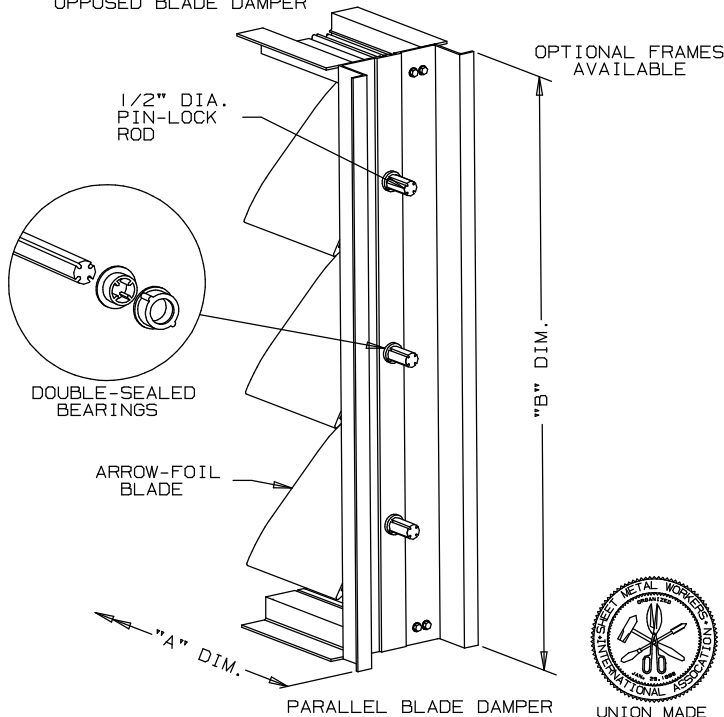
LINKAGE HARDWARE IS TO BE OF NON-CORROSIVE REINFORCED MATERIAL OR CADMIUM PLATED STEEL.

MINIMUM PANEL: 6" X 6 1/4"
MAXIMUM PANEL: 60" X 96"

PLEASE SPECIFY WHETHER OPPOSED OR PARALLEL BLADE OPERATION IS REQUIRED.



OPPOSED BLADE DAMPER



PARALLEL BLADE DAMPER

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

SCHEDULE

ITEM	QTY.	"A" DIM.	"B" DIM.

ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.
314 RIVERSIDE DRIVE
WYALUSING, PA 18853
TEL: (570) 746-1888 FAX: (570) 746-9286

AGENT: _____

ARCH. / ENG. :

CONTR. :

PROJECT :

EDR: ECN: JOB:

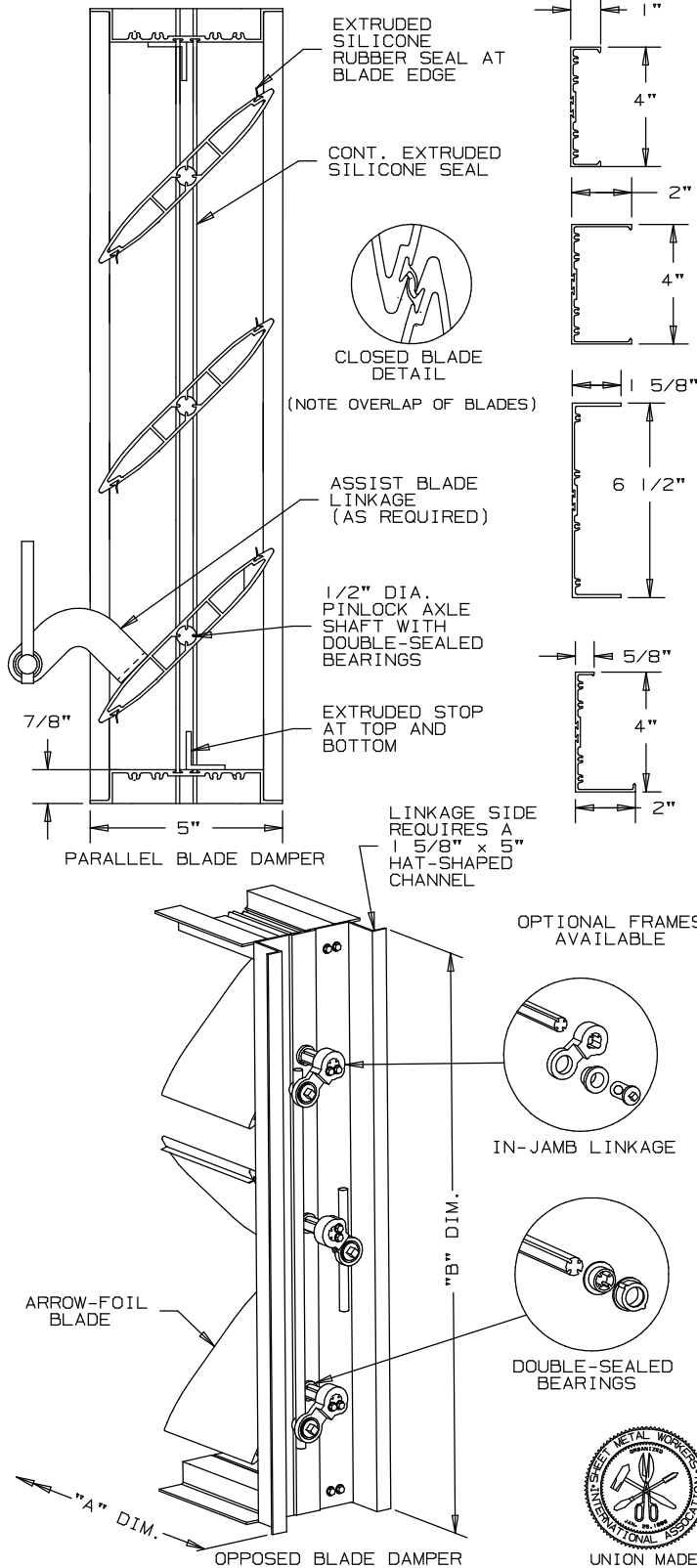
DATE: DWN. : DWG. :



ARROW EXTRUDED ALUMINUM ARROW-FOIL DAMPERS

TYPE PBD AF-206 & OBD AF-207

ARROW-FOIL DAMPERS WITH JAMB LINKAGE



SPECIFICATIONS

DAMPERS SHALL BE ARROW-FOIL DAMPER OBD AF-207 (OPPOSED) OR PBD AF-206 (PARALLEL) WITH JAMB LINKAGE AS MANUFACTURED BY ARROW UNITED INDUSTRIES, WYALUSING, PA 18853.

FRAMES AND BLADES TO BE A MINIMUM 12 GA (.081") EXTRUDED ALUMINUM. BLADES TO BE A SINGLE UNIT ARROW-FOIL DESIGN, 6" WIDE (4" AND 5" WIDE AVAILABLE) WITH THE PIN-LOCK AN INTEGRAL SECTION WITHIN THE BLADE CORE.

OVERLAP BLADES AND SEALS (NOT JUST OVERLAP SEALS) ASSURE MINIMUM AIR LEAKAGE. EXTRUDED SILICONE SEALS FIT INTO DOVETAILED SHAPED SLOTS ON BOTH FRAMES AND BLADES.

FRAMES TO BE EXTRUDED ALUMINUM "HAT-SHAPED" CHANNEL WITH REINFORCING BOSSES AND GROOVE INSERTS FOR SILICONE SEALS. STANDARD FRAMES ARE 5" WIDE "HAT-SHAPED" CHANNELS ON (4) SIDES.

AXLE SHAFTS TO BE 1/2" DIA. EXTRUDED ALUMINUM, PIN-LOCK DESIGN INTERLOCKING INTO BLADE SECTION. BEARINGS TO BE "DOUBLE-SEALED" TYPE WITH CELCON INNER BEARING ON AXLE RIDING IN POLYCARBONATE OUTER BEARING INSERTED IN FRAME SO THAT OUTER BEARING CANNOT ROTATE.

AXLE BEARINGS TO BE DESIGNED SO THAT THERE SHALL BE NO METAL-TO-METAL OR METAL-TO-BEARING RIDING SURFACES. INTERCONNECTING LINKAGE TO HAVE A SEPRATE CELCON BEARING TO ELIMINATE FRICTION IN LINKAGE.

LINKAGE CONTAINED WITHIN THE JAMB CONSISTS OF A HEAVY, ALUMINUM CRANK-ARM PERMANENTLY LOCKED TO THE BLADE SHAFT BY TWO STAINLESS STEEL FASTENERS. THE CRANK-ARM CONTAINS A 1/2" DIA. CADMIUM PLATED & CHROMATE TREATED MACHINED STEEL TRUNNION RIDING IN A CELCON BEARING. A PLATED STEEL 1/4-20 SET SCREW WITH LOCKING PATCH, TIES THE PIVOT TO THE 5/16" DIA. ALUMINUM LINKAGE ROD. THE LINKAGE OF EACH DAMPER IS INDIVIDUALLY ADJUSTED.

MINIMUM PANEL: 6" X 6 1/4"
MAXIMUM PANEL: 60" X 96"

PLEASE SPECIFY WHETHER OPPOSED OR PARALLEL BLADE OPERATION IS REQUIRED.

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

SCHEDULE

ITEM	QTY.	"A" DIM.	"B" DIM.



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

314 RIVERSIDE DRIVE
WYALUSING, PA 18853

TEL: (570) 746-1888 FAX: (570) 746-9286

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ARCH./ENG. :

CONTR. :

PROJECT :

EDR: _____ ECN: _____ JOB: _____

DATE: _____ DWN.: _____ DWG.: _____

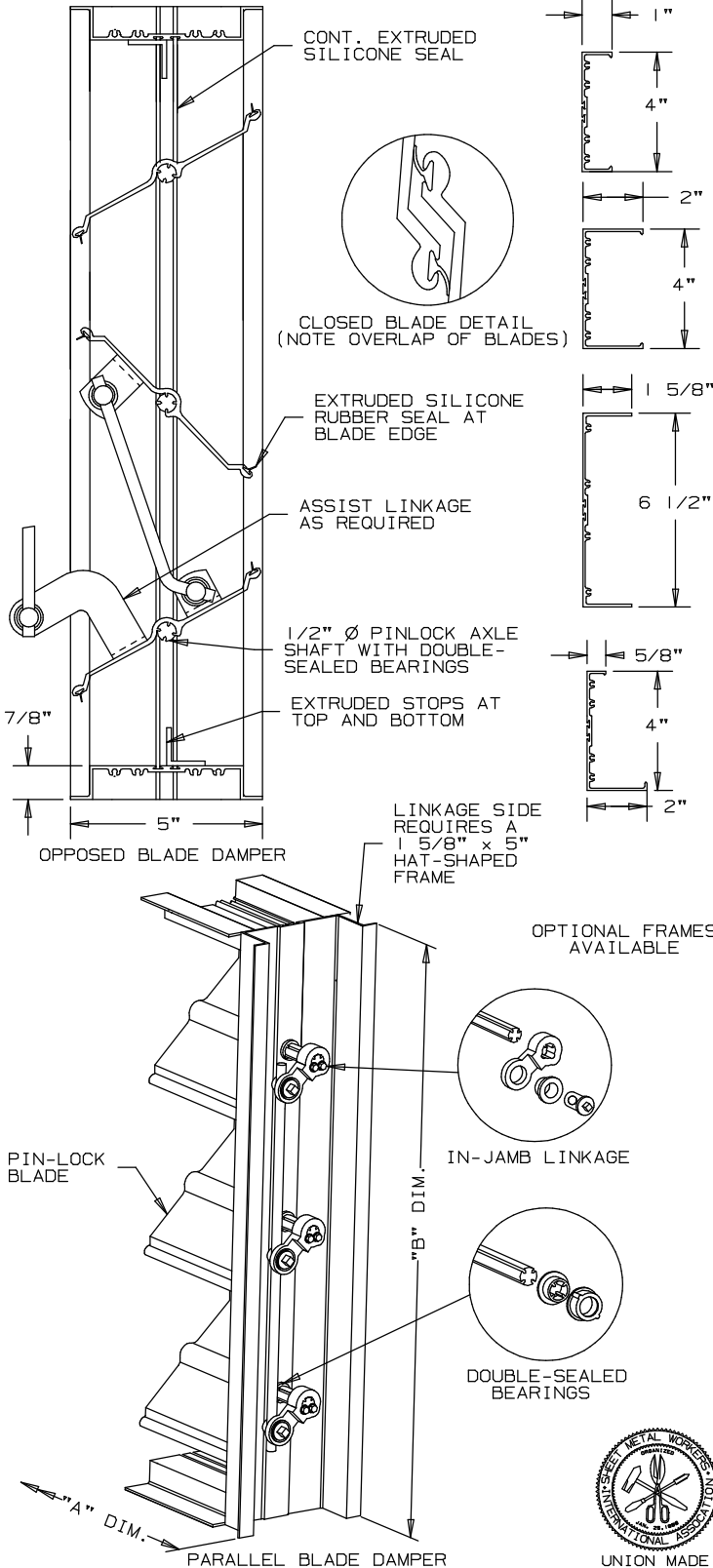


UNION MADE

ARROW EXTRUDED ALUMINUM PIN-LOCK DAMPERS

TYPE PBDPL-506 & OBDPL-507

PIN-LOCK DAMPERS WITH JAMB LINKAGE



SPECIFICATIONS

DAMPERS SHALL BE PIN-LOCK DAMPER OBDPL-507 (OPPOSED) OR PBDPL-506 (PARALLEL) WITH JAMB LINKAGE AS MANUFACTURED BY ARROW UNITED INDUSTRIES, WYALUSING, PA 18853.

FRAMES TO BE A MINIMUM 12 GA (.081") EXTRUDED ALUMINUM. BLADES TO BE A MINIMUM .125" THK. EXTRUDED ALUMINUM. BLADES TO BE A SINGLE UNIT PIN-LOCK DESIGN, 6" WIDE, WITH THE PIN-LOCK AN INTERGRAL SECTION WITHIN THE BLADE CORE.

OVERLAP BLADES AND SEALS (NOT JUST OVERLAP SEALS) ASSURE MINIMUM AIR LEAKAGE. EXTRUDED SILICONE SEALS FIT INTO DOVETAIL SHAPED SLOTS ON BOTH FRAMES AND BLADES.

FRAMES TO BE EXTRUDED ALUMINUM "HAT-SHAPED" CHANNEL WITH REINFORCING BOSSES AND GROOVE INSERTS FOR SILICONE SEALS. STANDARD FRAMES ARE 5" WIDE "HAT-SHAPED" CHANNELS ON (4) SIDES.

AXLE SHAFTS TO BE 1/2" DIA. EXTRUDED ALUMINUM, PIN-LOCK DESIGN INTERLOCKING INTO BLADE SECTION. BEARINGS TO BE "DOUBLE-SEALED" TYPE WITH CELCON INNER BEARING ON AXLE RIDING IN POLYCARBONATE OUTER BEARING INSERTED IN FRAME SO THAT OUTER BEARING CANNOT ROTATE.

AXLE BEARINGS TO BE DESIGNED SO THAT THERE SHALL BE NO METAL-TO-METAL OR METAL-TO-BEARING RIDING SURFACES. INTERCONNECTING LINKAGE TO HAVE A SEPRATE CELCON BEARING TO ELIMINATE FRICTION IN LINKAGE.

BLADE LINKAGE HARDWARE IS INSTALLED IN FRAME, OUT OF AIR-STREAM. INSTALLATION OF ASSIST LINKAGE SHALL BE DETERMINED BY THE FACTORY AND INSTALLED AS NECESSARY. ALL HARDWARE TO BE NON-CORROSIVE REINFORCED MATERIAL OR PLATED STEEL.

PLEASE SPECIFY WHETHER OPPOSED OR PARALLEL BLADE OPERATION IS REQUIRED.

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

FOR DAMPER PERFORMANCE
- SEE REVERSE SIDE

SCHEDULE

ITEM	QTY.	"A" DIM.	"B" DIM.



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

314 RIVERSIDE DRIVE
WYALUSING, PA 18853

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AGENT: _____

ARCH./ENG. :

CONTR. :

PROJECT :

EDR: ECN: JOB:

DATE: DWN.: DWG.:

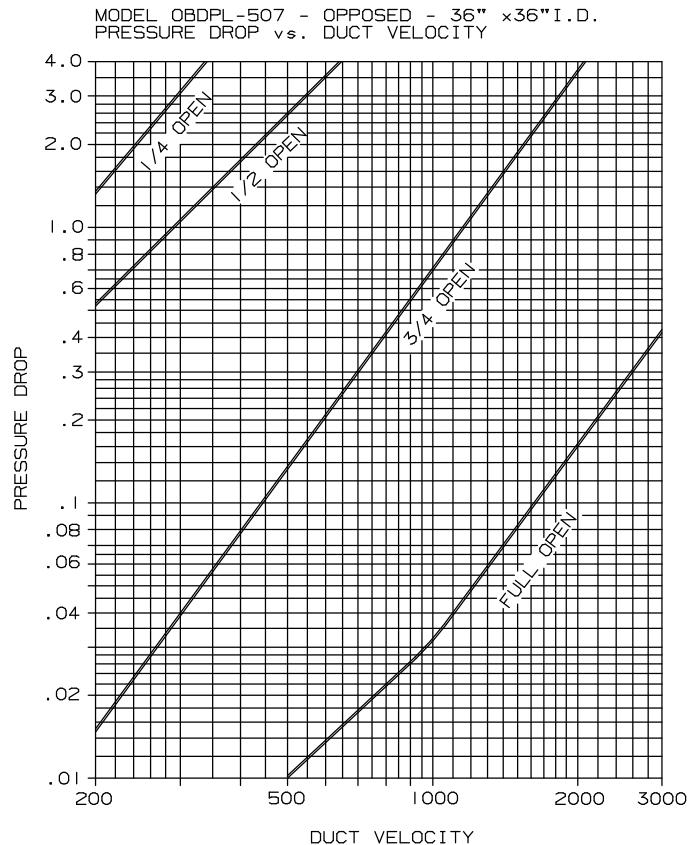


UNION MADE

DAMPER MODEL PINLOCK PBDPL-506 & OBDPL-507

PERFORMANCE DATA LOW AIR LEAKAGE, EFFICIENT PRESSURE DROP

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



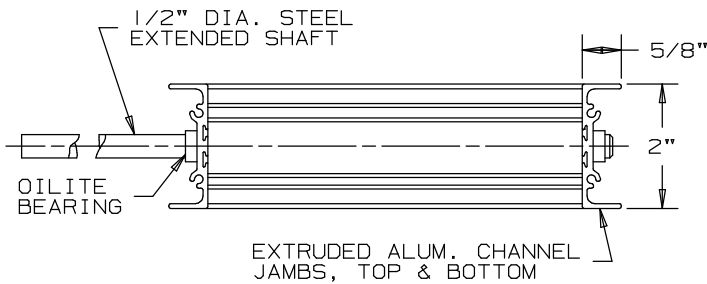
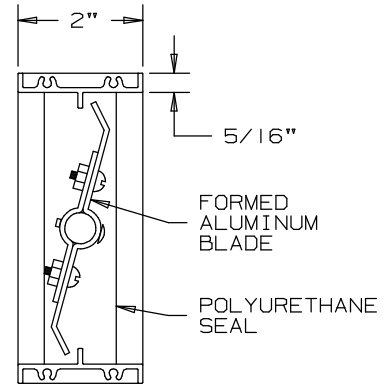
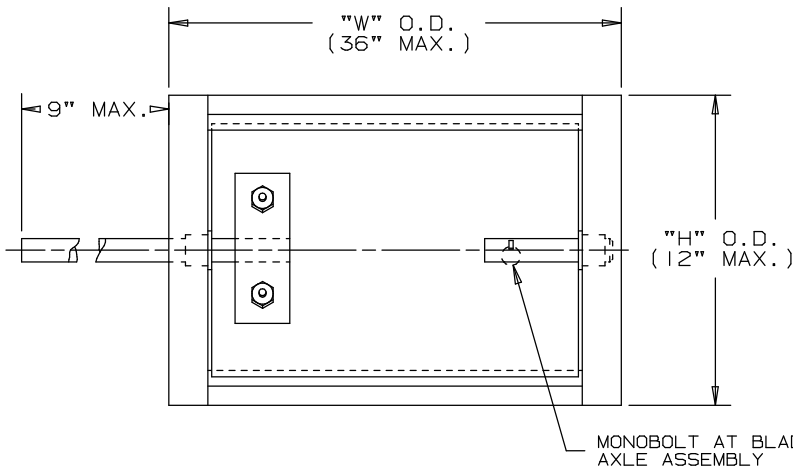
AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP 5.4. THE TEST RESULTS INDICATE EXCEPTIONAL LOW LEAKAGE. DAMPER LEAKAGE PERFORMANCE MEETS SPECIFICATIONS REQUIRING LESS THAN 1/2% OF 1% FOR DAMPER RANGE OF SIZES.

MAXIMUM DAMPER WIDTH	MAXIMUM SYSTEM STATIC PRESSURE	MAXIMUM SYSTEM VELOCITY	AIR LEAKAGE CFM/SF.
48"	2.0" W.G.	2000 FPM	7.5 CFM/SF
36"	2.5" W.G.	2500 FPM	10.5 CFM/SF
24"	2.5" W.G.	2500 FPM	10.5 CFM/SF
12"	4.0" W.G.	3000 FPM	13.2 CFM/SF

ARROW

SINGLE BLADE ALUMINUM DAMPER

TYPE SB-28



SPECIFICATIONS

- FRAME: 2" WIDE, .081" THK. EXTRUDED ALUMINUM CHANNEL.
- BLADE: FLAT, SINGLE WEB, .080" THK. FORMED ALUM.
- BEARINGS: OILITE BRONZE
- SHAFT: 1/2" DIAMETER PLATED STEEL.
- SEALS: POLYURETHANE ON JAMBS.

OPTIONAL

- OTHER MATERIALS:
- OTHER FINISHES:
- BEARINGS: NYLON, CELCON, BALL, ECT.

MINIMUM SECTION 6" x 3"
 MAXIMUM SECTION 36" x 12"

UNITS UP TO 48" WIDE SHIPPED ASSEMBLED.

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	
		OPENING SIZE		DAMPER SIZE		
ARROW UNITED INDUSTRIES A DIVISION OF MESTEK, INC. 314 RIVERSIDE DRIVE WYALUSING, PA 18853 TEL: (570) 746-1888 FAX: (570) 746-9286						ARCH./ENG.: CONTR.: PROJECT: EDR: ECN: JOB: DATE: DWN.: DWG.:
AGENT: _____						



Steel Dampers

- 150VCD [Single Blade Steel Volume Control Damper](#)
- 182 [Stainless Steel Control Damper](#)
- 395 [Low Leakage Steel Control Damper with Face Linkage](#)
- 1770 [Steel Control Damper with Face Linkage](#)
- 948 [Steel Damper Add-On Flange For Models 395 And 1770](#)
- 873 [Optional Steel Damper Frame Supplement](#)
- ID200 [Insulated Steel Damper](#)

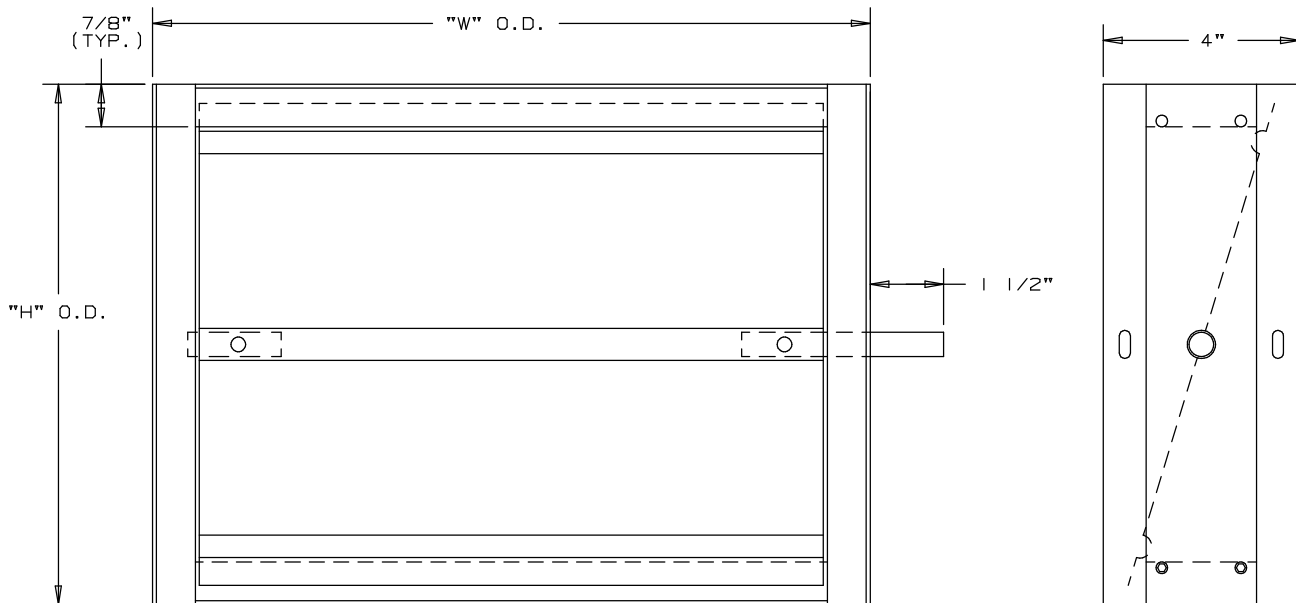
ARROW BALANCING DAMPER FORMED STEEL

TYPE 150VCD

VOLUME CONTROL BALANCING DAMPER FOR USE TO 1" W.G. AND 1500 FPM

DESIGNED FOR MANUAL BALANCING APPLICATIONS

HAT SHAPED FRAME PROVIDES GREATER
REINFORCEMENT AND EASE OF INSTALLATION



NOT TO SCALE

SPECIFICATIONS

FRAME: 18 GA. GALVANIZED STEEL HAT SHAPE
FURNISHED WITH PRE-PUNCHED MOUNTING
HOLES IN FRAME.

BLADE: 20 GA. GALVANIZED STEEL WITH FORMED
EDGES AND CENTER BEND.

SHAFT: 1/2" DIA. PLATED STEEL STUB,
MONO-BOLTED TO BLADE.

BEARING: SWAGED STEEL.

FINISH: FACTORY MILL.

ACTUATOR: HAND QUADRANT, SHIPPED LOOSE
FOR FIELD MOUNTING.

OPERATING TEMPERATURE LIMITS: 250°F

DAMPER SIZE: 6"x4" MINIMUM
36"x12" MAXIMUM

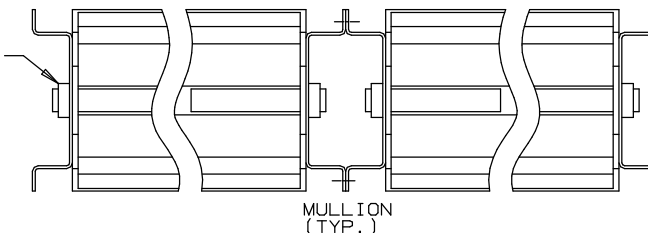
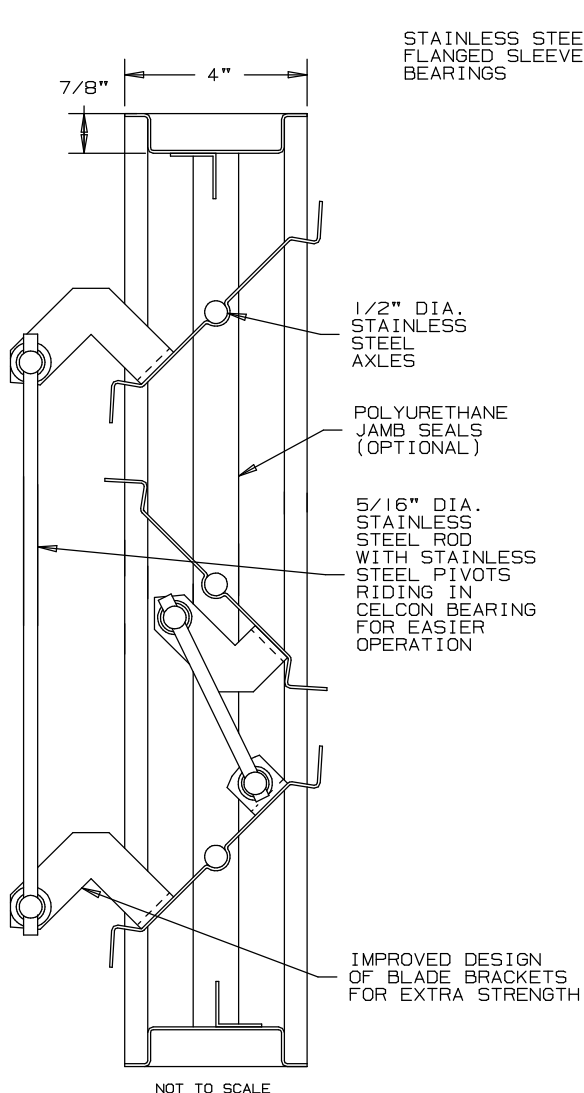
NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	DAMPER SIZE		TAGGING	
		"W" O.D.	"H" O.D.		
ARROW UNITED INDUSTRIES A DIVISION OF MESTEK, INC. 314 RIVERSIDE DRIVE WYALUSING, PA 18853 TEL: (570) 746-1888 FAX: (570) 746-9286				CONTR.:	
				CUST.:	
				PROJECT:	
				EDR:	ECN: JOB:
				DATE:	DWN.: DWG.:
AGENT: _____					

ARROW STAINLESS STEEL CONTROL DAMPERS

SERIES 182

PARALLEL OR OPPOSED BLADES - WITH OR WITHOUT SEALS



SPECIFICATIONS

FRAME: HAT-SHAPED CHANNEL, 4" DEEP, 18 GA. STAINLESS STEEL HAT SHAPED CHANNEL FOR GREATER RIGIDITY AND STRENGTH.

BLADE: MAXIMUM 6" SPACING. 18 GA. STAINLESS STEEL.

LINKAGE: CHEVRON TYPE FORMED BRACKETS OF 1/8" THICK STAINLESS STEEL.

BEARINGS: PRESS FIT STAINLESS STEEL, FLANGED SLEEVE TYPE.

AXLES: 1/2" DIA. STAINLESS STEEL.

DRIVESHAFT: 1/2" DIA. STAINLESS STEEL, EXTENDABLE 6" BEYOND FRAME.

SEALS: OPTIONAL.

ALLOY: TYPE 304 (2B FINISH) STANDARD. (SEE "OPTIONS").

SIZES: MADE TO EXACT SIZE AS REQUIRED:
MAXIMUM PANEL: 48" W X 96" H
MINIMUM PANEL: 6" W X 8 3/4" H

DAMPERS LESS THAN 11 3/4" HIGH WILL BE A SINGLE BLADE.

NOTE: SERIES 182 DAMPERS ARE RATED FOR SYSTEMS UP TO 2,000 FPM OR UP TO 4" S.P. IF BEING USED FOR APPLICATIONS BEYOND THIS, PLEASE ADVISE WHEN ORDERING.

SHIPPING WEIGHT: 6 1/2" LBS. PER SQ. FT.

OPTIONAL

DRIVE SHAFTS: EXTENDABLE TO 8" BEYOND FRAME, MORE THAN 8" USING EXTERIOR BEARING SUPPORT.

FLANGED FRAMES:
WIDER FRAMES: FRAMES WIDER THAN 4".
SEALS: AVAILABLE WITH NEOPRENE JAMB AND BLADE EDGE SEALS, OR STAINLESS STEEL JAMB SEALS, OR POLYURETHANE JAMB AND BLADE SEALS.

UNI-MOUNT BRACKETS: FOR ALL INTERNALLY MOUNTED PNEUMATIC OR ELECTRIC OPERATORS. GALVANIZED STEEL CONSTRUCTION, SPECIFY TYPE AND N.O. OR N.C.

BEARINGS: BRONZE, NYLON, CELCON, BALL, ETC.

MIXING/FACE & BYPASS DAMPERS
JACKSHAFTING: CARBON STEEL (PAINTED) IS STANDARD. STAINLESS STEEL IS AVAILABLE.

OTHER ALLOY: TYPE 316 STAINLESS STEEL, 2B FINISH.

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	PAR.	OPP.	SEALS	ACTUATOR MODEL	INT.	EXT.	N.C.	N.O.	TAG						
		DAMPER SIZE (O.D.)											LOCATION			FUNCTION		
UNION MADE																		

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CONTR. : _____

PROJECT : _____

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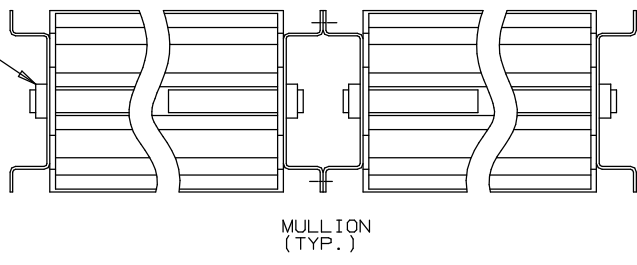
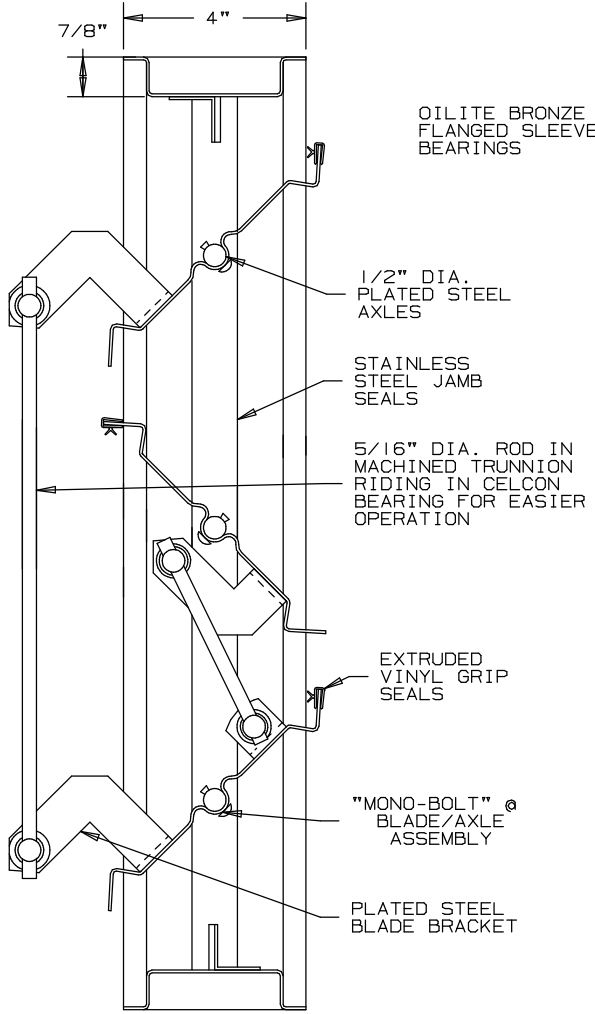
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AGENT: _____

ARROW STEEL CONTROL DAMPERS

SERIES 395

LOW LEAKAGE CONTROL DAMPER PARALLEL OR OPPOSED BLADES



NOT TO SCALE

OPTIONAL
SPECIAL FRAMES
PAINT FINISHES

SPECIFICATIONS

FRAME: HAT-SHAPED CHANNEL, 4" DEEP, 16 GA. GALVANIZED STEEL.

BLADE: 16 GA. GALVANIZED STEEL, ON 6" CENTERS.

LINKAGE: PIVOTS ARE .50" DIA. PLATED STEEL. A 1/4"-20 SET SCREW WITH LOCKING PATCH LOCKS THE PIVOTS TO A .31" DIA. ALUMINUM ROD. PIVOTS ROTATE IN A CELCON BEARING. BLADE BRACKETS ARE 12 GA. PLATED STEEL. BLADE LINKAGES ARE INDIVIDUALLY FACTORY ADJUSTED FOR MAXIMUM SHUT-OFF.

BEARINGS: SINTERED BRONZE, OIL IMPREGNATED.

AXLES: PLATED STEEL, .50" DIA.

DRIVESHAFT: 1/2" DIA. PLATED STEEL, EXTENDABLE 6".

SEALS: VINYL GRIP ON BLADES, STAINLESS STEEL ON JAMBS.

SIZES: MADE TO EXACT SIZE AS REQUIRED:
 MAXIMUM PANEL: 48" W X 72" H
 MINIMUM PANEL: 6" W X 8 3/4" H

DAMPERS LESS THAN 11" HIGH WILL BE A SINGLE BLADE.

DAMPERS BETWEEN THE HEIGHT OF 11" AND 14 3/4" WILL HAVE TWO BLADES, OPPOSED ACTION ONLY.

DAMPERS LESS THAN 8 3/4" IN HEIGHT WILL BE PROVIDED WITH A 5/8" x 2" x 5/8" EXTRUDED ALUMINUM FRAME.

NOTE: SERIES 395 DAMPERS ARE RATED FOR SYSTEMS UP TO 2,000 FPM OR UP TO 4" S.P. IF BEING USED FOR APPLICATIONS BEYOND THIS, PLEASE ADVISE WHEN ORDERING

SHIPPING WEIGHT: 6 1/2" LBS. PER SQ. FT.

SEE REVERSE SIDE FOR PERFORMANCE DATA

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	PAR.	OPP.	SEALS	ACTUATOR MODEL	INT.	EXT.	N.C.	N.O.	TAG					
		DAMPER SIZE (O.D.)						LOCATION		FUNCTION							



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ARCH./ENG. : _____

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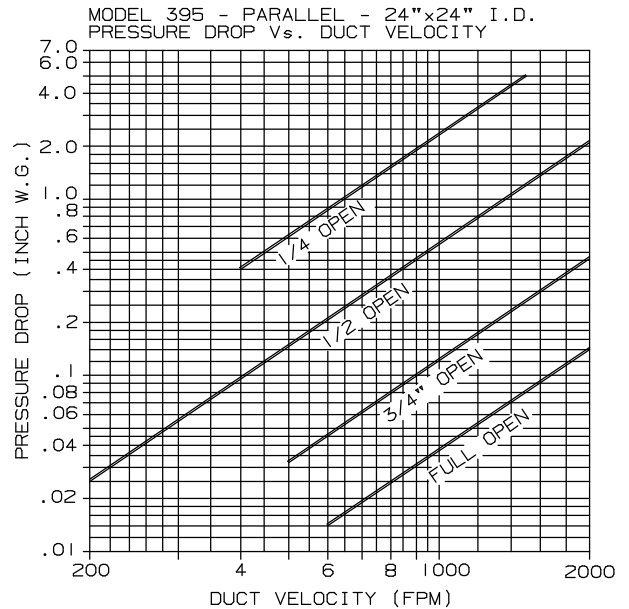
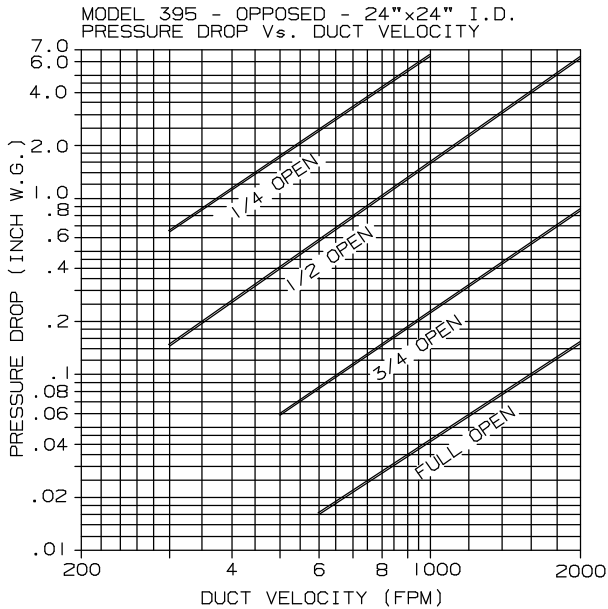
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CONTROL DAMPER MODEL 395

FORMED STEEL - PARALLEL - OPPOSED

PERFORMANCE DATA

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



TOTAL CFM AIR LEAKAGE AT ONE INCH STATIC PRESSURE DIFFERENTIAL THROUGH CLOSED DAMPER.

	DAMPER WIDTH (INCHES)			
	12"	24"	36"	48"
DAMPER HEIGHT (INCHES)	3	6	9	12
18"	5	9	14	18
24"	6	12	18	24
30"	8	15	23	30
36"	9	18	27	36
42"	11	21	32	42
48"	12	24	36	48
54"	14	27	41	54
60"	15	30	45	60
66"	17	33	50	66
72"	18	36	54	72

AIR LEAKAGE QUANTITIES SHOWN ABOVE ARE CORRECTED TO STANDARD AIR DENSITY. AIR LEAKAGE IS BASED ON OPERATION BETWEEN 50°F-104°F.

AIR LEAKAGE CORRECTION FACTORS

BLADE LENGTH LIMIT	PRESSURE (IN. WG.)	CONVERSION FACTOR
48" OR LESS	2	1.27
	3	1.60
	4	1.90

USE OF CORRECTION FACTORS WILL GIVE LEAKAGE VALUES AT GREATER THAN 1" PRESSURES.

LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.4. DATA IS BASED ON A CLOSING TORQUE OF 5 IN.-LBS/SQ. FT. WITH A MINIMUM OF 25 IN. LBS. OF CLOSING TORQUE APPLIED TO DAMPER OPERATING SHAFT, REGARDLESS OF DAMPER SIZE.

CONTROL DAMPER MODEL 1770

PERFORMANCE DATA

RECENT TESTS SHOW VERY EFFICIENT PRESSURE DROP

PRESSURE DROP TESTS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP
FIGURE 5.3 FOR DAMPERS INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM.
STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.

MODEL 1770 - PARALLEL - 24" x 24" I.D.

PRESSURE DROP vs. DUCT VELOCITY

DUCT VELOCITY (FPM)	100	200	300	400	500	600	700	800	900	1000	1250	1500	1750	2000	3000	4000	6000
1/4 OPEN				.40	.60	.85	1.20	1.50	1.90	2.30	3.50	5.00					
1/2 OPEN		.025	.052	.088	.13	.18	.25	.33	.42	.50	.80	1.20	1.60	2.10	4.40		
3/4 OPEN					.032	.045	.060	.078	.10	.12	.18	.26	.36	.46	1.10	1.80	
FULL OPEN						.014	.018	.024	.032	.037	.056	.078	.11	.14	.30	.52	

PRESSURE DROP / INCHES OF WATER

MODEL 1770 - OPPOSED - 24" x 24" I.D.

PRESSURE DROP vs. DUCT VELOCITY

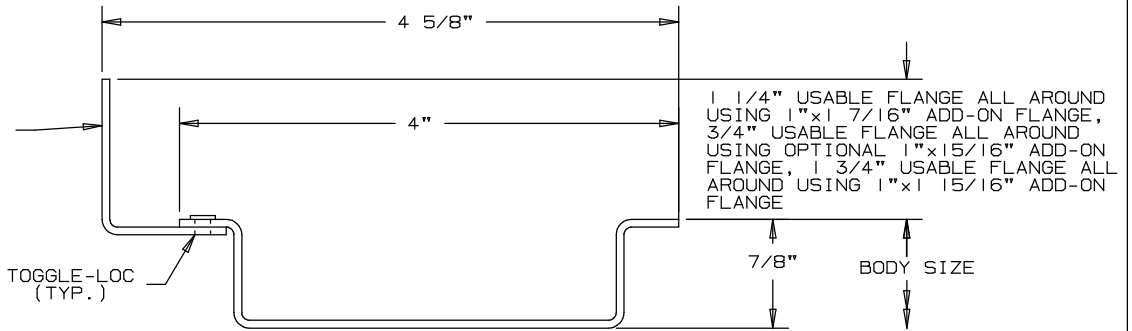
DUCT VELOCITY (FPM)	100	200	300	400	500	600	700	800	900	1000	1250	1500	1750	2000	3000	4000	6000
1/4 OPEN			.65	1.15	1.75	2.40	3.30	4.25	5.25	6.50							
1/2 OPEN			.145	.26	.40	.575	.79	1.00	1.30	1.70	2.50	3.60	4.75	6.30			
3/4 OPEN					.059	.080	.115	.145	.18	.22	.345	.475	.65	.85	1.75		
FULL OPEN						.016	.020	.026	.031	.039	.059	.085	.12	.15	.34	.58	1.20

PRESSURE DROP / INCHES OF WATER

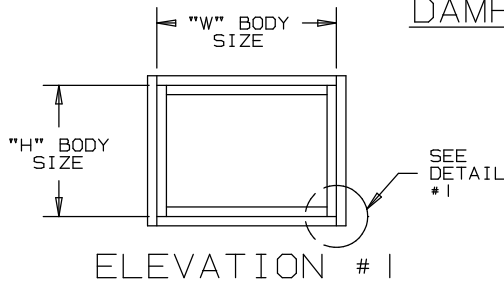
ARROW DAMPER ACCESSORIES

OPTIONAL STEEL DAMPER ADD-ON FLANGE MODELS 395/1770

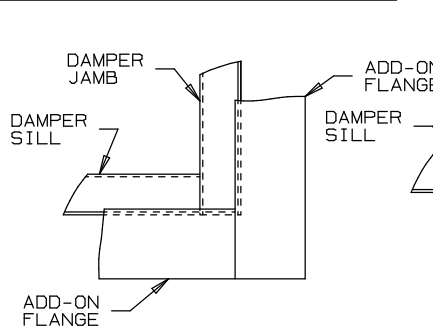
1" x 1 7/16", 16 GA.
GALVANIZED STL.
ANGLE ADD-ON FLANGE
- STANDARD LOCATION
ON SIDE OPPOSITE
FACE LINKAGE.
TYPICAL AROUND
PERIMETER OF FRAME.
OPTIONAL:
1" x 15/16", AND
1" x 1 15/16"
16 GA. GALVANIZED
STEEL ADD-ON FLANGE



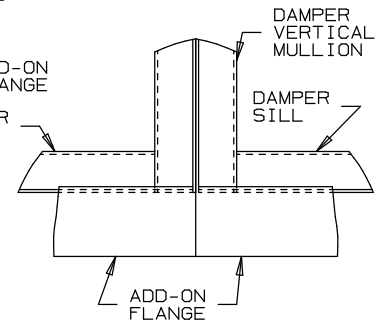
DAMPER FRAME DETAIL



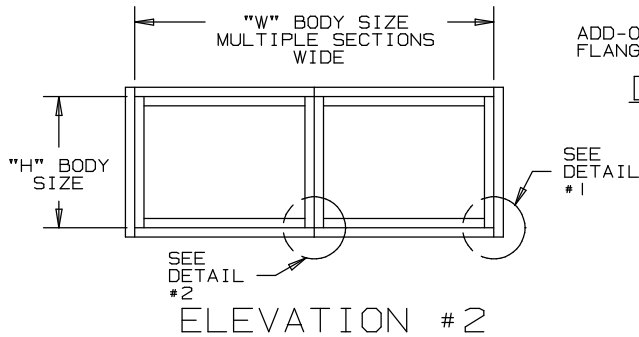
ELEVATION # 1



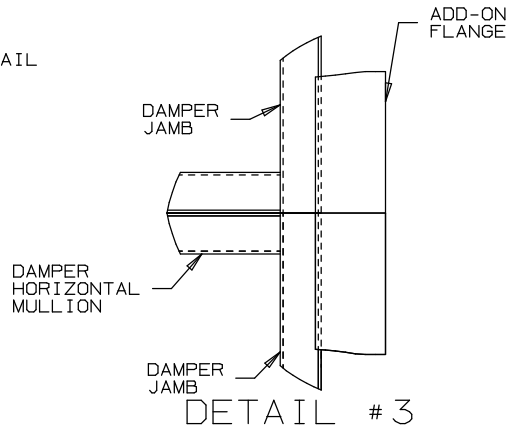
DETAIL # 1



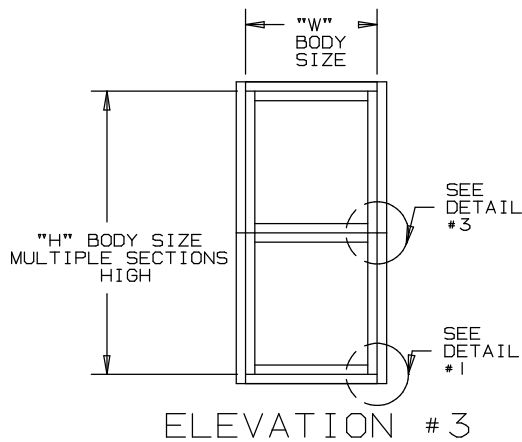
DETAIL # 2



ELEVATION # 2



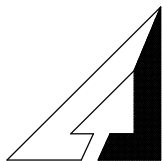
DETAIL # 3



ELEVATION # 3

NOTES:

1. WHEN FRAMES OF ADJACENT PANELS ARE JOINED AT THE MULLION (EITHER VERTICALLY OR HORIZONTALLY), THE FLANGE WILL BE OMITTED. THE MULLION WILL BE AS IT WOULD BE FOR A STANDARD CHANNEL FRAME. ADD-ON FLANGE IS ONLY AROUND OUTSIDE PERIMETER OF FRAME.
2. STANDARD MOUNTING LOCATION FOR ADD-ON FLANGE IS ON SIDE OPPOSITE FACE LINKAGE. OPTIONAL MOUNTING LOCATION IS ON SAME SIDE AS FACE LINKAGE.
3. REFER TO CATALOG SHEET #737 FOR REMAINING STANDARD MODEL 395 DAMPER CONSTRUCTION AND CATALOG SHEET #463 FOR STANDARD MODEL 1770 DAMPER CONSTRUCTION.



ARROW UNITED INDUSTRIES
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314 RIVERSIDE DRIVE
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ARCH./ENG.:

CONTR.:

PROJECT:

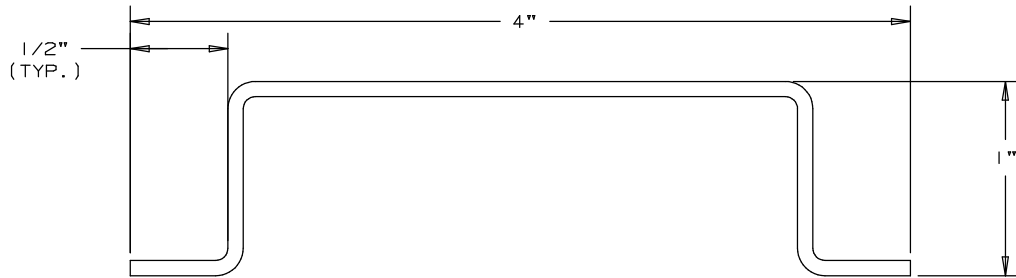
EDR: ECN: JOB:

DATE: DWN.: DWG.:

ARROW DAMPER ACCESSORIES

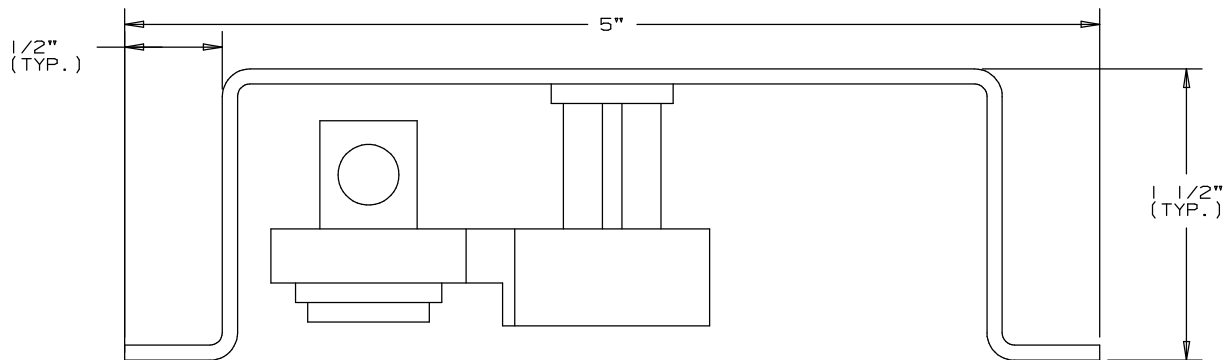
OPTIONAL STEEL DAMPER FRAME SUPPLEMENTAL

OPTIONAL DAMPER FRAMES FOR USE WITH
ARROW STEEL CONTROL DAMPERS

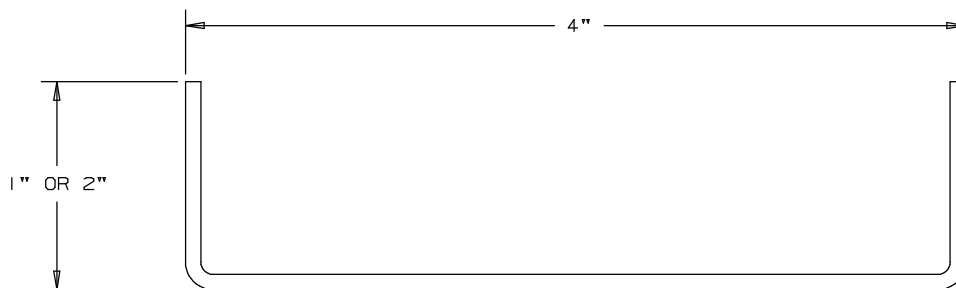


HAT-SHAPED FRAME

HAT-SHAPED FRAMES ARE FABRICATED TO 14 GA. STEEL WHEN A "DOUBLE-SEALED" PRESS FIT BEARING IS USED. WITH FLANGE SLEEVE OILITE BEARING, FRAME THICKNESS CAN INCREASE TO 12 GA. THICKNESS.



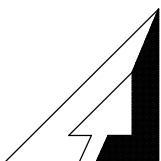
HAT-SHAPED FRAME
FOR USE WITH JAMB LINKAGE



CHANNEL FRAME

CHANNEL FRAMES ARE FABRICATED TO 14 GA. STEEL WHEN A "DOUBLE-SEALED" PRESS FIT BEARING IS USED. WITH FLANGE SLEEVE OILITE BEARING, FRAME THICKNESS CAN INCREASE TO 10 GA. THICKNESS.

*THIS SUPPLEMENTAL FRAME DATA IS TO BE USED IN CONJUNCTION WITH THE STANDARD CATALOG SHEETS FOR THE ARROW "EXTRUDED ALUMINUM ARROW-FOIL" AND THE "1770 & 395" STEEL CONTROL DAMPERS.



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PROJECT:

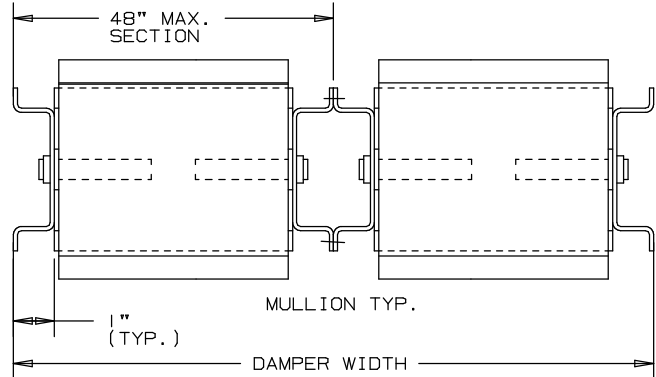
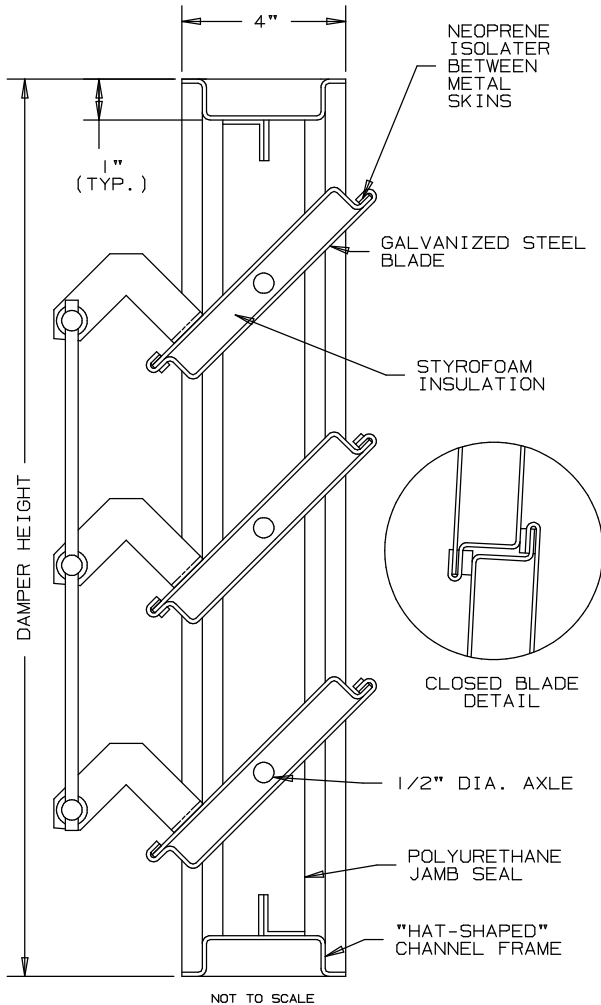
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DATE: DWN.: DWG.:

ARROW INSULATED DAMPER 4" DEEP

MODEL ID-200

PARALLEL BLADES ONLY



SPECIFICATIONS

FRAME: 4" WIDE, 16 GA. GALVANIZED STEEL "HAT-SHAPED" CHANNEL PROVIDES GREATER STRENGTH AND RIGIDITY.

BLADE: 18 GA. GALVANIZED STEEL "DOUBLE-THICKNESS" 1" THICK WITH STYROFOAM INSULATION SANDWICHED BETWEEN METAL SKINS, MECHANICALLY FASTENED TOGETHER, ON 6" C-C STANDARD SPACING.

AXLES: 1/2" DIAMETER CADMIUM PLATED STEEL STUB.

BEARINGS: OILITE BRONZE.

LINKAGE: PIVOTS ARE .050" DIAMETER STEEL, CADMIUM PLATED AND CHROMATE TREATED. A 1/4-20 SET SCREWS WITH LOCKING PATCH LOCKS THE PIVOTS TO A .312" DIAMETER ALUMINUM ROD. PIVOTS ROTATE IN A CELCON BEARING. BLADE LINKAGES ARE INDIVIDUALLY FACTORY ADJUSTED FOR MAXIMUM SHUTOFF.

SEALS: BLADE AND JAMB OF POLYURETHANE.

DRIVESHAFT: 1/2" DIAMETER CADMIUM PLATED STEEL, PERMANENTLY EXTENDED 6" BEYOND FRAME FOR EXTERNAL DRIVE. FOR INTERNAL DRIVE A BLADE CLIP WILL BE PROVIDED. PLEASE SPECIFY LOCATION OF DRIVE REQUIRED.

SIZES: MADE TO EXACT SIZE REQUIRED.
 MAXIMUM PANEL SIZE: 48" x 72"
 MINIMUM PANEL SIZE: 10" x 8 1/2"

FINISH: MILL.

INSULATING FACTORS FOR ABOVE CONSTRUCTION

R-VALUE = 4
 U-FACTOR, .25 BTU PER HOUR PER SQUARE FOOT PER DEGREE° F

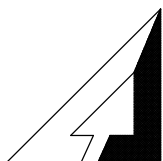
THE ABOVE VALUES ARE BASED ON CALCULATIONS CONSIDERING THE FACE AREA OF THE DAMPER ONLY. THIS DOES NOT INCLUDE FRAMES. INSULATION OF DAMPER FRAME SHALL BE BY OTHERS.

OPTIONAL

- A: FLANGED FRAMES
- B: WIDER FRAMES, WIDER THAN 4"
- C: FRAMES AND BLADES OF OTHER GAUGES AND MATERIALS
- D: FINISHES: ENAMELS, EPOXIES, ETC.
- E: SEALS: STAINLESS STEEL FOR JAMBS ONLY

DAMPERS WILL BE FABRICATED 1/4" SMALLER THAN OPENING SIZE UNLESS OTHERWISE SPECIFIED.

								 UNION MADE
ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	MULL		
		OPENING SIZE		DAMPER SIZE				



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Round Dampers

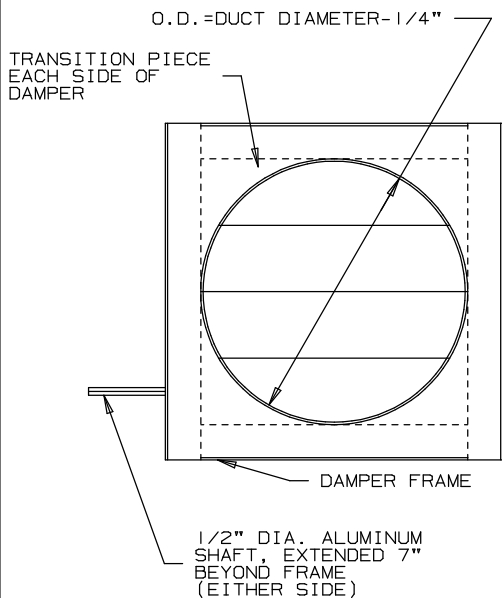
- 56 [Aluminum Air-Foil Damper Design with Aluminum Round/Oval Transition](#)
- 85 [Aluminum Pin-Lock Damper Design with Aluminum Round/Oval Transition](#)
- 70 [Single Blade Round Damper of 16 Gauge Galvanized Steel](#)
- 75 [Single Blade Round Damper of .081 Aluminum](#)
- 80 [Single Blade Round Damper of 16 Gauge Stainless Steel](#)
- 200VCRD [Single Blade Round Volume Control Damper](#)
- 250SRD [Single Blade Round Control Damper w/ Seal](#)

ARROW TRANSITION DAMPERS FOR ROUND AND OVAL DUCTS

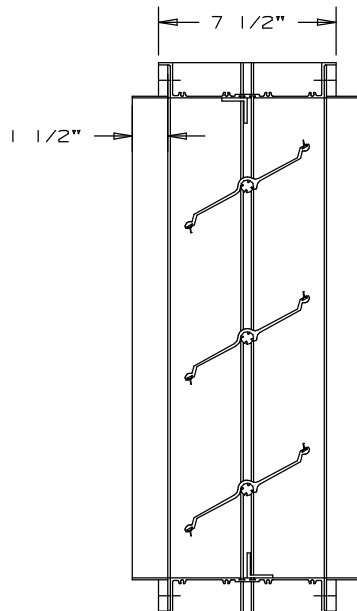
TYPE 56
TYPE 85

ARROW-FOIL
PIN-LOCK

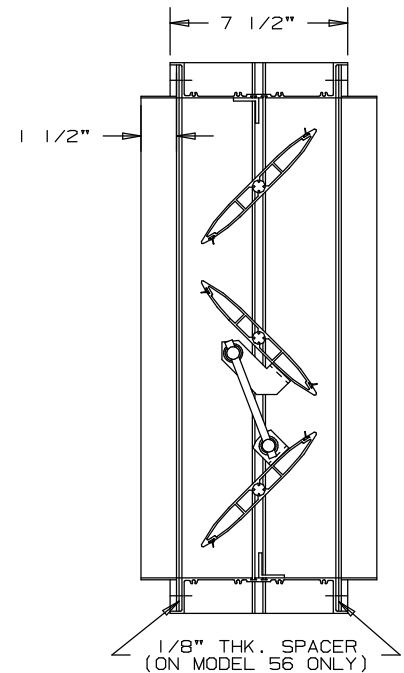
TIGHT CLOSING-MINIMUM LEAKAGE MULTI-BLADE-ALUMINUM-WITH ARROW-FOIL OR PIN-LOCK BLADES



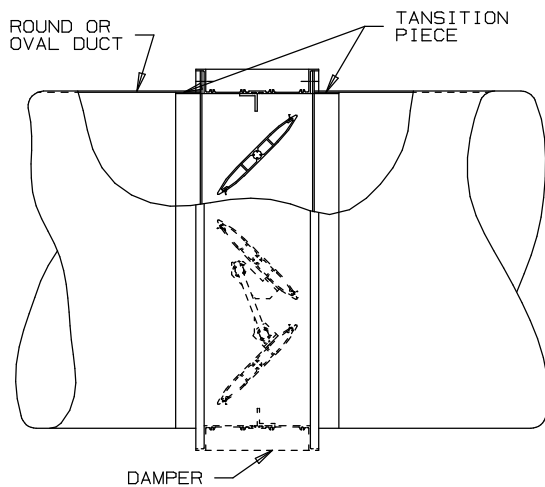
PIN-LOCK MODEL 85



PIN-LOCK
MODEL 85
(SHOWN PARALLEL)



ARROW-FOIL
MODEL 56
(SHOWN OPPOSED)



SECTION SHOWING TYPICAL APPLICATION

SPECIFICATIONS

1. DAMPER IS A STANDARD "ARROW-FOIL" OR "PIN-LOCK" CONSTRUCTION IN A 1 5/8"x7 1/2"x1 5/8" EXTRUDED "HAT-SHAPED" CHANNEL FRAME.
2. TRANSITION PIECE (.080" THK. ALUMINUM) ON EACH.
3. SIDE OF DAMPER, CONNECTS TO ROUND OR OVAL DUCT. SEE ARROW-FOIL OR PIN-LOCK CATALOG SHEET FOR DAMPER SPECIFICATIONS.
4. DAMPER BEARINGS ARE DOUBLE-SEALED.
5. LINKAGE IN JAMB, OUT OF AIRSTREAM.

MODEL NO.

PIN-LOCK ROUND TRANSITION (PAR. OR OPP.)..... 85
ARROW-FOIL ROUND TRANSITION (PAR. OR OPP.)..... 56
FOR OVAL ADD "OV" TO MODEL NUMBER, EX. 85-OV

UP TO 4" S.P.-USE MODEL 85(PIN-LOCK)
MAXIMUM WIDTH-MODEL 85-48"

UP TO 6" S.P.-USE MODEL 56(ARROW-FOIL)
MAXIMUM WIDTH-MODEL 56-60"

SHIPPING WEIGHT-7 LBS./SQ.FT.



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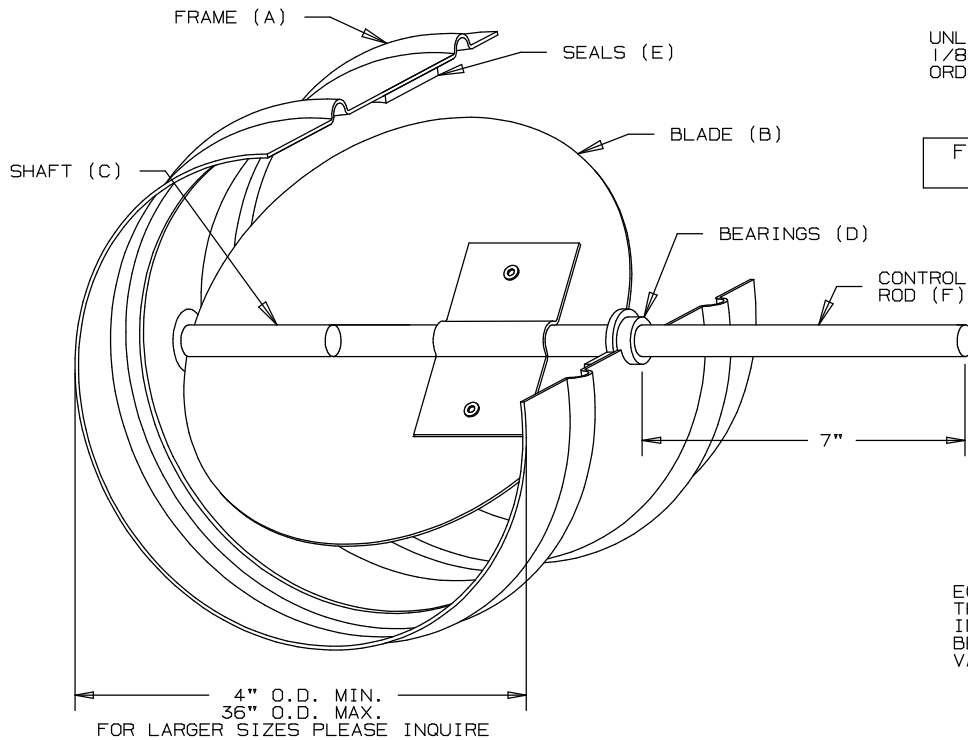
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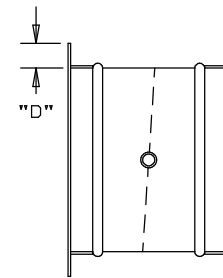
ARROW	TYPE 70	GALV. STEEL
ROUND DAMPERS	TYPE 75	ALUMINUM
SINGLE BLADE	TYPE 80	STAINLESS STEEL

TIGHT CLOSING DAMPER
 SUGGESTED MAXIMUM 4" W.G. DIFFERENTIAL PRESSURE



UNLESS OTHERWISE SPECIFIED,
1/8" WILL BE DEDUCTED FROM
ORDERED SIZES.

FOR PERFORMANCE DATA
SEE REVERSE SIDE



OPTIONAL FLANGED FRAME
 EQUAL LEG ANGLES ARE AVAILABLE.
 THEY ARE WELDED TO FRAMES AT
 INTERMITTENT SPACING AND CAULKED
 BETWEEN WELDS. FLANGE HEIGHT "D"
 VARIES WITH DAMPER DIAMETER.

4" O.D. MIN.
36" O.D. MAX.
FOR LARGER SIZES PLEASE INQUIRE

TYPE 70 GALV. STEEL

- (A) FRAME : 16 GA. GALVANIZED STEEL. x 7 1/2" DEEP.
- (B) BLADE: 16 GA. GALVANIZED STEEL. ABOVE 18" DIA. - BLADE IS REINFORCED.
- (C) SHAFT: 1/2" DIA. CADMIUM PLATED STEEL.
- (D) BEARINGS: FLANGE BRONZE OILITE.
- (E) SEALS: ON FRAME, CLOSED CELL NEOPRENE, 1/4" THK. TEMPERATURE RANGE -35°F TO 180°F.
- (F) CONTROL ROD: CADMIUM PLATED STEEL.
- (G) FINISH: GALVANIZED STEEL.

TYPE 75 ALUMINUM

- (A) FRAME : .080" THK. ALUMINUM. x 7 1/2" DEEP.
- (B) BLADE: .080" THK. ALUMINUM. ABOVE 18" DIA. - BLADE IS REINFORCED.
- (C) SHAFT: 1/2" DIA. ALUMINUM.
- (D) BEARINGS: FLANGE BRONZE OILITE.
- (E) SEALS: ON FRAME, CLOSED CELL NEOPRENE, 1/4" THK. TEMPERATURE RANGE -35°F TO 180°F.
- (F) CONTROL ROD: CADMIUM PLATED STEEL.
- (G) FINISH: MILL.

TYPE 80 STAINLESS STEEL

- (A) FRAME : 16 GA. STAINLESS STEEL. x 7 1/2" DEEP.
- (B) BLADE: 16 GA. STAINLESS STEEL. ABOVE 18" DIA. - BLADE IS REINFORCED.
- (C) SHAFT: 1/2" DIA. STAINLESS STEEL.
- (D) BEARINGS: FLANGE BRONZE OILITE.
- (E) SEALS: ON FRAME, CLOSED CELL NEOPRENE, 1/4" THK. TEMPERATURE RANGE -35°F TO 180°F.
- (F) CONTROL ROD: STAINLESS STEEL.
- (G) FINISH: NO 2B TYPE 304 STAINLESS STEEL

APPROXIMATE SHIPPING WEIGHT (IN LBS.) CAN BE CALCULATED BY MULTIPLYING THE CIRCUMFERENCE (DIA. x 3.141) BY .5 FOR TYPES 70 & 80; .3 FOR TYPE 75.



UNION MADE

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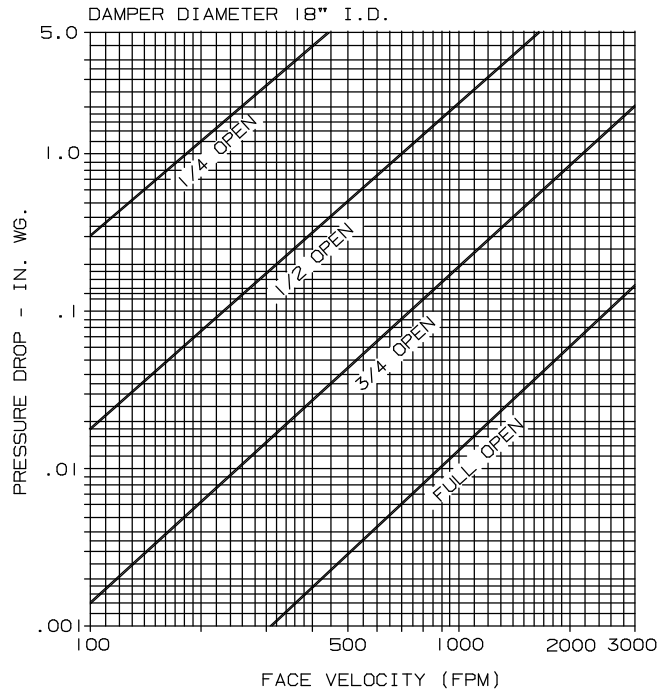
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CONTR. :	
PROJECT :	
EDR: _____	ECN: _____ JOB: _____
DATE: _____	DWN.: _____ DWG.: _____

DAMPER MODELS 70-75-80

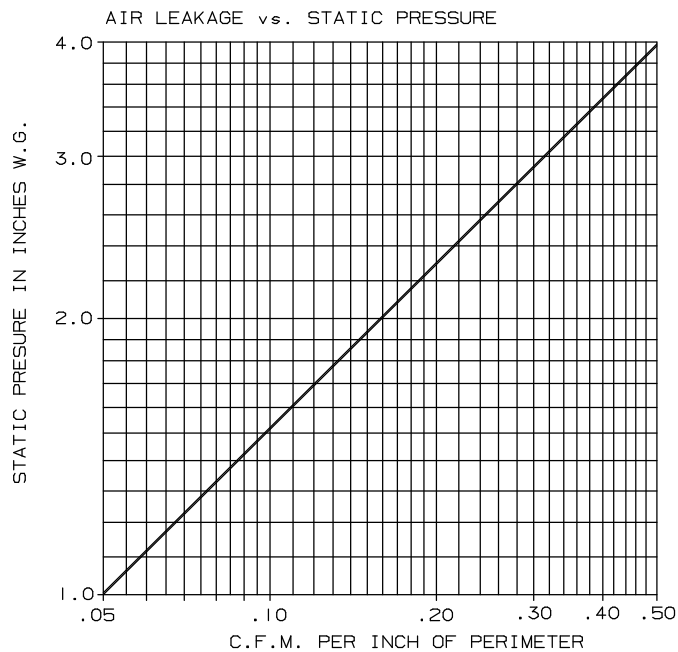
ROUND - CONTROL DAMPER

PERFORMANCE DATA

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500, USING TEST SET-UP 5.4. AIR LEAKAGE IS CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



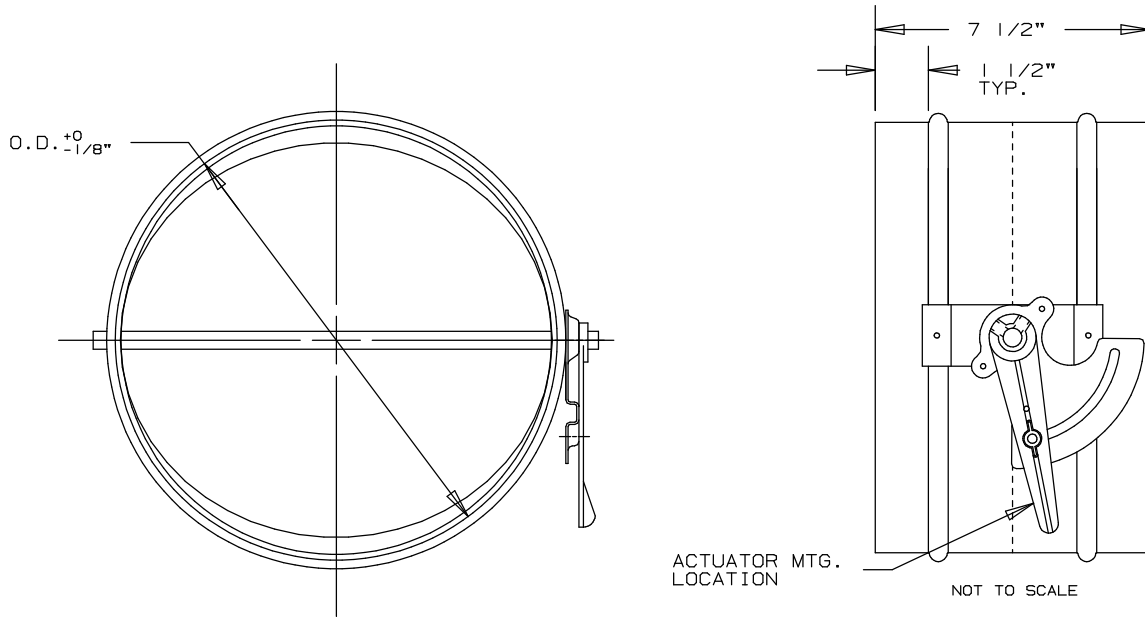
ARROW
BALANCING DAMPER
FORMED STEEL

TYPE
200VCRD

VOLUME CONTROL ROUND DAMPER
FOR USE TO 1" W.G. AND 1500 FPM

DESIGNED FOR MANUAL BALANCING APPLICATIONS

ROLLED RIBS IN FRAME PROVIDE GREATER REINFORCEMENT
EASE OF INSTALLATION AND SEALING JOINT



SPECIFICATIONS

FRAME: 22 GA. GALVANIZED STEEL SLEEVE
7 1/2" LONG WITH REINFORCING RIBS.
BLADE: 20 GA. GALVANIZED STEEL.
SHAFT: 1/2" DIA. PLATED STEEL STUB,
MONO-BOLTED TO BLADE.
BEARING: SWAGED STEEL.

FINISH: FACTORY MILL.
ACTUATOR: HAND QUADRANT, FACTORY MOUNTED.
OPERATING TEMPERATURE LIMIT: 250°F.
DAMPER SIZE: 4" DIA. MINIMUM
24" DIA. MAXIMUM

NOMINAL DEDUCTIONS WILL BE MADE TO OPENING SIZE GIVEN

ITEM	QTY.	DAMPER SIZE O.D.	TAGGING	REMARKS



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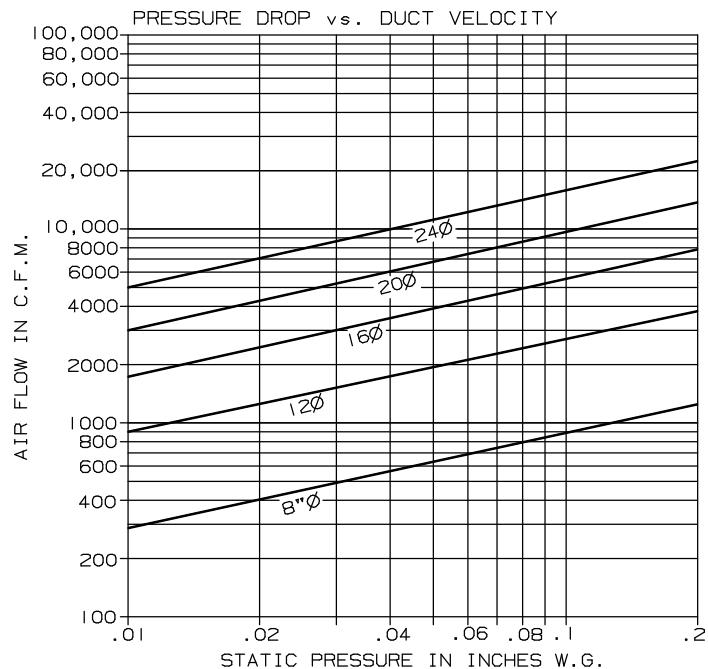
ARCH./ENG.:	
CONTR:	
PROJECT:	
EDR:	ECN: JOB:
DATE:	DWN: DWG:

DAMPER MODEL 200VCRD

FORMED STEEL - BALANCING DAMPER

PERFORMANCE DATA

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



ARROW CONTROL DAMPER FORMED STEEL

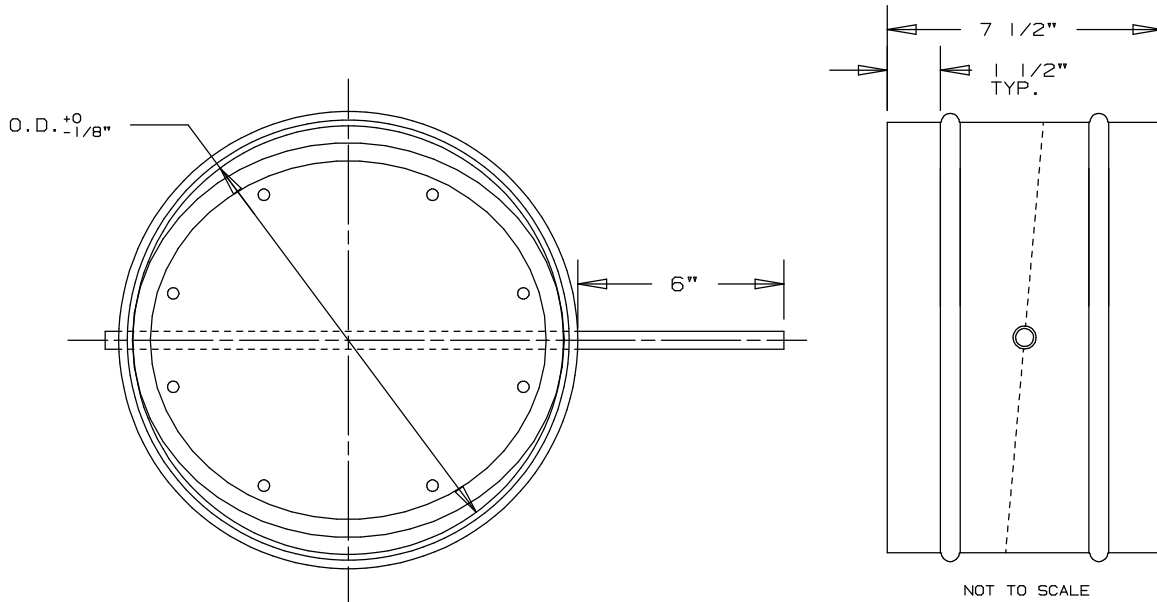
TYPE 250SRD

ROUND CONTROL DAMPER WITH SEALS
FOR USE TO 6" W.G. AND 3000 FPM

BUILT WITH ARROW QUALITY

DESIGNED FOR LOW LEAKAGE APPLICATIONS

ROLLED RIBS IN FRAME PROVIDE GREATER REINFORCEMENT
EASE OF INSTALLATION AND SEALING JOINT



SPECIFICATIONS

FRAME: 22 GA. GALVANIZED STEEL SLEEVE
7 1/2" LONG WITH REINFORCING RIBS.

BLADE: 20 GA. GALVANIZED STEEL.
DOUBLE THICKNESS.

SHAFT: 1/2" DIA. PLATED STEEL STUB,
MONO-BOLTED TO BLADE,
EXTENDED 6" BEYOND FRAME.

BEARING: BRONZE OILITE FLANGED
SLEEVE BEARING, PRESS
FIT INTO FRAME.

STOPS: FORMED GALVANIZED STEEL ANGLE
MECHANICALLY FASTENED TO FRAME
TO PREVENT OVER ROTATION OF BLADE.

SEALS: 1/16" THK. NEOPRENE RUBBER, RIVETED TO
BLADE WITH A 20 GA. GALVANIZED STEEL
RETAINING PLATE.

FINISH: FACTORY MILL.

OPERATING TEMPERATURE LIMIT: 250°F.

DAMPER SIZE: 4" DIA. MINIMUM
24" DIA. MAXIMUM

NOMINAL DEDUCTIONS WILL BE MADE TO OPENING SIZE GIVEN

ITEM	QTY.	DAMPER SIZE O.D.	TAGGING	REMARKS	 UNION MADE

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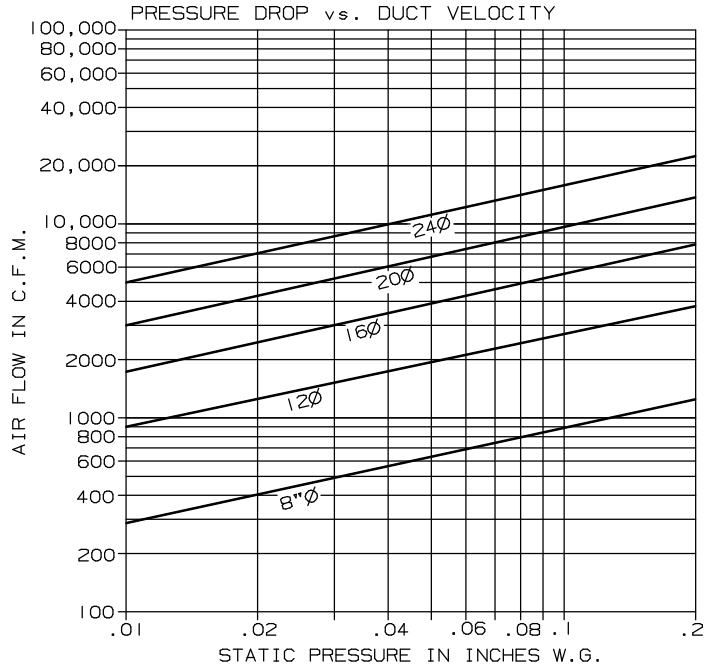
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PROJECT:
EDR: ECN: JOB:
DATE: DWN: DWG:

DAMPER MODEL 250SRD

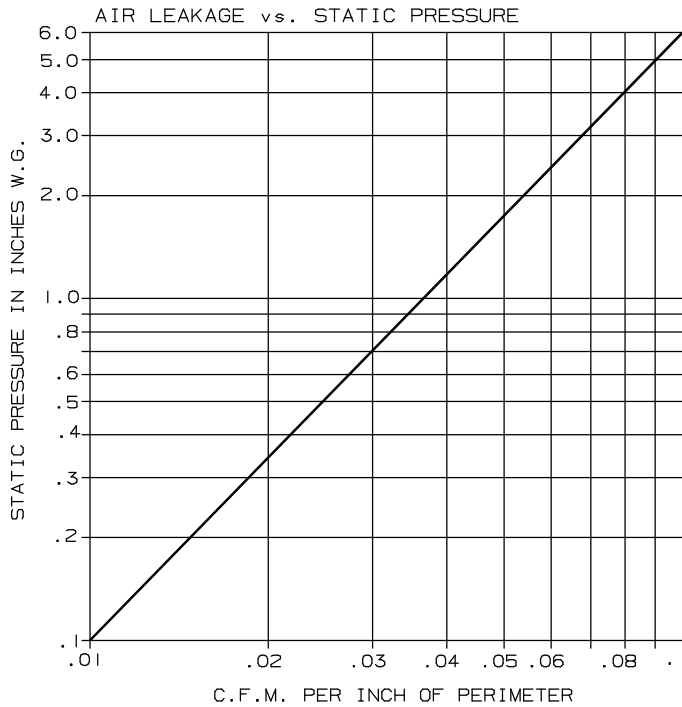
FORMED STEEL - CONTROL DAMPER

PERFORMANCE DATA

PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



PRESSURE DROP RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET-UP FIG. 5.4 AIR LEAKAGE IS CORRECTED TO .075 LB./CU. FT. AIR DENSITY.



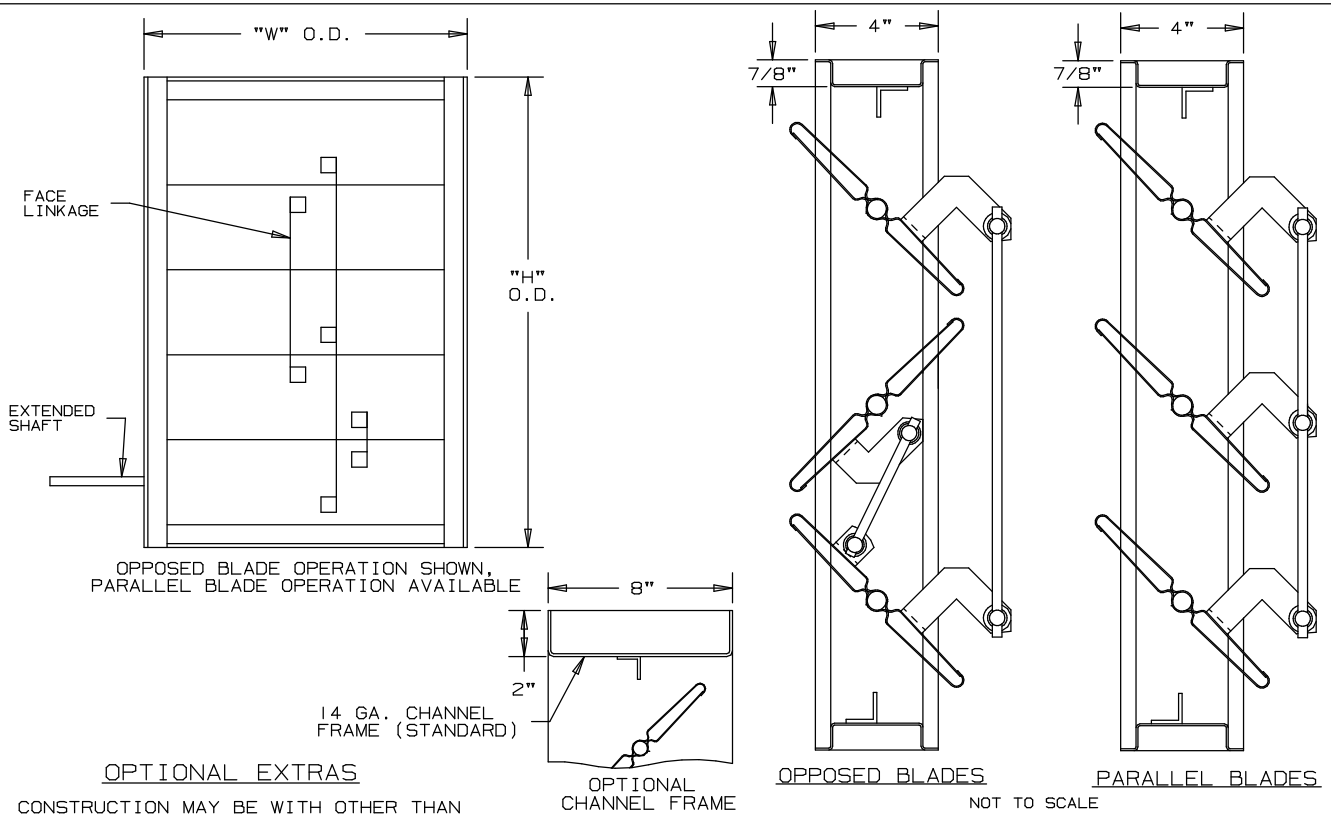


Industrial Dampers

- 300 [Galvanized Steel Airfoil Blade Industrial Control Damper with Face Linkage](#)
- 303 [Light Duty Industrial Galvanized Damper with 1/2" Shaft](#)
- 304 [Light Duty Industrial Galvanized Damper with 3/4" Shaft](#)
- 421 [Galvanized Formed Steel Blade Industrial Control Damper with Face Linkage
And 1/2" Shaft. For Use Up To 6" W.G. Static Pressure @ 2500 F.P.M.](#)
- 422 [Galvanized Formed Steel Blade Industrial Control Damper with Face Linkage
And 3/4" Shaft. For Use Up To 8" W.G. Static Pressure @ 2500 F.P.M.](#)
- 423 [Galvanized Formed Steel Blade Industrial Control Damper with Face Linkage
And 1/2" shaft. For Use Up To 10" W.G. Static Pressure @ 2500 F.P.M.](#)
- 530 [Galvanized Formed Airfoil Steel Blade Industrial Control Damper with Jamb
And 3/4" Shaft. Linkage For Use Up To 12" W.G. Static Pressure](#)
- 531 [Galvanized Formed Airfoil Steel Blade Industrial Control Damper with Jamb
Linkage And 3/4" Shaft. For Use Up To 20" W.G. Static Pressure](#)
- 540 [Galvanized Formed Airfoil Steel Blade Hi-Temperature Industrial Control
Damper with Jamb Linkage. For Use Up To 15" W.G. Static Pressure](#)
- 545 [HVAC and Process Control Damper with Airfoil Blade
For Clean Air Applications ONLY](#)
- 580R [Single Blade Round Industrial Process Control Damper](#)
- 581R [Single Blade Round Industrial Process Control Damper](#)
- SBB [Stuffing Box & Bearing Mounting Details](#)
- 723A [Damper Design Inquiry Sheet](#)

ARROW INDUSTRIAL DAMPER FOR PROCESS-CONTROL

MODEL 300



OPTIONAL EXTRAS

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. FLEXIBLE STAINLESS STEEL JAMB SEAL
2. FLEXIBLE STAINLESS STEEL BLADE EDGE SEAL
3. NEOPRENE JAMB SEAL
4. NEOPRENE BLADE EDGE SEAL
5. SPECIAL MATERIALS AND ALL STAINLESS STEEL CONSTRUCTION
6. ACTUATORS: ELECTRIC, PNEUMATIC
7. SPECIAL FINISHES
8. CHANNEL FRAMES
9. SPECIAL CHANNEL FRAME FLANGES OTHER THAN STANDARD 2", TO 3 1/2"
10. JAMB LINKAGE
11. FRAME HOLES FOR CHANNEL FRAME
12. OTHER BEARINGS

STANDARD SPECIFICATIONS

FRAME: 16 GA. GALVANIZED STEEL, 4" DEEP "HAT-SHAPED FRAME.
 BLADE: 16 GA. GALVANIZED STEEL AIRFOIL-8" WIDE MAX.
 SHAFT: 1/2" DIA. PLATED STEEL SHAFT FULL LENGTH.
 BEARINGS: STAINLESS STEEL FLANGED SLEEVE, PRESS FIT INTO FRAME.
 LINKAGE: FACE MOUNTED, LOCATED IN THE AIRSTREAM. FORMED BRACKET OF 1/8" THK. STEEL. TRUNNION IS A MACHINED PIVOT OF PLATED STEEL WITH A 5/16" DIAMETER ROD.
 OPERATOR: 6" EXTENDED SHAFT.
 FINISH: MILL.
 MAXIMUM TEMPERATURE: 250°F. FOR TEMPERATURES ABOVE 250°F CONSULT FACTORY.
 MAXIMUM PANEL SIZE: 48"x72"- "HAT-SHAPED" FRAME
 48"x96"-CHANNEL FRAME
 MINIMUM PANEL SIZE: 12"x8 SINGLE BLADE
 12"x12" OPPOSED

FOR PERFORMANCE DATA
- SEE REVERSE SIDE

DAMPERS WITH HAT-SHAPED FRAMES WILL BE FABRICATED 1/4" SMALLER THAN OPENING SIZE UNLESS OTHERWISE SPECIFIED.
 DAMPERS WITH CHANNEL FRAMES WILL BE FABRICATED TO EXACT I.D. DIMENSIONS UNLESS OTHERWISE SPECIFIED.

ITEM	QTY.	DAMPER SIZE		PAR	OPP	SEALS	ACTUATOR MODEL	LOCATION		FUNCTION		UNION MADE
		WIDTH	HEIGHT					INT.	EXT.	N.C.	N.O.	



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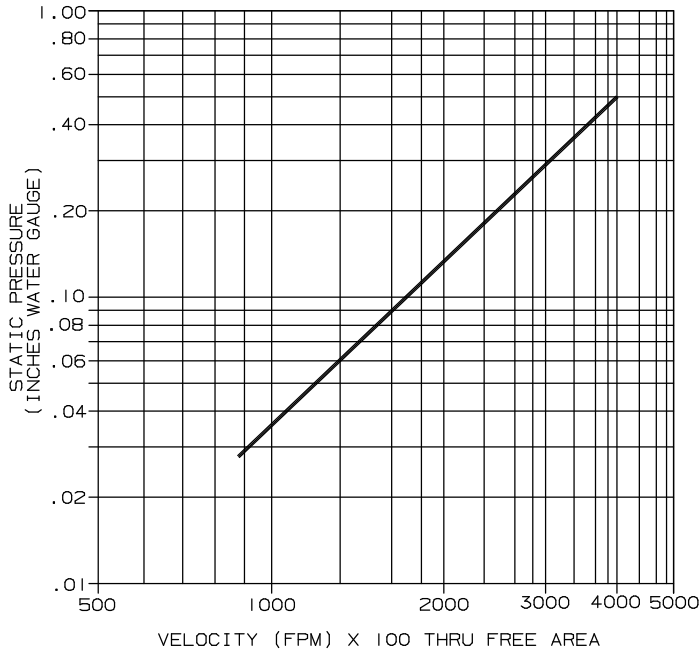
ARCH./ENG. : _____
 CONTR. : _____
 PROJECT : _____
 EDR: _____ ECN: _____ JOB: _____
 DATE: _____ DWN.: AP DWG. : _____

AGENT: _____

ARROW MODEL 300 INDUSTRIAL DAMPER PERFORMANCE DATA

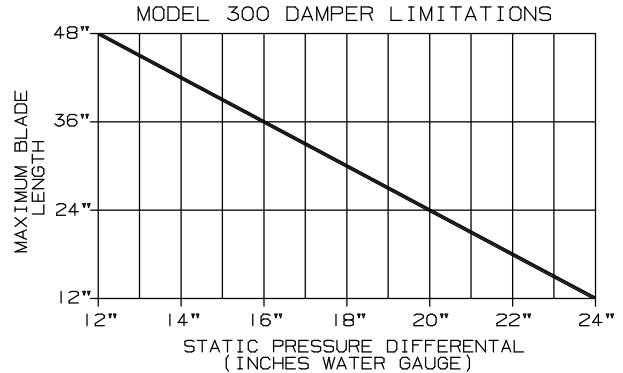
ARROW MODEL 300
42" x 42" I.D.

PRESSURE DROP vs. DUCT VELOCITY



VELOCITY (FPM) X 100 THRU FREE AREA
MAXIMUM SYSTEM VELOCITY 4000 FPM
PRESSURE DROP CURVES LISTED ARE BASED ON
AMCA STANDARD 500. USING TEST SET-UP
FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT
UPSTREAM AND DOWNSTREAM. STATIC PRESSURES
ARE CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN, THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A RELATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 300 DESIGN AT A LENGTH OF 48" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES) I.D.						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES) I.D.	12"	4	6	8	10	12	14	16
	24"	8	12	16	20	24	28	32
	36"	12	18	24	30	36	42	48
	48"	16	24	32	40	48	56	64
	60"	20	30	40	50	60	70	80
	72"	24	36	48	60	72	84	96
	84"	28	42	56	70	84	98	112
	96"	32	48	64	80	96	112	128

SHADED AREA - DAMPER HEIGHT CAN INCREASE TO 96" WHEN FURNISHED WITH CHANNEL FRAME

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

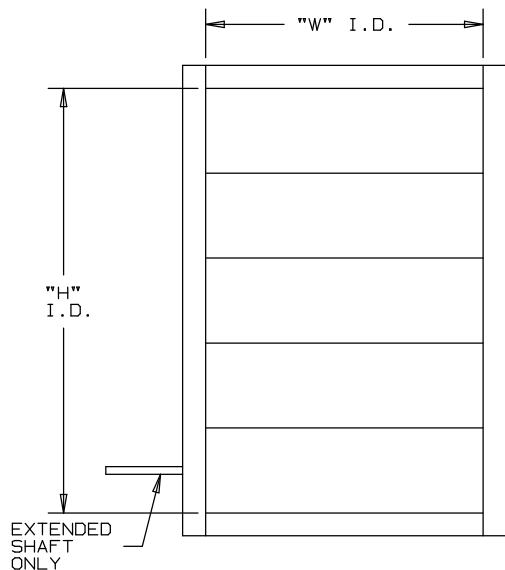
STATIC PRESSURE (IN)	2	3	4	5	6	7	8	9	10	11	12
MULTIPLIER CORRECTION FACTOR	1.5	2.0	2.5	2.8	3.1	3.4	3.8	4.4	5.0	5.6	6.3

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 15 IN. LBS./SQ. FT. OF DAMPER FACE AREA FOR A 48"x72", WITH A MINIMUM OF 25 IN. LBS./SQ. FT. OF DAMPER AREA FOR A SIZE 48"x9 1/2".

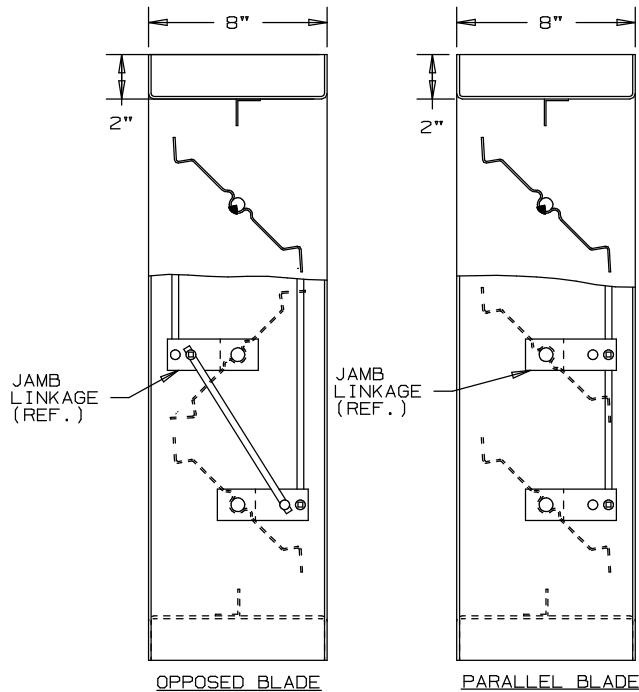
DAMPER AIR LEAKAGE SHOWN IS BASED UPON DAMPERS FURNISHED WITH BLADE AND JAMB SEALS. RESULTS PUBLISHED ARE FOR THE ARROW MODEL 300 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

ARROW INDUSTRIAL DAMPER LIGHT DUTY

MODEL 303



FOR PERFORMANCE DATA
- SEE REVERSE SIDE

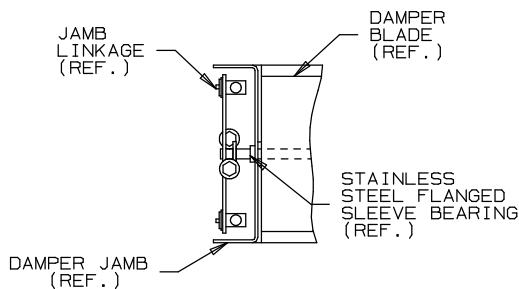


NOT TO SCALE

STANDARD SPECIFICATIONS

FRAME: 2"x8"x2"-14 GA. GALVANIZED STEEL FORMED CHANNEL.
 BLADE: 16 GA. FORMED GALVANIZED STEEL. ON 6" CENTERS.
 SHAFT: 1/2" DIA. PLATED COLD FINISHED STEEL STUB,
 PLUG WELDED TO BLADE. DRIVE SHAFT TO BE
 CONTINUOUS LENGTH.
 BEARINGS: STAINLESS STEEL FLANGED SLEEVE, PRESS
 FIT INTO FRAME.
 LINKAGE: PLATED STEEL ARM LOCATED IN JAMB. 5/16" DIA.
 INTER-CONNECTING ROD WITH STAINLESS STEEL
 TRUNNION PIVOT FASTENER.
 OPERATOR: 6" EXTENDED SHAFT.
 FINISH: FACTORY MILL.
 MAXIMUM TEMPERATURE: 250°F. FOR TEMPERATURES ABOVE 250°F,
 CONSULT FACTORY.
 MAXIMUM PANEL SIZE: 48"x96" I.D.
 MINIMUM PANEL SIZE: 6"x6 3/4" I.D. (SINGLE BLADE)
 6"x12" I.D. (OPPOSED BLADE)

- DAMPERS 36" WIDE AND ABOVE, FURNISHED WITH BLADE AND OR
 JAMB SEALS SHALL BE PROVIDED WITH DOUBLE JAMB LINKAGE.



JAMB LINKAGE DETAIL
OPPOSED LINKAGE
(SHOWN)

OPTIONAL

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS
 WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE,
 PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER
 SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON
 TYPES OF APPLICATIONS.

1. STAINLESS STEEL BLADE EDGE SEALS.
2. STUFFING BOXES AND REPLACEABLE PACKING.
3. FLANGES OTHER THAN STANDARD 2" WIDE
4. PAINTED FINISHES.
5. PERIMETER HOLES-ONE FLANGE.
6. PERIMETER HOLES-TWO FLANGES.
7. OTHER MATERIAL.



ARROW UNITED INDUSTRIES
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 WEB ADDRESS: WWW.ARROWUNITED.COM

AGENT: _____

ARCH. /ENG. :

CONTR. :

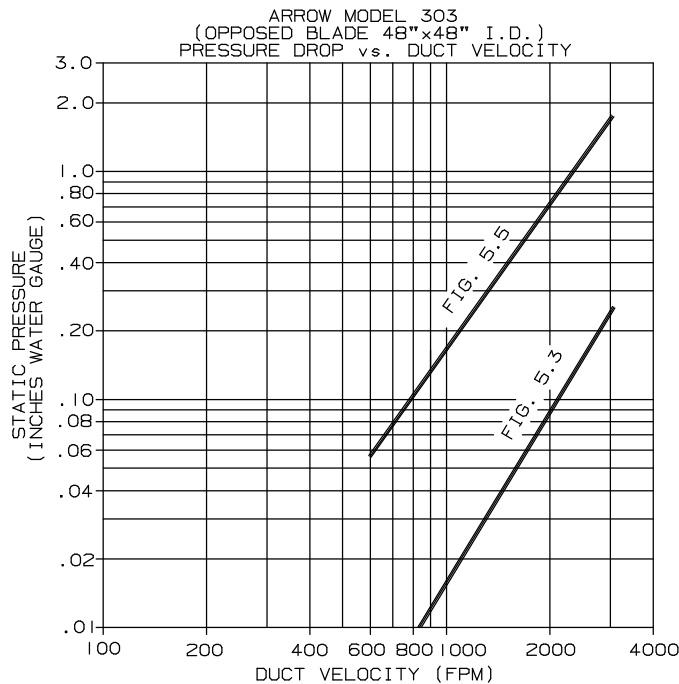
PROJECT :

EDR: _____ ECN: _____ JOB: _____

DATE: _____ DWN. : _____ DWG. : _____

INDUSTRIAL DAMPER LIGHT DUTY MODEL 303 PERFORMANCE DATA

PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500-D-98, USING TEST SET-UP 5.5. AND 5.3.
STATIC PRESSURES ARE CORRECTED TO .075 LB./CU.FT.



LEAKAGE :

AIR LEAKAGE QUANTITIES IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500-D-98 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

DAMPER HEIGHT (INCHES)	DAMPER WIDTH (INCHES)						
	12"	18"	24"	30"	36"	42"	48"
12"	4	6	8	10	12	14	16
24"	8	12	16	20	24	28	32
36"	12	18	24	30	36	42	48
48"	16	24	32	40	48	56	64
60"	20	30	40	50	60	70	80
72"	24	36	48	60	72	84	96
84"	28	42	56	70	84	98	112
96"	32	48	64	80	96	112	128

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 20" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

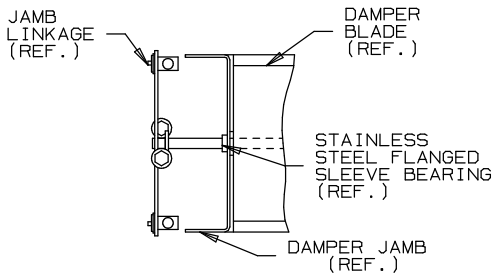
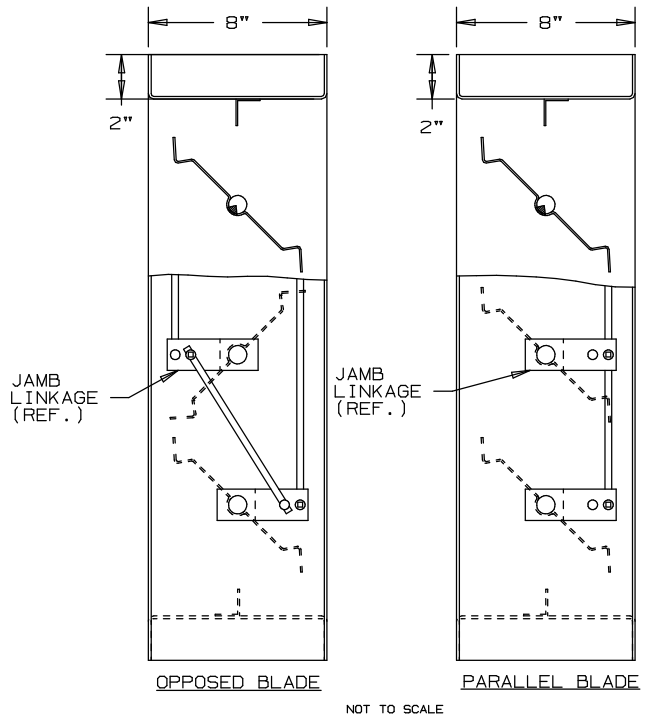
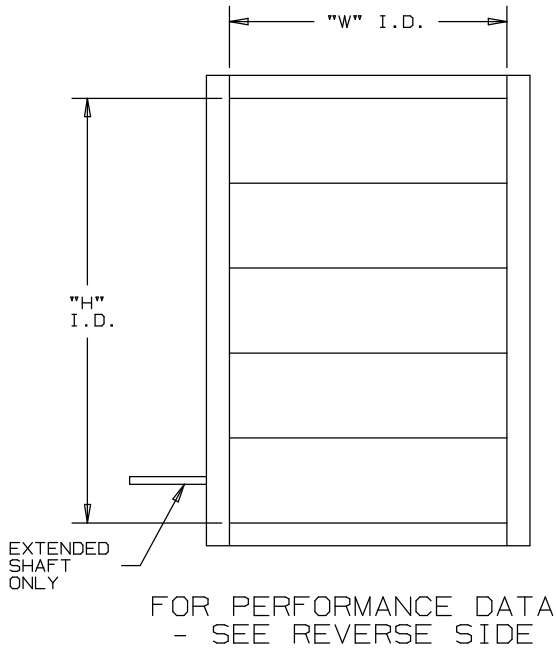
STATIC PRESSURE (IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MAXIMUM DAMPER WIDTH
3.0	4.5	5.5	6.5	7.0	7.8	8.3	9.0	9.7	10.2	-	-	-	-	-	-	-	-	-	-	-	12"-17"
2.0	3.0	3.5	4.2	4.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18"-24"
1.0	1.5	1.8	2.1	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	>24"-36"
1.0	1.5	1.8	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	>36"-48"

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500-D-98 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 10 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 96", WITH A MINIMUM OF 40 IN.LBS/SQ.FT OF DAMPER AREA FOR A SIZE 48" x 6 3/4".

DAMPER AIR LEAKAGE SHOWN IS BASED UPON DAMPERS FURNISHED WITH BLADE AND JAMB SEALS. RESULTS PUBLISHED ARE FOR THE ARROW MODEL 303 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

ARROW LIGHT DUTY INDUSTRIAL DAMPER

MODEL 304



JAMB LINKAGE DETAIL
OPPOSED LINKAGE
(SHOWN)

STANDARD SPECIFICATIONS

FRAME: 2"x8"x2"-14 GA. GALVANIZED STEEL FORMED CHANNEL.
 BLADE: 16 GA. FORMED GALVANIZED STEEL. ON 6" CENTERS.
 SHAFT: 3/4" DIA. PLATED COLD FINISHED STEEL STUB,
 PLUG WELDED TO BLADE. DRIVE SHAFT TO BE
 CONTINUOUS LENGTH.
 BEARINGS: STAINLESS STEEL FLANGED SLEEVE, PRESS
 FIT INTO FRAME.
 LINKAGE: PLATED STEEL ARM LOCATED IN JAMB. 1/2" DIA.
 INTER-CONNECTING ROD WITH STAINLESS STEEL
 TRUNNION PIVOT FASTENER.
 OPERATOR: EXTENDED SHAFT ONLY.
 FINISH: FACTORY MILL.
 MAXIMUM TEMPERATURE: 250°F. FOR TEMPERATURES ABOVE 250°F,
 CONSULT FACTORY.
 MAXIMUM PANEL SIZE: 48"x96" I.D.
 MINIMUM PANEL SIZE: 6"x6 3/4" I.D. (SINGLE BLADE)
 6"x12" I.D. (OPPOSED BLADE)

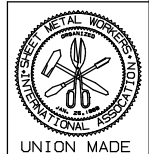
- DAMPERS 36" WIDE AND ABOVE, FURNISHED WITH BLADE AND OR JAMB SEALS SHALL BE PROVIDED WITH DOUBLE JAMB LINKAGE.

OPTIONAL

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. STAINLESS STEEL BLADE EDGE SEALS.
2. STUFFING BOXES AND REPLACEABLE PACKING.
3. FLANGES OTHER THAN STANDARD 2" WIDE
4. PAINTED FINISHES.
5. PERIMETER HOLES-ONE FLANGE.
6. PERIMETER HOLES-TWO FLANGES.
7. OTHER MATERIAL.



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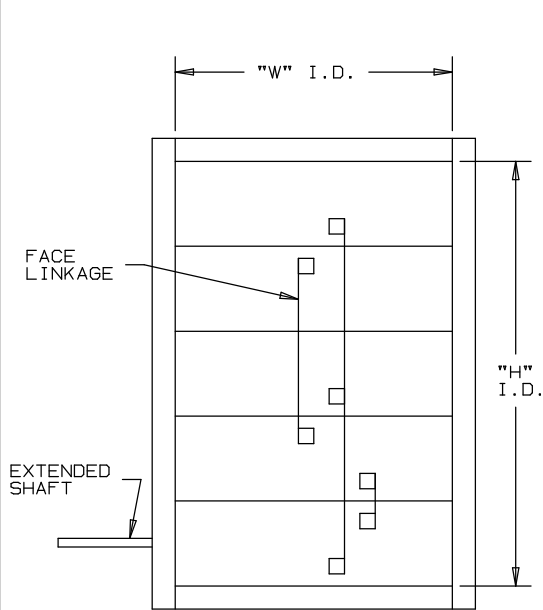
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ARCH. /ENG. :	
CONTR. :	
PROJECT :	
EDR: _____	ECN: _____ JOB: _____
DATE: _____	DWN. : _____ DWG. : _____

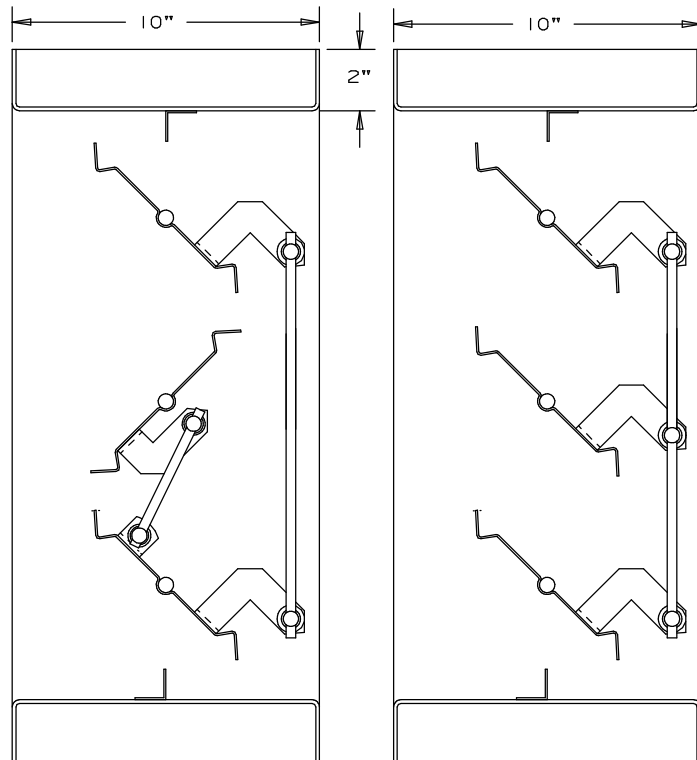
ARROW INDUSTRIAL DAMPER FOR PROCESS-CONTROL

MODEL 421

FOR USE UP TO 6" W.G. STATIC PRESSURE @ 2500 F.P.M.



OPPOSED BLADE OPERATION SHOWN,
PARALLEL BLADE OPERATION AVAILABLE



OPPOSED BLADES

PARALLEL BLADES

NOT TO SCALE

FOR PERFORMANCE DATA
- SEE REVERSE SIDE

VELOCITIES ABOVE 2500 FPM TO
4000 FPM MAXIMUM SHALL REQUIRE
A DOUBLE SET OF FACE LINKAGE

SEE PRICE LIST FOR OPTIONAL EXTRAS

OPTIONAL EXTRAS

CONSTRUCTION MAY BE WITH OTHER THAN
STANDARD MATERIALS WHEN REQUIRED TO
MEET SPECIAL CONDITIONS AS TEMPERATURE,
PRESSURE, VELOCITY, SYSTEM ENVIRONMENT
OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR
THE MORE COMMON TYPES OF APPLICATIONS.

1. NEOPRENE BLADE EDGE SEALS
2. STAINLESS STEEL JAMB SEALS
3. FLANGES OTHER THAN STANDARD
(2") UP TO 3 1/2"
4. PAINTED FINISHES
5. PERIMETER HOLES-ONE FLANGE
6. PERIMETER HOLES-BOTH FLANGES
7. OTHER MATERIALS
8. EXTERNAL LINKAGE
9. OTHER BEARINGS



UNION MADE

STANDARD SPECIFICATIONS

FRAME: 2"x10"x2" - 12 GA. GALVANIZED STEEL FORMED
CHANNEL FRAME, MECHANICALLY FASTENED
TOGETHER.

BLADE: 12 GA. GALVANIZED PRESS FORMED SINGLE
THICKNESS TO MAXIMUM 48" LENGTH, WELDED TO
SHAFT. BLADE WIDTH - MAXIMUM 9 3/4",
MINIMUM 6 3/4"

SHAFTS: CORROSION RESISTANT, PLATED COLD FINISHED
STEEL STUB: 1/2" DIA. TO 48" LENGTH.
DRIVE BLADE TO BE CONTINUOUS LENGTH.

BEARINGS: BRONZE OILITE FLANGED SLEEVE PRESSED
INTO FRAME.

LINKAGE: CHEVRON TYPE FORMED BRACKET OF 1/8" THICK
STEEL. TRUNNION IS A MACHINED PIVOT OF
PLATED STEEL WITH A 5/16" DIAMETER ROD.

FINISH: FACTORY MILL.

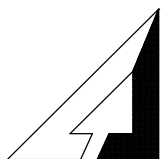
MAXIMUM TEMPERATURE: 250°F

MAXIMUM PANEL SIZE: 48" x 96" I.D. OF DAMPERS
WITHOUT SEALS

48" x 72" I.D. OF DAMPERS

WITH SEALS

MINIMUM PANEL SIZE: 6" x 6 3/4" I.D. (SINGLE BLADE)
6" x 15" I.D. (OPPOSED BLADES)



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AGENT: _____

ARCH./ENG.:

CONTR.:

PROJECT:

EDR: ECN: JOB:

DATE: DWN.: DWG.:

ARROW MODEL 421 INDUSTRIAL DAMPER PERFORMANCE DATA

LEAKAGE :

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	7	10	13	17	20	23	27
	24"	13	20	27	33	40	47	54
	36"	20	30	40	50	60	70	80
	48"	27	40	54	67	80	94	107
	60"	33	50	67	84	100	117	134
	72"	40	60	80	100	121	141	161

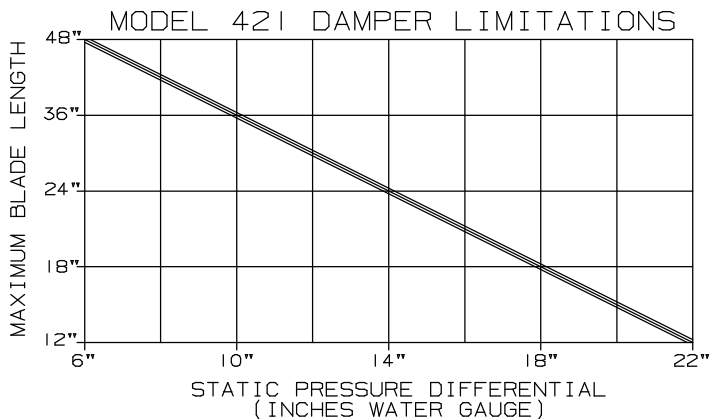
FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 6" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6
MULTIPLIER CORRECTION FACTOR	1.4	1.7	2.1	2.5	2.8

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 20 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 72", WITH A MINIMUM OF 40 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 6 3/4"

DAMPER AIR LEAKAGE SHOWN IS BASED UPON PUBLISHING ONLY THE MOST CONSERVATIVE LEAKAGE RESULTS FOR THE ARROW MODEL 421 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

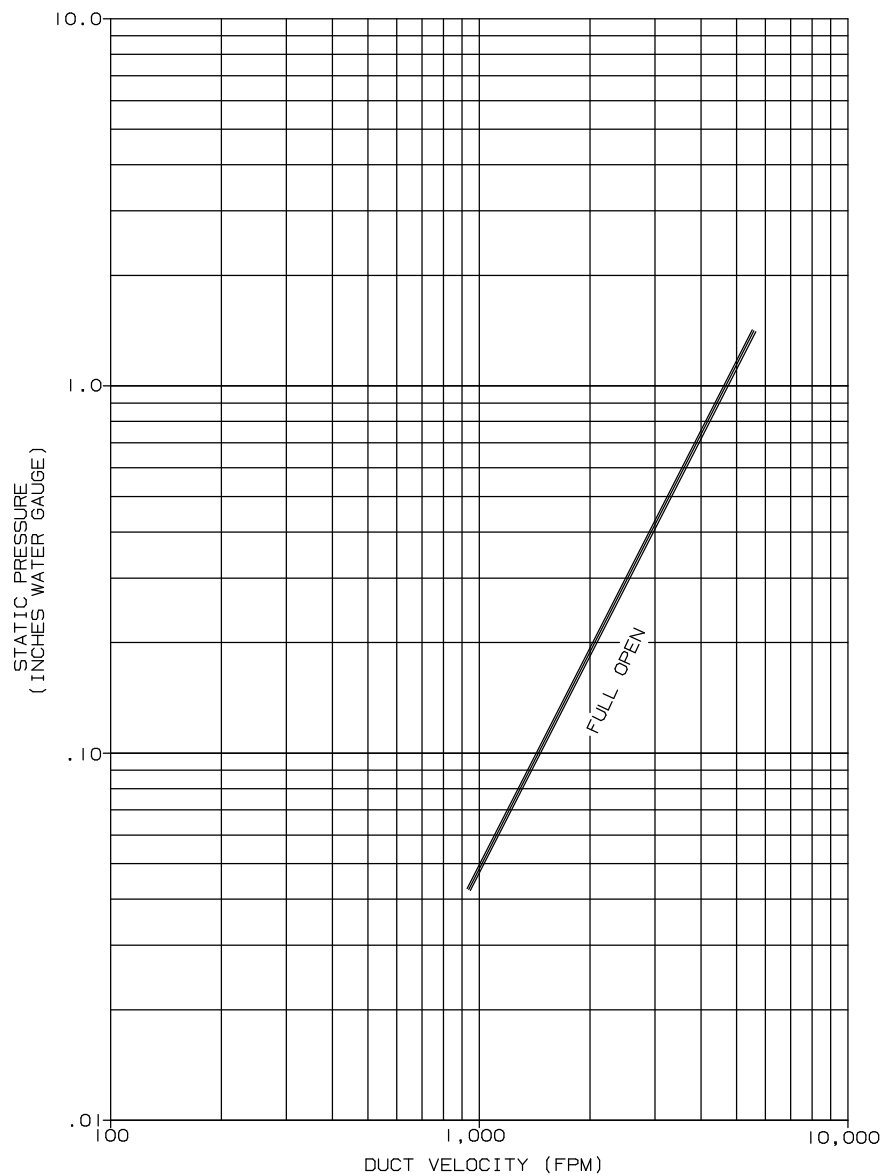
TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN, THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A REALATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 421 DAMPER DESIGN AT A BLADE LENGTH OF 48" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

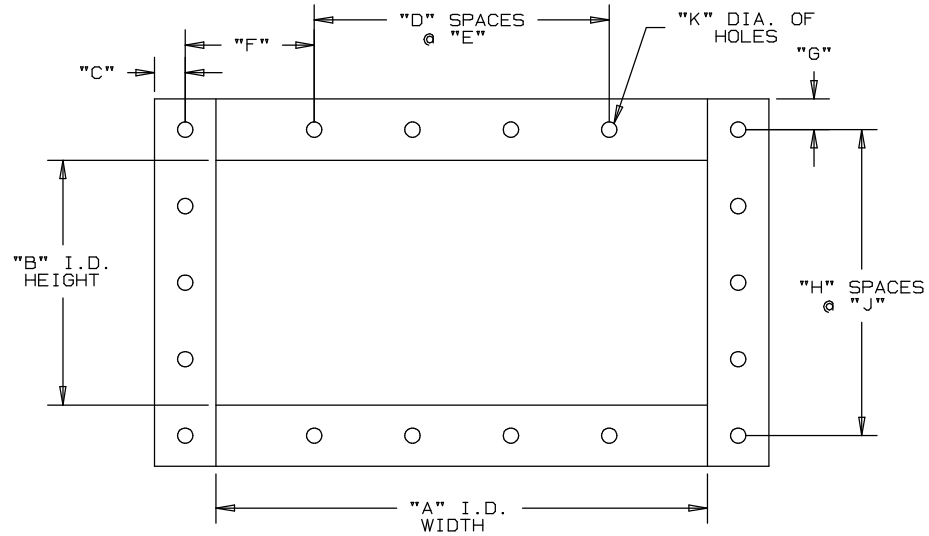
ARROW MODEL 421 INDUSTRIAL DAMPER PERFORMANCE DATA

ARROW MODEL 421 (OPPOSED BLADE) 42" x 42" I.D.
PRESSURE DROP vs. DUCT VELOCITY



PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500, USING
TEST SET UP FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND
DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

NOTES:



ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS

SHIP TO: _____

INVOICE TO: _____

PURCHASE ORDER: _____

MARK SHIPMENT: _____

SEND ORDER TO:



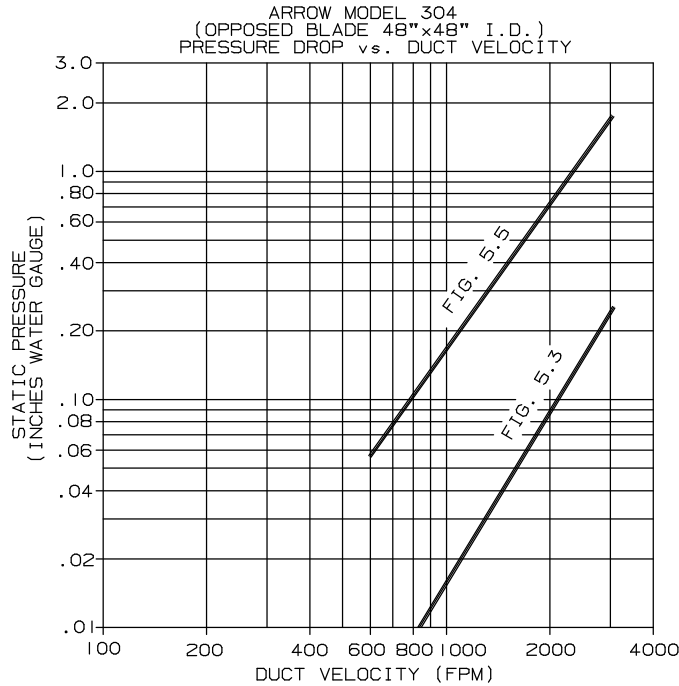
ARROW UNITED INDUSTRIES
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INDUSTRIAL DAMPER LIGHT DUTY MODEL 304 PERFORMANCE DATA

PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500-D-98, USING TEST SET-UP 5.5. AND 5.3. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU.FT.



LEAKAGE :

AIR LEAKAGE QUANTITIES IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500-D-98 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

DAMPER HEIGHT (INCHES)	DAMPER WIDTH (INCHES)						
	12"	18"	24"	30"	36"	42"	48"
12"	4	6	8	10	12	14	16
24"	8	12	16	20	24	28	32
36"	12	18	24	30	36	42	48
48"	16	24	32	40	48	56	64
60"	20	30	40	50	60	70	80
72"	24	36	48	60	72	84	96
84"	28	42	56	70	84	98	112
96"	32	48	64	80	96	112	128

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 20" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MAXIMUM DAMPER WIDTH
MULTIPLIER CORRECTION FACTOR	3.0	4.5	5.5	6.5	7.0	7.8	8.3	9.0	9.7	10.2	10.5	11.3	11.6	12.0	12.5	12.9	13.3	13.6	14.3	14.6	12"-17"
	2.0	3.0	3.5	4.2	4.5	5.0	5.5	6.0	6.2	6.8	7.0	7.5	7.7	7.8	8.2	-	-	-	-	-	18"-24"
	1.0	1.5	1.8	2.1	2.3	2.6	2.8	3.0	3.2	3.4	-	-	-	-	-	-	-	-	-	-	>24"-36"
	1.0	1.5	1.8	2.1	2.3	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	>36"-48"

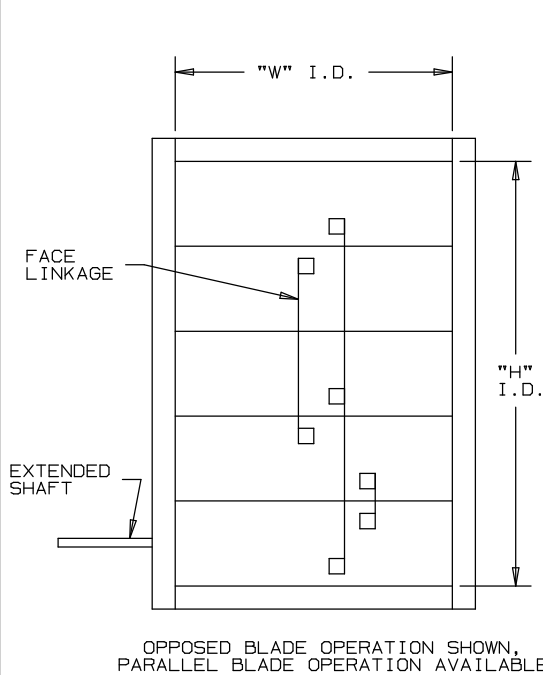
AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500-D-98 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 10 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 96", WITH A MINIMUM OF 40 IN.LBS/SQ.FT OF DAMPER AREA FOR A SIZE 48" x 6 3/4".

DAMPER AIR LEAKAGE SHOWN IS BASED UPON DAMPERS FURNISHED WITH BLADE AND JAMB SEALS. RESULTS PUBLISHED ARE FOR THE ARROW MODEL 304 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

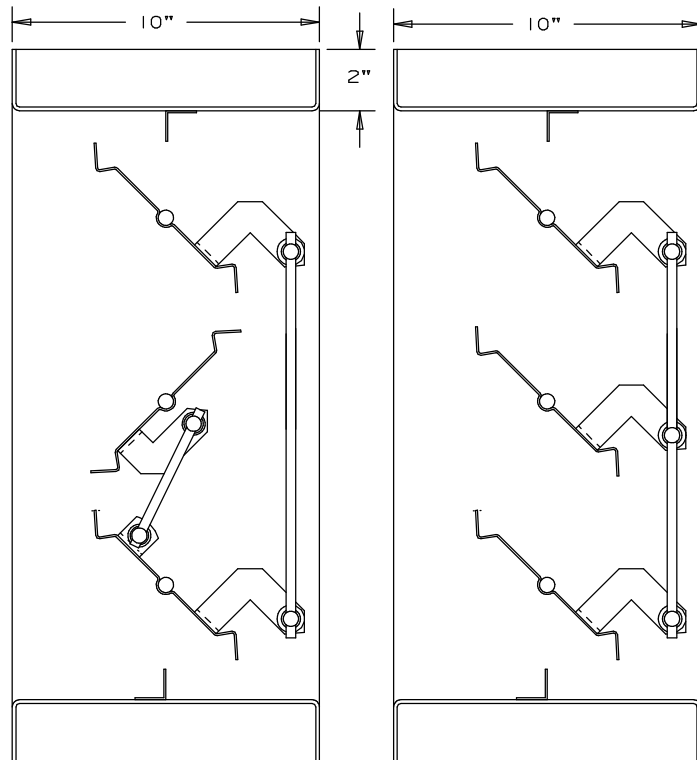
ARROW INDUSTRIAL DAMPER FOR PROCESS-CONTROL

MODEL 422

FOR USE UP TO 8" W.G. STATIC PRESSURE @ 2500 F.P.M.



OPPOSED BLADE OPERATION SHOWN,
PARALLEL BLADE OPERATION AVAILABLE



OPPOSED BLADES

PARALLEL BLADES

NOT TO SCALE

FOR PERFORMANCE DATA
- SEE REVERSE SIDE

VELOCITIES ABOVE 2500 FPM TO
4000 FPM MAXIMUM SHALL REQUIRE
A DOUBLE SET OF FACE LINKAGE

SEE PRICE LIST FOR OPTIONAL EXTRAS

OPTIONAL EXTRAS

CONSTRUCTION MAY BE WITH OTHER THAN
STANDARD MATERIALS WHEN REQUIRED TO
MEET SPECIAL CONDITIONS AS TEMPERATURE,
PRESSURE, VELOCITY, SYSTEM ENVIRONMENT
OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR
THE MORE COMMON TYPES OF APPLICATIONS.

1. NEOPRENE BLADE EDGE SEALS
2. STAINLESS STEEL JAMB SEALS
3. FLANGES OTHER THAN STANDARD
(2") UP TO 3 1/2"
4. PAINTED FINISHES
5. PERIMETER HOLES-ONE FLANGE
6. PERIMETER HOLES-BOTH FLANGES
7. OTHER MATERIALS
8. EXTERNAL LINKAGE
9. OTHER BEARINGS



UNION MADE

STANDARD SPECIFICATIONS

FRAME: 2"x10"x2" - 12 GA. GALVANIZED STEEL FORMED
CHANNEL FRAME, MECHANICALLY FASTENED
TOGETHER.

BLADE: 12 GA. GALVANIZED PRESS FORMED SINGLE
THICKNESS TO MAXIMUM 48" LENGTH, WELDED TO
SHAFT. BLADE WIDTH - MAXIMUM 9 3/4",
MINIMUM 6 3/4"

SHAFTS: CORROSION RESISTANT, PLATED COLD FINISHED
STEEL STUB: 3/4" DIA. TO 48" LENGTH.
DRIVE BLADE TO BE CONTINUOUS LENGTH.

BEARINGS: BRONZE OILITE FLANGED SLEEVE PRESSED
INTO FRAME.

LINKAGE: CHEVRON TYPE FORMED BRACKET OF 1/8" THICK
STEEL. TRUNNION IS A MACHINED PIVOT OF
PLATED STEEL WITH A 5/16" DIAMETER ROD.

FINISH: FACTORY MILL.

MAXIMUM TEMPERATURE: 250°F

MAXIMUM PANEL SIZE: 48" x 96" I.D. OF DAMPERS

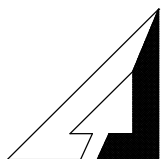
WITHOUT SEALS

48" x 72" I.D. OF DAMPERS

WITH SEALS

MINIMUM PANEL SIZE: 6" x 6 3/4" I.D. (SINGLE BLADE)

6" x 15" I.D. (OPPOSED BLADES)



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

314 RIVERSIDE DRIVE
WYALUSING, PA 18853

TEL: (570) 746-1888 FAX: (570) 746-9286
WEB ADDRESS: WWW.ARROWUNITED.COM

AGENT: _____

ARCH./ENG. :

CONTR. :

PROJECT :

EDR: ECN: JOB:

DATE: DWN.: DWG. :

ARROW MODEL 422 INDUSTRIAL DAMPER PERFORMANCE DATA

LEAKAGE :

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	7	10	13	17	20	23	27
	24"	13	20	27	33	40	47	54
	36"	20	30	40	50	60	70	80
	48"	27	40	54	67	80	94	107
	60"	33	50	67	84	100	117	134
	72"	40	60	80	100	121	141	161

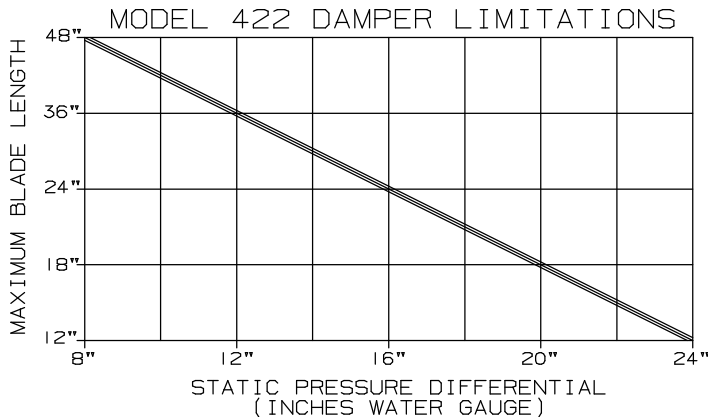
FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 8" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8
MULTIPLIER CORRECTION FACTOR	1.4	1.7	2.1	2.5	2.8	3.2	3.6

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 25 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 72", WITH A MINIMUM OF 45 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 6 3/4"

DAMPER AIR LEAKAGE SHOWN IS BASED UPON PUBLISHING ONLY THE MOST CONSERVATIVE LEAKAGE RESULTS FOR THE ARROW MODEL 422 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

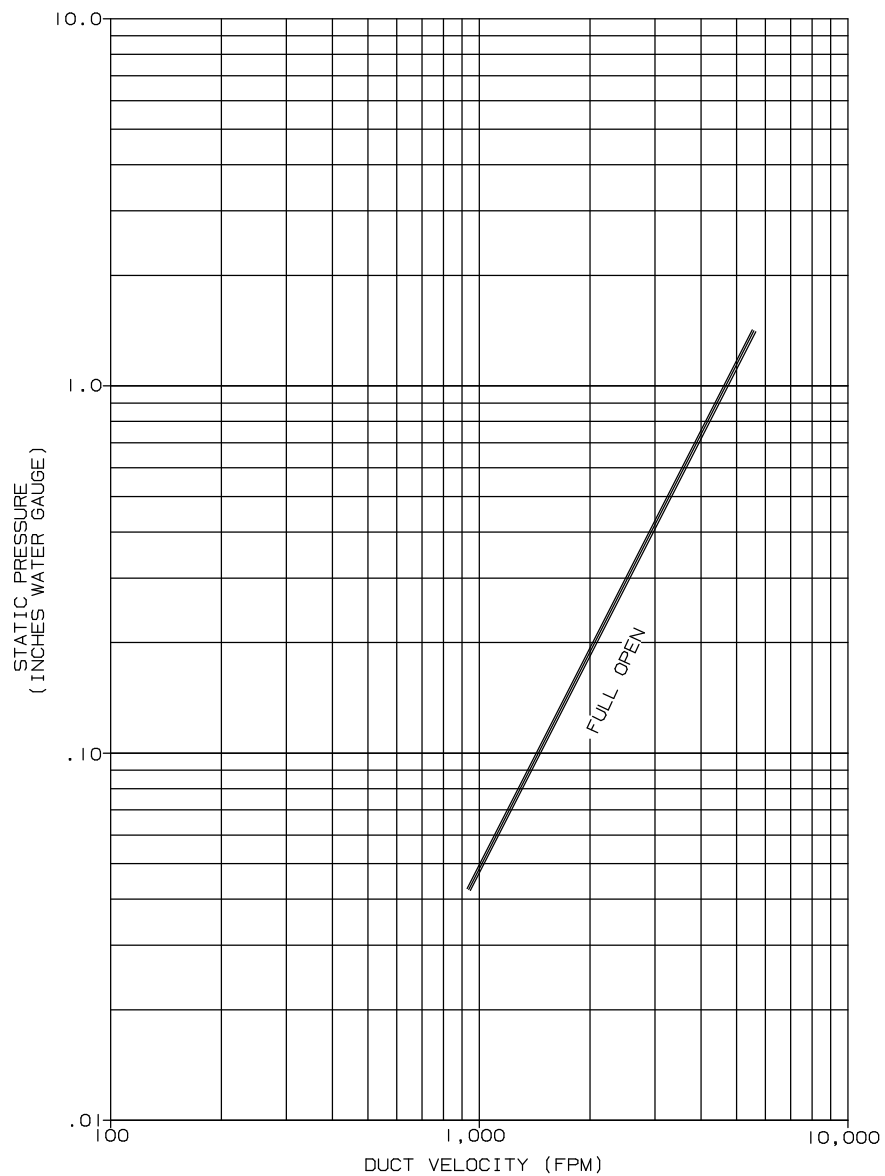
TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN, THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A REALATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 422 DAMPER DESIGN AT A BLADE LENGTH OF 48" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

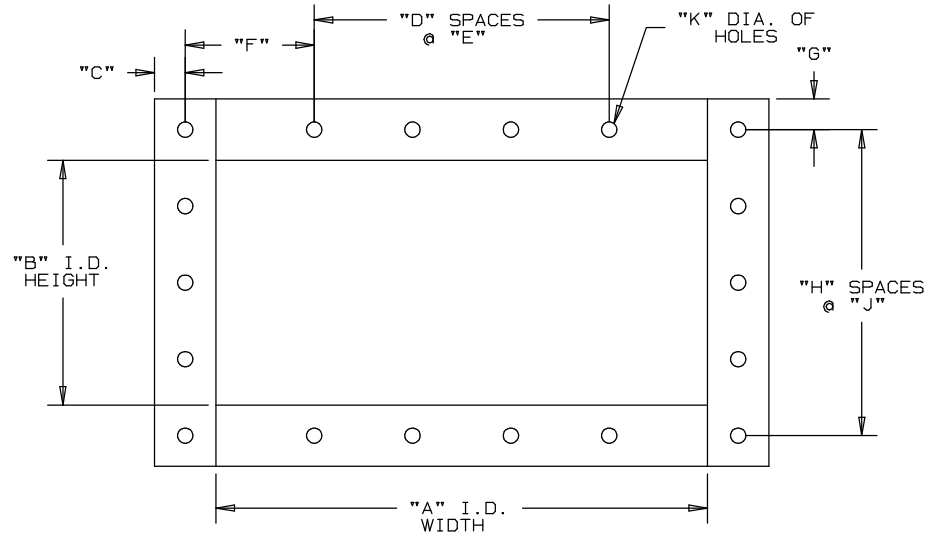
ARROW MODEL 422 INDUSTRIAL DAMPER PERFORMANCE DATA

ARROW MODEL 422 (OPPOSED BLADE) 42" x 42" I.D.
PRESSURE DROP vs. DUCT VELOCITY



PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500, USING
TEST SET UP FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND
DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

NOTES:



ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS


SHIP TO: _____

INVOICE TO: _____

PURCHASE ORDER: _____

MARK SHIPMENT: _____

SEND ORDER TO:

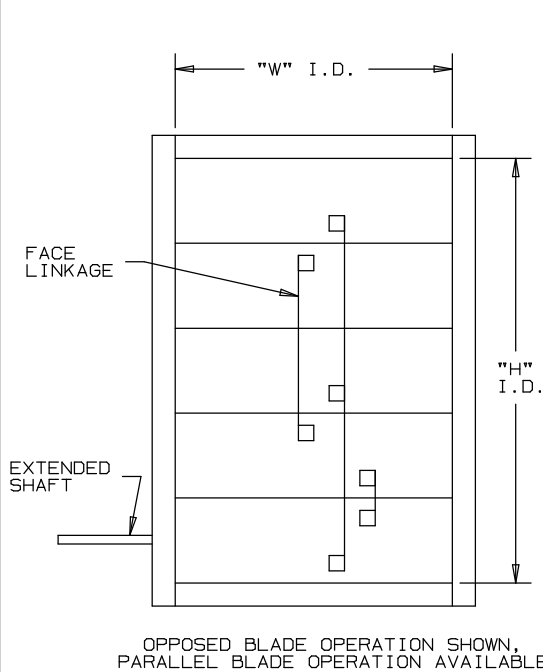


ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.
314 RIVERSIDE DRIVE
WYALUSING, PA 18853
TEL: (570) 746-1888 FAX: (570) 746-9286

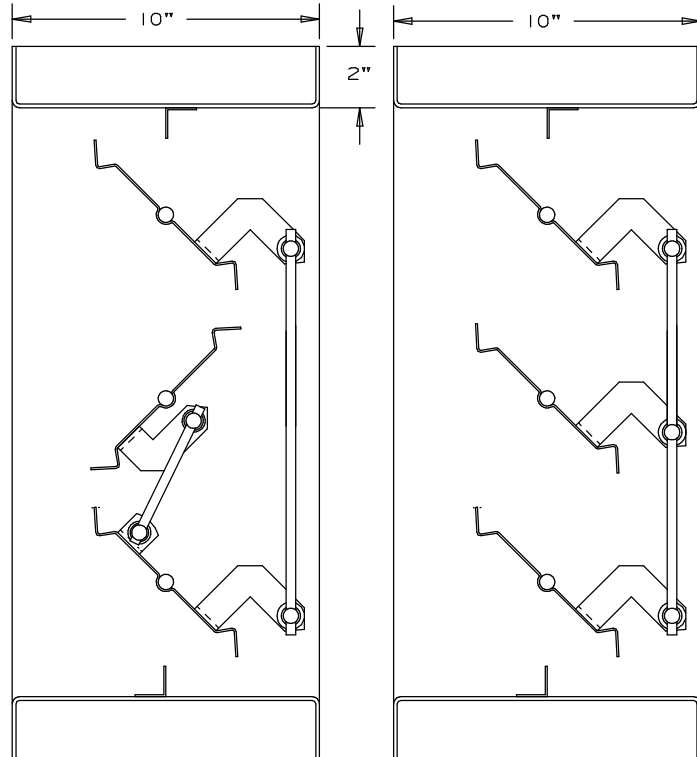
ARROW INDUSTRIAL DAMPER FOR PROCESS-CONTROL

MODEL 423

FOR USE UP TO 10" W.G. STATIC PRESSURE @ 2500 F.P.M.



OPPOSED BLADE OPERATION SHOWN,
PARALLEL BLADE OPERATION AVAILABLE



OPPOSED BLADES

PARALLEL BLADES

NOT TO SCALE

FOR PERFORMANCE DATA
- SEE REVERSE SIDE

VELOCITIES ABOVE 2500 FPM TO
4000 FPM MAXIMUM SHALL REQUIRE
A DOUBLE SET OF FACE LINKAGE

SEE PRICE LIST FOR OPTIONAL EXTRAS

OPTIONAL EXTRAS

CONSTRUCTION MAY BE WITH OTHER THAN
STANDARD MATERIALS WHEN REQUIRED TO
MEET SPECIAL CONDITIONS AS TEMPERATURE,
PRESSURE, VELOCITY, SYSTEM ENVIRONMENT
OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR
THE MORE COMMON TYPES OF APPLICATIONS.

1. NEOPRENE BLADE EDGE SEALS
2. STAINLESS STEEL JAMB SEALS
3. FLANGES OTHER THAN STANDARD
(2") UP TO 3 1/2"
4. PAINTED FINISHES
5. PERIMETER HOLES-ONE FLANGE
6. PERIMETER HOLES-BOTH FLANGES
7. OTHER MATERIALS
8. EXTERNAL LINKAGE
9. OTHER BEARINGS



UNION MADE

STANDARD SPECIFICATIONS

FRAME: 2"x10"x2" - 12 GA. GALVANIZED STEEL FORMED
CHANNEL FRAME, MECHANICALLY FASTENED
TOGETHER.

BLADE: 10 GA. GALVANIZED PRESS FORMED SINGLE
THICKNESS TO MAXIMUM 48" LENGTH, WELDED TO
SHAFT. BLADE WIDTH - MAXIMUM 9 3/4",
MINIMUM 6 3/4".

SHAFTS: CORROSION RESISTANT, PLATED COLD FINISHED
STEEL STUB: 3/4" DIA. TO 48" LENGTH.
DRIVE BLADE TO BE CONTINUOUS LENGTH.

BEARINGS: BRONZE OILITE FLANGED SLEEVE PRESSED
INTO FRAME.

LINKAGE: CHEVRON TYPE FORMED BRACKET OF 1/8" THICK
STEEL. TRUNNION IS A MACHINED PIVOT OF
PLATED STEEL WITH A 5/16" DIAMETER ROD.

FINISH: FACTORY MILL.

MAXIMUM TEMPERATURE: 250°F

MAXIMUM PANEL SIZE: 48" x 96" I.D. OF DAMPERS
WITHOUT SEALS

48" x 72" I.D. OF DAMPERS
WITH SEALS

MINIMUM PANEL SIZE: 6" x 6 3/4" I.D. (SINGLE BLADE)
6" x 15" I.D. (OPPOSED BLADES)



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

314 RIVERSIDE DRIVE
WYALUSING, PA 18853

TEL: (570) 746-1888 FAX: (570) 746-9286
WEB ADDRESS: WWW.ARROWUNITED.COM

AGENT: _____

ARCH./ENG.:

CONTR.:

PROJECT:

EDR: ECN: JOB:

DATE: DWN.: DWG.:

ARROW MODEL 423 INDUSTRIAL DAMPER PERFORMANCE DATA

LEAKAGE :

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	7	10	13	17	20	23	27
	24"	13	20	27	33	40	47	54
	36"	20	30	40	50	60	70	80
	48"	27	40	54	67	80	94	107
	60"	33	50	67	84	100	117	134
	72"	40	60	80	100	121	141	161

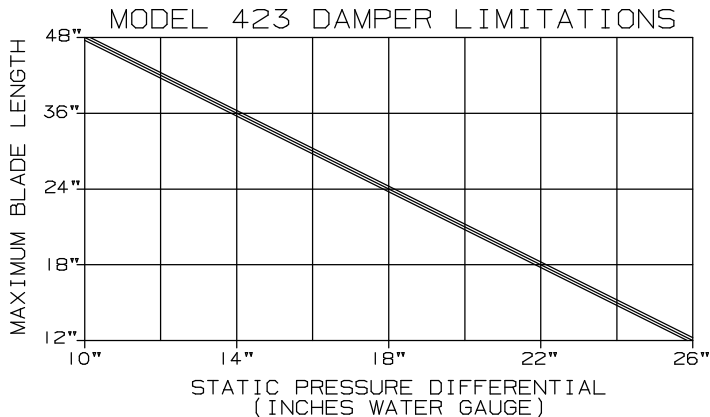
FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 10" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8	9	10
MULTIPLIER CORRECTION FACTOR	1.4	1.7	2.1	2.5	2.8	3.2	3.6	4.1	4.5

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 30 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 72", WITH A MINIMUM OF 50 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 48" x 6 3/4"

DAMPER AIR LEAKAGE SHOWN IS BASED UPON PUBLISHING ONLY THE MOST CONSERVATIVE LEAKAGE RESULTS FOR THE ARROW MODEL 423 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

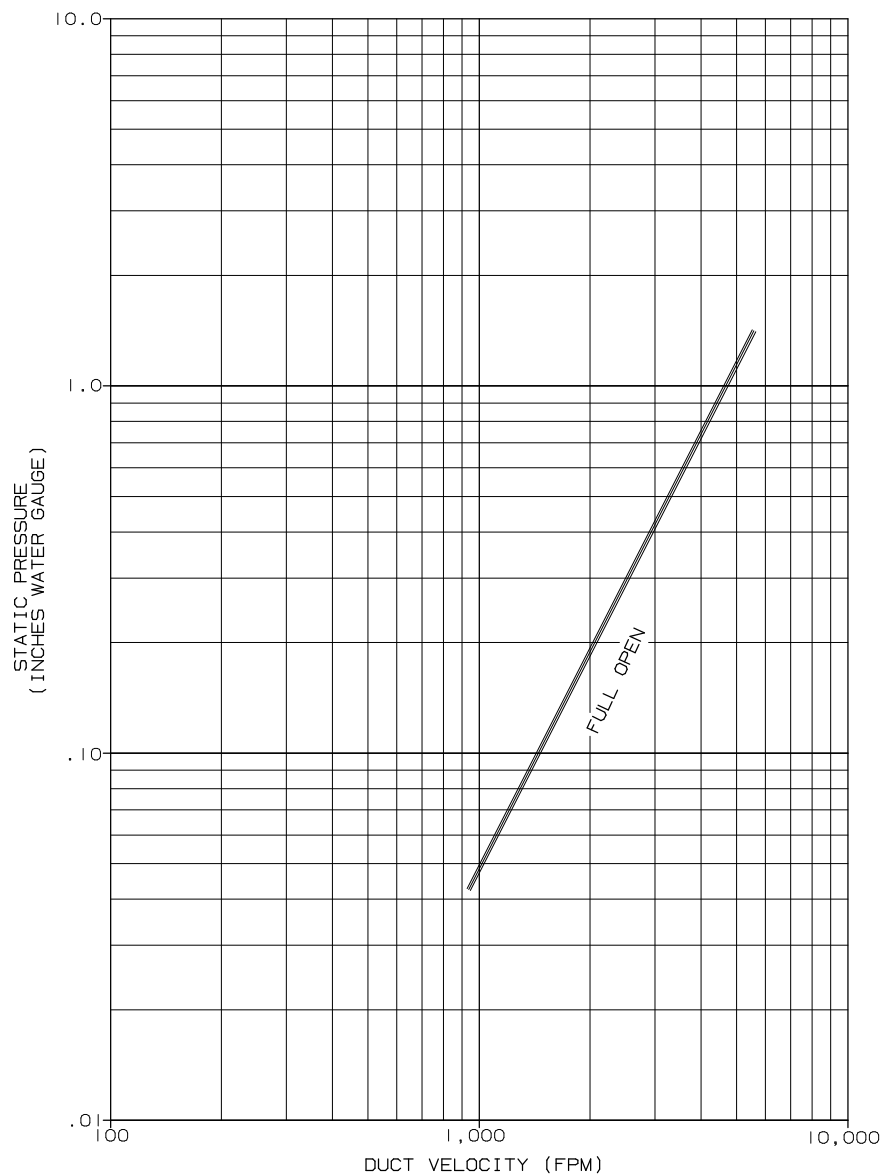
TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN, THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A REALATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 423 DAMPER DESIGN AT A BLADE LENGTH OF 48" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

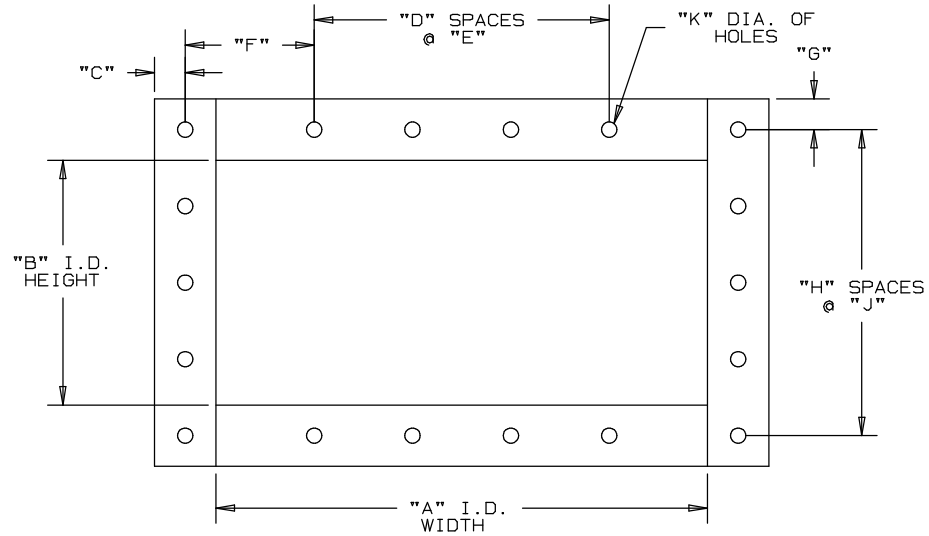
ARROW MODEL 423 INDUSTRIAL DAMPER PERFORMANCE DATA

ARROW MODEL 423 (OPPOSED BLADE) 42" x 42" I.D.
PRESSURE DROP vs. DUCT VELOCITY



PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500, USING
TEST SET UP FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND
DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

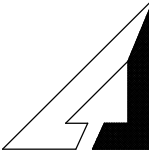
NOTES:



ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS

SHIP TO: _____ INVOICE TO: _____ PURCHASE ORDER: _____

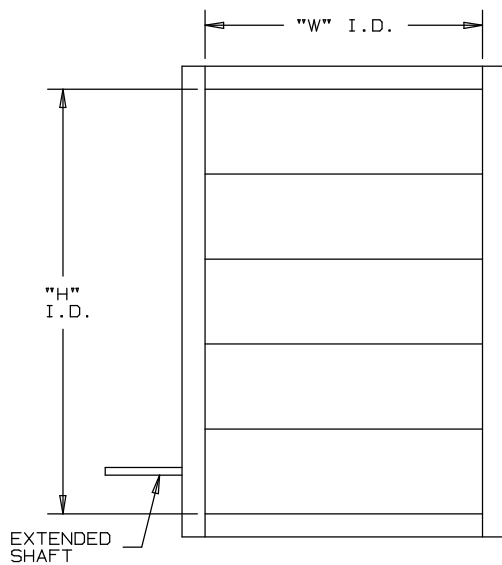
MARK SHIPMENT: _____

SEND ORDER TO:
 **ARROW UNITED INDUSTRIES**
 A DIVISION OF MESTEK, INC.
 314 RIVERSIDE DRIVE
 WYALUSING, PA 18853
 TEL: (570) 746-1888 FAX: (570) 746-9286

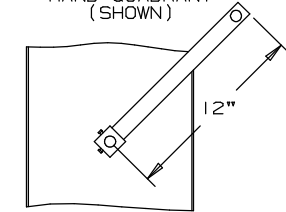
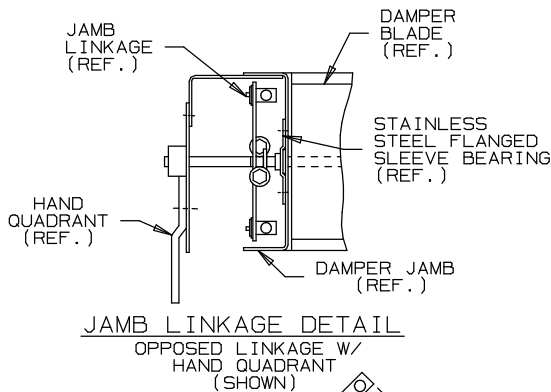
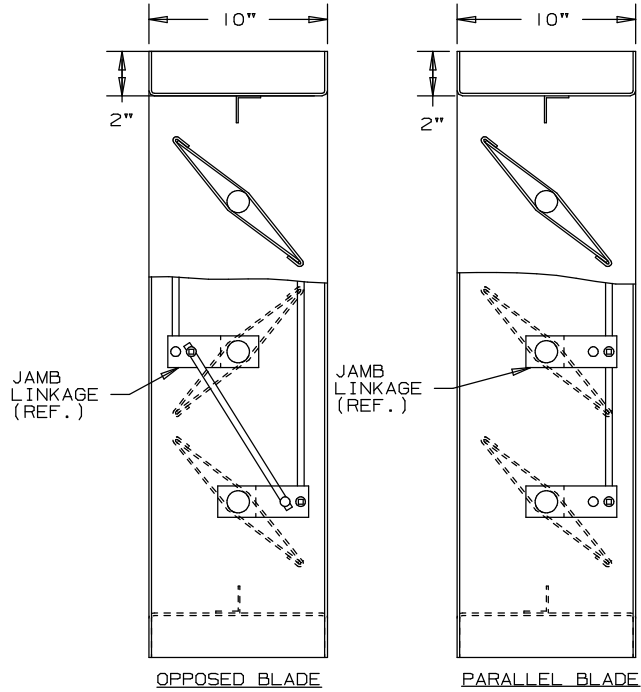
ARROW INDUSTRIAL DAMPER for PROCESS CONTROL

MODEL 530

FOR USE UP TO 12" W.G. STATIC PRESSURE



FOR PERFORMANCE DATA
- SEE REVERSE SIDE



PLEASE SPECIFY OPERATOR TYPE

STANDARD SPECIFICATIONS

FRAME: 2"x10"x2"-12 GA. GALVANIZED STEEL FORMED CHANNEL FRAME.
 BLADE: 16 GA. AIRFOIL TO MAX 48" LENGTH, 12 GA. AIRFOIL TO MAX 60" LENGTH
 BLADE WIDTH-MAX. 9 3/4", MIN. 6"
 SHAFT: CORROSION RESISTANT, PLATED COLD FINISHED STEEL. 3/4" DIA. TO 60" LENGTH.
 BEARINGS: STAINLESS STEEL FLANGED SLEEVE, BOLTED TO FRAME. LINKAGE: LOCATED IN JAMB. 1/2" DIA. INTER-CONNECTING ROD WITH TRUNNION PIVOT FASTENER.
 OPERATOR: MANUAL HAND QUADRANT OR LEVER ARM FOR MOTOR ACTUATOR. SPECIFY TYPE WHEN ORDERING.
 FINISH: FACTORY MILL.
 MAXIMUM TEMPERATURE: 450°F. FOR TEMPERATURES ABOVE 450°F, CONSULT FACTORY.
 MAXIMUM PANEL SIZE: 60"x96" I.D.
 MINIMUM PANEL SIZE: 6"x6" I.D. (SINGLE BLADE)
 6"x12" I.D. (OPPOSED BLADE)

OPTIONAL

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. STAINLESS STEEL BLADE EDGE SEALS.
2. STAINLESS STEEL JAMB SEALS.
3. STUFFING BOXES AND REPLACEABLE PACKING.
4. FLANGES OTHER THAN STANDARD 2" WIDE
5. PAINTED FINISHES.
6. PERIMETER HOLES-ONE FLANGE.
7. PERIMETER HOLES-TWO FLANGES.
8. OTHER MATERIAL.



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

314 RIVERSIDE DRIVE
WYALUSING, PA 18853
TEL: (570) 746-1888 FAX: (570) 746-9286
WEB ADDRESS: WWW.ARROWUNITED.COM

AGENT: _____

ARCH./ENG. :	
CONTR. :	
PROJECT :	
EDR :	ECN : JOB :
DATE :	DWN. : DWG. :

ARROW MODEL 530 INDUSTRIAL DAMPER PERFORMANCE DATA

LEAKAGE :

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES)								
		12"	18"	24"	30"	36"	42"	48"	54"	60"
DAMPER HEIGHT (INCHES)	12"	6	8	11	14	17	19	22	25	28
	24"	11	17	22	28	33	39	44	50	55
	36"	17	25	33	41	50	58	66	74	83
	48"	22	33	44	55	66	77	88	99	110
	60"	28	41	55	69	83	96	110	124	138
	72"	33	50	66	83	99	116	132	149	165
	84"	39	58	77	96	116	135	154	173	193
	96"	44	66	88	110	132	154	176	198	220

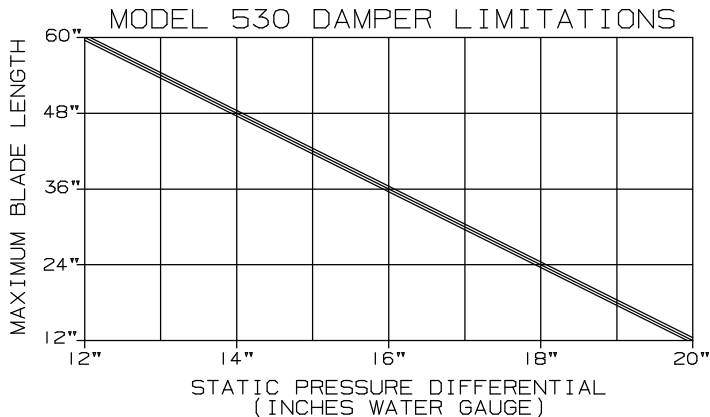
FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 12" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8	9	10	11	12
MULTIPLIER CORRECTION FACTOR	1.5	2.0	2.3	2.7	3.0	3.3	3.6	3.9	4.3	4.6	5.0

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 38 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 60" x 96", WITH A MINIMUM OF 45 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 60" x 8"

DAMPER AIR LEAKAGE SHOWN IS BASED UPON PUBLISHING ONLY THE MOST CONSERVATIVE LEAKAGE RESULTS FOR THE ARROW MODEL 530 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

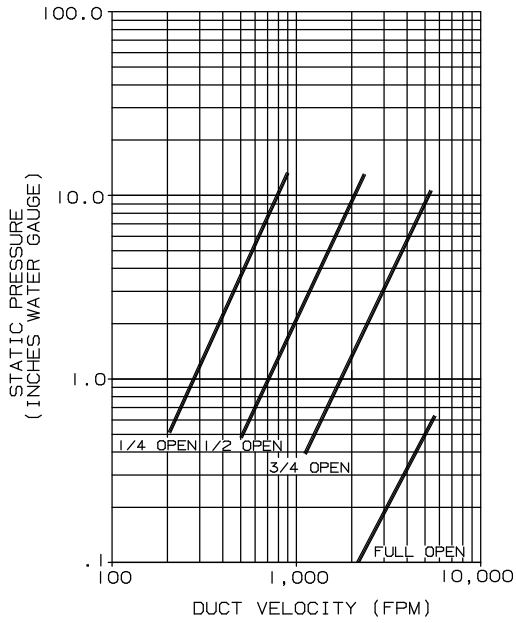
TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN, THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A REALATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 530 DAMPER DESIGN AT A BLADE LENGTH OF 60" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

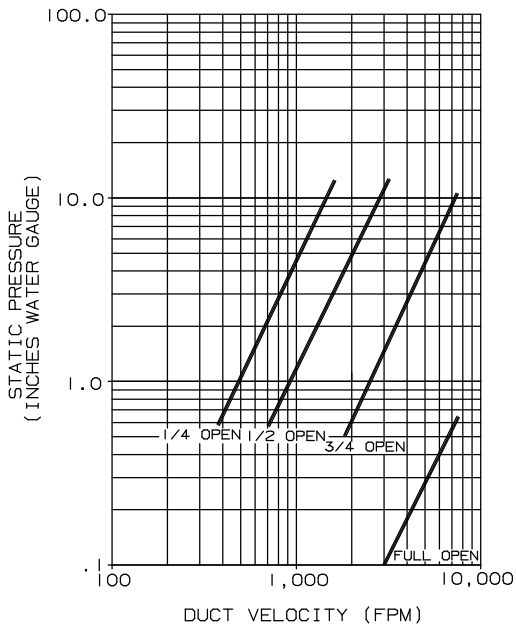
ARROW MODEL 530 INDUSTRIAL DAMPER PERFORMANCE DATA

ARROW MODEL 530 (OPPOSED BLADE) 42"x42" I.D.
PRESSURE DROP vs. DUCT VELOCITY

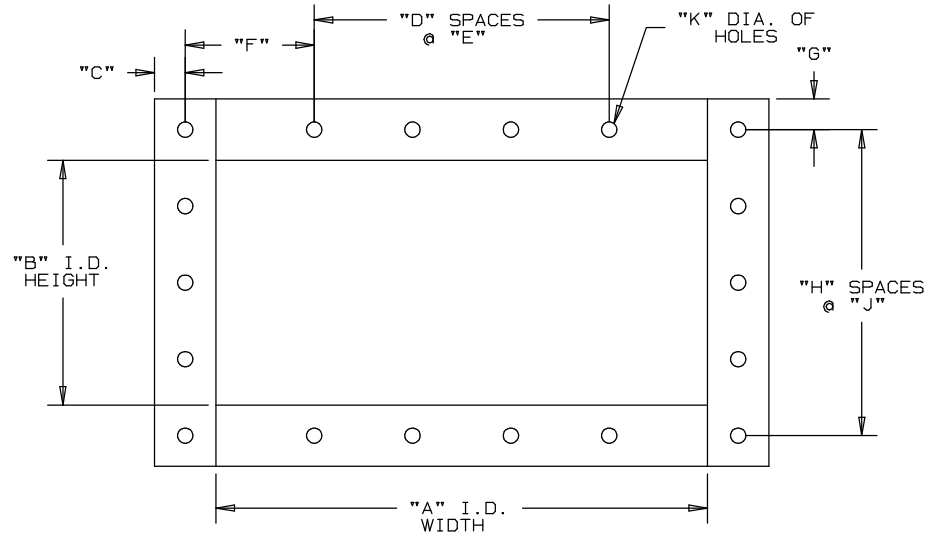


PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500, USING TEST SET UP FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.

ARROW MODEL 530 (PARALLEL BLADE) 42"x42" I.D.
PRESSURE DROP vs. DUCT VELOCITY



NOTES:



ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS

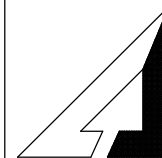
SHIP TO: _____

INVOICE TO: _____

PURCHASE ORDER: _____

MARK SHIPMENT: _____

SEND ORDER TO:



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

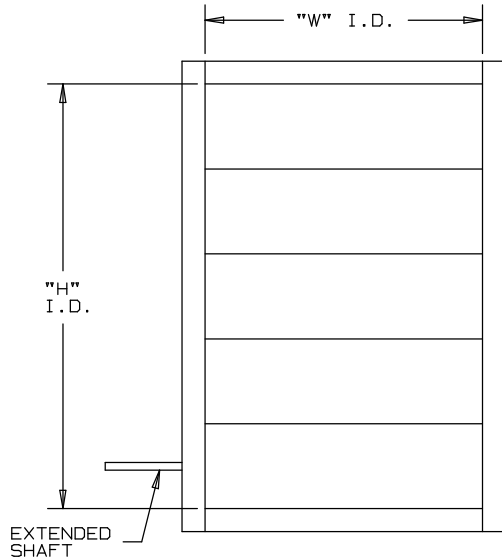
314 RIVERSIDE DRIVE
WYALUSING, PA 18853

TEL: (570) 746-1888 FAX: (570) 746-9286

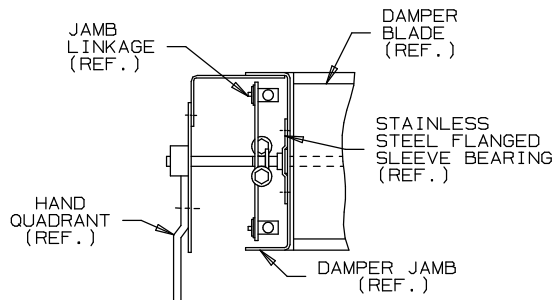
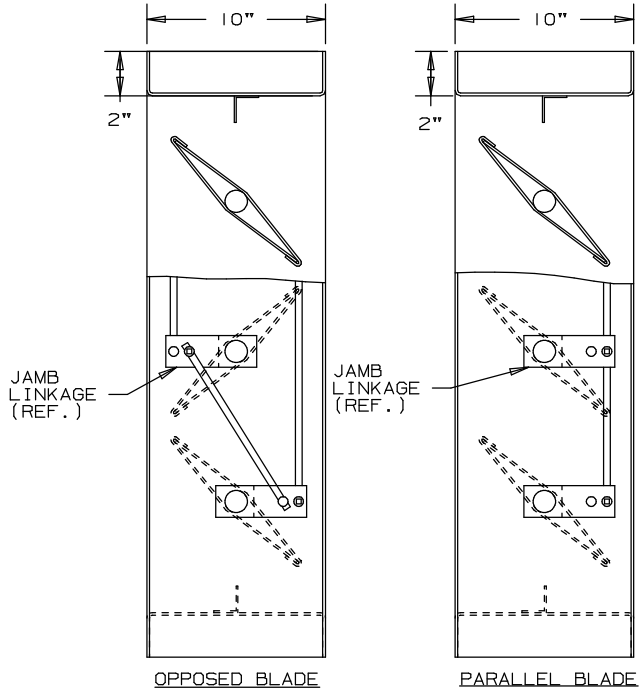
ARROW INDUSTRIAL DAMPER for PROCESS CONTROL

MODEL 531

FOR USE UP TO 20" W.G. STATIC PRESSURE

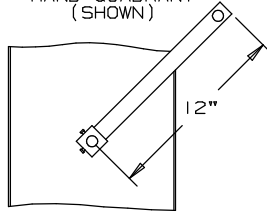


FOR PERFORMANCE DATA
- SEE REVERSE SIDE



JAMB LINKAGE DETAIL

OPPOSED LINKAGE W/
HAND QUADRANT
(SHOWN)



LEVER FOR
MOTOR OPERATION

PLEASE SPECIFY OPERATOR TYPE

STANDARD SPECIFICATIONS

FRAME: 2"x10"x2"-10 GA. GALVANIZED STEEL FORMED CHANNEL FRAME.
 BLADE: 12 GA. AIRFOIL TO MAX 48" LENGTH, 10 GA. AIRFOIL TO MAX 60" LENGTH. BLADE WIDTH-MAX. 9 3/4" MIN. 6"
 SHAFT: CORROSION RESISTANT, PLATED COLD FINISHED STEEL. 3/4" DIA. TO 48" LENGTH, 1" DIA. TO 60" LENGTH.
 BEARINGS: STAINLESS STEEL FLANGED SLEEVE BOLTED TO FRAME. LINKAGE: LOCATED IN JAMB. 1/2" DIA. INTER-CONNECTING ROD WITH TRUNNION PIVOT FASTENER.
 OPERATOR: MANUAL HAND QUADRANT OR LEVER ARM FOR MOTOR ACTUATOR. SPECIFY TYPE WHEN ORDERING.
 FINISH: FACTORY MILL.
 MAXIMUM TEMPERATURE: 450°F. FOR TEMPERATURES ABOVE 450°F, CONSULT FACTORY.
 MAXIMUM PANEL SIZE: 60"x96" I.D.
 MINIMUM PANEL SIZE: 6"x6" I.D. (SINGLE BLADE)
 6"x12" I.D. (OPPOSED BLADE)

OPTIONAL

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. STAINLESS STEEL BLADE EDGE SEALS.
2. STAINLESS STEEL JAMB SEALS.
3. STUFFING BOXES AND REPLACEABLE PACKING.
4. FLANGES OTHER THAN STANDARD 2" WIDE
5. PAINTED FINISHES.
6. PERIMETER HOLES-ONE FLANGE.
7. PERIMETER HOLES-TWO FLANGES.
8. OTHER MATERIAL.



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TEL: (570) 746-1888 FAX: (570) 746-9286
WEB ADDRESS: WWW.ARROWUNITED.COM

AGENT: _____

ARCH./ENG. :

CONTR. :

PROJECT :

EDR: ECN: JOB:

DATE: DWN.: DWG. :

ARROW MODEL 531 INDUSTRIAL DAMPER PERFORMANCE DATA

LEAKAGE :

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES)								
		12"	18"	24"	30"	36"	42"	48"	54"	60"
DAMPER HEIGHT (INCHES)	12"	5	7	10	12	14	17	19	22	24
	24"	10	14	19	24	29	34	39	43	48
	36"	14	22	29	36	43	51	58	65	72
	48"	19	29	39	48	58	68	77	87	96
	60"	24	36	48	60	72	84	96	108	121
	72"	29	43	58	72	87	101	116	130	145
	84"	34	51	68	84	101	118	135	152	169
	96"	39	58	77	96	116	135	154	174	193

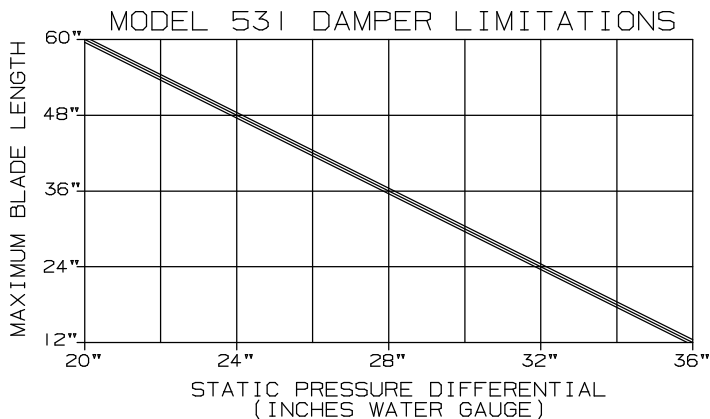
FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 20" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MULTIPLIER CORRECTION FACTOR	1.3	1.6	1.9	2.2	2.4	2.6	2.8	3.0	3.2	3.3	3.5	3.6	3.7	3.9	4.0	4.1	4.2	4.4	4.5

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 75 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 60" x 96", WITH A MINIMUM OF 55 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 60" x 8".

DAMPER AIR LEAKAGE SHOWN IS BASED UPON PUBLISHING ONLY THE MOST CONSERVATIVE LEAKAGE RESULTS FOR THE ARROW MODEL 531 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

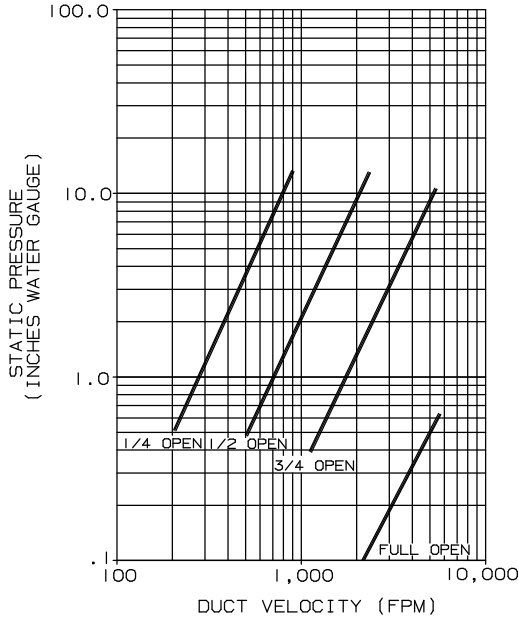
TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN. THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A REALATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 531 DAMPER DESIGN AT A BLADE LENGTH OF 60" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

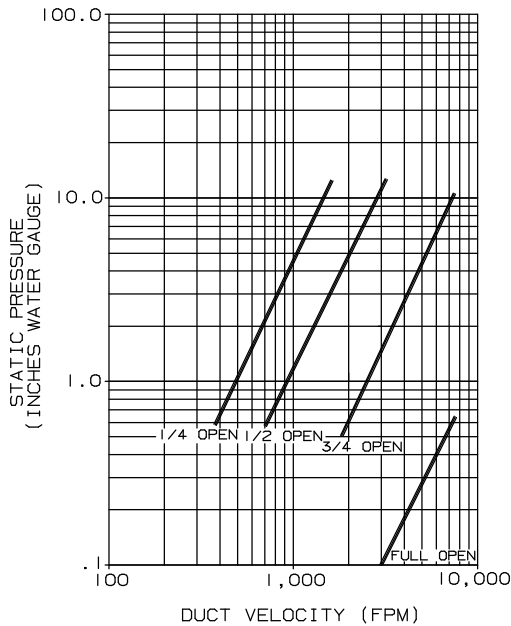
ARROW MODEL 531 INDUSTRIAL DAMPER PERFORMANCE DATA

ARROW MODEL 531 (OPPOSED BLADE) 42"x42" I.D.
PRESSURE DROP vs. DUCT VELOCITY

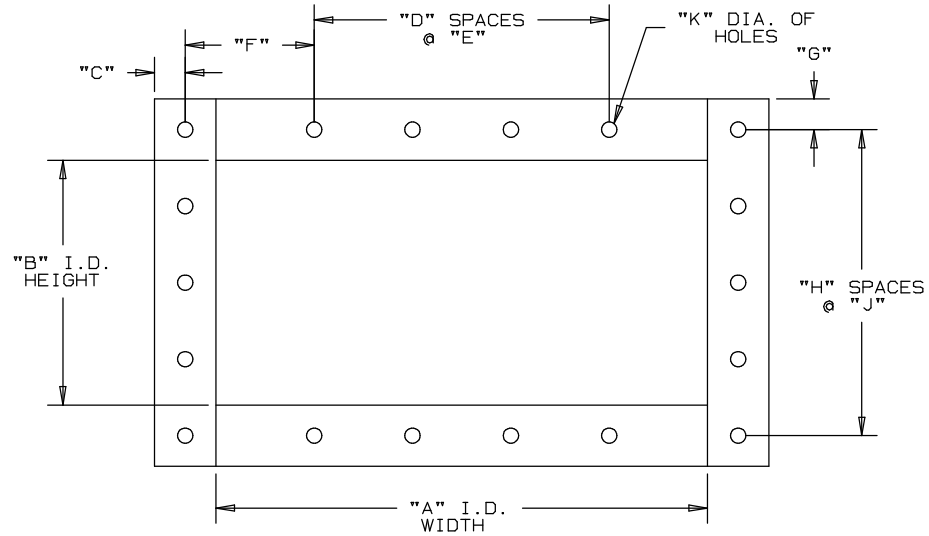


PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500, USING TEST SET UP FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.

ARROW MODEL 531 (PARALLEL BLADE) 42"x42" I.D.
PRESSURE DROP vs. DUCT VELOCITY



NOTES:

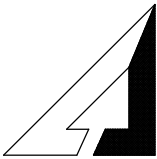


ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS

SHIP TO: _____ INVOICE TO: _____ PURCHASE ORDER: _____

MARK SHIPMENT: _____

SEND ORDER TO:

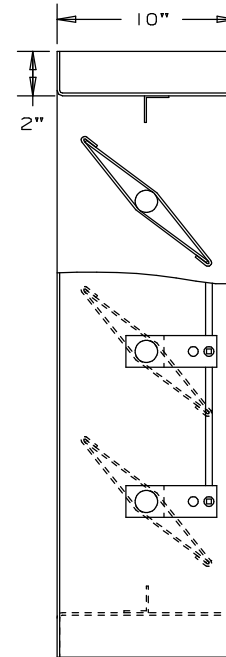
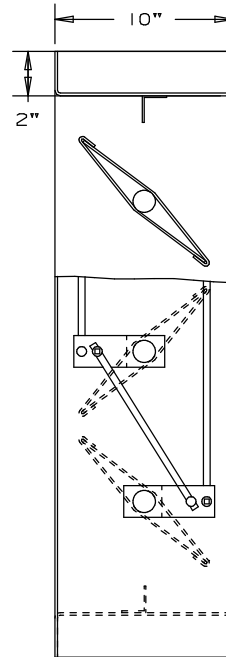
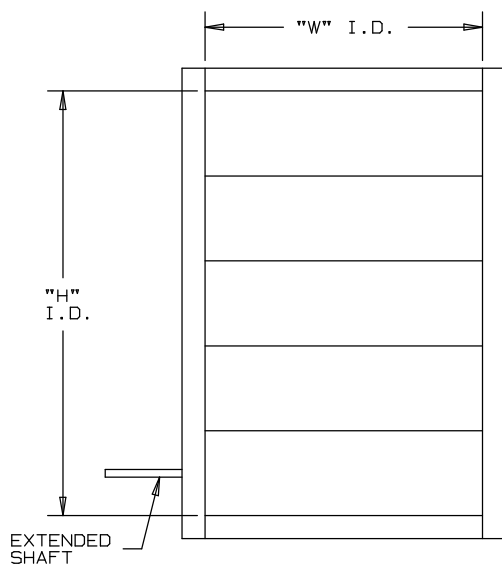


ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.
314 RIVERSIDE DRIVE
WYALUSING, PA 18853
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ARROW PROCESS-CONTROL HI-TEMPERATURE DAMPER

MODEL 540

15" STATIC PRESSURE-MAXIMUM, 800°F TEMPERATURE-
MAXIMUM FOR STANDARD CONSTRUCTION

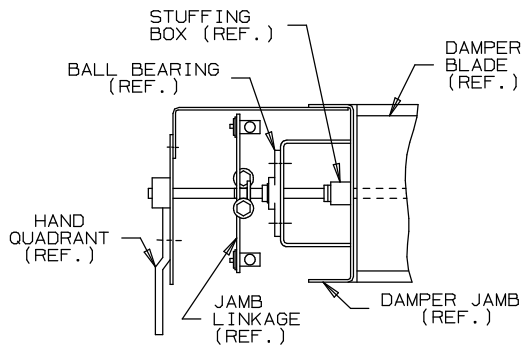


OPPOSED BLADE

NOT TO SCALE

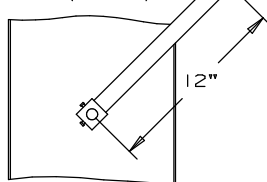
PARALLEL BLADE

SEE OTHER SIDE FOR SUBMITTAL SHEET AND DAMPERS ORDER FORM



JAMB LINKAGE DETAIL

OPPOSED LINKAGE W/
HAND QUADRANT
(SHOWN)



LEVER FOR
MOTOR OPERATION

PLEASE SPECIFY OPERATOR TYPE

STANDARD SPECIFICATIONS

FRAME: 2"x10"x2"-10 GA. HOT ROLL FORMED CHANNEL FRAME
 BLADE: 10 GA. AIRFOIL TO MAX 60" LENGTH
 BLADE WIDTH-MAX. 9 3/4", MIN. 6"
 SHAFT: COLD FINISHED STEEL-1" DIA. TO 60" LENGTH.
 BEARINGS: BALL BEARINGS, MOUNTED ON STAND-OFF BRACKET WITH STUFFING BOX AND REPLACEABLE PACKING.
 LINKAGE: LOCATED IN JAMB. 1/2" DIA. INTER-CONNECTING ROD WITH TRUNNION PIVOT FASTENER.
 OPERATOR: MANUAL HAND QUADRANT OR LEVER ARM FOR MOTOR ACTUATOR. SPECIFY TYPE WHEN ORDERING.
 FINISH: HI-TEMPERATURE ALUMINUM PAINT.
 MAXIMUM TEMPERATURE: 800°F. FOR TEMPERATURES ABOVE 800°F, CONSULT FACTORY.
 MAXIMUM PANEL SIZE: 60"x96" I.D.
 MINIMUM PANEL SIZE: 6"x6" I.D. (SINGLE BLADE)
 6"x12" I.D. (OPPOSED BLADE)

OPTIONAL

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. STAINLESS STEEL BLADE EDGE SEALS.
 2. STAINLESS STEEL JAMB SEALS.
 3. FLANGES OTHER THAN STANDARD 2" WIDE.
 4. PAINTED FINISHES.
 5. PERIMETER HOLES-ONE FLANGE.
 6. PERIMETER HOLES-TWO FLANGES.
 7. CORTEN MATERIAL AVAILABLE
- THIS DAMPER NOT AVAILABLE IN STAINLESS STEEL.



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A DIVISION OF MESTEK, INC.

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WYALUSING, PA 18853

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PROJECT :

EDR :

ECN :

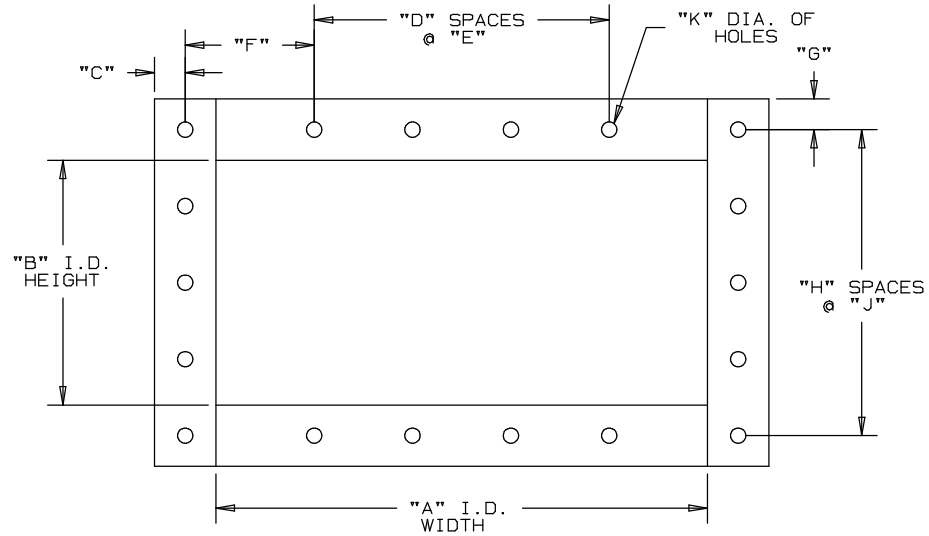
JOB :

DATE :

DWN. :

DWG. :

NOTES:



ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS

SHIP TO: _____

INVOICE TO: _____

PURCHASE ORDER: _____

MARK SHIPMENT: _____

SEND ORDER TO:



ARROW UNITED INDUSTRIES
A DIVISION OF MESTEK, INC.

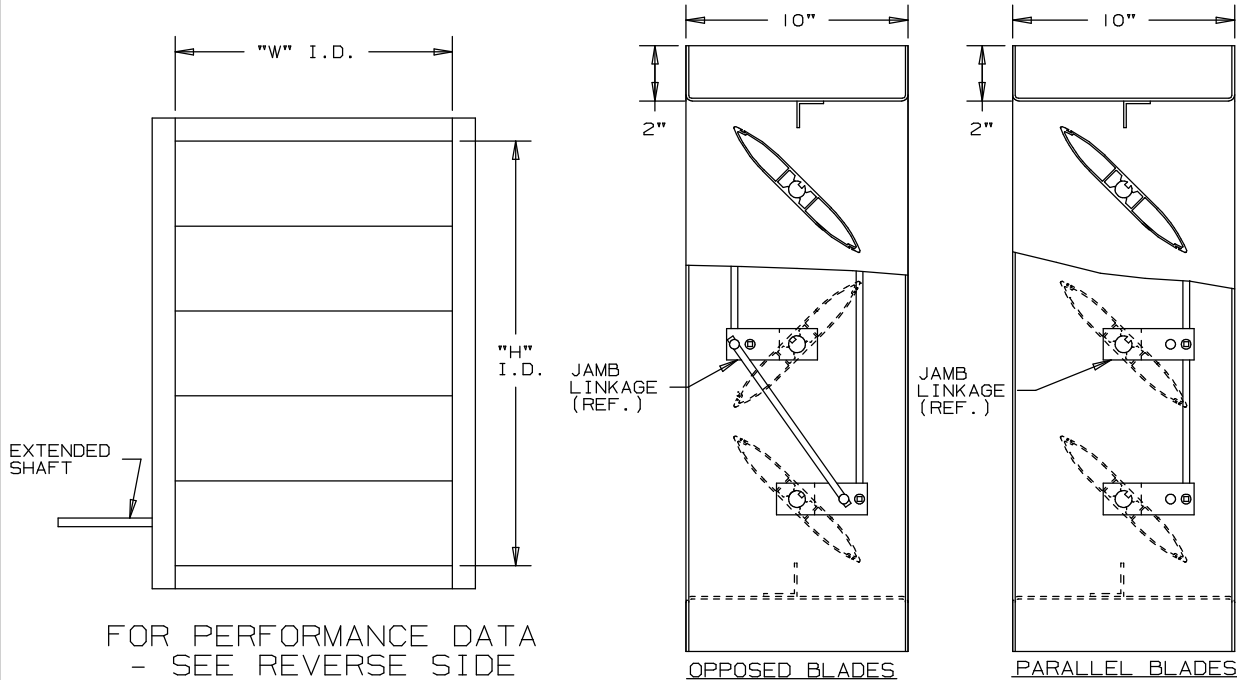
314 RIVERSIDE DRIVE
WYALUSING, PA 18853

TEL: (570) 746-1888 FAX: (570) 746-9286

ARROW INDUSTRIAL DAMPER FOR PROCESS-CONTROL

MODEL 545

HVAC AND PROCESS CONTROL
CLEAN AIR APPLICATIONS ONLY

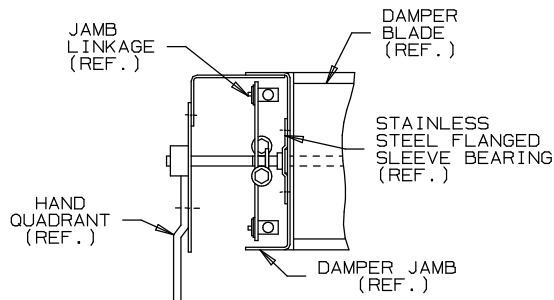


FOR PERFORMANCE DATA
- SEE REVERSE SIDE

OPPOSED BLADES

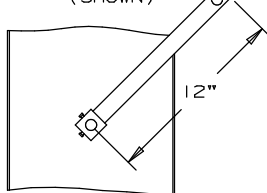
PARALLEL BLADES

NOT TO SCALE



JAMB LINKAGE DETAIL

OPPOSED LINKAGE W/
HAND QUADRANT
(SHOWN)



LEVER FOR
MOTOR OPERATION

PLEASE SPECIFY OPERATOR TYPE

STANDARD SPECIFICATIONS

FRAME: 2" x 10" x 2" - 12 GA. GALVANIZED STEEL FORMED CHANNEL FRAME
 BLADE: MINIMUM THICKNESS, .080" EXTRUDED ALUMINUM 8" WIDE ARROW-FOIL.
 SHAFT: 3/4" DIAMETER PLATED STEEL STUB SHAFT WITH A POSITIVE INTERLOCK INTO BLADE SECTION.
 LINKAGE: FORMED 12 GA. GALVANIZED STEEL. TRUNNION IS A MACHINED PIVOT OF PLATED STEEL WITH A 1/2" DIAMETER PLATED STEEL INTERCONNECTING ROD.
 BEARINGS: SINTERED STAINLESS STEEL OILITE FLANGED SLEEVE BOLTED TO FRAME.
 FINISH: FACTORY MILL.
 OPERATOR: MANUAL HAND QUADRANT OR LEVER ARM FOR MOTOR ACTUATOR. SPECIFY TYPE WHEN ORDERING.
 MAXIMUM TEMPERATURE: 400°F
 MAXIMUM PANEL SIZE: 60" x 96" I.D. OF DAMPERS
 MINIMUM PANEL SIZE: 12" x 8 1/4" I.D. (SINGLE BLADE)
 12" x 16" I.D. (OPPOSED BLADES)

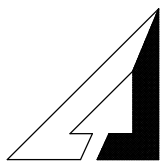
OPTIONAL EXTRAS

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. STAINLESS STEEL JAMB SEALS.
2. STAINLESS STEEL BLADE EDGE SEALS.
3. STUFFING BOXES AND REPLACEABLE PACKING.
4. FLANGES OTHER THAN STANDARD 2" WIDE
5. PAINTED FINISHES.
6. PERIMETER HOLES-ONE FLANGE.
7. PERIMETER HOLES-TWO FLANGES.
8. OTHER FRAME MATERIAL.



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A DIVISION OF MESTEK, INC.

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WYALUSING, PA 18853
TEL: (570) 746-1888 FAX: (570) 746-9286
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AGENT: _____

ARCH./ENG. :

CONTR. :

PROJECT :

EDR: _____ ECN: _____ JOB: _____

DATE: _____ DWN. : _____ DWG. : _____

ARROW MODEL 545 INDUSTRIAL DAMPER PERFORMANCE DATA

LEAKAGE :

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

AIR LEAKAGE (TOTAL C.F.M.)

		DAMPER WIDTH (INCHES)								
		12"	18"	24"	30"	36"	42"	48"	54"	60"
DAMPER HEIGHT (INCHES)	12"	12	16	20	22	24	28	32	34	36
	24"	20	24	28	32	36	42	48	49	50
	36"	30	35	42	48	54	57	60	68	75
	48"	40	44	48	54	60	70	80	90	100
	60"	50	55	60	67	75	87	100	112	125
	72"	60	65	65	80	90	105	120	135	150
	84"	70	77	84	95	105	122	140	158	175
	96"	80	88	90	108	120	140	160	180	200

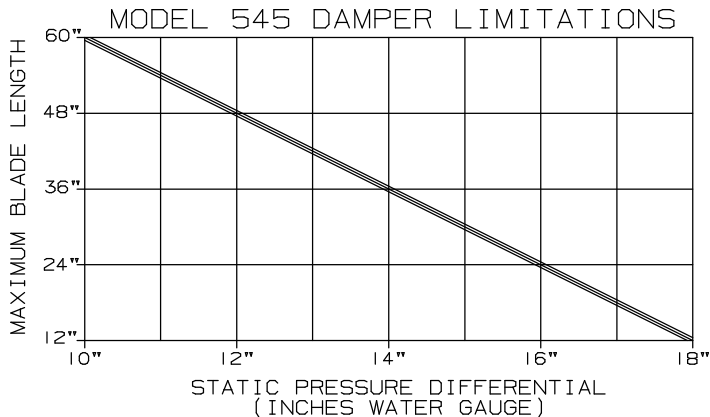
FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A MAXIMUM OF 10" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8	9	10
MULTIPLIER CORRECTION FACTOR	1.3	1.5	1.6	1.8	2.0	2.3	2.6	2.8	3.0

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP 5.4 WITH A DAMPER CLOSING TORQUE APPLIED TO THE DAMPER OF 31 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 60" x 96", WITH A MINIMUM OF 45 IN.LBS./SQ.FT. OF DAMPER AREA FOR A SIZE 60" x 8"

DAMPER AIR LEAKAGE SHOWN IS BASED UPON PUBLISHING ONLY THE MOST CONSERVATIVE LEAKAGE RESULTS FOR THE ARROW MODEL 545 INDUSTRIAL DAMPER FOR AN ENTIRE RANGE OF DAMPER SIZES.

TO ENSURE PROPER DAMPER OPERATION AND AIR LEAKAGE PERFORMANCE FOR THIS DAMPER DESIGN, THE STATIC PRESSURE/BLADE LENGTH LIMITS SHOWN PROVIDE THE USER WITH THIS INFORMATION AND IN ADDITION PROVIDES A REALATIONSHIP BETWEEN DAMPER COST AND THE APPLICATION.



THE MODEL 545 DAMPER DESIGN AT A BLADE LENGTH OF 60" HAS A MAXIMUM ALLOWABLE BLADE DEFLECTION OF L/360 FOR THE STATIC PRESSURE INDICATED ON THE CHART. AT REDUCED BLADE LENGTHS HIGHER STATIC PRESSURE LIMITS CAN BE ATTAINED WITHOUT SACRIFICING DAMPER OPERATING AND PERFORMANCE CHARACTERISTICS.

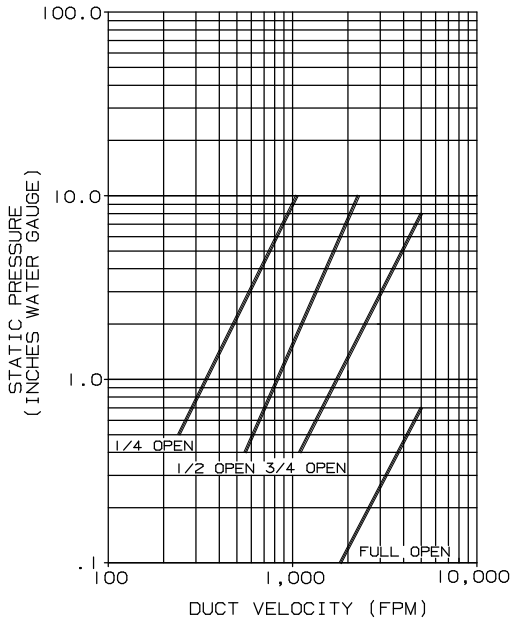
ARROW MODEL 545 INDUSTRIAL DAMPER PERFORMANCE DATA

VELOCITY LIMITATIONS:

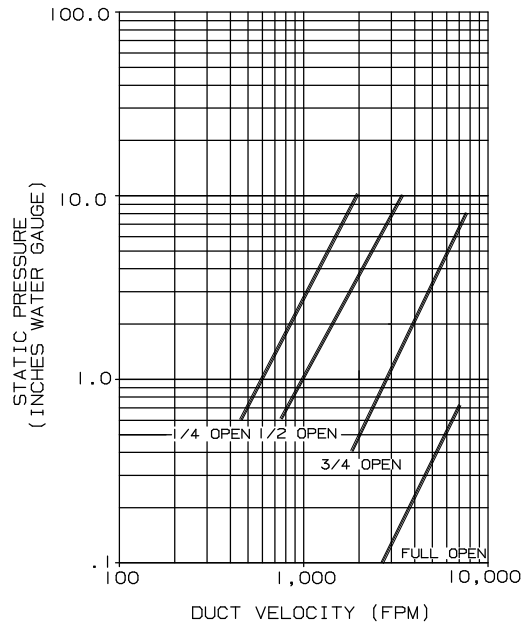
THE TABLE BELOW LISTS THE MAXIMUM ALLOWABLE VELOCITY FOR A GIVEN MAXIMUM DAMPER SIZE. WHEN APPLICATION REQUIREMENTS EXCEED THE RECOMMENDATIONS LISTED IN THE TABLE, SELECT ANOTHER MODEL OR CONSULT THE FACTORY.

MAXIMUM ALLOWABLE VELOCITY		
3000 FPM AND LESS	4000 FPM	5000 FPM
DAMPER SIZES:	DAMPER SIZES:	DAMPER SIZES:
12" x 9" MIN. TO 60" x 96" MAX.	12" x 9" MIN. TO 60" x 72" MAX.	12" x 9" MIN. TO 60" x 54" MAX.

ARROW MODEL 545 (OPPOSED BLADE) 42"x42" I.D.
PRESSURE DROP vs. DUCT VELOCITY

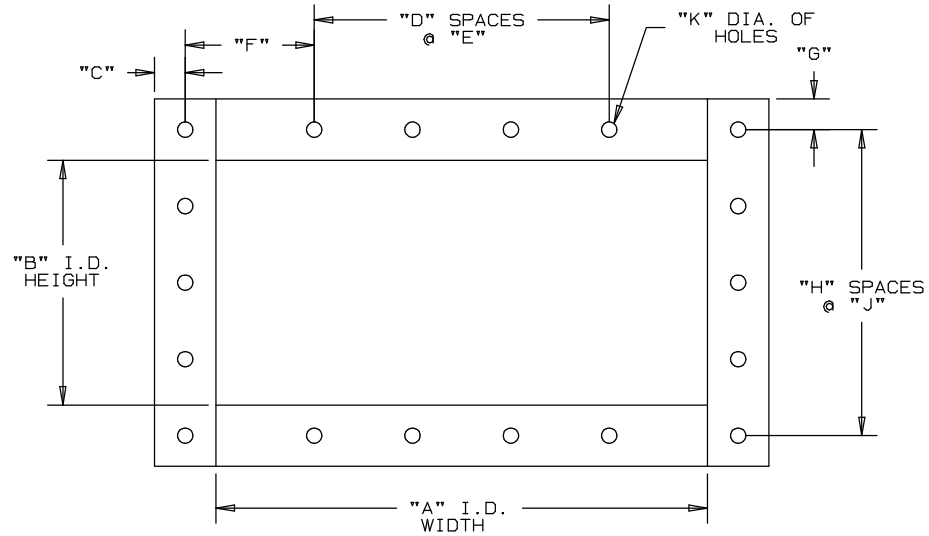


ARROW MODEL 545 (PARALLEL BLADE) 42"x42" I.D.
PRESSURE DROP vs. DUCT VELOCITY



PRESSURE DROP CURVES LISTED ARE BASED ON AMCA 500, USING TEST SET UP FIGURE 5.3 FOR DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM. STATIC PRESSURES ARE CORRECTED TO .075 LB./CU. FT. AIR DENSITY.

NOTES:




ITEM	QUANTITY	PARALLEL	OPPOSED	I.D. (WIDTH) "A"	I.D. (HEIGHT) "B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	HAND QUADRANT	MOTOR LEVER ARM	VARIATIONS

SHIP TO: _____ INVOICE TO: _____ PURCHASE ORDER: _____

MARK SHIPMENT: _____

SEND ORDER TO:



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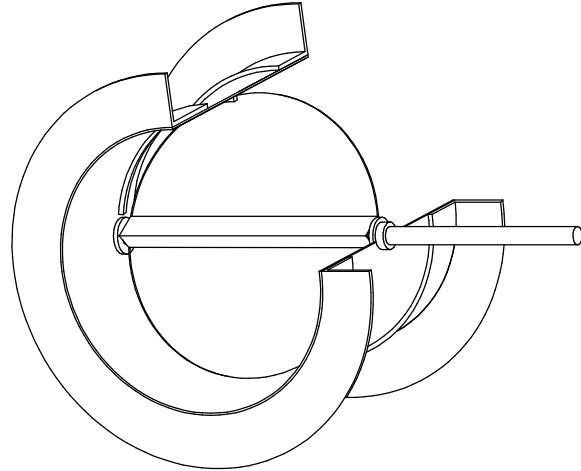
ARROW

ROUND INDUSTRIAL DAMPER FOR PROCESS CONTROL

MODEL 580-R

THE CONSTRUCTION DESCRIBED BELOW IS CONSERVATIVE. THERE ARE APPLICATIONS WHERE THIS DESIGN MAY BE USED IN SIZES THAT CAN OPERATE SATISFACTORILY WHEN STATIC PRESSURES ARE ABOVE 15 INCHES.

FOR PERFORMANCE DATA
SEE REVERSE SIDE



INSIDE DIAMETER		FRAME		BLADE THK.	SHAFT DIA.
ABOVE	THROUGH	DEPTH	FLANGES		
6"	12"	10" GA.	1 1/4" x 1 1/4" x 1/8" FOR 6" TO 11" DIA. 1 1/2" x 1 1/2" x 1/8" FOR 12" DIA.	12 GA.	1/2"
12"	24"	10" GA.	1 1/2" x 1 1/2" x 1/8" FOR 12" - 15" DIA. 1 1/2" x 1 1/2" x 3/16" FOR 16" - 24" DIA.	10 GA. TO 36" DIA.	3/4"
24"	48"		2" x 2" x 3/16" 25" - 48" DIA		10 GA. W/ (2) GUSSETS 37" - 48" DIA

OPTIONAL EXTRAS

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

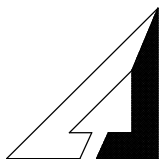
1. STAINLESS STEEL
2. STUFFING BOXES AND REPLACEABLE PACKING
3. BALL BEARINGS
4. PAINTED FINISHES
5. PERIMETER HOLES - ONE FLANGE
6. PERIMETER HOLES - BOTH FLANGES
7. OTHER MATERIALS
8. LOW LEAKAGE SEAL SYSTEMS

STANDARD SPECIFICATIONS

- FRAME: FABRICATED STEEL CHANNEL, CHANNEL DEPTH EQUAL TO BLADE DIAMETER OF 10" AND LESS.
- BLADE: SINGLE THICKNESS WITH REINFORCING GUSSETS WELDED TO BLADE PARALLEL TO AIR FLOW AS REQUIRED.
- SHAFT: PLATED STEEL CONTINUOUS LENGTH WELDED TO BLADE.
- BEARING: SINTERED STAINLESS STEEL FLANGED SLEEVE PRESSED IN THE FRAME.
- STOP: 1/4" x 1/4" METAL BAR FOR SIZES UP TO 12" DIA.
1/4" x 1/2" METAL BAR BEYOND 12" DIA. TO 48" DIA.
SHALL BE WELDED TO INTERIOR PERIMETER OF SLEEVE.
- OPERATOR: EXTENDED SHAFT 6" LONG BEYOND FRAME FLANGES.
- FINISH: MILL/GALVANIZED/ZINC RICH TOUCH UP.
- MINIMUM: 6" DIAMETER.
MAXIMUM: 48" DIAMETER.
- MAXIMUM TEMPERATURE: 250°F. CONSULT FACTORY FOR HIGHER TEMPERATURE REQUIREMENTS.



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CONTR. :

PROJECT :

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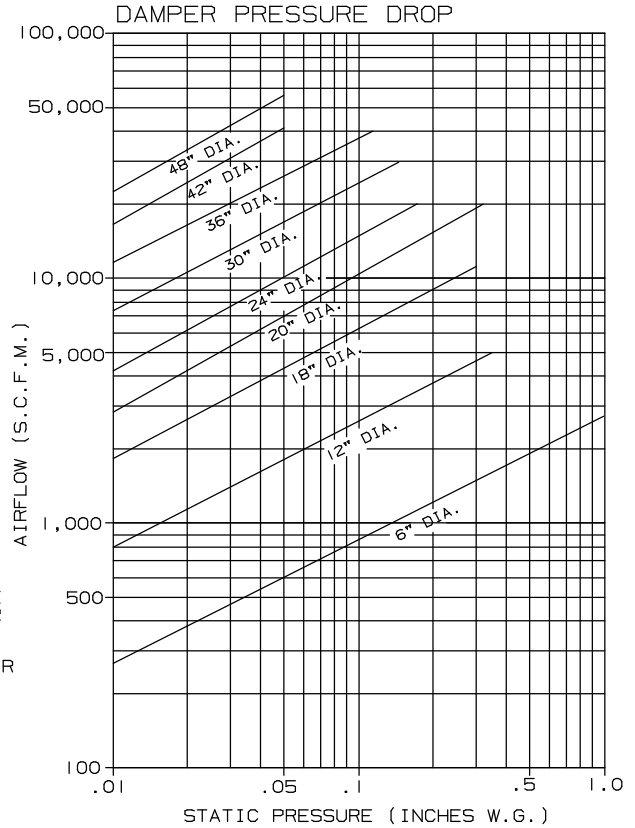
ARROW MODEL 580-R ROUND INDUSTRIAL DAMPER PERFORMANCE DATA

PRESSURE AND VELOCITY LIMITATIONS

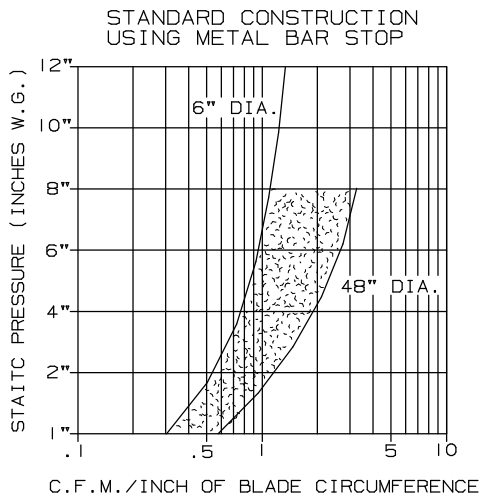
THE MODEL 580-R DAMPER HAS BEEN DESIGNED TO OPERATE SATISFACTORILY WITHIN THE LIMITS SHOWN BELOW. CONSULT THE FACTORY WHEN APPLICATIONS EXCEED THE LIMITS SHOWN.

DAMPER DIAMETER	MAXIMUM SYSTEM STATIC PRESSURE	MAXIMUM SYSTEM VELOCITY
6" - 12"	12"	6000
13" - 24"	10"	6000
25" - 36"	8"	5000
37" - 48"	8"	4000

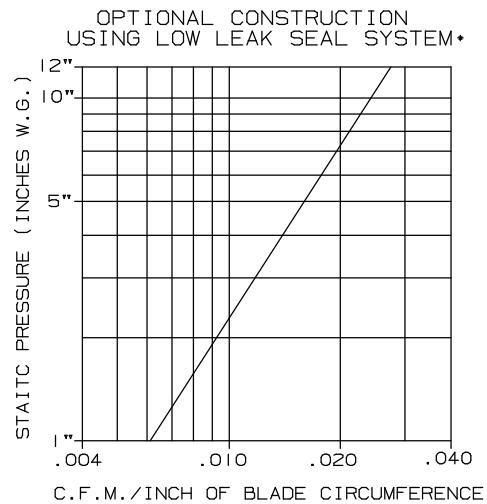
DAMPER PERFORMANCE FOR PRESSURE DROP AND AIR LEAKAGE IS BASED ON AMCA STANDARD 500 USING FIG. 5.3 (DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM FOR PRESSURE DROP) AND FIG. 5.4 FOR AIR LEAKAGE. STATIC PRESSURE AND CFM ARE CORRECTED TO .075 LB./CU.FT. AIR DENSITY.



DAMPER LEAKAGE CHARTS



LEAKAGE RESULTS SHOWN ARE BASED ON TESTS USING VARIOUS DAMPER SIZES. THE SHADED AREA BETWEEN THE GRAPH LINES INDICATE NORMAL EXPECTED LEAKAGE RANGE FOR STANDARD DAMPER OPERATING CONDITIONS AND SIZES.



*LOW LEAKAGE SEAL SYSTEM CONSISTS OF: RUBBER SEAL BOLTED TO BLADE, STUFFING BOX WITH PACKING GLAND MATERIAL, AND OUTBOARD BEARING

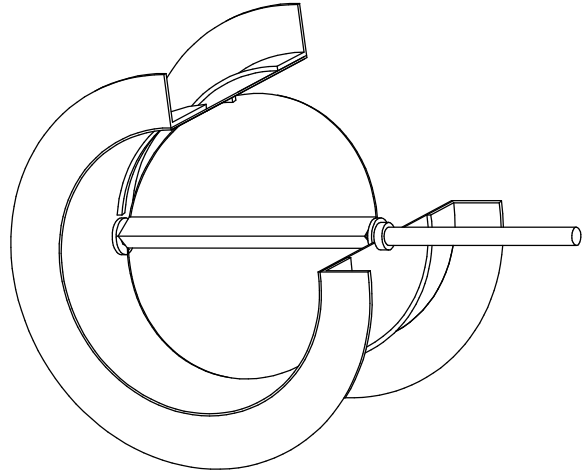
ARROW

ROUND INDUSTRIAL DAMPER FOR PROCESS CONTROL

MODEL 581-R

THE CONSTRUCTION DESCRIBED BELOW IS CONSERVATIVE. THERE ARE APPLICATIONS WHERE THIS DESIGN MAY BE USED IN SIZES THAT CAN OPERATE SATISFACTORILY WHEN STATIC PRESSURES ARE ABOVE 15 INCHES.

FOR PERFORMANCE DATA
SEE REVERSE SIDE



INSIDE DIAMETER		FRAME		BLADE THK.	SHAFT DIA.
ABOVE	THROUGH	DEPTH	FLANGES		
6"	10"	10 GA.	1 1/4" x 1 1/4" x 1/8" FOR 6" - 11" DIA.	10 GA.	1/2"
10"	12"	10" / 10 GA.	1 1/2" x 1 1/2" x 1/8" FOR 12" DIA.	10 GA.	3/4"
12"	24"	10" / 10 GA.	1 1/2" x 1 1/2" x 1/8" FOR 12" - 15" DIA.	7 GA.	1"
24"	36"		1 1/2" x 1 1/2" x 3/16" FOR 16" - 24" DIA.	7 GA, W/ (2) GUSSETS	
36"	48"		2" x 2" x 3/16" ABOVE 25" DIA.	7 GA, W/ (3) GUSSETS	

OPTIONAL EXTRAS

CONSTRUCTION MAY BE WITH OTHER THAN STANDARD MATERIALS WHEN REQUIRED TO MEET SPECIAL CONDITIONS AS TEMPERATURE, PRESSURE, VELOCITY, SYSTEM ENVIRONMENT OR OTHER SPECIFICATIONS.

LISTED BELOW ARE SOME OPTIONS USED FOR THE MORE COMMON TYPES OF APPLICATIONS.

1. STAINLESS STEEL
2. STUFFING BOXES AND REPLACEABLE PACKING
3. BALL BEARINGS
4. PAINTED FINISHES
5. PERIMETER HOLES - ONE FLANGE
6. PERIMETER HOLES - BOTH FLANGES
7. OTHER MATERIALS
8. LOW LEAKAGE SEAL SYSTEMS

STANDARD SPECIFICATIONS

- *FRAME: FABRICATED STEEL CHANNEL. CHANNEL DEPTH EQUAL TO BLADE DIAMETER OF 10" AND LESS.
- BLADE: SINGLE THICKNESS WITH REINFORCING GUSSETS WELDED TO BLADE PARALLEL TO AIR FLOW AS REQUIRED.
- SHAFT: PLATED STEEL CONTINUOUS LENGTH WELDED TO BLADE.
- BEARING: SINTERED STAINLESS STEEL FLANGED SLEEVE PRESSED IN THE FRAME.
- STOP: 1/4" x 1/4" METAL BAR FOR SIZES UP TO 12" DIA. 1/4" x 1/2" METAL BAR BEYOND 12" DIA. TO 48" DIA. SHALL BE WELDED TO INTERIOR PERIMETER OF SLEEVE.
- OPERATOR: EXTENDED SHAFT 6" LONG BEYOND FRAME FLANGES.
- FINISH: MILL/GALVANIZED/ZINC RICH TOUCH UP.
- MINIMUM: 6" DIAMETER.
- MAXIMUM: 48" DIAMETER.
- MAXIMUM TEMPERATURE: 250°F. CONSULT FACTORY FOR HIGHER TEMPERATURE REQUIREMENTS.



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WEB ADDRESS: WWW.ARROWUNITED.COM

AGENT: _____

ARCH./ENG. :	
CONTR. :	
PROJECT :	
EDR: _____	ECN: _____ JOB: _____
DATE: _____	DWN.: _____ DWG.: _____

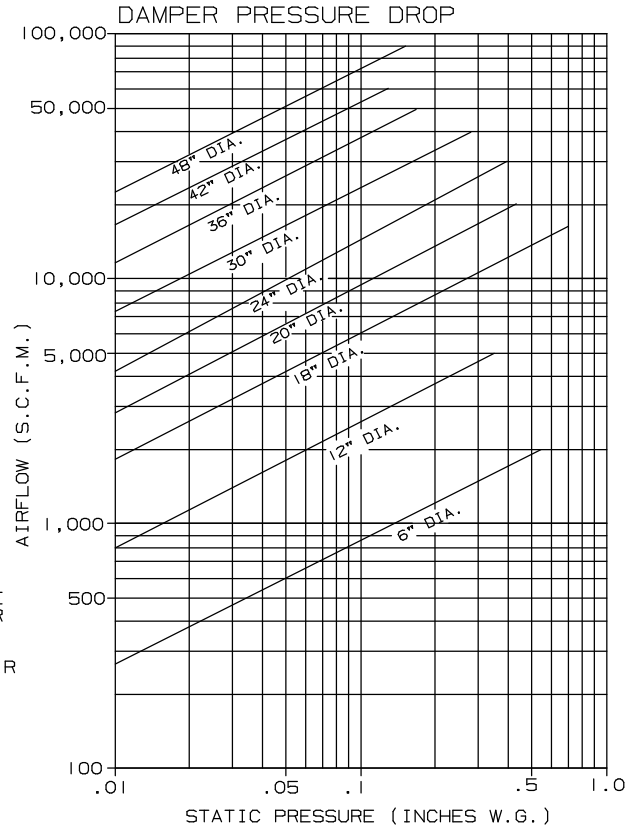
ARROW MODEL 581-R ROUND INDUSTRIAL DAMPER PERFORMANCE DATA

PRESSURE AND VELOCITY LIMITATIONS

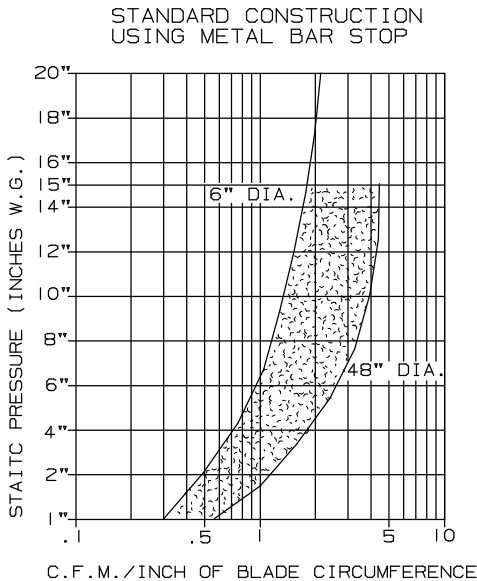
THE MODEL 581-R DAMPER HAS BEEN DESIGNED TO OPERATE SATISFACTORILY WITHIN THE LIMITS SHOWN BELOW. CONSULT THE FACTORY WHEN APPLICATIONS EXCEED THE LIMITS SHOWN.

DAMPER DIAMETER	MAXIMUM SYSTEM STATIC PRESSURE	MAXIMUM SYSTEM VELOCITY
6" - 12"	20"	7000
13" - 24"	17"	7000
25" - 36"	16"	7000
37" - 48"	15"	7000

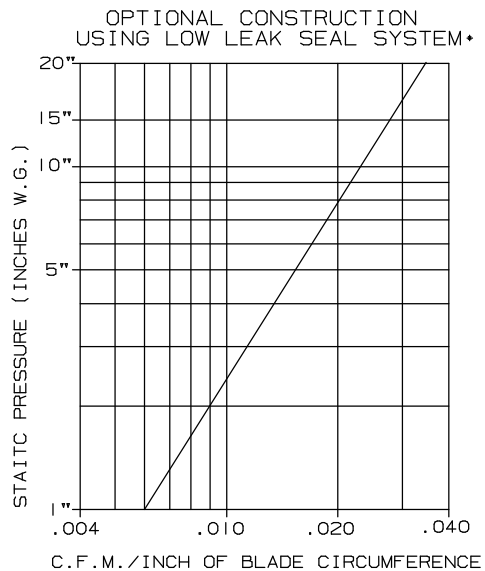
DAMPER PERFORMANCE FOR PRESSURE DROP AND AIR LEAKAGE IS BASED ON AMCA STANDARD 500 USING FIG. 5.3 (DAMPER INSTALLED WITH DUCT UPSTREAM AND DOWNSTREAM FOR PRESSURE DROP) AND FIG. 5.4 FOR AIR LEAKAGE. STATIC PRESSURE AND CFM ARE CORRECTED TO .075 LB./CU.FT. AIR DENSITY.



DAMPER LEAKAGE CHARTS



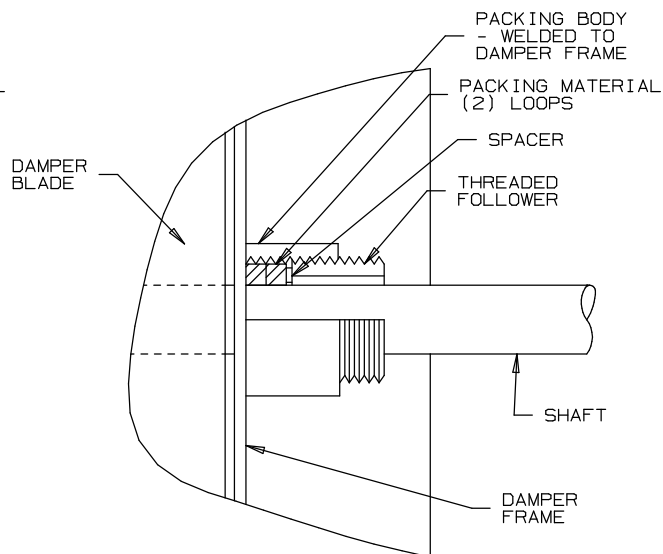
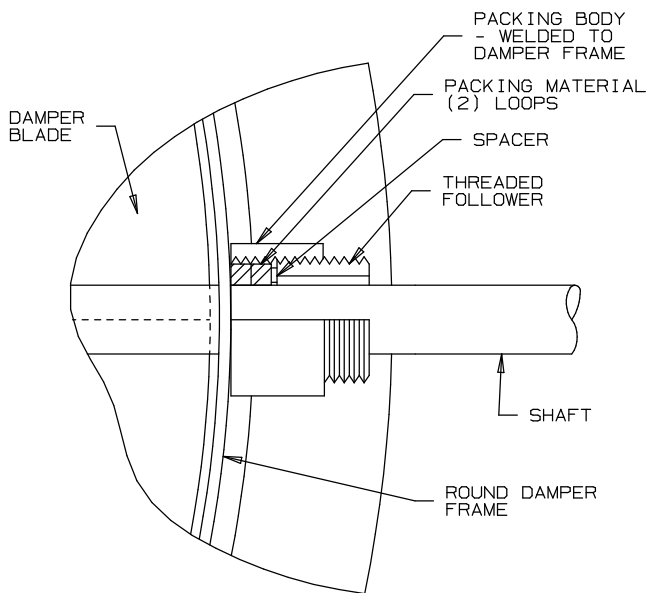
LEAKAGE RESULTS SHOWN ARE BASED ON TESTS USING VARIOUS DAMPER SIZES. THE SHADED AREA BETWEEN THE GRAPH LINES INDICATE NORMAL EXPECTED LEAKAGE RANGE FOR STANDARD DAMPER OPERATING CONDITIONS AND SIZES.



*LOW LEAKAGE SEAL SYSTEM CONSISTS OF:
RUBBER SEAL BOLTED TO BLADE, STUFFING BOX WITH PACKING GLAND MATERIAL, AND OUTBOARD BEARING

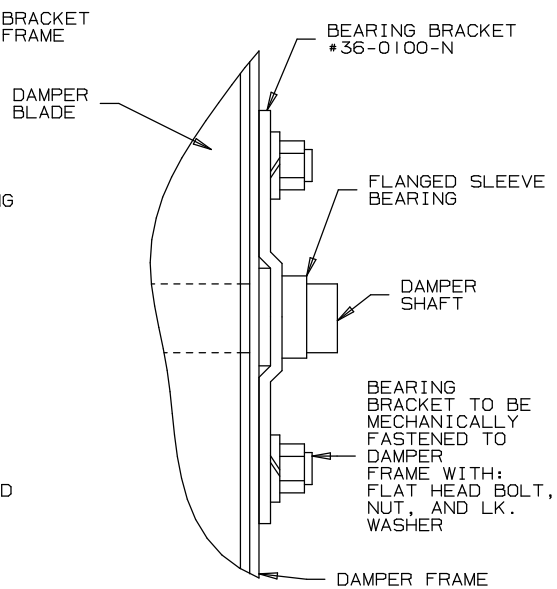
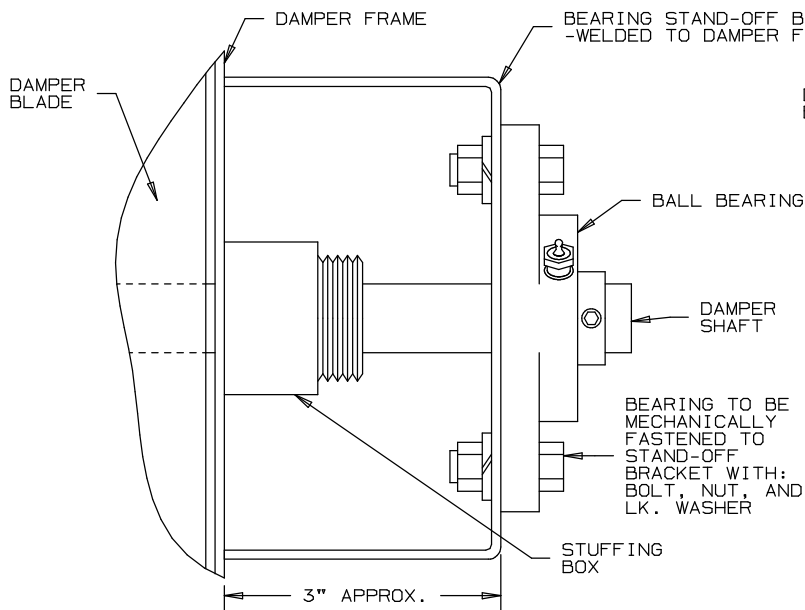
ARROW INDUSTRIAL DAMPER

STUFFING BOX & BEARING MOUNTING DETAILS



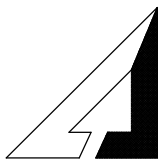
STUFFING BOX MOUNTING DETAILS

PACKING MATERIAL VARIES WITH APPLICATION.
CONSULT FACTORY WITH SPECIFIC APPLICATION REQUIREMENTS.



BEARING MOUNTING DETAILS

BEARING STAND-OFF BRACKET IS TYPICALLY USED WHEN FURNISHING A STUFFING BOX.



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**Damper Design
 Inquiry Sheet**

Date _____

Customer _____ Agent _____

_____ Inquiry No. _____

Description Or Type Of Project _____

Location Of Project _____

DESIGN CONDITIONS

1. Service Temperature Extremes Max. _____ °F, Min. _____ °F

2. Volume _____ ACFM (Wide Open Position) _____

3. Max. Static Pressure (In. W.G.) Positive, or Negative

4. Max. Differential Pressure (Damper Closed) _____ In W.G.

5. Air Content, (Give Name and Quantity, As Known)

- A. Solid Matter _____
- B. Gaseous _____
- C. Liquid _____

6. Prohibited Construction Materials (If Known) _____

7. Desired Construction Materials (If Known) _____

8. Installed Damper Position

- A. Horiz. Duct, Horiz. Damper Blades _____
- B. Horiz. Duct, Vert. Damper Blades _____
- C. Vert. Duct _____
- D. Other _____

9. Damper Dimensions Inside Frame Outside Frame

- A. Width (Parallel To Blade) _____ X Height _____
- B. Depth Of Frame (If Specified) _____
- C. Max. Blade Width (If Specified) _____
- D. Quantity Required _____

10. Damper Bearings

- A. Type Of Lubrication Permanent Relubricate In Field
- B. Replaceable Non-Replaceable
- C. Desired Bearing _____

11. Damper operation:

- A. Two-Position (Open/Closed) _____
- B. Modulating _____
- C. Other _____

12. Damper Location _____ Indoors _____ Outdoors

13. Max. Allowable Leakage

- A. Thru Closed Damper _____ C.F.M./Sq. Ft. At _____ In. W.G.
- B. Differential Pressure With Air Temperature Of _____ °F
- C. Thru Frame To Ambient. Zero C.F.M. Minimal C.F.M. (Not Critical)

14. Frequency Of Operation

- A. Normally Open _____
- B. Normally Open _____
- C. Modulating _____

15. Type Of Damper Operator (Specify Operator Action, And Fail-Safe Condition If Required)

- A. Electrical _____ ,Volt _____ ,Hertz _____
- B. Pneumatic _____ Line Pressure _____
- C. Hydraulic _____ Line Pressure _____
- D. Manual _____ Type _____

16. Operator Location On Frame _____

17. Is A Manual Override Required _____

18. Finish Required _____

19. Quotation Required By _____

20. Delivery Required By _____

21. Special Requirements Or Comments _____

22. Please Attach And Forward All Appropriate Sketches, Drawings, Specifications,
Or Other Information That Is Part Of The Scope Of Work To Be Completed.



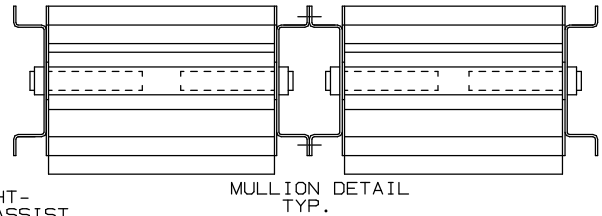
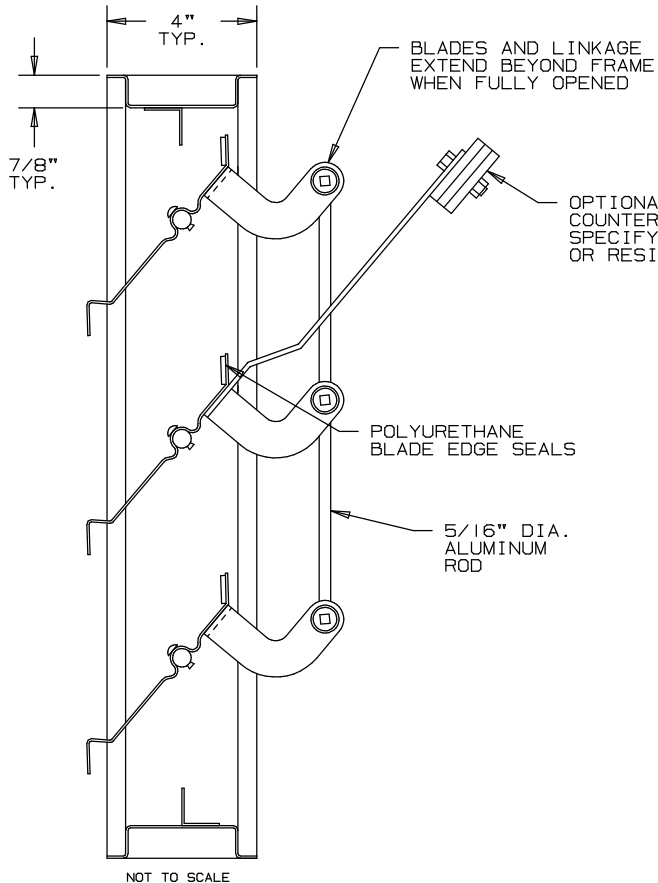
Backdraft Dampers

- 366 [16 Gauge Galvanized Steel Intake or Discharge Back Draft Damper](#)
- 388 [Single Blade Round Backdraft Damper of 16 Gauge Galvanized Steel](#)
- 389 [Single Blade Round Backdraft Damper of .081 Aluminum](#)
- 390 [Single Blade Round Backdraft Damper of 16 Gauge Stainless Steel](#)
- 400 [Heavy Duty Teardrop Design Formed Steel Backdraft Damper](#)
- 500 [Light Duty Pressure Relief Backdraft Damper](#)
- 503 [Light Duty Stainless Steel Backdraft Damper](#)
- 655 [Extruded Aluminum Backdraft Damper](#)
- 850 [Extruded Aluminum Teardrop Blade Backdraft Damper](#)
- 900 [Formed Steel Frame with Extruded Aluminum Teardrop Blade Backdraft Damper](#)

ARROW BACKDRAFT DAMPERS FORMED STEEL

TYPE 366

FOR INTAKE OR DISCHARGE APPLICATIONS



SPECIFICATIONS

- FRAMES: 16 GA. GALVANIZED STEEL, HAT-SHAPED CHANNEL FRAME.
- BLADES: 16 GA. GALVANIZED STEEL, ON 8" C-C SPACING (MAX).
- SHAFT: 1/2" DIA. PLATED STEEL STUB 6" LONG, MONO-BOLTED TO BLADE.
- LINKAGE: 1/8" THK. PLATED STEEL BRACKET WITH 1/2" DIA. STEEL PIVOT IN A CELCON SLEEVE BEARING. LINKAGE ROD IS 5/16" DIA. ALUMINUM, LOCKED TO PIVOT WITH 1/4-20 UNC PLATED STEEL SET SCREW.
- BEARINGS: OIL IMPREGNATED SINTERED BRONZE, FLANGED SLEEVE.
- FINISH: FACTORY MILL.
- SEALS: 3/16" THICK POLYURETHANE FOAM AT BLADE EDGES, NONE AT JAMBS.
- OPERATING TEMPERATURE LIMITS: -30°F TO 180°F
- SIZE LIMITS: MINIMUM: 8" WIDE x 11" HIGH
MAXIMUM: 48" WIDE x 72" HIGH

WHEN A NON-SYMETRICAL FRAME CROSS SECTION IS SPECIFIED (I.E.: FLANGED), SPECIFY THE FLANGE/AIRFLOW ORIENTATION.



SPECIFY AIR FLOW-HORIZONTAL, VERTICAL-UP, OR VERTICAL-DOWN.

AVAILABLE OPTIONS OR VARIATIONS.

- HEAVIER FRAME AND BLADES TO 10 GA.
- HEAVIER SHAFTS TO 1" DIA.
- ALUMINUM BLADES AND SHAFTS.
- NEOPRENE BLADE EDGE SEALS.
- POLYURETHANE OR NEOPRENE JAMB SEALS.
- STAINLESS STEEL FRAME AND BLADES.
- STAINLESS STEEL SHAFTS.
- STAINLESS STEEL LINKAGE.
- ADJUSTABLE COUNTERWEIGHTS TO ASSIST OR RESIST OPENING.
- ADJUSTABLE COUNTERWEIGHTS FOR EXTERNAL APPLICATIONS ON EXTENDED SHAFT.
- OTHER FRAME CONTOURS.
- OTHER BEARINGS: NYLON, BALL, SINTERED STAINLESS STEEL.

FOR PERFORMANCE DATA
SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	MULL	COUNTER BALANCE	AIR FLOW (DIRECTION)	
		OPENING SIZE		DAMPER SIZE					
 ARROW UNITED INDUSTRIES A DIVISION OF MESTEK, INC. 314 RIVERSIDE DRIVE WYALUSING, PA 18853 TEL: (570) 746-1888 FAX: (570) 746-9286						ARCH./ENG. : _____ CONTR. : _____ PROJECT : _____ EDR: _____ ECN: _____ JOB: _____ DATE: _____ DWN. : _____ DWG. : _____			

AGENT: _____

ARROW MODEL 366 BACKDRAFT DAMPER PERFORMANCE DATA

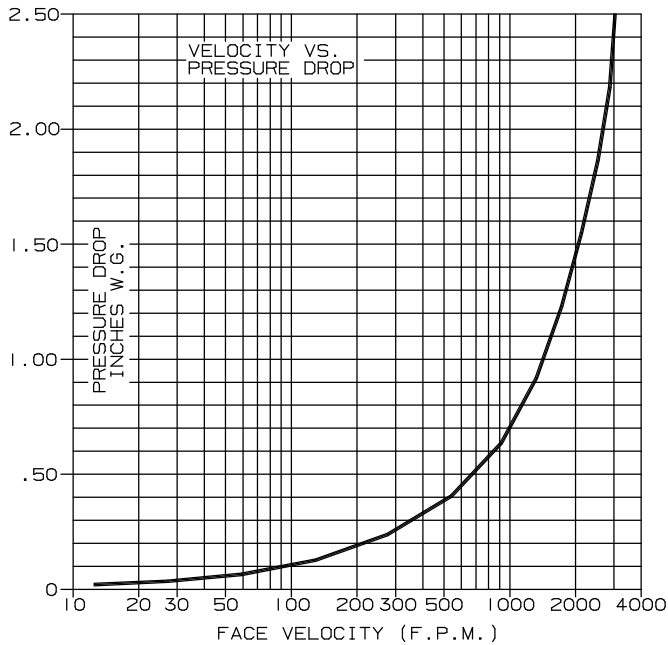
WITHOUT DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.4
(FACE MOUNTED TO A PLENUM).

PRESSURE IS CORRECTED TO .075 LB./CU.FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .01 INCHES W.G.
FULLY OPEN - 2.5 INCHES W.G.



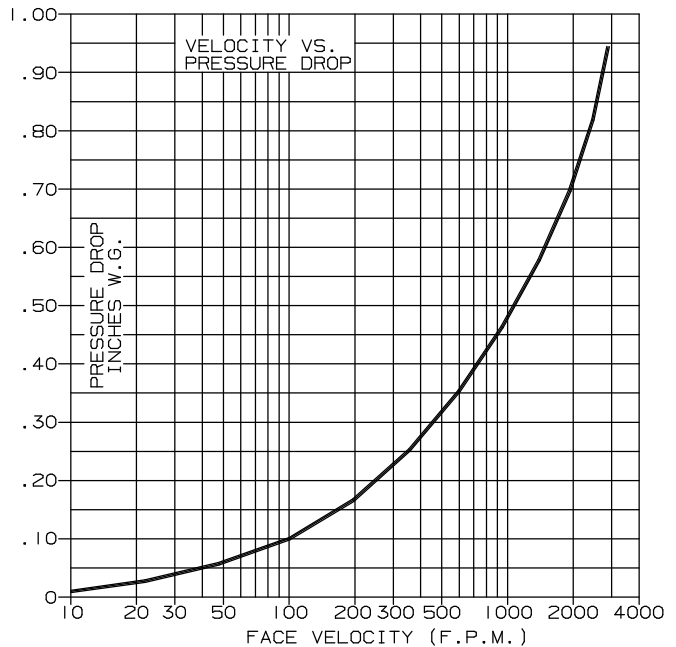
WITH DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.3
(DUCTWORK INSTALLED UPSTREAM AND DOWNSTREAM
OF DAMPER).

PRESSURE IS CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .01 INCHES W.G.
FULLY OPEN - .96 INCHES W.G.



TYPICAL PERFORMANCE FOR MODEL 366 BACKDRAFT DAMPER
SIZE TESTED 42" x 42", FURNISHED WITH COUNTERWEIGHT TO ASSIST OPENING.

AIR LEAKAGE

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA
STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED
TO .075 LB./CU.FT. AIR DENSITY.

TOTAL CFM AIR LEAKAGE AT ONE INCH STATIC PRESSURE
DIFFERENTIAL THROUGH CLOSED DAMPER.

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	8.3	12.5	16.6	20.8	24.9	29.0	33.2
	24"	16.6	24.9	33.2	41.5	49.8	58.1	66.4
	36"	24.9	37.4	49.8	62.3	74.7	87.2	99.6
	48"	33.2	49.8	66.4	83.0	99.6	116.2	132.8
	60"	41.5	62.3	83.0	103.8	124.5	145.3	166.0
	72"	49.8	74.7	99.6	124.5	149.4	174.3	199.2

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A
MAXIMUM 4" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4
MULTIPLIER CORRECTION FACTOR	1.22	1.63	1.99

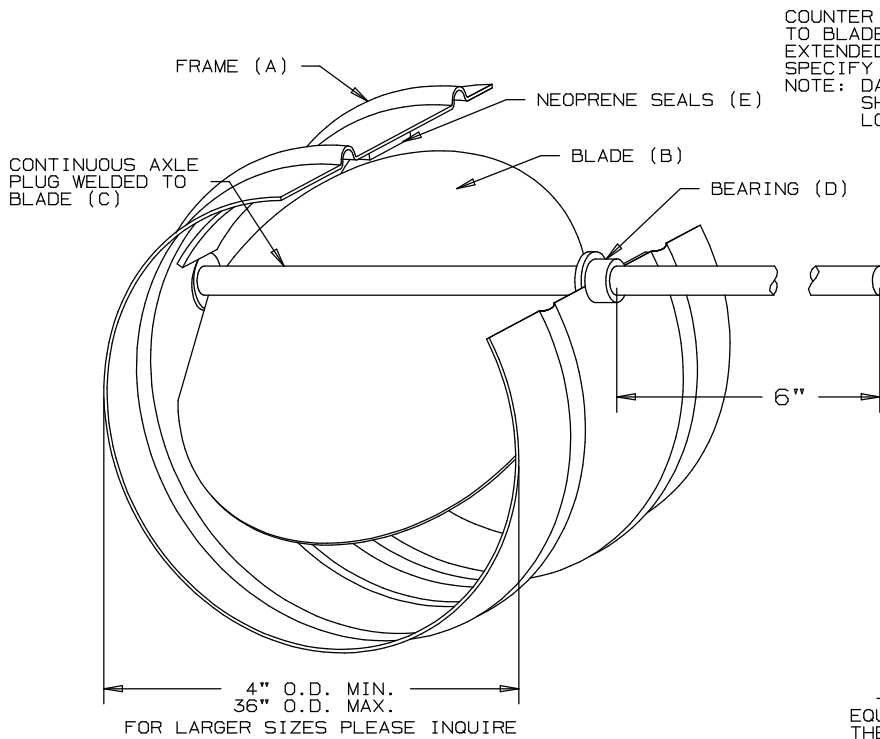
*MAXIMUM PANEL SIZE LIMIT 48" x 72"

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4
WITH DAMPER IN THE CLOSED POSITION WITHOUT THE AID OF A COUNTERWEIGHT OR OTHER
MECHANICAL MEANS TO PROVIDE CLOSING TORQUE, FOR A SIZE 42" x 42" DAMPER
WITH BLADE & JAMB SEALS.

ARROW

ROUND BACKDRAFT DAMPERS

TYPE 388 - GALV. STEEL
 TYPE 389 - ALUMINUM
 TYPE 390 - STAINLESS STEEL



COUNTER BALANCE AVAILABLE MOUNTED TO BLADE OR INSTALLED ON SHAFT EXTENDED FROM DAMPER. (PLEASE SPECIFY TO ASSIST OR RESIST OPENING).
 NOTE: DAMPER SIZES 12" DIA. AND LESS SHALL HAVE A COUNTER BALANCE LOCATED ON AN EXTENDED SHAFT ONLY.

UNLESS OTHERWISE SPECIFIED, 1/8" WILL BE DEDUCTED FROM ORDERED SIZES.

OPTIONAL FLANGED FRAME

EQUAL LEG ANGLES ARE AVAILABLE. THEY ARE WELDED TO FRAMES AT INTERMITTENT SPACING AND CAULKED BETWEEN WELDS. FLANGE HEIGHT "D" VARIES WITH DAMPER DIAMETER.

TYPE 388 GALV. STEEL

TYPE 389 ALUMINUM

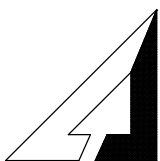
TYPE 390 STAINLESS STEEL

- | | | |
|--|--|--|
| (A) FRAME : 16 GA. GALVANIZED STEEL. x 7 1/2" DEEP. | (A) FRAME : .080" THK. ALUMINUM. x 7 1/2" DEEP. | (A) FRAME : 16 GA. STAINLESS STEEL. x 7 1/2" DEEP. |
| (B) BLADE: 16 GA. GALVANIZED STEEL. ABOVE 18" DIA. - BLADE IS REINFORCED. | (B) BLADE: .080" THK. ALUMINUM. ABOVE 18" DIA. - BLADE IS REINFORCED. | (B) BLADE: 16 GA. STAINLESS STEEL. ABOVE 20" DIA. - BLADE IS REINFORCED. |
| (C) AXLE: CONTINUOUS 1/2" DIA. CADMIUM PLATED STEEL. | (C) AXLE: CONTINUOUS 1/2" DIA. ALUMINUM. | (C) AXLE: CONTINUOUS 1/2" DIA. STAINLESS STEEL. |
| (D) BEARINGS: FLANGE BRONZE OILITE. | (D) BEARINGS: FLANGE BRONZE OILITE. | (D) BEARINGS: FLANGE BRONZE OILITE. |
| (E) SEALS: ON FRAME, CLOSED CELL NEOPRENE, 1/4" THK. TEMPERATURE RANGE -35°F TO 180°F. | (E) SEALS: ON FRAME, CLOSED CELL NEOPRENE, 1/4" THK. TEMPERATURE RANGE -35°F TO 180°F. | (E) SEALS: ON FRAME, CLOSED CELL NEOPRENE, 1/4" THK. TEMPERATURE RANGE -35°F TO 180°F. |
| (F) FINISH: GALVANIZED STEEL. | (F) FINISH: MILL. | (F) FINISH: NO 2B TYPE 304 STAINLESS STEEL |

APPROXIMATE SHIPPING WEIGHT (IN LBS.) CAN BE CALCULATED BY MULTIPLYING THE CIRCUMFERENCE (DIA. X 3.141) BY .5 FOR TYPES 388 & 389; .3 FOR TYPE 390.



UNION MADE



ARROW UNITED INDUSTRIES
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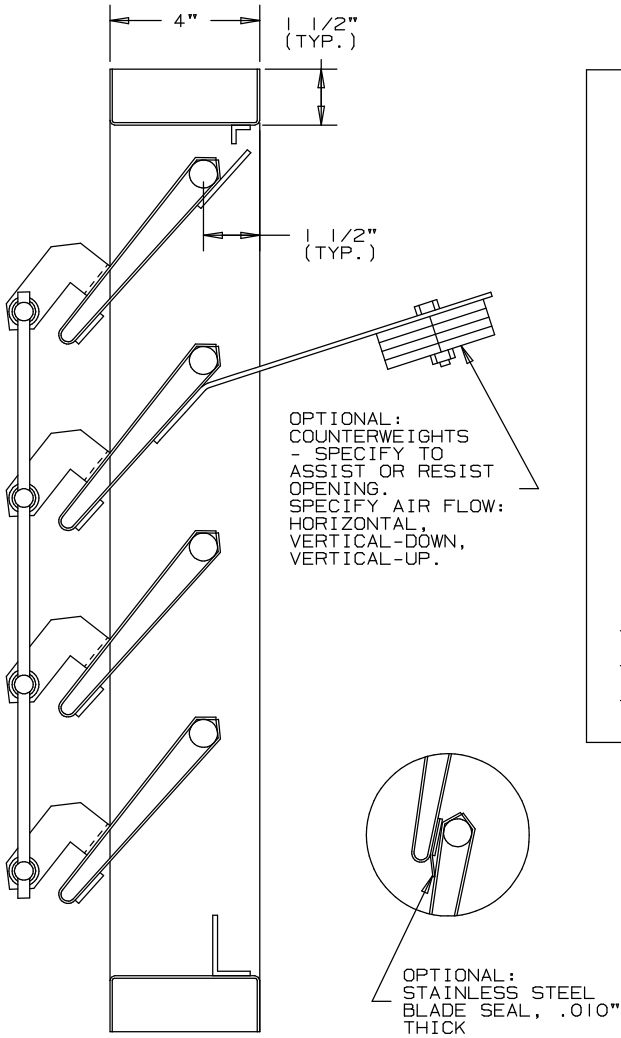
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DATE: DWN.: DWG.:

ARROW BACKDRAFT DAMPERS FORMED STEEL

TYPE 400

HEAVY DUTY - "TEAR-DROP" DESIGN



NOT TO SCALE

SPECIFICATIONS

- FRAME: CHANNEL OR FLANGED TYPE - 10 GA. GALVANIZED STEEL (SPECIFY FLANGE/AIRFLOW ORIENTATION).
- BLADE: 16 GAUGE GALVANIZED STEEL.
- BLADE SPACING: 3 3/8" MINIMUM TO 7 1/8" MAXIMUM.
- LINKAGE: 1/8" THICK PLATED STEEL BRACKET, WITH 1/2" DIAMETER PLATED STEEL PIVOT RIDING IN A CELCON SLEEVE BEARING. LINKAGE ROD IS 5/16" DIAMETER ALUMINUM, LOCKED TO PIVOT WITH A 1/4"-20 UNC PLATED STEEL SET SCREW. SINGLE LINKAGE FOR PANELS UNDER 20" WIDE. DOUBLE LINKAGE FOR PANELS OVER 20" WIDE.
- AXLES: 3/4" DIAMETER STEEL, FULL LENGTH OF BLADE.
- BEARINGS: BRONZE OILITE.
- SEALS: POLYURETHANE ON BLADE EDGES, NONE AT JAMBS.
- TEMPERATURE LIMITS: 180°F MAXIMUM.


OPTIONAL

- FRAMES ARE AVAILABLE TO COMPLETELY CONTAIN BLADES AND LINKAGE
- SPECIAL SEALS ON BLADES AND JAMBS MAY BE ADDED TO PROVIDE LOW LEAKAGE.
- ARROW DESIGNS AND CUSTOM FABRICATES SPECIAL DAMPERS TO MEET SPECIFIC APPLICATIONS

FOR PERFORMANCE DATA
SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	MULL	COUNTER BALANCE	AIR FLOW (DIRECTION)	 UNION MADE
		OPENING SIZE		DAMPER SIZE					


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ARROW MODEL 400 BACKDRAFT DAMPER PERFORMANCE DATA

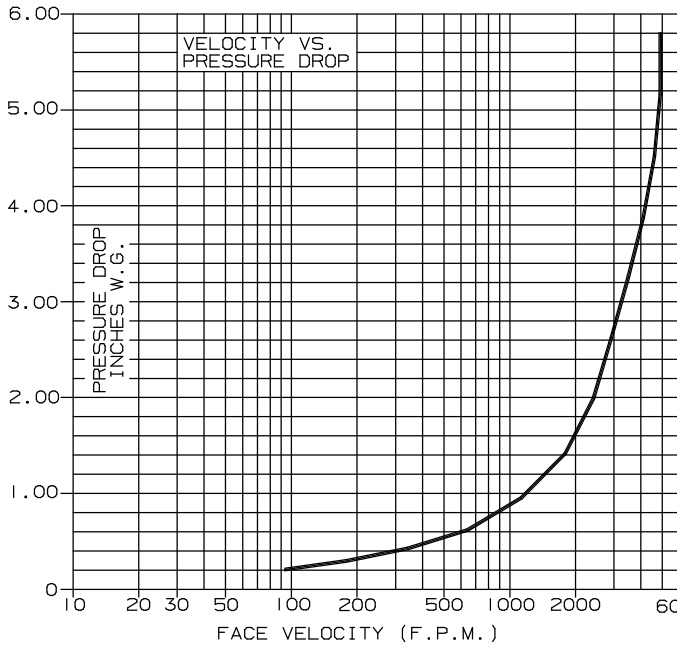
WITHOUT DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.4
(FACE MOUNTED TO A PLENUM).

PRESSURE IS CORRECTED TO .075 LB./CU.FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .12 INCHES W.G.
FULLY OPEN - 3.37 INCHES W.G.



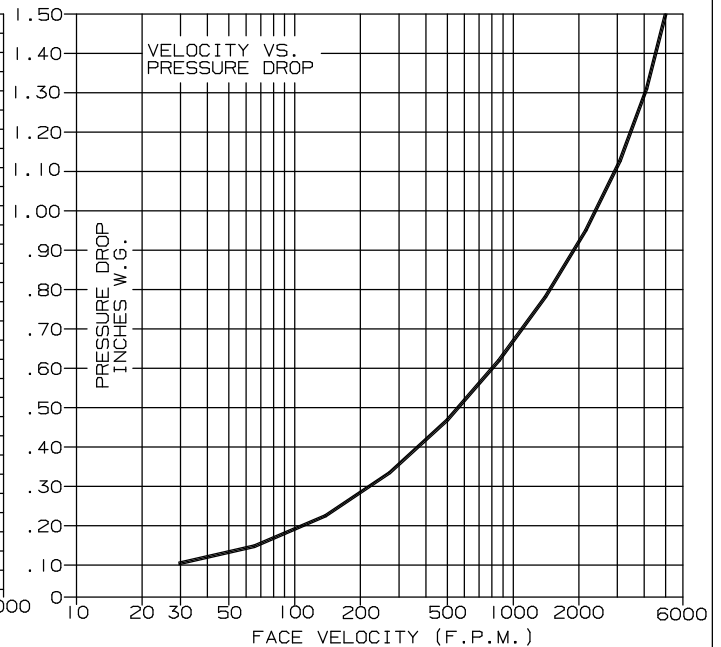
WITH DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.3
(DUCTWORK INSTALLED UPSTREAM AND DOWNSTREAM
OF DAMPER).

PRESSURE IS CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .05 INCHES W.G.
FULLY OPEN - .70 INCHES W.G.



TYPICAL PERFORMANCE FOR MODEL 400 BACKDRAFT DAMPER
SIZE TESTED 42" x 42", FURNISHED WITH COUNTERWEIGHT TO ASSIST OPENING.

AIR LEAKAGE

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA
STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED
TO .075 LB./CU.FT. AIR DENSITY.

TOTAL CFM AIR LEAKAGE AT ONE INCH STATIC PRESSURE
DIFFERENTIAL THROUGH CLOSED DAMPER.

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	8	12	16	20	24	28	32
	24"	16	24	32	40	48	56	64
	36"	24	36	48	60	72	84	96
	48"	32	48	64	80	96	112	128
	60"	40	60	80	100	120	140	160
	72"	48	72	96	120	144	168	192

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A
MAXIMUM 10" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8	9	10
MULTIPLIER CORRECTION FACTOR	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3

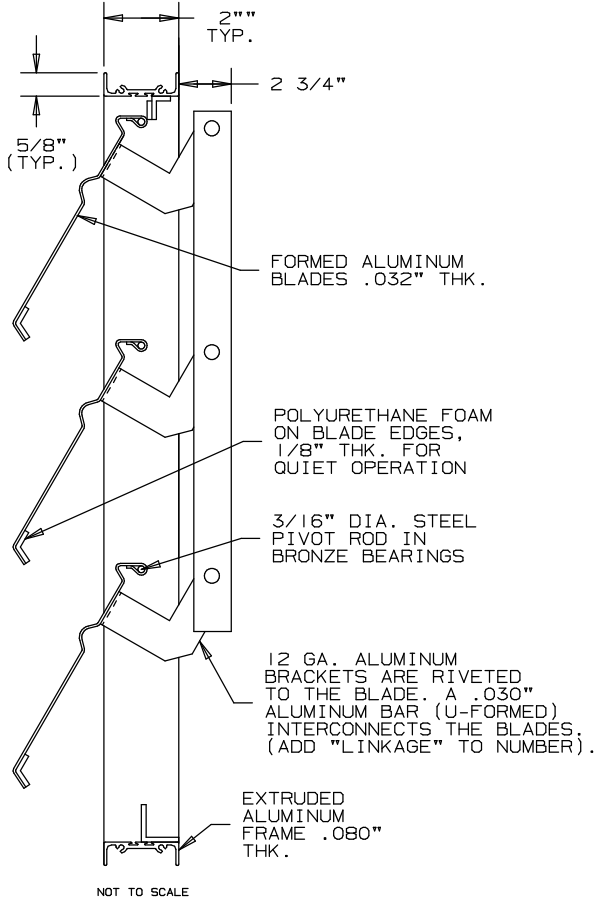
*MAXIMUM PANEL SIZE LIMIT 48" x 72"

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4
WITH DAMPER IN THE CLOSED POSITION WITHOUT THE AID OF A COUNTERWEIGHT OR OTHER
MECHANICAL MEANS TO PROVIDE CLOSING TORQUE, FOR A SIZE 42" x 42" DAMPER
WITH BLADE & JAMB SEALS.

ARROW BACKDRAFT DAMPERS ALUMINUM

TYPE 500-B

LIGHT DUTY - PRESSURE RELIEF SHUTTERS



- MORE EFFICIENT
- CLOSES MORE POSITIVELY

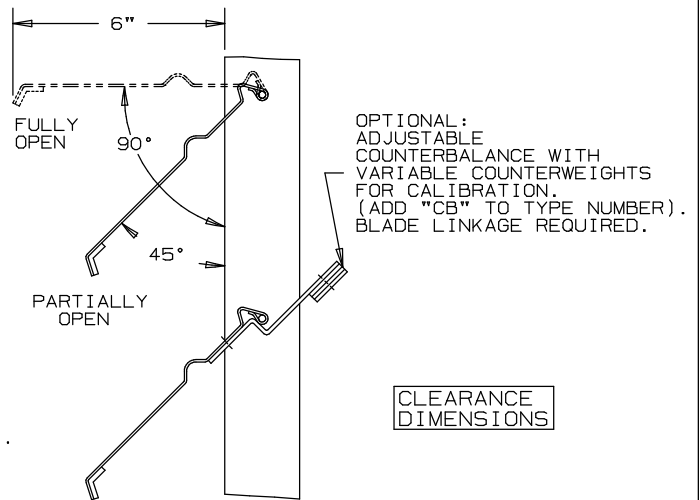
SPECIFICATIONS

FRAME: STANDARD 5/8"x2"x5/8" EXTRUDED ALUMINUM CHANNEL, .093" THK.
 BLADE: .032" THICK ALUMINUM, FORMED OVER A 3/16" DIA. STEEL ROD.
 SEALS: POLYURETHANE FOAM AT BLADE EDGES, NONE AT JAMBS.
 BEARINGS: BRONZE OILITE.
 LINKAGE: ALUMINUM CHEVRON BRACKET WITH ALUMINUM LINKAGE BAR

- OPTIONAL FEATURES:
- NO BLADE TO BLADE LINKAGE
 - ADJUSTABLE COUNTERBALANCE (CB)
 - SPECIFY TO ASSIST OR RESIST OPENING, LINKAGE MUST BE USED.
 - SCREEN - BIRD OR INSECT.

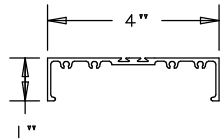
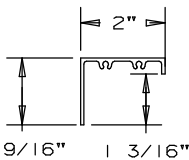
MAXIMUM PANEL SIZE: 48" W x 72" H.

SPECIFY AIR FLOW (AF) AS "HORIZONTAL", "VERTICAL UP" OR "VERTICAL DOWN"



TYPE 502-B
FLANGED FRAME
2" OR 4" DEEP, .080" THK.

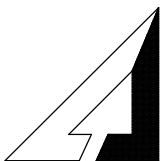
TYPE 501-B
CHANNEL FRAME
4" OR 6" DEEP, .080" THK.



FOR PERFORMANCE DATA
SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	MULL	COUNTER BALANCE	AIR FLOW (DIRECTION)		
		OPENING SIZE		DAMPER SIZE						UNION MADE



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ARROW MODEL 500 BACKDRAFT DAMPER PERFORMANCE DATA

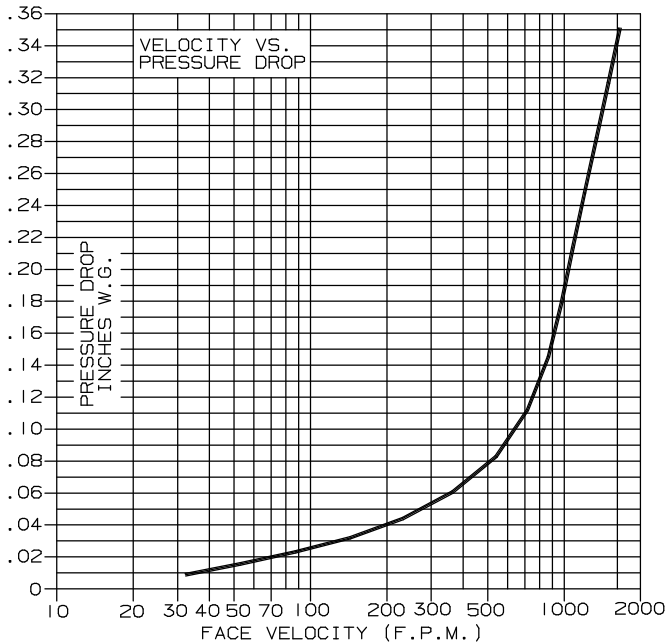
WITHOUT DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.4 (FACE MOUNTED TO A PLENUM).

PRESSURE IS CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .01 INCHES W.G.
FULLY OPEN - .35 INCHES W.G.



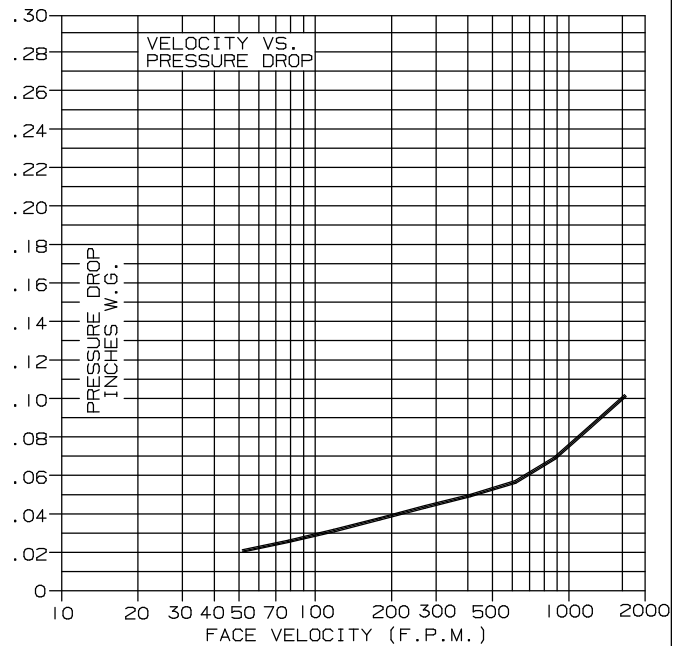
WITH DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.3 (DUCTWORK INSTALLED UPSTREAM AND DOWNSTREAM OF DAMPER).

PRESSURE IS CORRECTED TO .075 LB./CU. FT. AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .01 INCHES W.G.
FULLY OPEN - .06 INCHES W.G.



TYPICAL PERFORMANCE FOR MODEL 500 BACKDRAFT DAMPER
SIZE TESTED 42" x 42", FURNISHED WITH COUNTERWEIGHT TO ASSIST OPENING.

AIR LEAKAGE

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT .10" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

TOTAL CFM AIR LEAKAGE AT .10" STATIC PRESSURE
DIFFERENTIAL THROUGH CLOSED DAMPER.

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	6.6	9.9	13.2	16.5	19.8	23.1	26.4
	24"	13.2	19.8	26.4	33.0	39.6	46.2	52.8
	36"	19.8	29.7	39.6	49.5	59.4	69.3	79.2
	48"	26.4	39.6	52.8	66.0	79.2	92.4	105.6
	60"	33.0	49.5	66.0	82.5	99.0	115.5	132.0
	72"	39.6	59.4	79.2	99.0	118.8	138.6	158.4

FOR DETERMINING LEAKAGE VALUES GREATER THAN .10" W.G. TO A
MAXIMUM 2" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	.2	.3	.4	.5	1.0	1.5	2.0
MULTIPLIER CORRECTION FACTOR	1.07	1.12	1.19	1.24	1.66	1.92	2.10

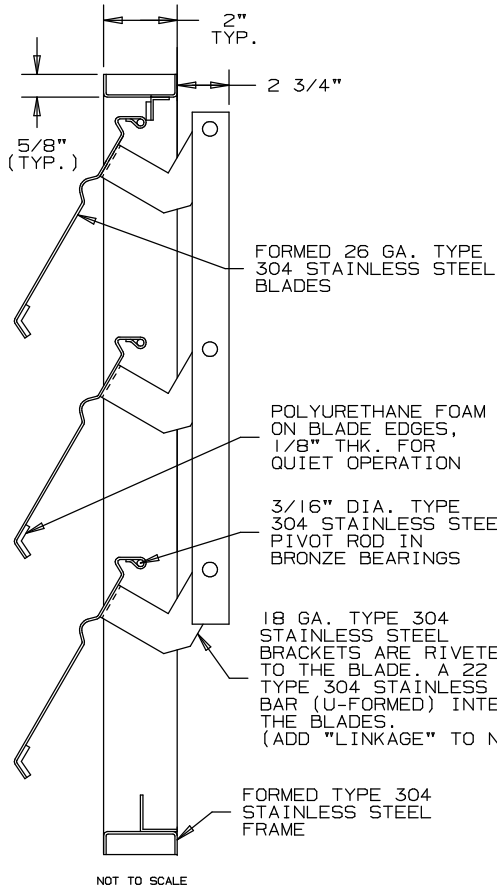
MAXIMUM PANEL SIZE LIMIT 48" x 72".

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4 WITH DAMPER IN THE CLOSED POSITION WITHOUT THE AID OF A COUNTERWEIGHT OR OTHER MECHANICAL MEANS TO PROVIDE CLOSING TORQUE, FOR A SIZE 42" x 42" DAMPER WITH BLADE & JAMB SEALS.

ARROW BACKDRAFT DAMPERS STAINLESS STEEL

TYPE 503

LIGHT DUTY - PRESSURE RELIEF SHUTTERS



- MORE EFFICIENT
- CLOSURES MORE POSITIVELY

SPECIFICATIONS

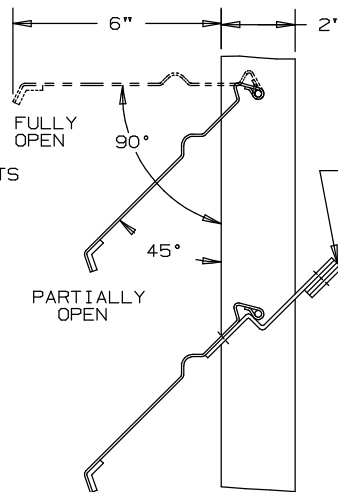
FRAME: STANDARD 5/8"x2"x5/8" FORMED TYPE 304, 16 GA. STAINLESS STEEL CHANNEL.
 BLADE: 26 GA. TYPE 304 STAINLESS STEEL, FORMED OVER A 3/16" DIA. STAINLESS STEEL ROD.
 SEALS: POLYURETHANE FOAM AT BLADE EDGES, NONE AT JAMBS.
 BEARINGS: BRONZE OILITE.
 LINKAGE: 18 GA. TYPE 304 STAINLESS STEEL CHEVRON BRACKET WITH 22 GA. TYPE 304 STAINLESS STEEL LINKAGE BAR.

OPTIONAL FEATURES:

- NO BLADE TO BLADE LINKAGE
- ADJUSTABLE COUNTERBALANCE (CB)
 - SPECIFY TO ASSIST OR RESIST OPENING, LINKAGE MUST BE USED.
- SCREEN - BIRD OR INSECT.

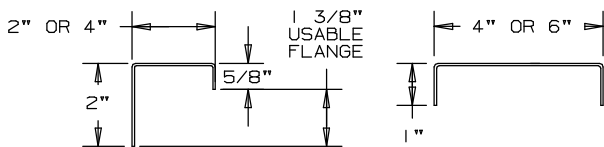
MAXIMUM PANEL SIZE: 36" W x 60" H.

SPECIFY AIR FLOW (AF) AS "HORIZONTAL", "VERTICAL UP" OR "VERTICAL DOWN"



OPTIONAL FRAMES

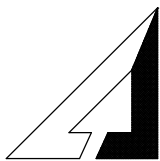
FLANGED FRAME 2" OR 4" DEEP, 16 GA. CHANNEL FRAME 4" OR 6" DEEP, 16 GA.



FOR PERFORMANCE DATA
SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO THE OPENING SIZE GIVEN.

ITEM	QTY.	WIDTH HEIGHT OPENING SIZE		WIDTH HEIGHT DAMPER SIZE		MULL	COUNTER BALANCE	AIR FLOW (DIRECTION)	UNION MADE	



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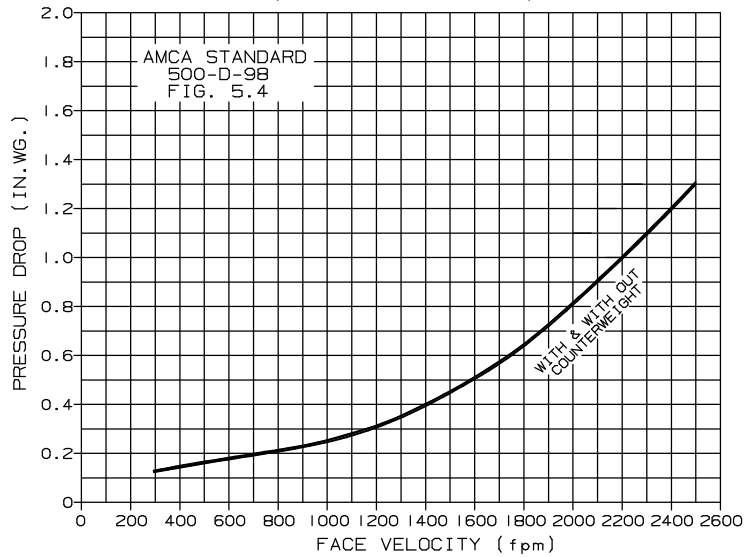
PROJECT :

EDR: ECN: JOB:

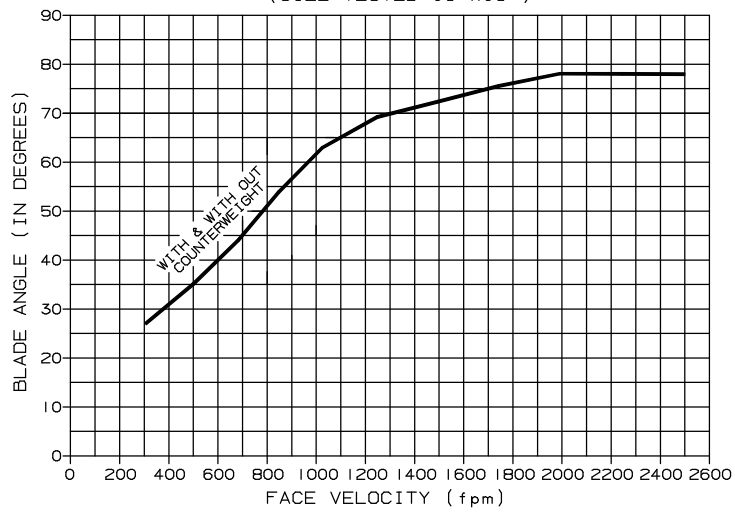
DATE: DWN. : DWG. :

ARROW MODEL 503 BACKDRAFT DAMPER PERFORMANCE DATA

PRESSURE DROP CURVE (SIZE TESTED 36"x39")

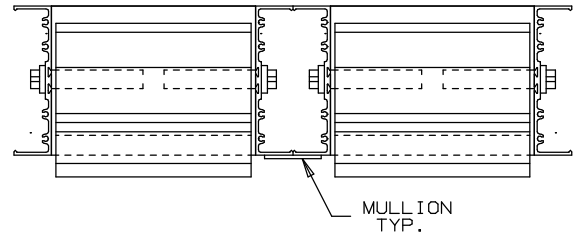
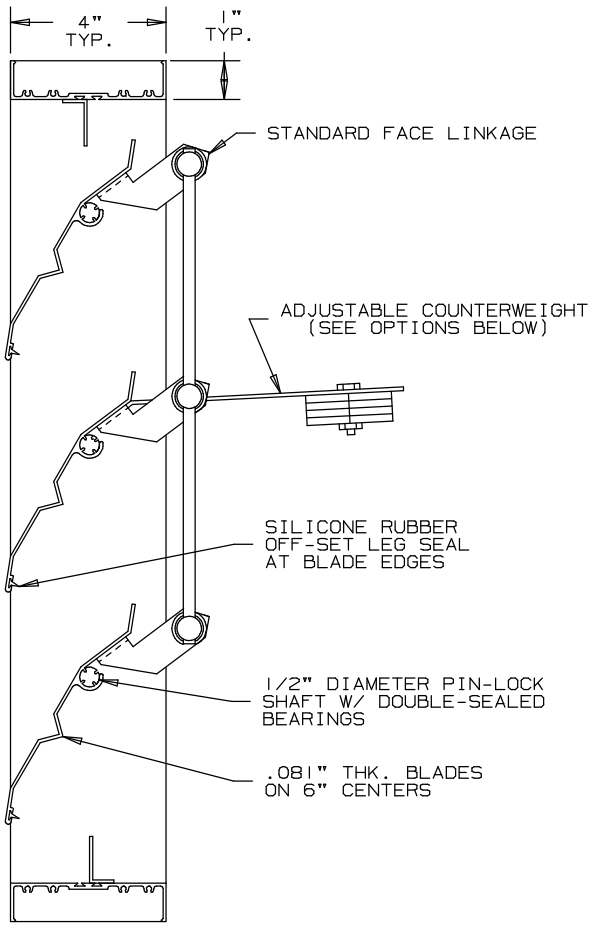


BLADE ANGLE CURVE (SIZE TESTED 36"x39")



ARROW BACKDRAFT DAMPERS ALUMINUM

TYPE 655



SPECIFICATIONS

FRAME : EXTRUDED ALUMINUM, 6063-T6/T52 ALLOY, .081" THICK. 1"x4"x1" CHANNEL FRAME ON ALL SIDES.

BLADES: EXTRUDED ALUMINUM, 6063-T6/T52 ALLOY, .081" THICK. DESIGNED FOR STRENGTH AND LOW LEAKAGE WITH OVERLAPPING EDGES.

SHAFTS: 1/2" DIAMETER EXTRUDED ALUMINUM, PIN-LOCK DESIGN.

SEALS: SILICONE RUBBER OFF-SET LEG AT BLADE EDGES. NONE AT JAMBS.

BEARING: CELCON BEARING MATERIAL SO THAT THERE WILL BE NO METAL TO METAL FRICTION.

LINKAGE: FACE MOUNTED IN THE AIRSTREAM.

FACE OF DAMPER: FULL JAMB SECTION WITH BLADES, HEAD AND SILL CONTAINED IN JAMBS.

MAXIMUM PANEL SIZE: 48" x 72"
MINIMUM PANEL SIZE: 8" x 8"

TEMPERATURE LIMITS: -40°F TO 190°F

FINISH: MILL IS STANDARD, OPTIONAL FINISHES AVAILABLE.

NOT TO SCALE

OPTIONAL

FRAMES: ALUMINUM - 1 5/8"x6"x1 5/8"
FLANGED - (ALUMINUM) 2"x4"x5/8"
STEEL - CHANNEL OR FLANGED

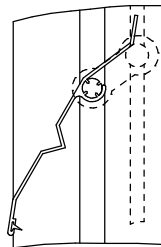
SCREENS: BIRD OR INSECT

LINKAGE: IN-JAMB OUT OF AIRSTREAM

SEALS: POLYURETHANE OR NEOPRENE AT JAMBS

BEARINGS: OILITE BRONZE OR BALL BEARING

COUNTERWEIGHTS: ADJUSTABLE FOR INFINITE OPENING PRESSURES, OPTIONAL LOCATIONS. SPECIFY IF AIRFLOW IS HORIZONTAL, VERTICAL UP OR DOWN, SPECIFY TO ASSIST OR RESIST OPENING. SPECIFY LOCATIONS, INTERNALLY (ON BLADES) OR EXTERNALLY (ON EXTENDED SHAFT).



OPTIONAL JAMB LINKAGE AND JAMB SEALS

NOTE:
WHEN A NON-SYMETRICAL FRAME CROSS SECTION IS SPECIFIED (I.E. FLANGED), SPECIFY THE FLANGE/AIRFLOW ORIENTATION.

FOR PERFORMANCE DATA
SEE REVERSE SIDE

NOMINAL DEDUCTIONS WILL BE MADE TO OPENING SIZES GIVEN.

ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	MULL				
		OPENING SIZE		DAMPER SIZE						

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AGENT: _____

ARROW MODEL 655 BACKDRAFT DAMPER PERFORMANCE DATA

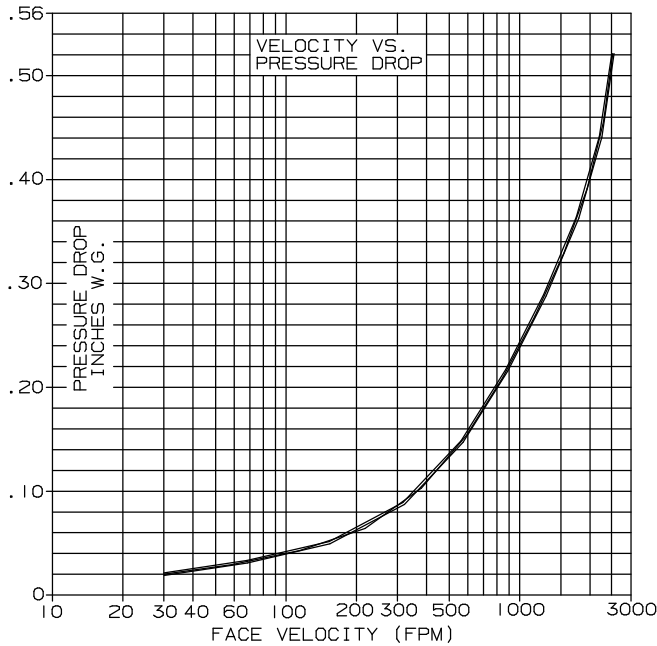
WITHOUT DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.4 (FACE MOUNTED TO A PLENUM).

PRESSURE IS CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .01 INCHES W.G.
FULLY OPEN - .52 INCHES W.G.



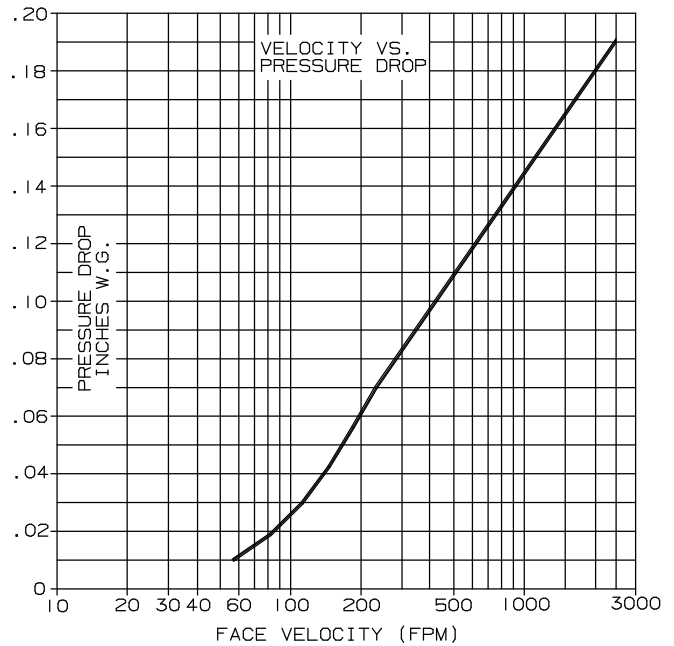
WITH DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.3 (DUCTWORK INSTALLED UPSTREAM AND DOWNSTREAM OF DAMPER).

PRESSURE IS CORRECTED TO .075 LB./CU. FT. AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .01 INCHES W.G.
FULLY OPEN - .18 INCHES W.G.



TYPICAL PERFORMANCE FOR MODEL 655 BACKDRAFT DAMPER
SIZE TESTED 42" x 42", FURNISHED WITH COUNTERWEIGHT TO ASSIST OPENING.

AIR LEAKAGE

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT .10" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

TOTAL CFM AIR LEAKAGE AT .10" STATIC PRESSURE DIFFERENTIAL THROUGH CLOSED DAMPER.

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	3.0	4.5	6.0	7.5	9.0	10.5	12.0
	24"	6.0	9.0	12.0	15.0	18.0	21.0	24.0
	36"	9.0	13.5	18.0	22.5	27.0	31.5	36.0
	48"	12.0	18.0	24.0	30.0	36.0	42.0	48.0
	60"	15.0	22.5	30.0	37.5	45.0	52.5	60.0
	72"	18.0	27.0	36.0	45.0	54.0	63.0	72.0

FOR DETERMINING LEAKAGE VALUES GREATER THAN .10" W.G. TO A MAXIMUM 4" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	.2	.3	.4	.5	1.0	2.0	3.0	4.0
MULTIPLIER CORRECTION FACTOR	1.7	2.0	2.3	2.7	4.0	5.0	6.7	8.3

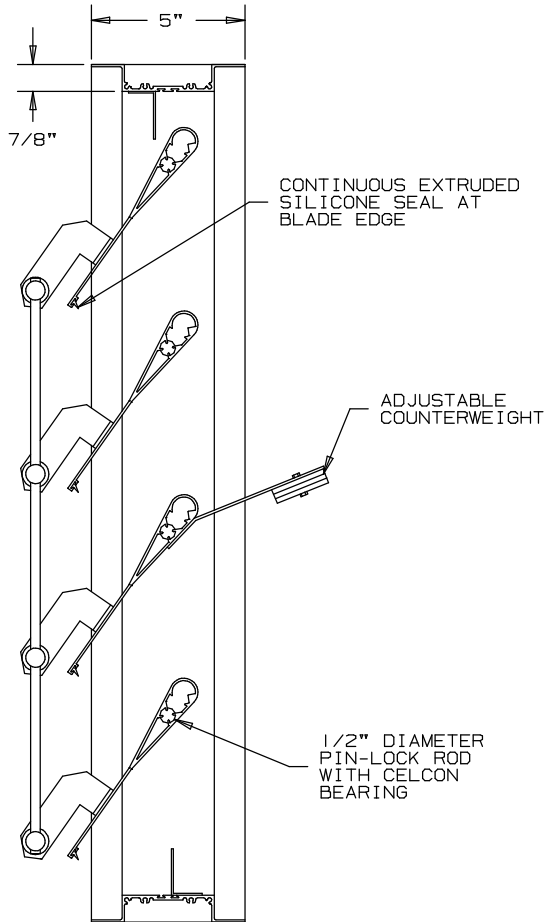
MAXIMUM PANEL SIZE LIMIT 48" x 72".

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4 WITH DAMPER IN THE CLOSED POSITION WITHOUT THE AID OF A COUNTERWEIGHT OR OTHER MECHANICAL MEANS TO PROVIDE CLOSING TORQUE, FOR A SIZE 42" x 42" DAMPER WITH BLADE & JAMB SEALS.

ARROW BACKDRAFT DAMPERS EXTRUDED ALUMINUM

TYPE 850

FOR HEAVY-DUTY APPLICATIONS



NOT TO SCALE

OPTIONAL

FRAMES: ALUMINUM - (CHANNEL) 1 5/8" x 6 1/2" x 1 5/8",
1" x 4" x 1" AND 2" x 4" x 2"
(FLANGED) 2" x 4" x 5/8"
STEEL - CHANNEL OR FLANGED
LINKAGE: IN-JAMB, OUT OF AIR STREAM
BEARINGS: OILITE BRONZE OR BALL BEARINGS
JAMB SEALS: POLYURETHANE OR NEOPRENE; FOR
INCREASED LOW LEAKAGE EFFICIENCY,
EXTRUDED SILICONE SEALS.

DAMPERS WILL BE FABRICATED 1/4" SMALLER THAN OPENING SIZE UNLESS OTHERWISE SPECIFIED.

ADJUSTABLE COUNTERWEIGHTS AVAILABLE TO ASSIST OR RESIST OPENING AT THE FULL RANGE OF PRESSURE INCREMENTS.

ALUMINUM CONSTRUCTION (SEE OPTIONS)
FOR HORIZONTAL OR VERTICAL OPERATION

SPECIFICATIONS

FRAME: EXTRUDED ALUMINUM, 6063-T6/T52 ALLOY, .080" THICK "HAT SHAPED" CHANNEL WITH REINFORCING BOSSES AND GROOVE INSERTS FOR SEALS. STANDARD FRAMES ARE 5" WIDE "HAT-SHAPED" FRAMES TYPICAL (4) SIDES.

BLADES: EXTRUDED ALUMINUM TEARDROP, 6063-T6/T52 ALLOY, .080" THK. WITH GROOVE INSERTS AT BLADE EDGES FOR EXTRUDED SILICONE RUBBER SEALS. BLADE SPACING IS 6" ON CENTER.

AXLES: 1/2" DIAMETER EXTRUDED ALUMINUM PIN-LOCK DESIGN, POSITIVELY LOCKED TO BLADE, PLACED OFF-CENTER.

SEALS: EXTRUDED SILICONE RUBBER OFF-SET LEG AT BLADE EDGES. NONE AT JAMBS.

LINKAGE: STANDARD IS FACE LINKAGE ON THE BLADES, PLATED STEEL.

BEARINGS: FLANGED CELCON BEARING.

COUNTERWEIGHTS: ADJUSTABLE FOR A FULL RANGE OF OPENING PRESSURES. OPTIONAL MOUNTING LOCATIONS. SPECIFY IF AIR FLOW IS HORIZONTAL, VERTICAL-UP, OR VERTICAL-DOWN. ALSO SPECIFY TO ASSIST OR RESIST OPENING.
A - INTERNALLY (ON BLADES)
B - EXTERNALLY (ON EXTENDED SHAFT)

FINISH - MILL IS STANDARD, OTHERS ARE AVAILABLE.

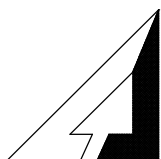
TEMPERATURE LIMITS: -40°F TO 190°F.

MINIMUM PANEL SIZE: 10" x 10"
MAXIMUM PANEL SIZE: 48" x 96"

WHEN A NON-SYMETRICAL FRAME CROSS-SECTION IS SPECIFIED (I.E.: FLANGED), SPECIFY THE FLANGE/AIRFLOW ORIENTATION.

FOR PERFORMANCE DATA
-SEE REVERSE SIDE

ITEM	QTY.	WIDTH	HEIGHT	WIDTH	HEIGHT	MULL	COUNTER BALANCE	AIR FLOW (DIRECTION)
		OPENING SIZE		DAMPER SIZE				



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ARROW MODEL 850 BACKDRAFT DAMPER PERFORMANCE DATA

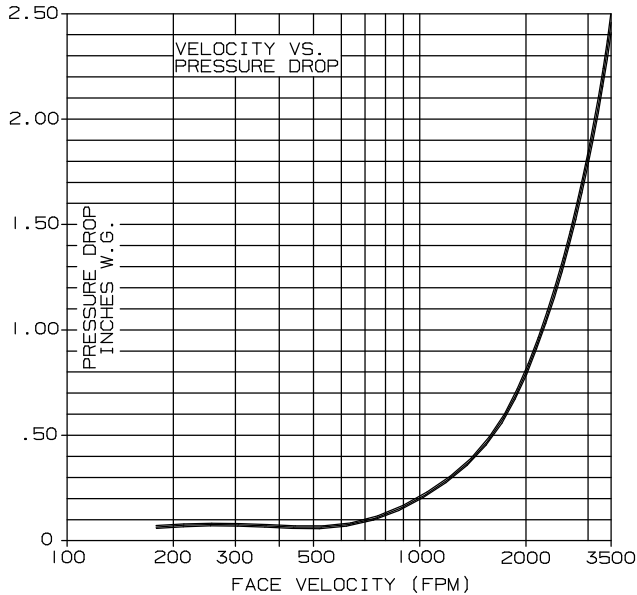
WITHOUT DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.4
(FACE MOUNTED TO A PLENUM).

PRESSURE IS CORRECTED TO .075 LB./CU.FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .03 INCHES W.G.
FULLY OPEN - .39 INCHES W.G.



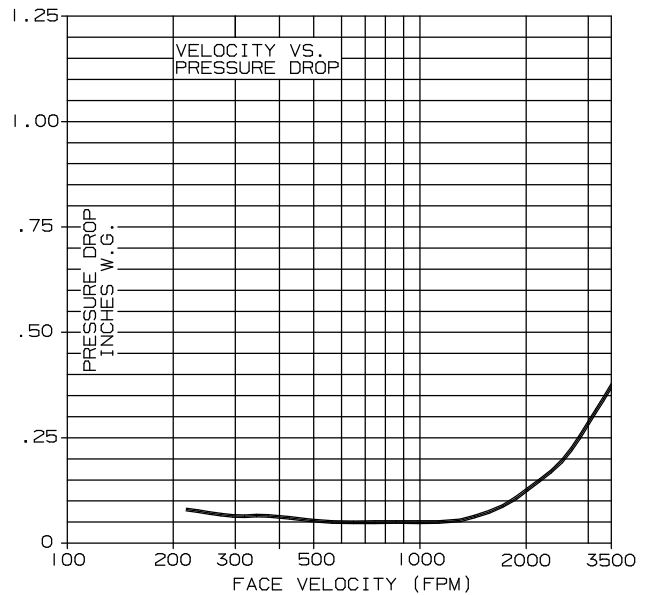
WITH DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.3
(DUCTWORK INSTALLED UPSTREAM AND DOWNSTREAM
OF DAMPER).

PRESSURE IS CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .05 INCHES W.G.
FULLY OPEN - .12 INCHES W.G.



TYPICAL PERFORMANCE FOR MODEL 850 BACKDRAFT DAMPER
SIZE TESTED 42" x 42", FURNISHED WITH COUNTERWEIGHT TO ASSIST OPENING.

AIR LEAKAGE

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED TO .075 LB./CU.FT. AIR DENSITY.

TOTAL CFM AIR LEAKAGE AT ONE INCH STATIC PRESSURE
DIFFERENTIAL THROUGH CLOSED DAMPER.

		DAMPER WIDTH (INCHES)						
		12"	18"	24"	30"	36"	42"	48"
DAMPER HEIGHT (INCHES)	12"	8	12	16	20	24	28	32
	24"	16	24	32	40	48	56	64
	36"	24	36	48	60	72	84	96
	48"	32	48	64	80	96	112	128
	60"	40	60	80	100	120	140	160
	72"	48	72	96	120	144	168	192
	84"	56	84	112	140	168	196	224
	96"	64	96	128	160	192	224	256

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A
MAXIMUM 8" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE	2	3	4	5	*6	7	8
MULTIPLIER CORRECTION FACTOR	1.5	2.0	1.7	2.9	3.2	3.5	3.8

* MAXIMUM PANEL SIZE LIMIT 48" x 96" FOR STATIC PRESSURE LIMITS GREATER THAN
6" W.G. TO 8" W.G. DIFFERENTIAL MAXIMUM PANEL SIZE LIMIT 36" x 96".

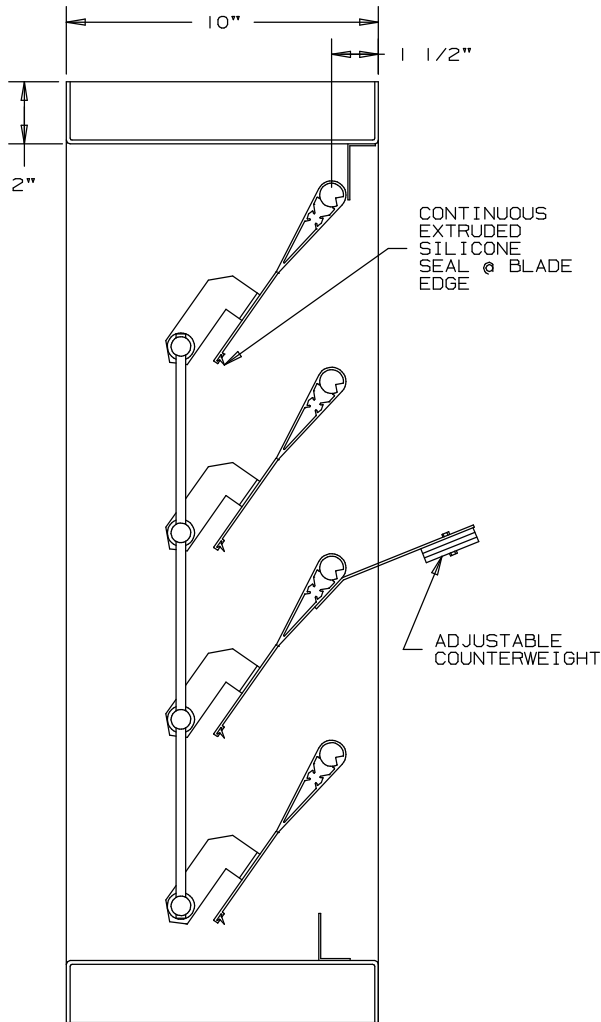
AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4
WITH DAMPER IN THE CLOSED POSITION WITHOUT THE AID OF A COUNTERWEIGHT OR OTHER
MECHANICAL MEANS TO PROVIDE CLOSING TORQUE, FOR A SIZE 42" x 42" DAMPER
WITH BLADE & JAMB SEALS.

ARROW BACKDRAFT DAMPERS

EXTRUDED ALUMINUM BLADE, FORMED STEEL FRAME

TYPE 900

FOR EXTRA HEAVY-DUTY APPLICATIONS



ADJUSTABLE COUNTERWEIGHTS AVAILABLE TO ASSIST OR RESIST OPENING AT THE FULL RANGE OF PRESSURE INCREMENTS.

FOR HORIZONTAL OR VERTICAL OPERATION

SPECIFICATIONS

FRAME: 2" x 10" x 2", 12 GA. GALVANIZED STEEL FORMED CHANNEL.

BLADE: EXTRUDED ALUMINUM TEARDROP, 6063-T52/T6 ALLOY, .080" THK. WITH GROOVE INSERTS AT BLADE EDGES FOR EXTRUDED SILICONE RUBBER SEALS. BLADE SPACING IS 6" ON CENTER

AXLES: 3/4" DIAMETER PLATED STEEL POSITIVELY LOCKED TO BLADE, PLACED OFF-CENTER IN BLADE.

SEALS: EXTRUDED SILICONE RUBBER OFF-SET LEG AT BLADE EDGES. NONE AT JAMBS.

LINKAGE: STANDARD IS 1/8" THICK PLATED STEEL BRACKET WITH 1/2" DIAMETER PLATED STEEL PIVOT RIDING IN A CELCON SLEEVE BEARING. LINKAGE ROD IS 5/16" DIAMETER, LOCKED TO PIVOT WITH A 1/4-20 UNC PLATED STEEL SET SCREW.

BEARINGS: BALL BEARING PRESSED INTO FRAME.

COUNTERWEIGHTS: ADJUSTABLE FOR A FULL RANGE OF OPENING PRESSURES. OPTIONAL MOUNTING LOCATIONS. SPECIFY IF AIR FLOW IS HORIZONTAL, VERTICAL-UP, OR VERTICAL-DOWN. ALSO SPECIFY TO ASSIST OR RESIST OPENING.
A - INTERNALLY (ON BLADES)
B - EXTERNALLY (ON EXTENDED SHAFT)


FINISH - MILL IS STANDARD, OTHERS ARE AVAILABLE.


TEMPERATURE LIMITS: -30°F TO 190°F.

MINIMUM PANEL SIZE: 8" x 8" I.D.
MAXIMUM PANEL SIZE: 60" x 96" I.D.

WHEN A NON-SYMETRICAL FRAME CROSS-SECTION IS SPECIFIED (I.E.: FLANGED), SPECIFY THE FLANGE/AIRFLOW ORIENTATION.

FOR PERFORMANCE DATA
-SEE REVERSE SIDE

ITEM	QTY.	WIDTH	HEIGHT	MULL	COUNTER BALANCE	AIR FLOW (DIRECTION)	TAGGING	
		DAMPER SIZE (I.D.)						

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ARROW MODEL 900 BACKDRAFT DAMPER PERFORMANCE DATA

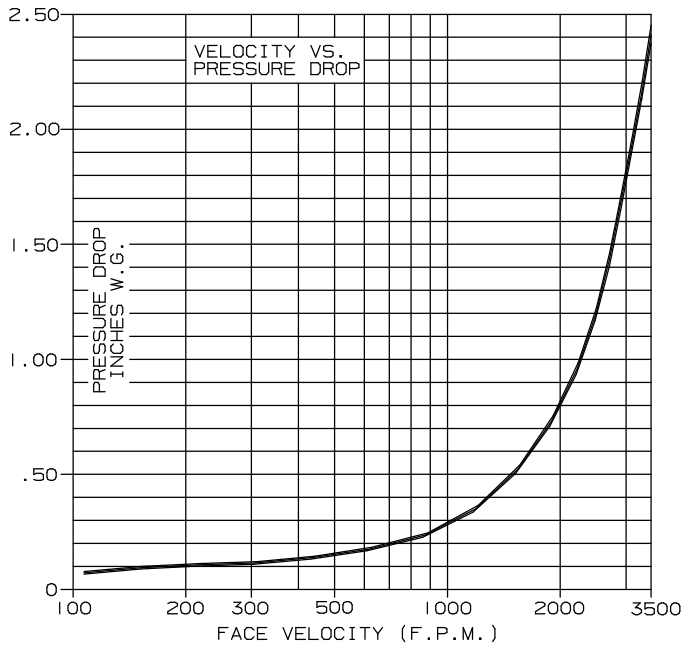
WITHOUT DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.4
(FACE MOUNTED TO A PLENUM).

PRESSURE IS CORRECTED TO .075 LB./CU.FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .02 INCHES W.G.
FULLY OPEN - 1.50 INCHES W.G.



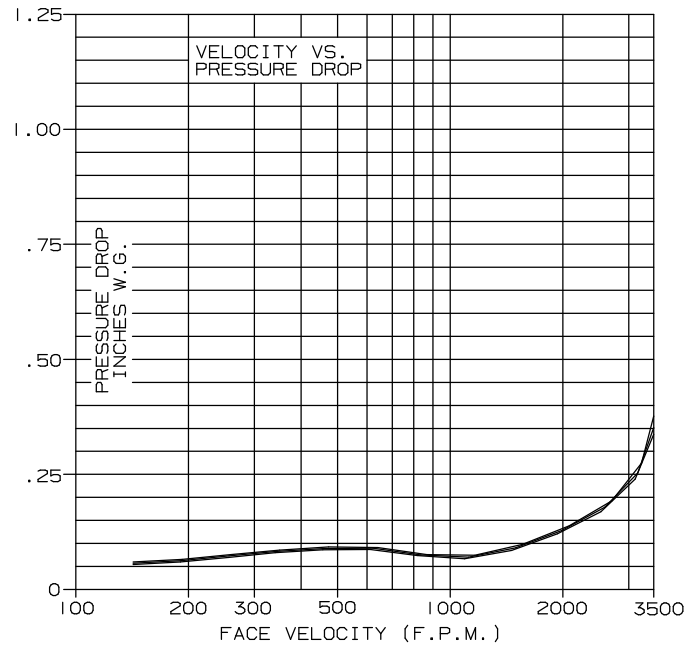
WITH DUCTWORK

DAMPER INSTALLED PER AMCA 500 FIG. 5.3
(DUCTWORK INSTALLED UPSTREAM AND DOWNSTREAM
OF DAMPER).

PRESSURE IS CORRECTED TO .075 LB./CU. FT.
AIR DENSITY.

OPERATIONAL PRESSURES

START TO OPEN - .03 INCHES W.G.
FULLY OPEN - .25 INCHES W.G.



TYPICAL PERFORMANCE FOR MODEL 900 BACKDRAFT DAMPER
SIZE TESTED 42" x 42", FURNISHED WITH COUNTERWEIGHT TO ASSIST OPENING.

AIR LEAKAGE

AIR LEAKAGE QUANTITIES SHOWN IN THE CHART ARE RESULTS OF TESTS PER AMCA
STANDARD 500 AND ARE SHOWN AT 1" W.G. DIFFERENTIAL PRESSURE AND CORRECTED
TO .075 LB./CU.FT. AIR DENSITY.

TOTAL CFM AIR LEAKAGE AT ONE INCH STATIC PRESSURE
DIFFERENTIAL THROUGH CLOSED DAMPER.

	DAMPER WIDTH (INCHES)									
	12"	18"	24"	30"	36"	42"	48"	54"	60"	
DAMPER HEIGHT (INCHES)	12"	8	12	16	20	24	28	32	36	40
24"	16	24	32	40	48	56	64	72	80	
36"	24	36	48	60	72	84	96	108	120	
48"	32	48	64	80	96	112	128	144	160	
60"	40	60	80	100	120	140	160	180	200	
72"	48	72	96	120	144	168	192	216	240	
84"	56	84	112	140	168	196	224	252	280	
96"	64	96	128	160	192	224	256	288	320	

FOR DETERMINING LEAKAGE VALUES GREATER THAN 1" W.G. TO A
MAXIMUM 8" W.G. USE THE MULTIPLIER CORRECTION CHART BELOW.

STATIC PRESSURE (IN)	2	3	4	5	6	7	8
MULTIPLIER CORRECTION FACTOR	1.5	1.9	2.3	2.5	2.9	3.0	3.1

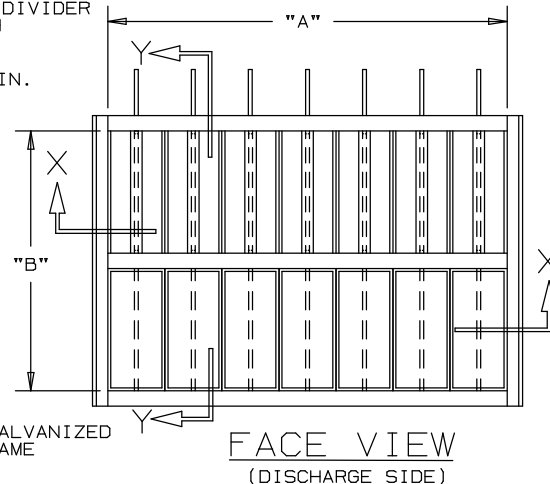
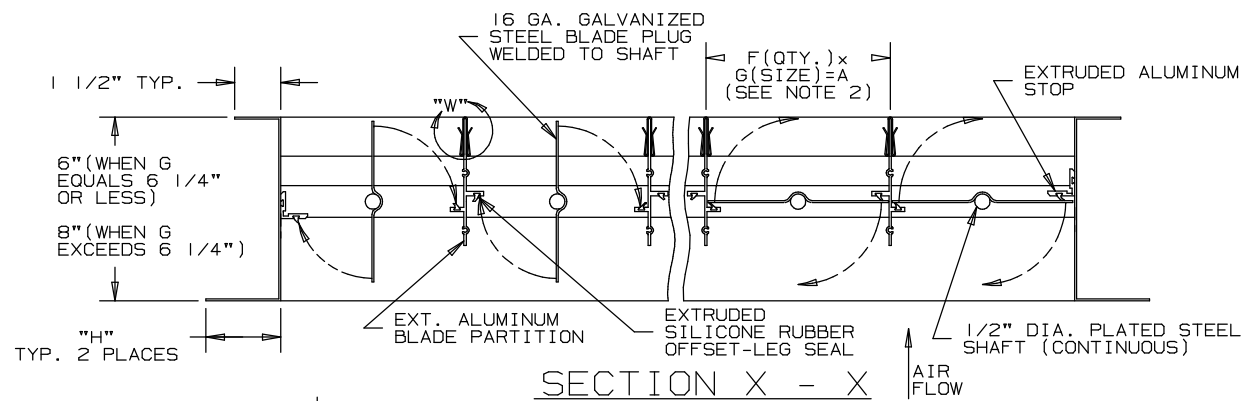
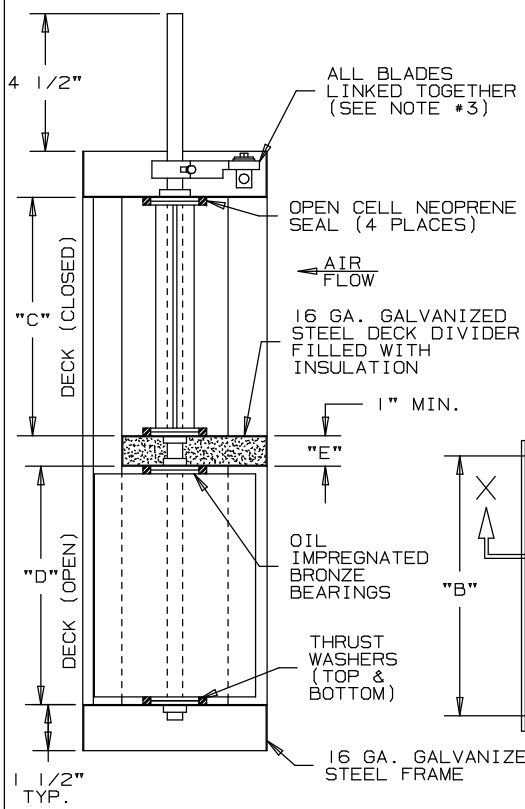
*MAXIMUM PANEL SIZE LIMIT 60" x 96" FOR STATIC PRESSURE LIMITS GREATER THAN
5"W.G. TO 8" W.G. DIFFERENTIAL MAXIMUM PANEL SIZE LIMIT 48" x 96".

AIR LEAKAGE RATINGS ARE BASED ON AMCA STANDARD 500 USING TEST SET UP FIG. 5.4
WITH DAMPER IN THE CLOSED POSITION WITHOUT THE AID OF A COUNTERWEIGHT OR OTHER
MECHANICAL MEANS TO PROVIDE CLOSING TORQUE, FOR A SIZE 42" x 42" DAMPER
WITH BLADE & JAMB SEALS.



Multizone Dampers

- 354 [16 Gauge Formed Galvanized Blades and Channel Frame Zone Damper](#)
- 354AL [.063 Formed Aluminum Blade and .081 Formed Aluminum Frame](#)
- AFDMZ [Extruded Aluminum Arrow-Foil Design Blades and .081 Aluminum Formed Frame Zone Damper](#)
- 356 [Triple Deck Multi-Zone Galvanized Steel Damper](#)



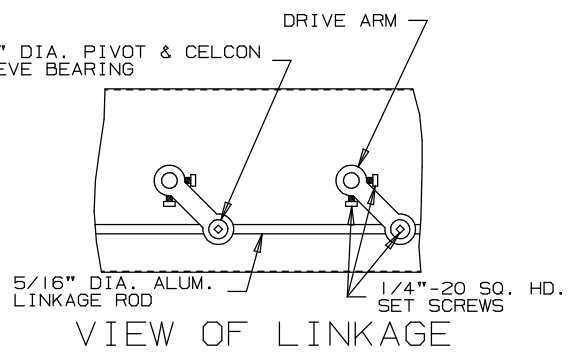
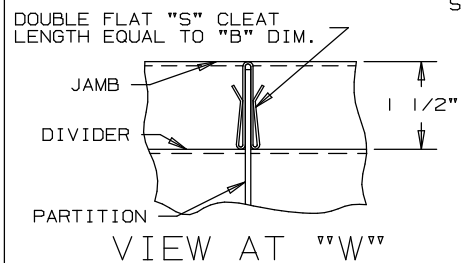
SECTION Y - Y

FACE VIEW
(DISCHARGE SIDE)

OPTIONS & ACCESORIES

1. FACTORY-ARRANGED ZONES. WHEN SPECIFIED, LINKAGE WILL GROUP BLADES ONLY AS DESIRED. FINELY ADJUSTED FOR MINIMUM LEAKAGE. DUCT-CLEATS INSTALLED ONLY WHERE NEEDED.
2. INSULATED FRAME. FRAME-ENDS AND BOTTOM (COLD DECK) COVERED WITH 1" INSULATION, RETAINED BY GALVANIZED COVER.
3. DRIVE-SHAFTS AND LINKAGE AT LOWER END OF BLADE-SHAFTS.
4. SPECIAL ADAPTOR CLEATS TO ALLOW 1" INSULATION SPACE BETWEEN ADJACENT ZONE DUCTS.
5. LINKAGE AND DRIVE-EXTENSIONS AT BOTH ENDS OF SHAFTS. THIS FEATURE CONTRIBUTES TO SUPERIOR LEAKAGE PERFORMANCE. (SEE TEST DATA).

- NOTES:
1. STANDARS FINISH IS MILL-GALVANIZED.
 2. AVAILABLE BLADE SIZES (DIM. G); 4" TO 8".
 3. TO DISRIBUTE BLADES INTO DESIRED ZONE-SIZES CUT TO THE 5/16" DIA. LINKAGE ROD ACCORDINGLY.



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A DIVISION OF MESTEK, INC.

314 RIVERSIDE DRIVE
WYALUSING, PA 18853

TEL: (570) 746-1888 FAX: (570) 746-9286

MODEL 354 ZONE DAMPER

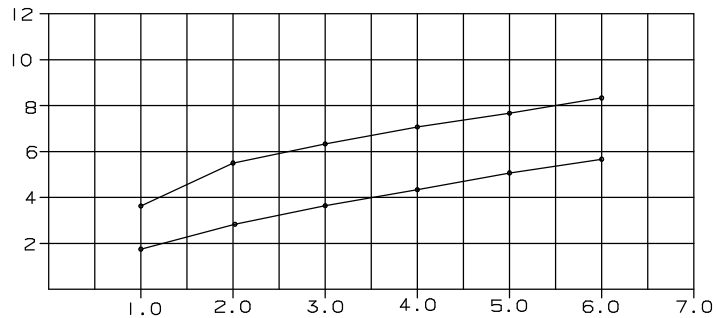
SEE REVERSE SIDE FOR
PERFORMANCE DATA
& ORDER CHART



UNION MADE

MARK	QTY.	A	B	C	D	E	F×G(=A)	H	OPTIONS & ACCESSORIES
							x		
							x		
							x		
							x		
							x		
							x		
							x		
							x		

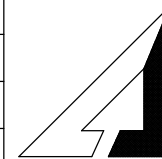
LEAKAGE PERFORMANCE



JOB NOTES:

THE ABOVE GRAPH WAS PRODUCED FROM TEST RESULTS ATTAINED AT AN AMCA REGISTERED LABORATORY. TEST WAS PERFORMED IN ACCORDANCE WITH STANDARD 500-75 AND WITNESSED BY A NATIONALLY-KNOWN ENGINEERING CONCERN. TEST UNIT SIZE WAS 5'X3' COMPRISING THREE ZONES; ONE OF 4-BLADES, ONE OF 2-BLADES, AND ONE SINGLE BLADE. A CLOSING TORQUE OF 4 IN. LBS. PER SQ. FT. WAS APPLIED. THE TWO DECKS WERE TESTED INDEPENDENTLY AND THE GRAPH ABOVE REFLECTS THE COMPOSITE LEAKAGE.

ARCH./ENG. :		
CONTR. :		
PROJECT :		
EDR :	ECN :	JOB :
DATE :	DWN. :	DWG. :

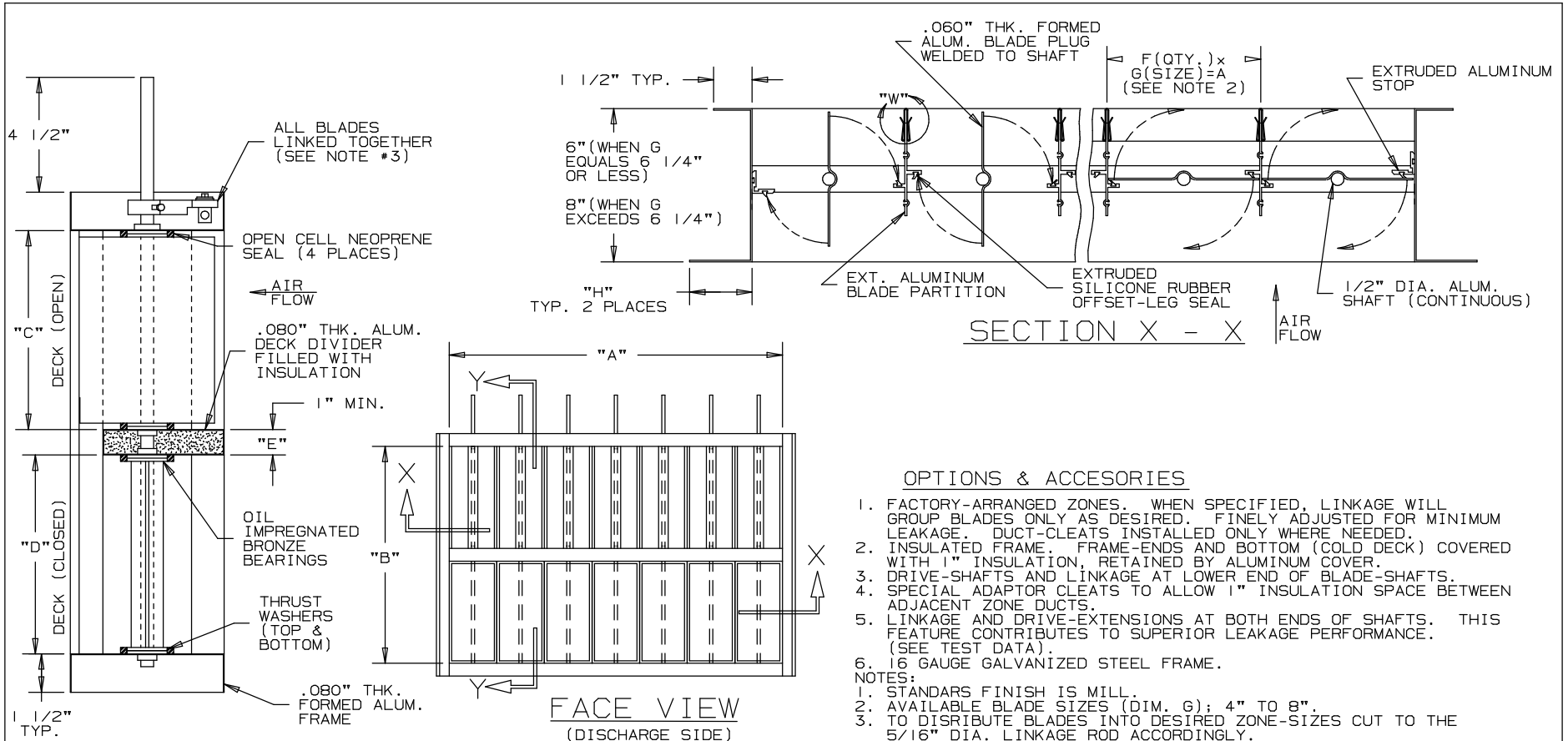


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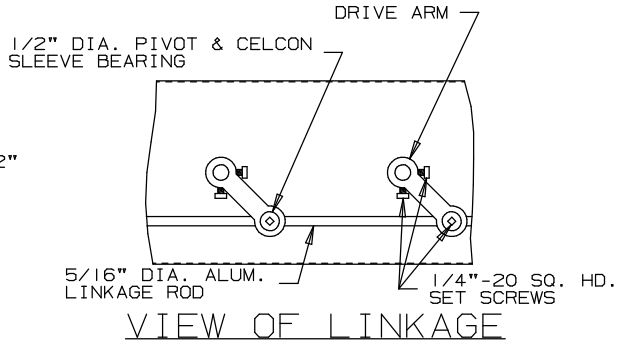
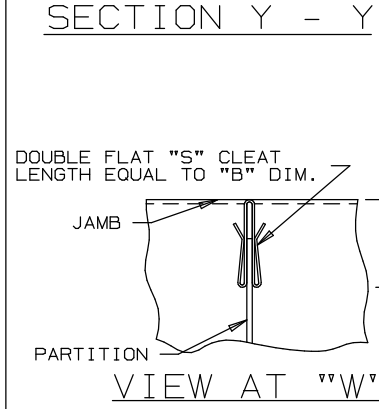
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AGENT : _____



- OPTIONS & ACCESSORIES**
1. FACTORY-ARRANGED ZONES. WHEN SPECIFIED, LINKAGE WILL GROUP BLADES ONLY AS DESIRED. FINELY ADJUSTED FOR MINIMUM LEAKAGE. DUCT-CLEATS INSTALLED ONLY WHERE NEEDED.
 2. INSULATED FRAME. FRAME-ENDS AND BOTTOM (COLD DECK) COVERED WITH 1" INSULATION, RETAINED BY ALUMINUM COVER.
 3. DRIVE-SHAFTS AND LINKAGE AT LOWER END OF BLADE-SHAFTS.
 4. SPECIAL ADAPTOR CLEATS TO ALLOW 1" INSULATION SPACE BETWEEN ADJACENT ZONE DUCTS.
 5. LINKAGE AND DRIVE-EXTENSIONS AT BOTH ENDS OF SHAFTS. THIS FEATURE CONTRIBUTES TO SUPERIOR LEAKAGE PERFORMANCE. (SEE TEST DATA).
 6. 16 GAUGE GALVANIZED STEEL FRAME.
- NOTES:**
1. STANDARDS FINISH IS MILL.
 2. AVAILABLE BLADE SIZES (DIM. G); 4" TO 8".
 3. TO DISTRIBUTE BLADES INTO DESIRED ZONE-SIZES CUT TO THE 5/16" DIA. LINKAGE ROD ACCORDINGLY.



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MODEL 354-AL ZONE DAMPER

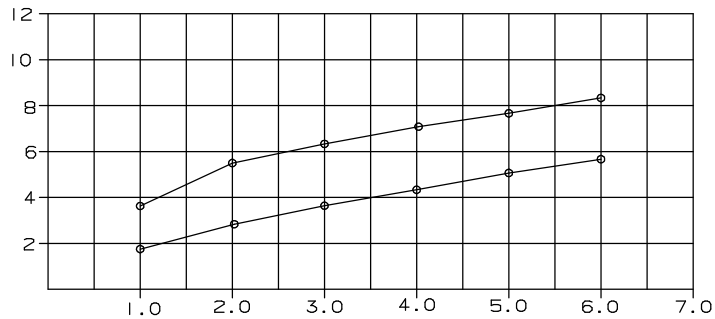
SEE REVERSE SIDE FOR PERFORMANCE DATA & ORDER CHART

UNION MADE

1034-JAN-2004-1

MARK	QTY.	A	B	C	D	E	F x G (=A)	H	OPTIONS & ACCESSORIES
							X		
							X		
							X		
							X		
							X		
							X		
							X		
							X		

LEAKAGE PERFORMANCE



JOB NOTES:

THE ABOVE GRAPH WAS PRODUCED FROM TEST RESULTS ATTAINED AT AN AMCA REGISTERED LABORATORY. TEST WAS PERFORMED IN ACCORDANCE WITH STANDARD 500-75 AND WITNESSED BY A NATIONALLY-KNOWN ENGINEERING CONCERN. TEST UNIT SIZE WAS 5'X3' COMPRISING THREE ZONES; ONE OF 4-BLADES, ONE OF 2-BLADES, AND ONE SINGLE BLADE. A CLOSING TORQUE OF 4 IN. LBS. PER SQ. FT. WAS APPLIED. THE TWO DECKS WERE TESTED INDEPENDENTLY AND THE GRAPH ABOVE REFLECTS THE COMPOSITE LEAKAGE.

ARCH./ENG. :

CONTR. :

PROJECT :

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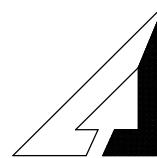
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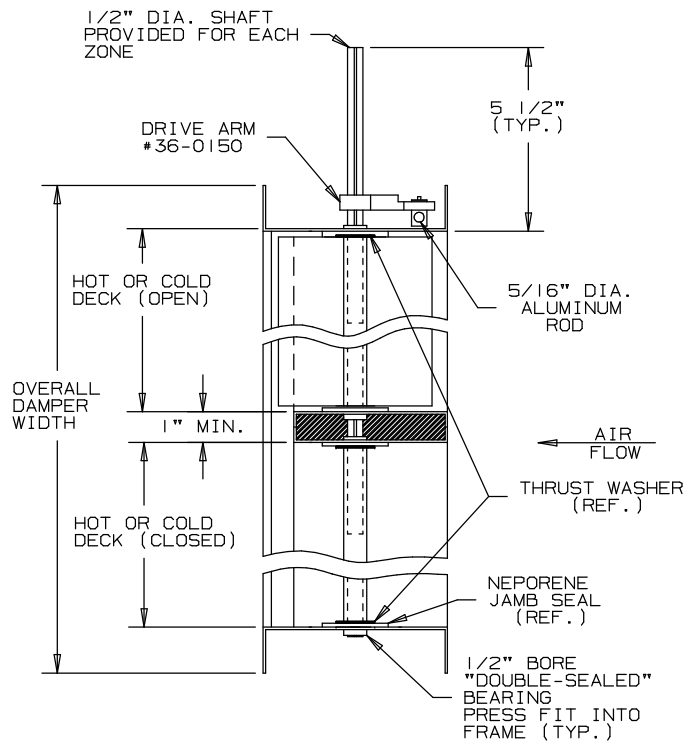


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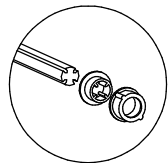
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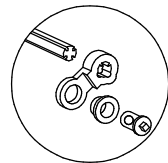
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SECTION B - B

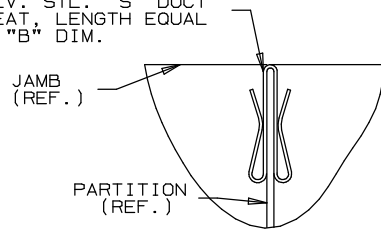


DOUBLE-SEALED BEARINGS

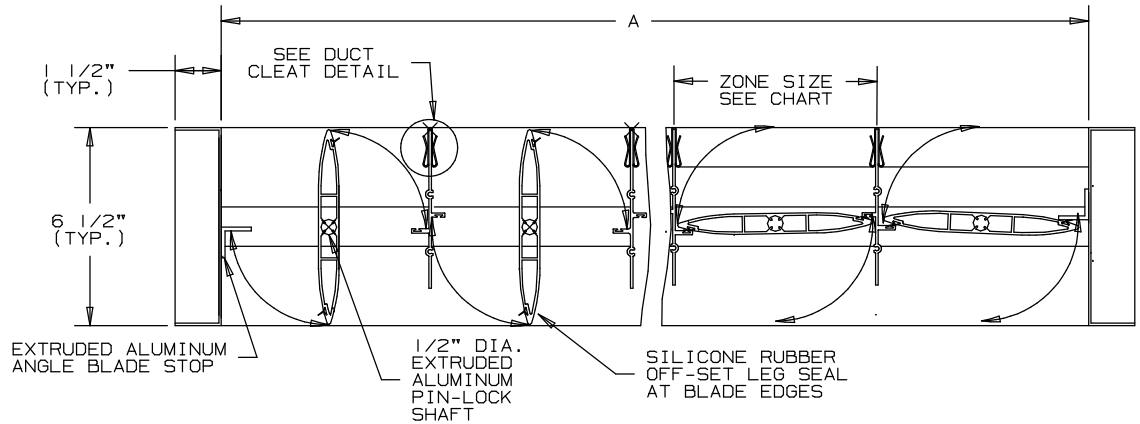


IN-JAMB LINKAGE

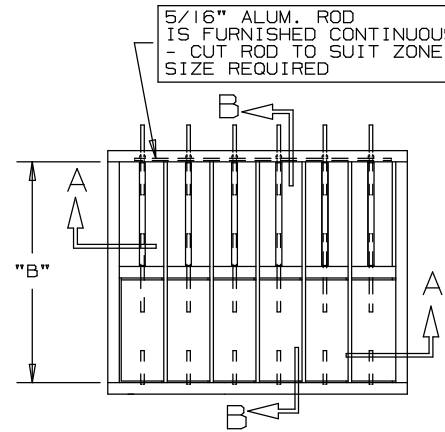
DOUBLE FLAT 20 GA. GALV. STL. "S" DUCT CLEAT, LENGTH EQUAL TO "B" DIM.



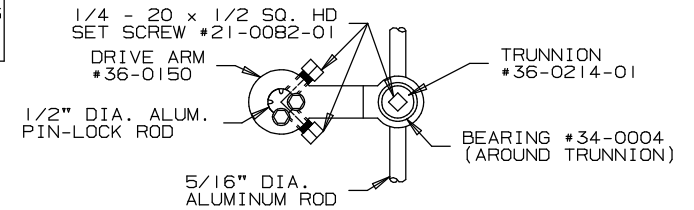
DUCT CLEAT DETAIL



SECTION A - A



PLAN VIEW OF ZONE DAMPER



DETAIL OF DRIVE ARM ASSEMBLY

CONSTRUCTION

FRAME: .080" THK. 1 1/2"x6 1/2"x1 1/2" FORMED ALUMINUM CHANNEL.
 BLADES: .080" THK. EXTRUDED ALUMINUM ARROW-FOIL.
 DECK DIVIDER: .080" THK. FORMED ALUMINUM, INSULATED.
 SHAFTS: 1/2" DIA. "PIN-LOCK".
 BEARINGS: DOUBLE-SEALED WITH THRUST WASHERS.
 SEALS: SILICONE RUBBER OFF-SET LEG SEAL @ BLADE EDGES, NEOPRENE @ JAMBS.

CHART "D"	
BLADE SIZE	ZONE SIZE
4" (102mm)	4 1/4" (108mm)
5" (127mm)	5 1/4" (133mm)
6 3/8" (162mm)	6 5/8" (168mm)

NOT TO SCALE

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MODEL AFD-MZ ZONE DAMPER

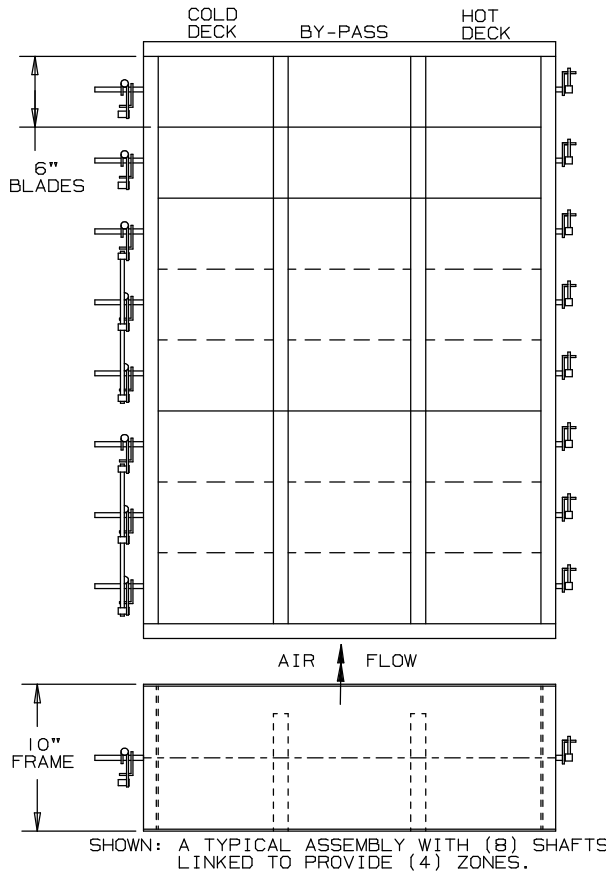


UNION MADE

ARROW MODEL 356-10 TRIPLE - DECK MULTI-ZONE DAMPER

ONE-TIER
CONSTRUCTION
SINGLE ACTUATOR
PER ZONE

THIS DAMPER, MOUNTED ON THE DISCHARGE OF AIR-HANDLING UNITS, DISTRIBUTES CONDITIONED AIR TO NUMEROUS ZONES WITHIN A BUILDING. ● EACH ZONE CAN BE SIZED FOR A SPECIFIC CFM VOLUME. ● EACH ZONE IS CONTROLLED BY A SINGLE ACTUATOR. HEATED AIR & COOLED AIR ARE NEVER DISCHARGED SIMULTANEOUSLY.



CONSTRUCTION SPECIFICATIONS:

- FRAME: 16 GA. GALVANIZED STEEL CHANNEL, 1"x10"x1", FOUR SIDES.
- DECK DIVIDERS: 16 GA. GALVANIZED STEEL TUBE, 1"x8 1/2", INSULATED.
- BLADES: 16 GA. GALVANIZED STEEL, FORMED TO FIT THE SHAFTS AND TO ADD STRAIGHTNESS AND STRENGTH. THE STANDARD BLADE/ZONE WIDTH IS 6".
- SHAFTS: A PLATED STEEL SHAFT 1/2" DIAMETER IS CONTINUOUS ACROSS ALL THREE DECKS AND EXTENDS 6" AT THE "DRIVE" SIDE. THE HOT AND COLD DECK BLADES RIDE ON GALVANIZED STEEL TUBES .845" O.D., OVER THE 1/2" DIAMETER SHAFT. HOT AND COLD DECKS ARE SPRING LOADED TO THE CLOSED POSITION.
- SPRINGS: TORSION SPRINGS ARE ACCESSABLE AT BOTH SIDES OF THE DAMPER. THEY ARE FACTORY SET AT OPTIMUM TORQUE.
- BEARINGS: EACH ZONE SEGMENT CONTAINS A BLADE IN EACH OF THE THREE DECKS. ALL BLADES RIDE ON SINTERED BRONZE, OIL IMPREGNATED BEARINGS. THE BLADES ARE PROVIDED WITH THRUST BEARINGS TO ALLOW THE SHAFTS TO OPERATE IN THE VERTICAL POSITION.
- SEALS: ALL BLADE ENDS ARE SEALED AT THE JAMBS AND DECK DIVIDERS WITH NEOPRENE FOAM SEALS. ALL BLADE EDGES ARE SEALED USING FLEXIBLE EDGE SEALS.
- DUCT CLEATS: GALVANIZED STEEL "S" CLEATS ARE PROVIDED BETWEEN ALL ZONES ON THE DISCHARGE SIDE OF THE DAMPER
- LINKAGE: ALL BLADES WILL BE INTER-LINKED ON THE EXTENDED SHAFT (ACTUATOR) SIDE OF THE DAMPER. THE LINKAGE ROD WILL THEN BE CUT IN THE FIELD TO ARRANGE ZONES AS NEEDED.

SEQUENCE OF OPERATION

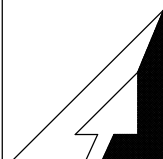
THE BY-PASS IS ATTACHED TO THE FULL LENGTH 1/2" DIAMETER SHAFT. THE HOT-DECK AND COLD DECK BLADES ARE MOUNTED ON (HOLLOW) SHAFTS THAT RIDE ON BEARINGS SUPPORTED ON THE 1/2" SHAFT. THEY ARE SPRING-LOADED TO THE CLOSED POSITION AND ARE OPENED BY LEVERS ATTACHED TO THE 1/2" SHAFT.

A FULL SEQUENCE OF CONTROL OCCURS DURING 90° OF ROTATION BY THE 1/2" DIAMETER SHAFT. THE SEQUENCE GIVEN BELOW IS THE CLOCKWISE ROTATION, FACING THE SHAFT END. THE SAME DESCRIPTION APPLIES FROM EITHER SIDE OF THE DAMPER

POINT OF ROTATION	DESCRIPTION
0 DEGREES	THE NEAR DECK IS OPEN. THE BY-PASS DECK IS CLOSED. THE FAR DECK IS CLOSED.
0 TO 45 DEGREES	THE NEAR DECK CLOSES AS THE BYPASS DECK OPENS.
45 DEGREES	THE NEAR DECK IS CLOSED. THE BYPASS DECK IS OPEN. THE FAR DECK IS CLOSED.
THIS IS THE NORMAL POSITION FOR ALL SHAFTS WHEN NO ROTATIONAL FORCES ARE APPLIED. IT IS ALSO THE POSITION THE BLADES WOULD BE IN WHEN THE TEMPERATURE OF THE ZONE IS AT SET-POINT.	
45 TO 90 DEGREES	THE BY-PASS DECK CLOSES AS THE FAR DECK OPENS.
90 DEGREES	THE NEAR DECK IS CLOSED. THE BYPASS DECK IS CLOSED. THE FAR DECK IS OPEN.

OPTIONAL CONSTRUCTION FEATURES:

- FLANGE FRAMES GREATER THAN 1".
- HOLE PATTERN IN FRAME FLANGES
- DECK DIVIDERS THICKER THAN 1.0"
- ZONES FACTORY ARRANGED.
 - A.) USING THE AVAILABLE 6" STANDARD BLADES (AS SHOWN ABOVE)
 - B.) USING COMBINATIONS OF OTHER SIZES TO FIT THE ZONE SIZE REQUIREMENTS.
- DRIVE SHAFTS EXTENDED BOTH SIDES OF DAMPERS.
- INSULATED FRAME



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