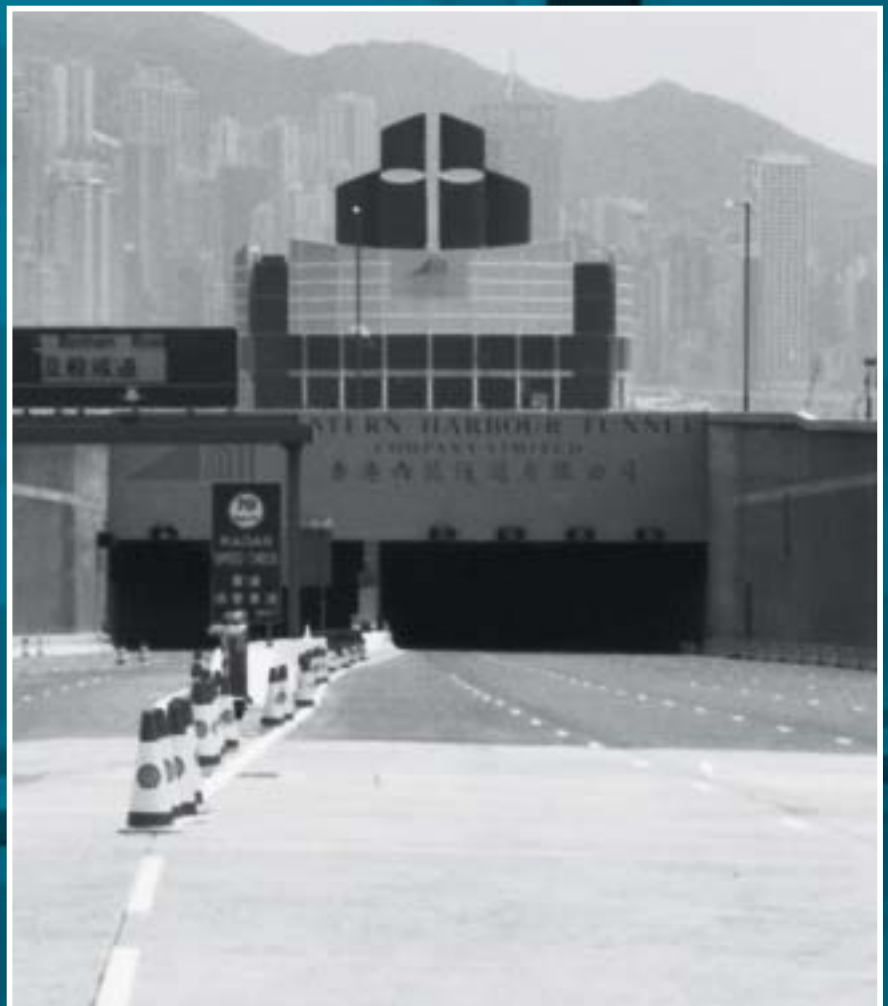


RUSKIN

INDUSTRIAL AND TUNNEL VENTILATION DAMPERS

*Solutions specifically for Industrial
and Mass Transit applications*



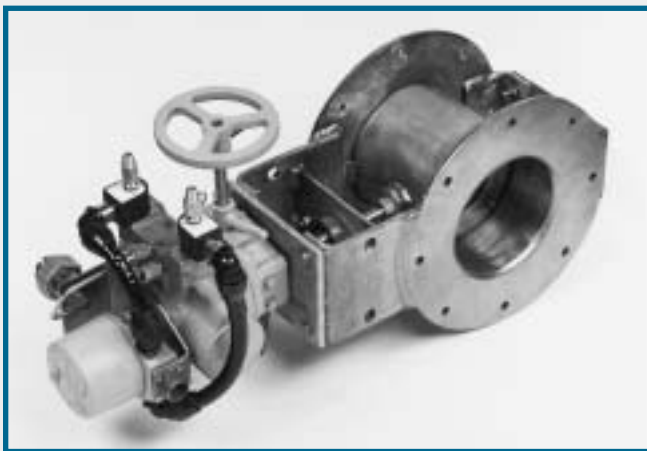
SPECIALIZED PRODUCTS FOR DEMANDING APPLICATIONS

For over 40 years, Ruskin has been the leader in designing and manufacturing durable, high performance dampers for industrial and tunnel ventilation applications.

Because Ruskin customers deserve the highest quality products, Ruskin has developed an on-site AMCA-registered air performance laboratory. Located in Kansas City, Missouri, this test facility has three high capacity wind tunnels, including the largest test tunnel in the industry. With a flow capacity of 128,000 cfm (3,625 M³/MIN) and 55" static pressure (13.69 Kpa), these test tunnels help Ruskin simulate demanding wind and air handling situations and are ideal for testing leakage and pressure drop.

Ruskin's goal is to deliver products that meet and exceed industry standards. Experienced, professional engineers, an AMCA-registered air performance testing laboratory for research and development, and the latest in manufacturing technology are the key ingredients that assure superiority of Ruskin products.

With a history of developing original ideas, Ruskin is known for its innovation and use of leading-edge technology. This includes using the latest materials to custom build dampers and louvers to withstand the most stringent environments. Ruskin products are installed in NASA applications, hi-pressure transit tunnels, and highly corrosive environments such as naval ships and waste water treatment facilities.



Ruskin can engineer and install pneumatic, electric or manual type actuation to best meet your specifications.

And, Ruskin is committed to delivering products to job sites on time. With six plant locations, Ruskin is meeting the needs of contractors and engineers around the globe.

For the name and address of your Ruskin Representative, call (816) 761-7476, or visit our web site at www.ruskin.com.



Ruskin's unique bubble tight designs meet or exceed ASME AG-1.

Quick Reference Chart

HEAVY DUTY CONTROL DAMPERS

Damper Model	Standard Construction Description	Applications	Damper Width in. & (mm) (Single Sections)*	Max. System Pressure (in. w.g./Kpa)	Max. System Velocity (FPM/M/S)	Leakage With / Without Seals (CFM/SQ.FT.)		Temp. Range °F and (°C)**
CD80AF4	- Galvanized construction - Welded 12 ga. up to 48" wide, 10 ga. 48" to 60" airfoil blade 3/4" axles up 48" blade width, 1" axle 48" to 60" 8" x 2" x 10 ga. channel flange frame - Stainless steel sleeve bearing bolted to frame	Fan Discharge	60" (1524)	20.00/5.0	5000/25.4	4.0	32	250°F to 400°F (121°C to 204°C)
		Isolation	48" (1219)	26.00/6.5	5000/25.4	4.0	32	
		Stack Isolation	36" (914)	32.00/8.0	5000/25.4	4.0	32	
			24" (610)	35.00/9.0	6000/30.4	8.0	40	
			12" (310)	44.00/11.0	6000/30.4	13.0	60	
CD80AF3	- Galvanized construction - Welded 16 ga. up to 48" wide, 14 ga. 48" to 60" airfoil blade 3/4" axles - Stainless steel sleeve bearing bolted to frame 8" x 2" x 12 ga. flange frame	High Pressure	60" (1524)	14.00/3.5	5000/25.4	4.0	32	250°F to 400°F (121°C to 204°C)
		Thermal Oxidizer Fans	48" (1219)	19.00/4.7	5000/25.4	4.0	32	
		Fan Intake	36" (914)	24.00/6.0	5000/25.4	4.0	32	
			24" (610)	29.00/7.2	6000/30.4	8.0	40	
			12" (305)	34.00/8.5	6000/30.4	13.0	60	
CD80AF2	8" x 2" x 14 ga. galvanized channel frame 3/4" plated axles - Stainless steel press fit bearings 10 ga. galvanized steel clevis side linkage - Max single section 60" w x 96" h	Paint Ovens	60" (1524)	12.00/3.0	4000/20.3	4.0	32	250°F to 400°F (121°C to 204°C)
		Heat Recovery	48" (1219)	17.00/4.2	4000/20.3	4.0	32	
		Air Handler Intake	36" (914)	22.00/5.5	4000/20.3	4.0	32	
			24" (610)	27.00/6.7	5000/25.4	8.0	40	
			12" (305)	32.00/8.0	6000/30.4	13.0	60	
CD80AF1	8" x 2" x 14 ga. galvanized channel frame 1/2" plated axles - Stainless steel press fit bearings 10 ga. galvanized steel clevis side linkage - Max single section 48" w x 96" h	Face and Bypass	48" (1219)	10.00/2.5	4000/20.3	4.0	32	250°F to 400°F (121°C to 204°C)
		Low Pressure	36" (914)	14.80/3.7	4000/20.3	4.0	32	
		Light Industrial	24" (610)	19.30/4.8	5000/25.4	8.0	40	
			12" (305)	24.00/6.0	6000/30.4	13.0	60	
CD80VG2	8" x 2" x 14 ga. galvanized channel frame 3/4" plated axles 16 ga. triple vee groove galvanized blades - Concealed side linkage - Stainless steel press fit bearings	Air Handler Intake	48" (1219)	6.75/1.7	2000/10.1	8.0	32	250°F to 400°F (121°C to 204°C)
		Drying Processes	36" (914)	9.00/2.2	2000/10.1	8.0	32	
		Balancing	24" (610)	15.50/3.8	2000/10.1	10.0	40	
			12" (305)	20.00/5.0	2000/10.1	15.0	60	
CD80VG1	8" x 2" x 14 ga. galvanized channel frame 1/2" plated axles 16 ga. triple vee groove galvanized blades - Concealed side linkage - Stainless steel press fit bearings	Light Duty Ventilation	48" (1219)	2.50/.62	2000/10.1	8.0	32	250°F to 400°F (121°C to 204°C)
		Fresh Air Intake	36" (914)	3.75/.93	2000/10.1	8.0	32	
		Damper Louver	24" (610)	6.00/1.5	2000/10.1	10.0	40	
		Combinations	12" (305)	8.25/2.05	2000/10.1	15.0	60	
CD80VGX	8" x 2" x 14 ga. galvanized channel frame 3/4" 90° crank arm 16 ga. vee groove blades - Stainless steel press fit bearings - Max single section 48" w x 96" h	Economically Priced	48" (1219)	6.75/1.7	2000/10.1	—	32	250°F to 400°F (121°C to 204°C)
		Express Delivery	36" (914)	9.00/2.2	2000/10.1	—	32	
		Fan Discharge	24" (610)	15.50/3.8	2000/10.1	—	40	
			12" (305)	20.00/5.0	2000/10.1	—	60	
CD/OD102	10" x 2" x 12 ga. steel channel frame 6063T5 extruded aluminum airfoil blade 10 ga. galvanized clevis arm linkage - Stainless steel press fit bearings - Max single section 60" w x 96" h	Aluminum Construction	60" (1524)	8.00/2.0	4000/20.3	6.7	32	300°F (149°C)
		Fan Intake and Discharge	48" (1219)	12.00/3.0	4000/20.3	8.0	32	
		Clean Room Applications	36" (914)	16.00/4.0	4000/20.3	8.0	32	
			24" (610)	20.00/5.0	5000/25.4	10.0	40	
			12" (305)	24.00/6.0	5000/25.4	15.0	60	

* Multiple section dampers are available in unlimited sizes.

Leakage information based on pressure differential of 1" w.g. (0.248 Kpa) tested per AMCA 500.

** Higher temperature ratings available consult Ruskin.

Note: Alternate materials such as stainless steel construction available as an option.

HEAVY DUTY CONTROL DAMPERS

Quick Reference Chart

Damper Model	Standard Construction Description	Applications	Damper Width in. & (mm) (Single Sections)*	Max. System Pressure (in. w.g./Kpa)	Max. System Velocity (FPM/M/S)	Leakage With / Without Seals (CFM/SQ.FT.)		Temp. Range °F and (°C)**
CD30AF2	• 3" x 1" x 12 ga. frame	Air Handler Intake	60" (1524)	12.00/3.0	4000/20.3	4.0	32	250°F to 400°F (121°C to 204°C)
	• In air stream mounted linkage	Induct Mounting	48" (1219)	17.00/4.2	4000/20.3	4.0	32	
	• 3/4" axles	Low Pressure Drop	36" (914)	22.00/5.5	4000/20.3	4.0	32	
	• 16 ga. air foil blades		24" (610)	27.00/6.7	5000/25.4	8.0	40	
	• In duct mounting design		12" (305)	32.00/8.0	6000/30.4	13.0	60	
CD30AF1	• 3" x 1" x 12 ga. frame	Ultra Low Leakage	48" (1219)	10.00/2.5	4000/20.3	4.0	32	250°F to 400°F (121°C to 204°C)
	• In air stream mounted linkage	Options	36" (914)	14.80/3.7	4000/20.3	4.0	32	
	• 1/2" axles	Clean Rooms	24" (610)	19.30/4.8	5000/25.4	8.0	40	
	• 16 ga. air foil blades	Hospitals	12" (305)	24.00/6.0	6000/30.4	13.0	60	
	• Max single section 48" w x 96" h							
TD30AF2	• 12 ga. flanged channel frame	Fire Rated Tunnel Damper	60" (1524)	12.00/3.00	4000/20.3	4.0	—	482°F (250°C 2 Hour) Qualified to BS 476 pt. 20 2 Hour
	• Airfoil 14 ga. galvanized blades	Cycle Tested	48" (1219)	17.00/4.20	4000/20.3	4.0	—	
	• 3/4" full length stainless steel axles	Track Isolation	36" (914)	22.00/5.50	4000/20.3	4.0	—	
	• Stainless steel blade seals		24" (610)	27.00/6.70	4000/20.3	8.0	—	
	• BS476 pt. 20 approved		12" (305)	32.00/8.00	4000/20.3	12.0	—	
CD82HT	• 8" x 2" x 3/16" steel channel frame	High Temperature Ovens	60" (1524)	13.00/3.2	2000/10.1	—	32	750°F (399°C)
	• 1/4" blades	Foundry	48" (1219)	15.00/3.7	2500/12.7	—	32	
	• Cast iron sleeve bearings bolted to frame	Dryer Fans	36" (914)	17.00/4.2	3000/15.2	—	32	
	• 1" diameter axles		24" (610)	19.00/4.7	3500/17.7	—	40	
	• 750°F service		12" (305)	21.00/5.2	4000/20.3	—	60	
CD30VG2	• 3" x 1" x 12 ga. frame	Manufacturing Plants	48" (1219)	6.75/1.7	3500/17.7	8.0	32	250°F to 400°F (121°C to 204°C)
	• In air stream mounted linkage	Balancing	36" (914)	11.00/2.7	3500/17.7	8.0	32	
	• 3/4" axles	Face and Bypass	24" (610)	15.50/3.8	3500/17.7	10.0	40	
	• 16 ga. galvanized vee groove blades		12" (305)	20.00/5.0	3500/17.7	15.0	60	
	• Stainless steel press fit bearings							
CD30VG1	• 3" x 1" x 12 ga. frame	Fresh Air Intake	48" (1219)	2.75/.68	3000/15.2	8.0	32	250°F to 400°F (121°C to 204°C)
	• In air stream mounted linkage	Gymnasiums	36" (914)	3.75/.93	3000/15.2	8.0	32	
	• 1/2" axles	Food Processing	24" (610)	6.00/1.5	3000/15.2	10.0	40	
	• 16 ga. galvanized vee groove blades		12" (305)	8.25/2.05	3000/15.2	15.0	60	
	• Stainless steel press fit bearings							
CDRI92	• Round channel flange frame (10 ga. to 5/16")	Round Duct Isolation	72" (1829)	15.00/3.7	7000/35.5	2.3	—	250°F (121°C)
	• Steel blade with stiffeners (when required)	Gas Vapor Isolation	60" (1524)	15.00/3.7	7000/35.5	1.9	—	
	• Adjustable full circumference blade seal	Bio-Labs	48" (1219)	15.00/3.7	7000/35.5	1.5	—	
	• Full length solid steel axle		36" (914)	16.00/3.9	7000/35.5	1.1	—	
	• Shaft seals with outboard mounted ball bearings		24" (610)	17.00/4.2	7000/35.5	0.8	—	
CDR92	• Round channel flange frame (10 ga. to 1/4")	Balancing	72" (1829)	13.00/3.2	6000/30.4	60.0 Total	275 Total	250°F to 400°F (121°C to 204°C)
	• Steel blade with stiffeners (when required)	Fume Extraction	60" (1524)	13.00/3.2	6000/30.4	45.0 Total	225 Total	
	• Grease lubricated bearings mounted to frame	Process Piping	48" (1219)	13.00/3.2	6000/30.4	35.0 Total	175 Total	
	• Full length solid steel axle		36" (914)	14.00/3.5	6000/30.4	28.0 Total	125 Total	
	• Full circumference blade stop		24" (610)	15.00/3.7	6000/30.4	25.0 Total	85 Total	
CDR82	• Round channel flange frame (10 ga. to 3/16")	Odor Control	60" (1524)	6.00/1.5	4000/20.3	45.0 Total	225 Total	250°F to 400°F (121°C to 204°C)
	• Steel blade with stiffeners (when required)	Face and Bypass	48" (1219)	6.00/1.5	4000/20.3	35.0 Total	175 Total	
	• Stainless steel press fit bearings	Incineration	36" (914)	8.00/2.0	5000/25.4	28.0 Total	125 Total	
	• Full length solid steel axle		24" (610)	8.00/2.0	6000/30.4	25.0 Total	85 Total	
	• Maximum size 60"		12" (305)	10.00/2.5	6000/30.4	15.0 Total	50 Total	

* Multiple section dampers are available in unlimited sizes.

Leakage information based on pressure differential of 1" w.g. (0.248 Kpa) tested per AMCA 500.

** Higher temperature ratings available consult Ruskin.

Note: Alternate materials such as stainless steel construction available as an option.

Quick Reference Chart

HEAVY DUTY CONTROL DAMPERS

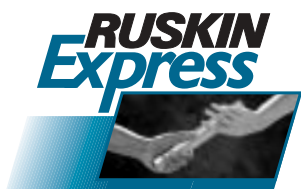
Damper Model	Standard Construction Description	Applications	Damper Width in. & (mm) (Single Sections)*	Max. System Pressure (in. w.g. / Kpa)	Max. System Velocity (FPM / M / S)	Leakage With / Without Seals (CFM / SQ.FT.)		Temp. Range °F and (°C)**
CDRS82	• 16 ga. x 8" galvanized round channel frame up to 18"	Isolation	48" (1219)	4.00/1.0	2500/12.7	11.3 Total	35 Total	250°F (121°C)
	• 12 ga. x 8" galvanized round channel frame	Fume Hoods	36" (914)	4.00/1.0	2500/12.7	8.5 Total	28 Total	
	• 18" and above	Pharmaceutical Ventilation	24" (610)	4.00/1.0	2500/12.7	5.7 Total	25 Total	
	• 12 ga. flange		12" (305)	4.00/1.0	4000/20.3	2.9 Total	15 Total	
	• Single skin 16 ga. blade		6" (152)	4.00/1.0	4000/20.3	1.4 Total	7.5 Total	
	• 1/2" shaft to 24," 3/4" shaft to 24" and above							
CDRI95	• 3/16" to 5/16" thick channel frame	Thermal Oxidizers						
	• One piece 3/8" to 3/4" thick blades	High Temperature Round						
	• Minimum 1" stub axles	Ducting			Consult Ruskin			
	• Adjustable ceramic tadpole seal	Inceneration						
	• 500° to 1200°F service							
CD80BOX	• Double skin box 10 ga. blades	Industrial Fan Discharge	72" (1829)	25.00/6.25	6000/30.5	9.0	—	482°F (250°C 2 Hour)
	• Relubricable ball bearings mounted outboard of frame	High Pressure	60" (1524)	34.00/8.70	6000/30.5	9.0	—	
		Tunnel Ventilation	48" (1219)	40.00/10.00	6000/30.5	9.0	—	
	• 3/16" steel channel frame		36" (914)	47.00/11.80	6000/30.5	9.0	—	
	• 1" axle up to 48", above 48", wide consult Ruskin				HIGHER TEMPERATURE AND PRESSURE RATING AVAILABLE – CONSULT RUSKIN.			
	• Shaft packing seals							
IVD	• 10 ga. steel round channel frame	Fan Inlet	60" (1524)	6.00/1.5	2242/11.3	—	90	250°F to 400°F (121°C to 204°C)
	• Multiple 16 ga. blades	Round Duct Balancing	48" (1219)	8.00/2.0	3025/15.3	—	103	
	• 1/2" plated axles	System Control	36" (914)	8.00/2.0	4102/20.8	—	125	
	• Open or bullet nose hub		24" (610)	8.00/2.0	6529/33.1	—	167	
	• External linkage with stainless press fit bearings		12" (305)	8.00/2.0	14103/71.6	—	282	
TD102AF	• 9" x 2" galvanized frame (opt aluminum)	Aluminum Tunnel Damper	60" (1524)	10.00/2.50	4000/20.3	5.2	—	482°F (250°C 2 Hour)
	• 7.75" wide aluminum 215RI anodized blade	250°C/482°F 1 Hour Tested	48" (1219)	15.00/3.80	4000/20.3	5.2	—	
	• 3/4" stainless steel axles bolted to blade	Trtack and Fan Isolation	36" (914)	20.00/5.00	5000/25.4	5.2	—	
	• 10 ga. stainless steel side linkage		24" (610)	25.00/6.30	5000/25.4	5.2	—	
	• Flexible stainless steel side seals							
PDR92	• Flanged channel frame	Make Up Air	52" (1321)		6000/30.4	.045	40	
	• Offset blade	System and Duct Pressure	48" (1219)		6000/30.4	.05	35	
	• Grease lubricated bearings mounted outboard of frame	Pressure Relief	36" (914)	Consult Ruskin	6000/30.4	.07	28	
	• External counter weight		16" (406)		6000/30.4	.13	25	
	• Elastomeric seal				6000/30.4	.24	20	

* Multiple section dampers are available in unlimited sizes.

Leakage information based on pressure differential of 1" w.g. (0.248 Kpa) tested per AMCA 500.

** Higher temperature ratings available consult Ruskin.

Note: Alternate materials such as stainless steel construction available as an option.



Nobody delivers dampers faster...NOBODY!

INDUSTRIAL RECTANGULAR & ROUND DAMPERS

From light operations to heavy-duty applications, Ruskin builds dampers that meet the most demanding situations. Every Ruskin damper is built with performance in mind and are designed to meet or exceed AMCA specifications.

Ruskin works with a variety of materials including galvanized steel, stainless steel, aluminum and fiberglass in order to match our customer's exact specifications. By molding and forming these materials, Ruskin can develop dampers to fit almost any application.



CD30 "in-duct" style dampers can be linked together such as this 2 x 1 assembly or designed and manufactured to operate independently.

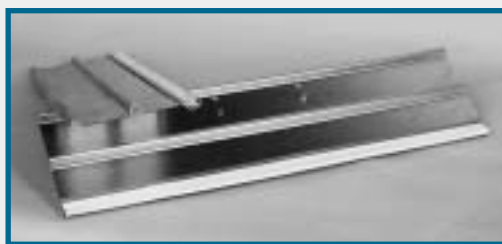
CD30 – CD80

Ruskin's model CD30 available in airfoil or vee groove blade design is well suited for "in-duct" mounting applications. Factory installed face linkage and stainless steel pivot pins provide smooth operation whether with pneumatic or electric actuation or manual hand quadrant.

Ruskin model CD80 is the workhorse of the rectangular damper family. Available in many different material selections and configurations this damper family is easily tailored to meet and exceed your system requirements.



Ruskin can custom design dampers to match any specification.



The vee groove blade is designed to be subjected to lower system pressures and velocities.

INDUSTRIAL RECTANGULAR & ROUND DAMPERS



Operating linkages can be located in-airstream or mounted as side linkage for routine maintenance and inspection.



Box blades are used when system pressures exceed that of standard airfoil shapes or long blade spans are needed. Available in CD80 series dampers.



Airfoil blades with bolted axles are common, and allows for easy removal of the blade from the frame if needed.

When it comes to industrial ventilation, contractors and engineering firms around the world depend on Ruskin to provide the industry's finest products. Ruskin dampers are designed to perform no matter what the application and environment. And, since most industrial systems can't be shut down for normal periodic maintenance, Ruskin designs its products to support options such as exposed linkages and outboard bearing packages. These facilitate easy maintenance while the system is operational.

High temperature applications are no problem for Ruskin. Where heat is a concern, Ruskin engineers have designed dampers that offer bearings and linkages that extend from the frame to allow for both insulation and heat dissipation.

Actuation may also be installed outboard by using Ruskin's exclusive high temperature couplers.

Through constant testing and damper development, Ruskin has the information needed to calculate blade lengths and cross sections for practically any application.

Although a particular damper blade may be designed for high temperature, it may not withstand extreme system pressures. That's why Ruskin performs actual in-house testing. This allows Ruskin engineers to select the right blade design to meet the customer's need.



Ruskin damper model CDRI92 can be easily adapted to provide tight shut-off in large openings. This 10' x 10' (3.048 M x 3.048 M) CDRI92 equipped with full circumference silicone blade seals meet leakage of 14 cfm (.39648M³) total per section. Electric 2 position actuators were installed with right angle gear boxes and direct coupled to a 3" (76.2 MM) O.D. extended damper output shaft.

INDUSTRIAL RECTANGULAR & ROUND DAMPERS

PDR92

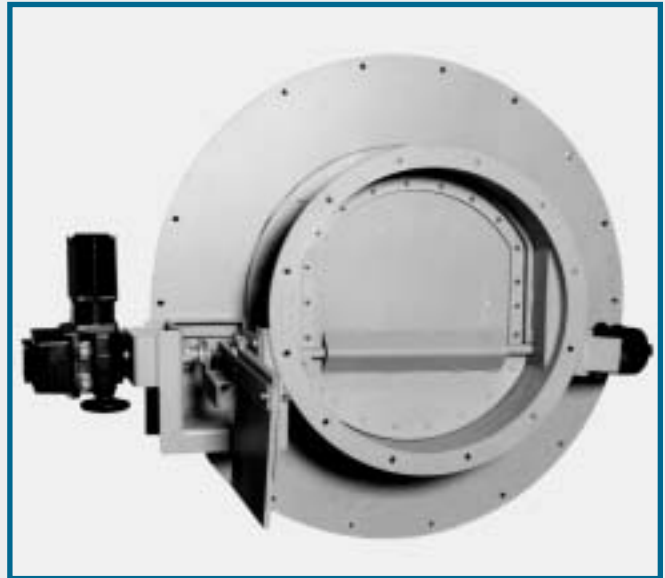
Ruskin's PDR92 round purge dampers have been specifically designed for both duct protection and additional make-up air applications. They are equipped with a counterbalanced arm and actuation override. This damper can be operated to open upon demand or by system pressure. They are perfectly suited for RTO systems requiring fan make-up air during start up.



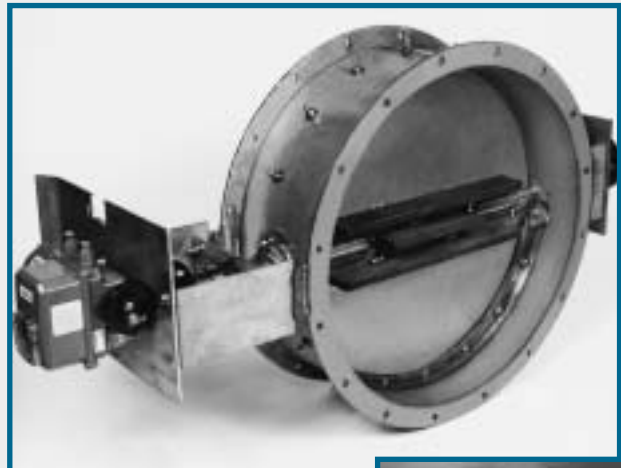
From 12" inside diameter to 102", Ruskin's manufacturing capabilities are limitless.

CDRI92

Model CDRI92 is the lowest leakage rated round control damper without stepping up to Ruskin's bubble tight damper family. Standard with full circumference wiper seal and outboard bearings with shaft seals this damper can test to .009SCFM (.00025488 M³) per inch of perimeter at 10" w.g. (2.5 Kpa).



Flanged or unflanged the CDR damper family will accept either ANSI drilling or customer supplied bolting.



Ruskin model CDRI95 equipped with heat shield and thermal coupler.



CDRI95

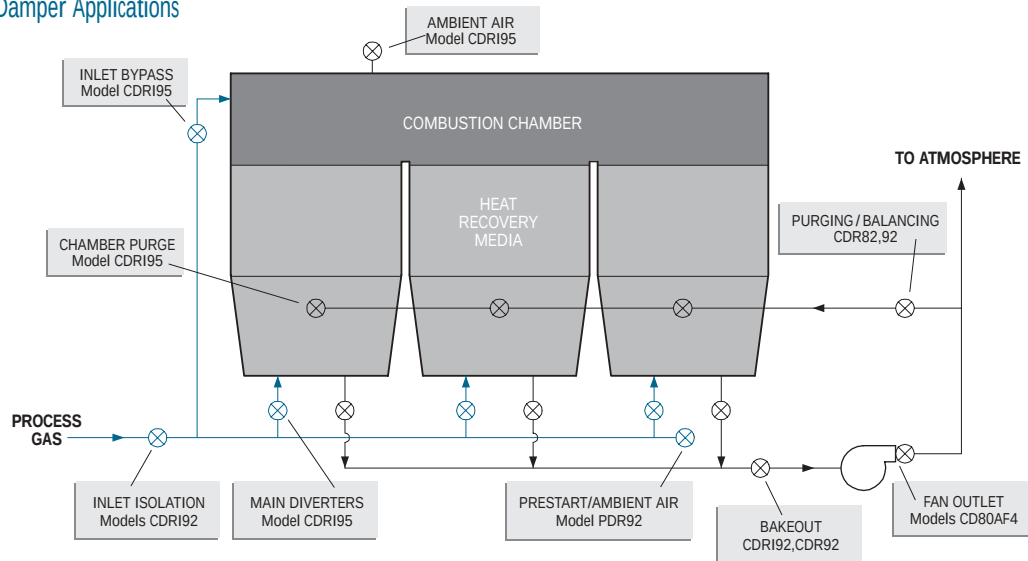
Ruskin's model CDRI95 is designed and constructed for exposures up to 1200°F (649°C). A removable ceramic tadpole seal design allows the CDRI95 to be easily maintained and provides low leakage at elevated temperatures.

HIGH TEMPERATURE APPLICATIONS

Precise flow control of Volatile Organic Compounds (VOCs) and other Hazardous Air Pollutants (HAPs) within an oxidizer system will optimize destruction efficiency and contribute toward the venting of treated exhaust that is in compliance with Clean Air regulations. To accomplish this, the control dampers (integral to the design and efficiency of the system) must withstand elevated temperatures and a caustic environment while meeting stringent leakage criteria. Through close affiliation with system manufacturers and engineers, Ruskin has developed a complete line of products designed to provide efficient airflow control in the most demanding applications.

Regenerative Thermal Oxidizer (RTO)

Ruskin Damper Applications

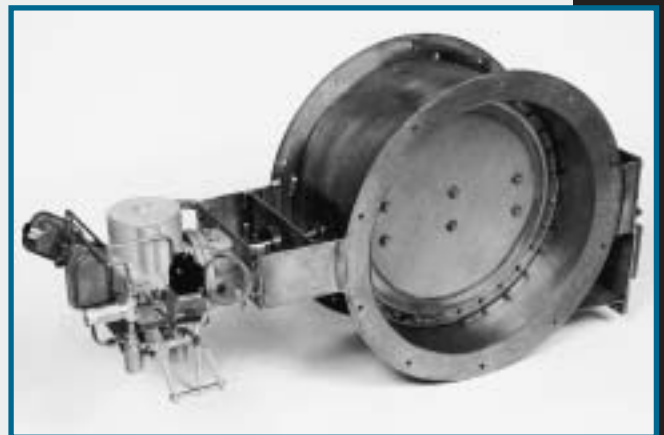


Model CDR195 High Temperature, Low Leakage Damper

Ruskin product developments for the pollution control industry continue to surpass the competition! Our CDR195 damper is designed to operate efficiently in environments where low leakage is critical and where airflow temperatures are extreme. Functioning as a DIVERter VALVE that constantly redirects process exhaust gases from one chamber to another, the CDR195 will enhance system efficiency through precise airflow control.

Product Features Include:

- Removable ceramic tadpole seal design allows for ease of maintenance and minimizes leakage at high temperatures
- Sizes in excess of 68" (1727 MM) in diameter
- Designed for continuous operation up to 1200°F (649°C) and intermittent excursions to 2000°F (1093°C)
- Available in standard carbon steel or various grades of stainless steel
- Center-pivoting blade design to enable "positive" seating
- Engineered coupler for direct mounting actuator in high temperature applications



TUNNEL VENTILATION PRODUCTS

From Los Angeles to London to Hong Kong, Ruskin's Tunnel Ventilation Products are supplying commuters a breath of fresh air...even when they are underground. Ruskin tunnel ventilation dampers are relied upon worldwide. These specialized dampers provide fire protection as well as purge and smoke control during emergency conditions.

By using a combination of stainless steel, galvanized steel and aluminum, Ruskin tunnel dampers can withstand the harshest conditions, including the constantly changing environments found in most tunnels.



Ruskin supplied CD80 series tunnel dampers to provide smoke control and fan isolation to Seattle Washington's 23rd street automotive tunnel.



Ruskin Model TD102 and TD30AF have been tested and certified to meet 250°C (482°F) for two hours with electric and pneumatic actuators. For extended duration, Ruskin tunnel damper actuators can be provided with heat couplers and insulated bags.



Ruskin provides the complete package. Terminal Boxes and factory installed conduit can be installed and tested as shown on these 3 x 3 (.914 M x .914 M) section TD102AF Tunnel Ventilation Dampers.

TD30AF2

Galvanized airfoil blades and stainless steel axles provide the TD30AF optimum performance for fire rated tunnel ventilation dampers. It's construction meets requirements of BS476 pt. 20, UL555S, NFPA 130 and has been tested in accordance to AMCA 500. Equipped with either pneumatic or electric spring return actuators this damper provides excellent fail safe protection. Press fit stainless steel bearings and stainless blade and jamb seals provide the corrosion protection needed in tunnel environments.

TD102

Aluminum airfoil blade control dampers are well suited for tunnel ventilation projects. Damper blades are extruded from 6063T5 aluminum and anodized with a 215RI anodized finish. Axles are mechanically fixed in full length extruded blade tubes and supported on each end by externally mounted flanged bearings. 10 ga. (3.42 MM) minimum hot dipped galvanized frame is provided with offset flanges for ease of installation. Tested and approved to 250°C (482°F) for one hour meeting NFPA 130, *Fixed Guideway Transit Systems*.

TUNNEL VENTILATION PRODUCTS



Engineers designing tunnel ventilation safety systems, which include smoke and fire dampers, have relied on Ruskin's expertise for over 40 years. They know that each damper is thoroughly checked, tested and

cycled before it is sent out. And, to make certain each damper performs up to specifications, leakage and performance requirements are verified through Ruskin's Research and Development department.

With over 100,000 sq. ft. (92,963 M²) dedicated solely to tunnel ventilation products, Ruskin offers the industry's largest manufacturing capacities.



These special stainless steel CD80AF4 tunnel ventilation dampers are fitted with external bolt on bearings and stainless steel jamb seals. 12" (305 MM) wide airfoil blades and 3/16" (4.69 MM) thick offset frames will provide years of maintenance free operation.



Ruskin's test facility provides vital information on leakage and pressure drop on selected tunnel damper sizes.



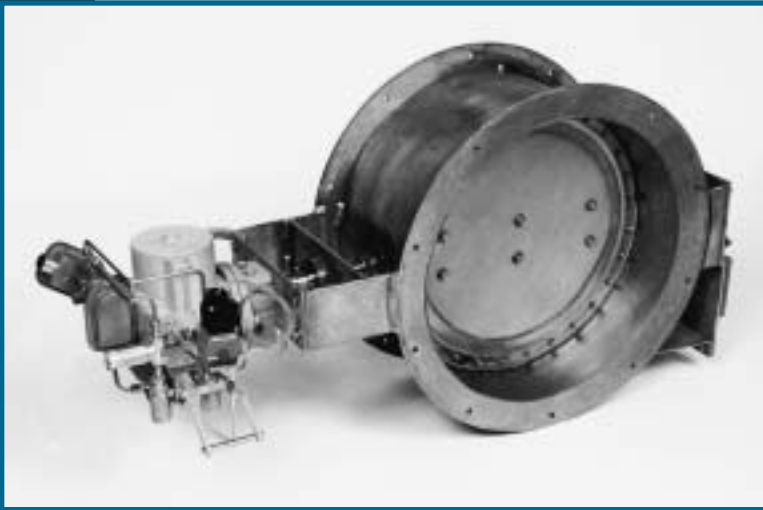
Ruskin model TD30AF provides fan isolation and natural ventilation to the 2km Western Harbor Crossing in Hong Kong, which is capable of carrying 180,000 vehicles each day.



Over a million simulated pressure transversals at 24" w.g. (6Kpa) in both directions have been conducted on this TD30AF providing Ruskin engineers valuable information on bearing loading and possible blade fatigue.

ACCESSORIES & OPTIONS

With over 40 years of experience, Ruskin has designed dampers to fit practically every industrial application. Today, the fully-staffed engineering department is ready to tackle new challenges. Ruskin eliminates guesswork when ordering and selecting dampers by offering many standard features, including bolt-on bearings and shaft seals. And, to make certain the damper meets specifications, Ruskin's in-house 15,000 sq. ft. (13,935 M²) testing facility verifies damper leakage and performance.



Certain elevated temperature applications may require the use of Ruskin's high temperature couplers reducing heat transfer into the actuator.

From pneumatic to manual type actuation, Ruskin can engineer and install the right actuation for any application. Auxiliary positioners, limit switches and other communication output signal devices are considered part of the complete Ruskin package. All actuation packages are cycled and tested for accuracy and performance prior to shipment.



Double clevis crank arms and bolt on bearings are standard on CD80 series dampers.

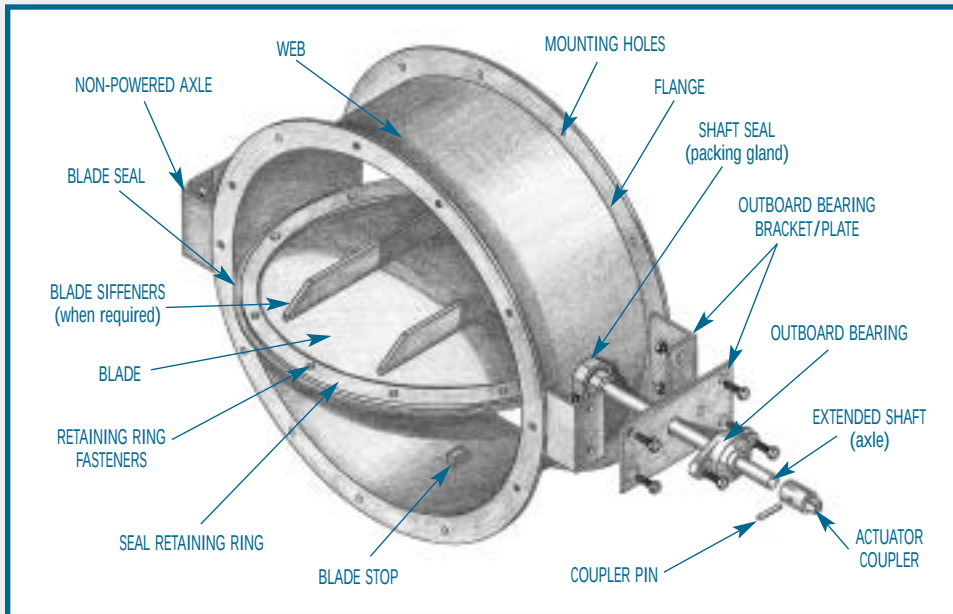
Ruskin can provide infinite hand quad operation or manual hand wheel override on all industrial grade dampers.

Right angle gear box and hand wheel provide manual override when needed on this electric spring return actuator.

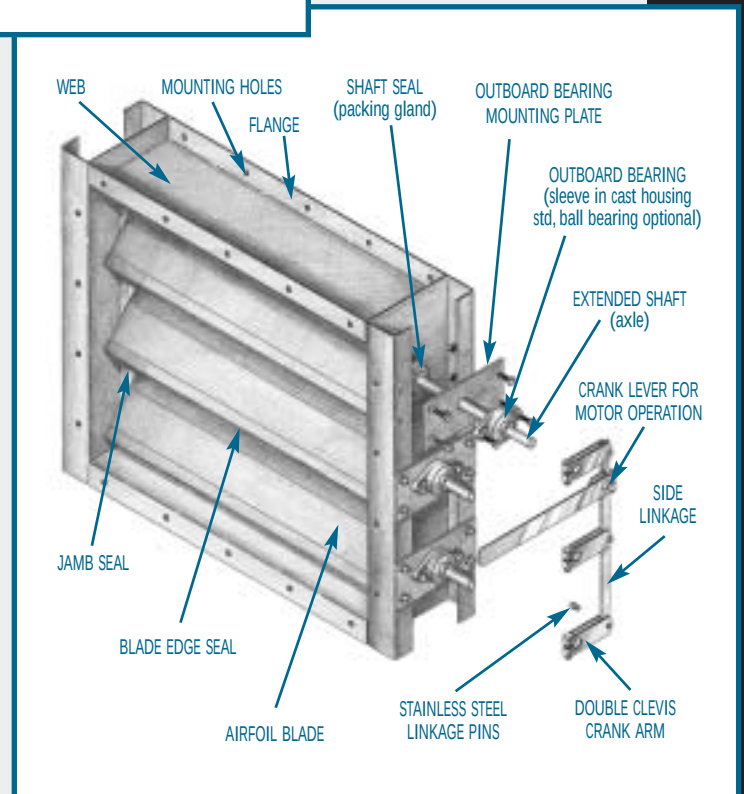


ACCESSORIES & OPTIONS

These illustrations depict typical damper construction. Ruskin dampers may or may not use all the options shown. Depending on your application or system requirements you may require additional variations than those shown. Use these drawings as reference when selecting your next Ruskin Industrial dampers.



Standard catalog construction is called out on all Ruskin specification sheets. Pressure rating and leakage rates are based on standard construction. Ruskin Industrial grade dampers are capable of being tailored to meet certain demands such as larger flanges or nonstandard bolt patterns. These options can be used on both rectangular and round dampers. Elevated temperatures may require axle bolting or tolerance increase, which may change standard catalog performance ratings. Consult Ruskin to discuss your particular needs and systems requirements. Ruskin Industrial grade dampers are easily modified.



ACCESSORIES & OPTIONS

HIGH TEMPERATURE

Temperatures above Ruskin standard construction can be met by using many different methods. Listed are a few explanations and suggestions when ordering and specifying Ruskin dampers for elevated temperatures.

Heatshields

1. Use heatshields if temperature exceeds 400°F (204°C) to 500°F (260°C)
2. Above 500°F (260°C) mount actuator offset of power axle. No heatshield is required if actuator is offset and temperature is below 800°F (426°C), unless customer specifies.
3. Use high temperature seals in pneumatic actuators if offered by actuator manufacturer. Check with manufacturer on seals and temperature ratings.



Heatshields are used in an attempt to deflect the radiant heat coming off the damper frame, away from the actuator. However, this does not stop the heat from conducting through the axle and coupling from entering the actuator. The actuator is offset from the power axle to eliminate this problem. Excessive heat present in the actuator can damage internal seals and liquify the necessary lubricants in the actuator, thus causing failure in actuator operation. We make every effort to eliminate the damaging effects that heat can have on actuators by supplying heat dissipating couplers.

Axles

It has been proven that the electro-zinc plating that we use on our standard axle stock begins to flake off at approximately 450°F (232°C). When this occurs, the plating material can collect between the bearing and axle causing increased friction and torque. Also, this possibly can cause the damper to seize up. In order to prevent this, we specify using 304 stainless steel axles in place of electro-zinc plated axles when temperatures exceed 400°F (204°C).



- Bolted Blade to Axle Construction
Rectangular units — Stub axles can be welded to blade up to 850°F (454°C). Above 850°F (454°C) bolt blade to axle.

All full length axles above 500°F (260°C) to be bolted to blade. Due to the expansion rates of dissimilar metals at elevated temperatures we run the risks of welds cracking.

- Round Dampers
As a rule, Ruskin recommends bolting blade to axle for all round dampers over 500°F (260°C) continuous operation.

Bearings

Maximum recommended temperature for sintered stainless steel bearings is 1500°F (815°C).

For temperatures above 1500°F (815°C), use cast iron bearing.

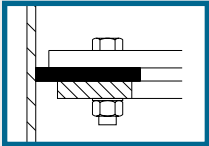


Graphite bearings are not recommended unless specified. Graphite bearings have a tendency to absorb moisture and crack, and are very expensive in comparison to Ruskin's standard sintered stainless steel bearings. Relube ball bearings packed with Dupont Krytox 240 AC Grease can be bolted to frame up to 300°F (149°C). If mounted outboard of frame, the bearing could be used in applications up to 500°F (260°C).*

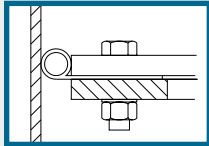
When using graphite bearings the use of stainless steel axles are required. Carbon steel axles may rust inside of the bearing causing axles to bind.

*Consult Ruskin for higher temperatures.

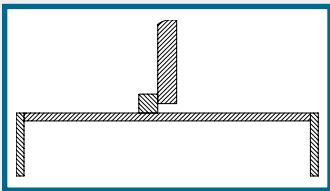
Typical blade seal arrangements (round dampers)



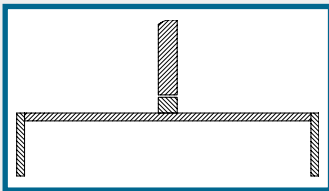
Wiper Seal



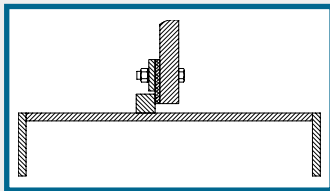
Tadpole Wiper Seal



Metal to Metal

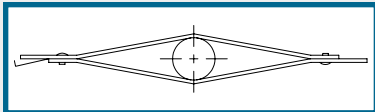


Scissor Type

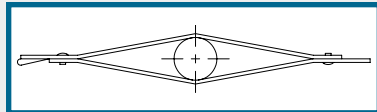


Full Circumference with Blade Seal

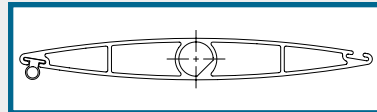
Typical blade seal arrangements (rectangular dampers)



Stainless Steel



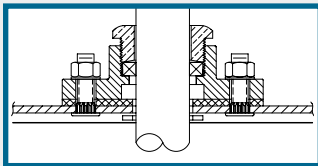
Fold and Sewn Silicone



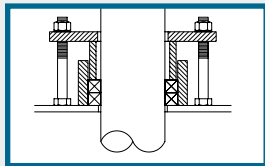
Interlocking Extruded Seal

TYPE	TEMPERATURE
Silicone	400°F Maximum (204°C)
Neoprene	250°F Maximum (121°C)
EPDM (Nordel)	250°F Maximum (121°C)
Tetraglass	1000°F Maximum (537°C)
Ceramic	2200°F Maximum (1204°C)
Viton (Fluorocarbon)	400°F Maximum (204°C)
Stainless Steel	1000°F Maximum (537°C)

Typical shaft seal arrangements



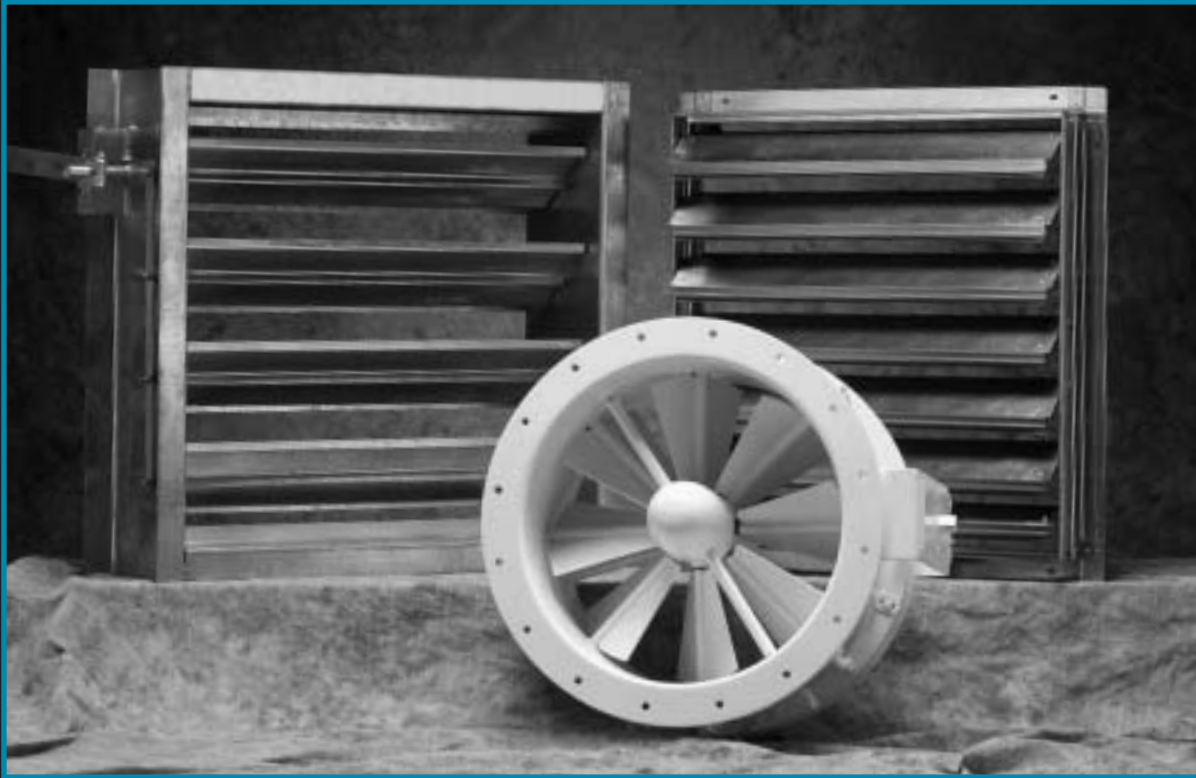
Stuffing Box Shaft Seal



Pump Type Shaft Seal

Typical Shaft Seal Materials

PACKING TYPES	TEMPERATURE
Non-Asbestos and Silicone Free Fiber Infused TFE	450°F (232°C)
Chrysotile Asbestos Graphite and Asbestos Core with Inconel Wire	1000°F (537°C)
100% Graphite	2500°F (1371°C)



To learn more about Ruskin's products and their specifications, see Ruskin's website at www.ruskin.com.
Our website also has the contact information for the Ruskin representative nearest to you.

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