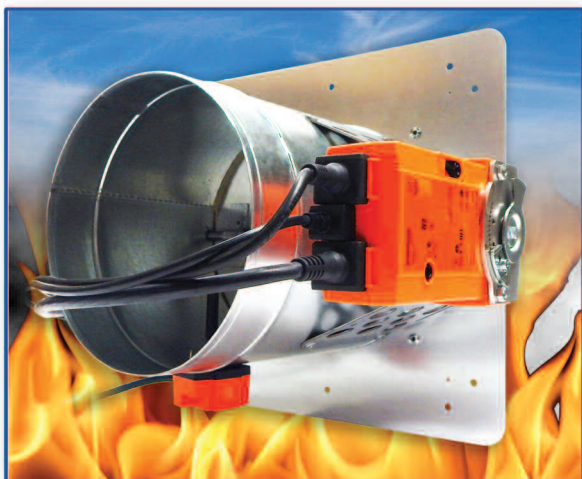


FSD-C Series



Circular Single Blade Combination Fire and Smoke Damper

- ES classified fire dampers with reduced smoke leakage characteristics to BS EN 1366-2 (test standard) and BS EN 13501-3 (extended field of application)
- Aerodynamically Air Control tested to BS EN 1751
- Tested and assessed installation methods in differing support constructions BS EN 1366-2
- Rotatable cleats®
- Can be installed from one side of the fire separation without the need to fit a secondary installation plate or provide fire-rated infill material
- Replaceable thermal fuse element from outside of the duct.
- Commissioning friendly
- Blade Position Indicator
- IP54 degree of protection
- Test switch for periodic damper testing
- LED green indication when lit indicates that a supply voltage is present and that the temperature fuses are operational
- Damper casings conform to BS EN 1506
- CE marked complying with the requirements of EN 15650



MANUFACTURERS OF AIR, FIRE AND SMOKE CONTROL PRODUCTS



Introduction

The FSD-C Motorised Failsafe Single Blade combination Fire and Smoke Damper has been designed specifically for installations where space is at a premium and installation within the fire separation is not feasible.

The FSD-C Single Blade Fire/Smoke Damper provides greater free area than comparable sized conventional multi blade fire/smoke dampers.

The installation plate, with its engineered installation perforations, acts as a template to allow the marking of the fixing positions on the surface structure to which the plate will be affixed, allowing for a quick and efficient install.

Introduction

What is a fire damper and why might they be needed?

The FSD-C Series Single Blade Circular Fire Damper is designed to stop the spread of fire through ducts passing through walls and floors.

The product range has many features and options to meet the requirements of specifiers, contractors, local and national authorities. Dampers are available to suit both low/medium and high velocity applications.

What are the 'E' and 'ES' classifications?

To achieve the classifications to EN13501-3, fire dampers and fire and smoke dampers shall be tested to EN1366-2 and a 300Pa pressure difference is applied across the damper. During the fire test period, the integrity of the seal between the damper and the structure shall not have any gaps larger than 150mm x 6mm. There shall not be any sustained flaming. The largest size of damper to be manufactured for sale as a single section shall be fire tested.

E = Integrity

The maximum leakage permissible at 300Pa corrected to 20°C is 360m³/hr/m² (100 l/s/m²) throughout the fire test period.

ES = Integrity with Smoke Leakage Performance

The maximum leakage permissible at 300Pa corrected to 20°C is 200m³/hr/m² (55.5 l/s/m²) at ambient prior to the fire test and throughout the fire test period. In addition, for the ES classification to be attained, the smallest damper must also meet the 200m³/hr/m² maximum leakage with a 300Pa pressure across the damper. (This is equivalent to just 0.55 l/s on a 100x100 damper)

Fire dampers should be installed as tested.

Some applications (fan off) allow the use of tests undertaken to BS 476-20/22 and this is also allowed worldwide in areas outside of the EU. Test reports showing testing to EN 1366-2 should be acceptable to meet the requirements of BS 476-20/22, but the reverse is definitely not the case and no classifications are available.

However, as a word of caution, in whichever case, the correct model must be selected, to match fire resistance time with installation method and with the supporting construction (wall or floor).

To ensure that all testing and assessments are traceable back to initial fire test reports, the BSB FSD-C series is product certificated by the Loss Prevention Certification Board (LPCB). This means that in addition to normal BS EN ISO 9001 compliance, the product is also checked to ensure that same product is being manufactured that has been tested or assessed.

BSB have a policy of continued testing and product certification to try and provide as broad a number of installation methods as possible.

BSB also follow regulation and standards development very carefully to provide input on changes and to be able to pass on relevant information to designers, specifiers, building control authorities (BCA's) and installers.

FSD-C Features and Benefits

- Tested and certified installation variants of the FSD-C are available for both blockwork and stud partitions.
- All BSB tested installation methods give at least a E90 classification.
- Unique blade construction.
- Halogen free LSF cable
- Exceeds the requirements of EN1366-2
- Reduced commissioning time
- Thermal fuse replaceable external to the duct.
- Test switch integral to the thermal fuse allowing the damper to be tested locally and individually.
- LED indication that power is available to the actuator and the thermal fuse is intact.
- Installation plate with template location holes to allow easy installation.

Testing and Conformities

Tested to EN1366-2. See installation details for full details.

Damper casings conform to BS EN 1506

Tested/assessed and achieved equivalent classification to:

ES Classification (BS EN 1366-2/BS EN 13501-3)

- BSB FSD-C fitted with Installation Plate
 - E180 - Blockwork/Masonry wall
 - ES120 - Blockwork/Masonry wall
 - ES90 - Concrete floor
 - ES120 - Horizontal application (please refer to BSB sales office)
 - ES90 - Horizontal application (please refer to BSB sales office)
 - E120 - Dry Partition wall
 - ES120 - Dry Partition wall

Integrity only (BS 476-20/22 - ADB)

Meets the requirements of BS 476-20/22 -

Refer to BS 476-10.6.6.3

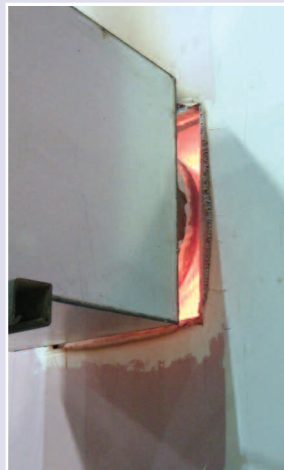
FSD-C Blade leakage (BS EN 1751)

- Class 2

Corrosion Testing

BBA test report 50447 issue 2 refers

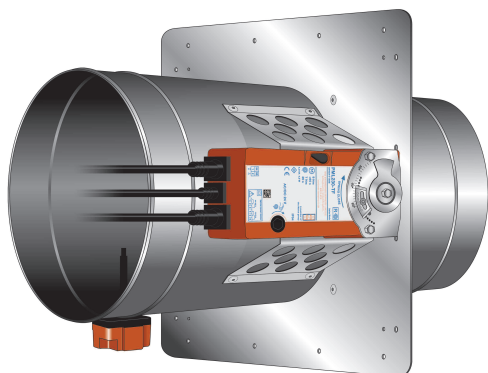
- Tested to BS EN 60068-2-11:1999



The FSD-C Series Range

The BSB FSD-C series is available in the following case diameters:

FSD-C100 - 100mm dia.	FSD-C200 - 200mm dia.
FSD-C125 - 125mm dia.	FSD-C250 - 250mm dia.
FSD-C150 - 150mm dia.	FSD-C300 - 300mm dia.
FSD-C160 - 160mm dia.	FSD-C315 - 315mm dia.



Thermal Fuse

The BSB PML24-TF and PML230-TF actuators incorporate a thermal fuse (TF), which operates at 72°C.

The thermal fuse will be factory fitted to the FSD-TD series damper a quick visual check as standard, unless requested otherwise.

The thermal fuse has a green LED indicator which provides a quick visual check that the fitted actuator is receiving power and that the thermal fuse is intact.

A momentary push test switch is included within the thermal fuse head for periodic testing of the damper.

For reasons of safety the thermal fuse is designed to operate only once upon reaching the activation temperature. Cutting the cable to the thermal fuse with the power on will trip an electrical fuse within the actuator, rendering it inoperable.



Damper Control Panels

BSB offer two alternative damper control panels when monitoring and controlling dampers. The Electro Mechanical System and the Fully Addressable System. Please contact our sales office or consult relevant product brochures for further information.

Damper Weight Chart Including Actuator (kg approx.)

Nom. Dia. (mm)	320mm no inst.plate	320mm with inst. plate	420mm no inst.plate	Total Weight
100	0.7	2.7	2.5	2.8
125	1.0	3.0	2.7	3.2
150	1.2	3.3	3.1	3.5
160	1.2	3.3	3.2	3.5
200	1.8	4.0	3.7	4.3
250	2.6	4.9	4.6	5.3
300	3.7	6.2	5.7	6.6
315	4.0	6.6	6.1	7.0

Typical Tender/Specification Text

The BSB FSD-C combination Fire and Smoke Damper shall pass the test requirements stated in EN 1366-2.

For maintenance of the integrity of compartmentation the fire damper shall have an E classification to EN 13501-3.

The damper shall have an ES classification complying with EN1366-2 and EN 13501-3 and have a minimum E120 and ES120 rating.

For the protection of escape routes and areas with sleeping risk, the FSD-C fire/smoke damper should be used. Please refer Approved Document B (ADB).

The single blade layered design shall be held open against the constant force of the fitted actuator that is released to spring closed via the activation of the fitted thermal fuse rated at 72°C.

The damper actuator assembly shall be safely tested and released closed externally to the damper without the need for specialist tools.

The fire damper body shall be fully welded to meet the air tightness test requirements of HVCA specification DW144 to class A B & C to a maximum of 1000Pa and comply with EN1751.

The closed blade shall meet the air tightness test requirement of BS EN 1751 Class 2.

The BSB FSD-C combination Fire and Smoke Damper shall have a tested or assessed installation method that matches the requirement of the supporting construction. DW145 Method 4 Blockwork Walls and Partition Walls refers.

Leakage Classification

Blade leakage classification is given numerically and case leakage classification is given using capital letters.

- Class 4, 3, 2 or 1 refers to blade leakage - EN1751 section C.2 refers
- Class 4 achieving the lowest leakage.
- Class A, B or C refers to casing leakage - EN1751 section C.3 refers
- DW144 part 8 table 17 and figure 178 refers.
- Class C achieving the lowest leakage at elevated pressures.

The above references are illustrated in the graphs on Pages 10, 11 and 13 of this brochure.

FSD-C Series

Single Blade Fire and Smoke Dampers - Product Specification



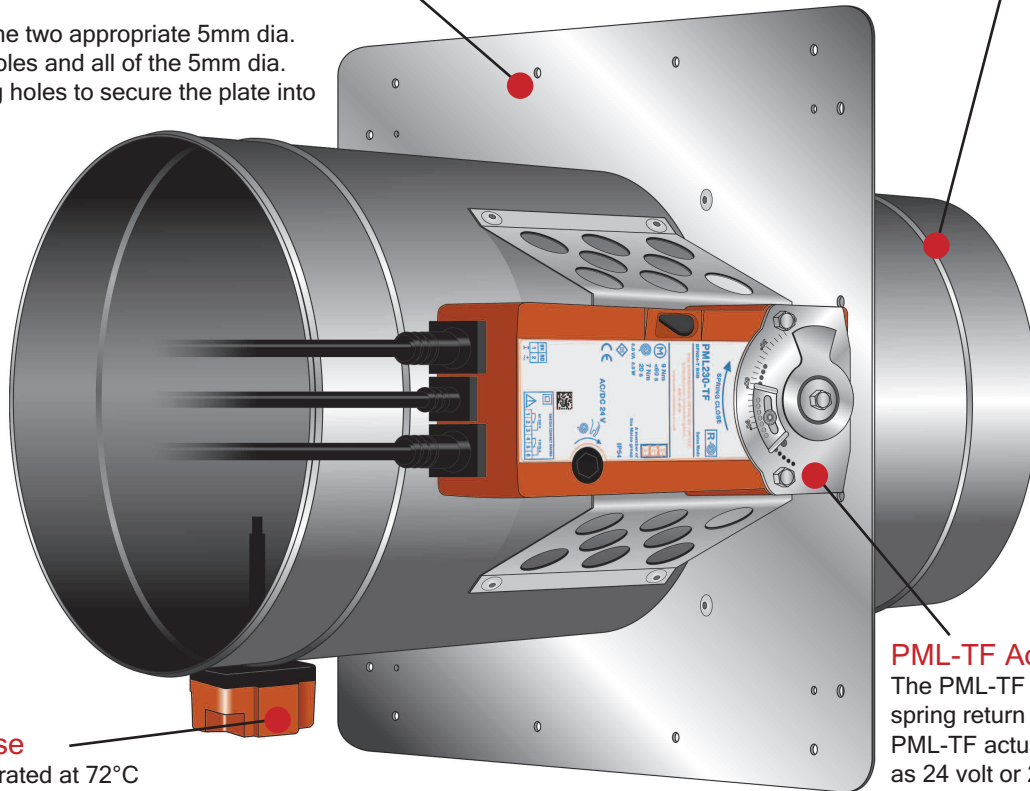
Installation Plate

The installation plate allows the damper to be fixed into place from one side only with no infill material being required on the other open side

Use either of the two appropriate 5mm dia. corner fixing holes and all of the 5mm dia. mid span fixing holes to secure the plate into position.

Case

Galvanised mild steel to
BS EN 10346 DX 51D Z275 0.8 ± 0.1 mm
Damper casing conforms to BS EN 1506.



Thermal Fuse

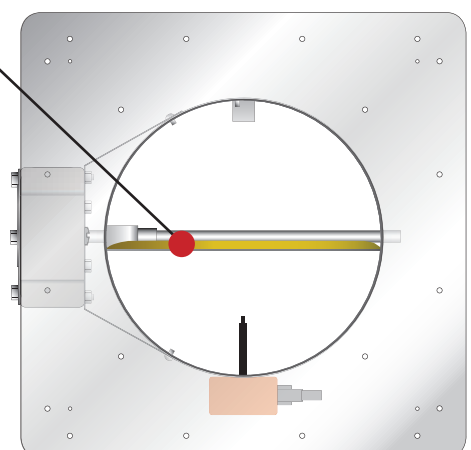
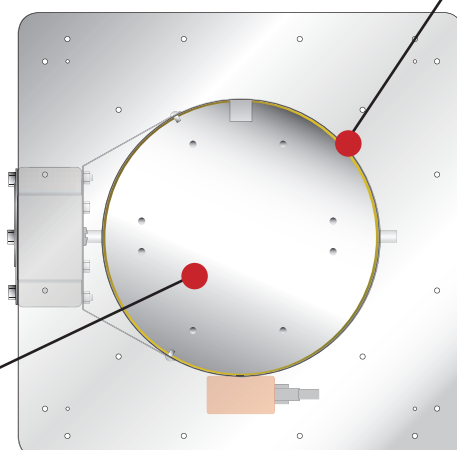
Thermal Fuse rated at 72°C is factory fitted and is replaceable external to the damper case. The thermal fuse is fitted with a green LED indication light which provides a quick visual check that the actuator is receiving power and that the thermal fuse is operational. A manual momentary push test switch for periodic testing of the damper is also included

Blade Seal (patented)

Layered glass woven sheets and central intumescent disc to a patented design that allows the blade assembly to be of minimal thickness, thus minimising pressure loss, providing an effective seal to comply with EN 1366-2 achieving ES classification.

Blade

Galvanised 1.2mm one piece circular steel discs either side of the patented seal design providing a 5mm thick assembly affixed by blade brackets to the drive spindle. Grade 430 stainless steel blade option available.



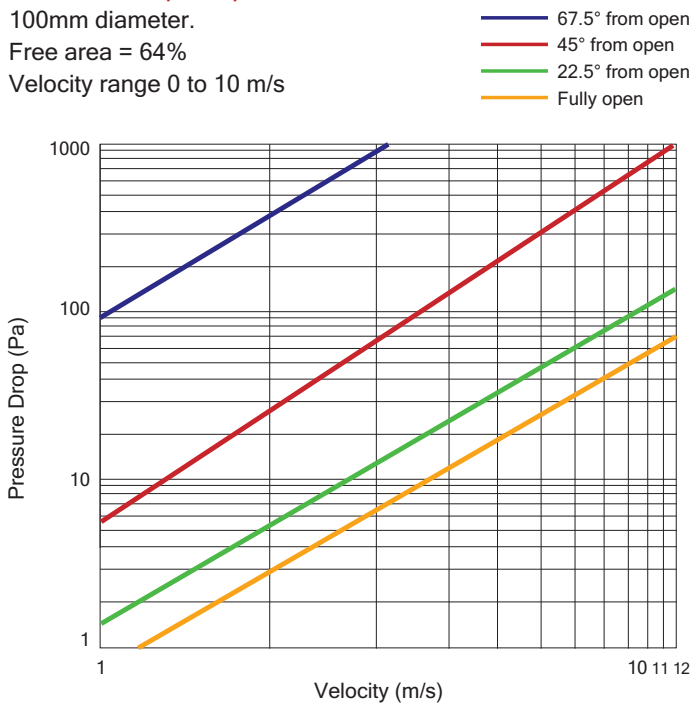
Performance Data

Pressure Drop Graph - Model FSD-C100

100mm diameter.

Free area = 64%

Velocity range 0 to 10 m/s

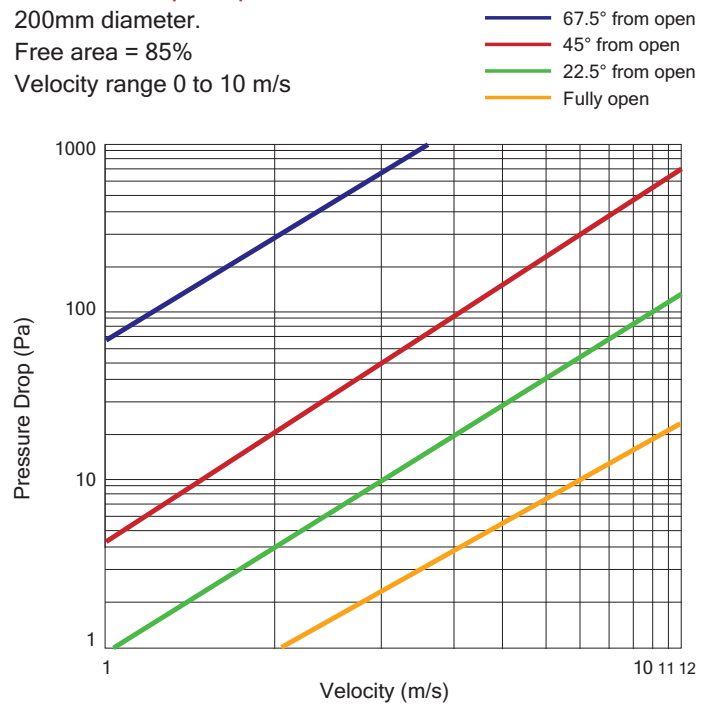


Pressure Drop Graph - Model FSD-C200

200mm diameter.

Free area = 85%

Velocity range 0 to 10 m/s

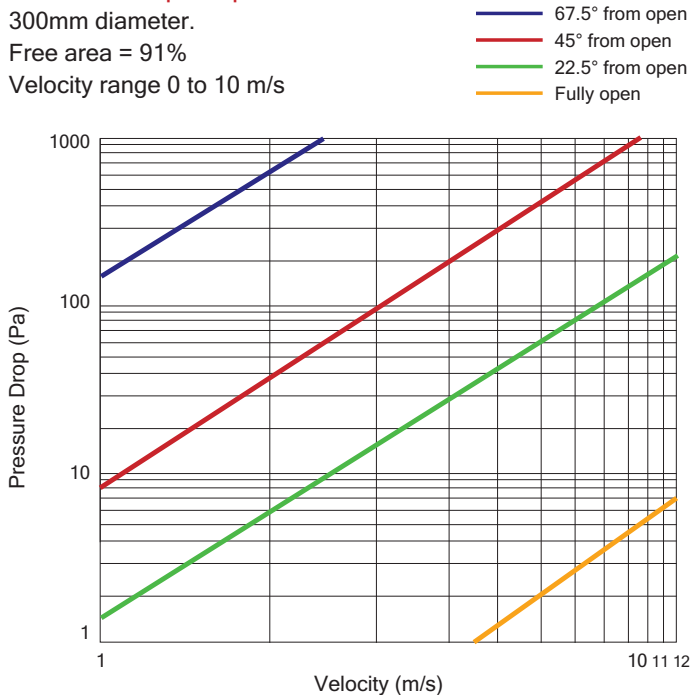


Pressure Drop Graph - Model FSD-C300

300mm diameter.

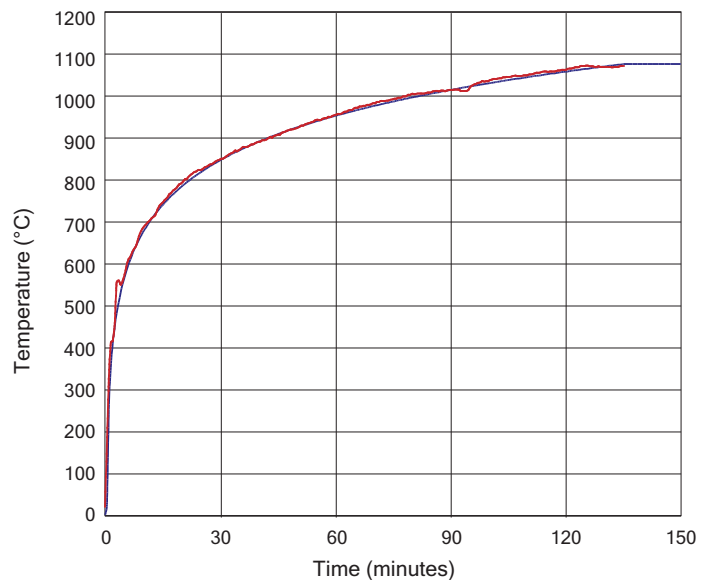
Free area = 91%

Velocity range 0 to 10 m/s



Time / Temperature Curve - EN13501-4:2007

Standard Curve (blue) and BRE Test 279799 (red).

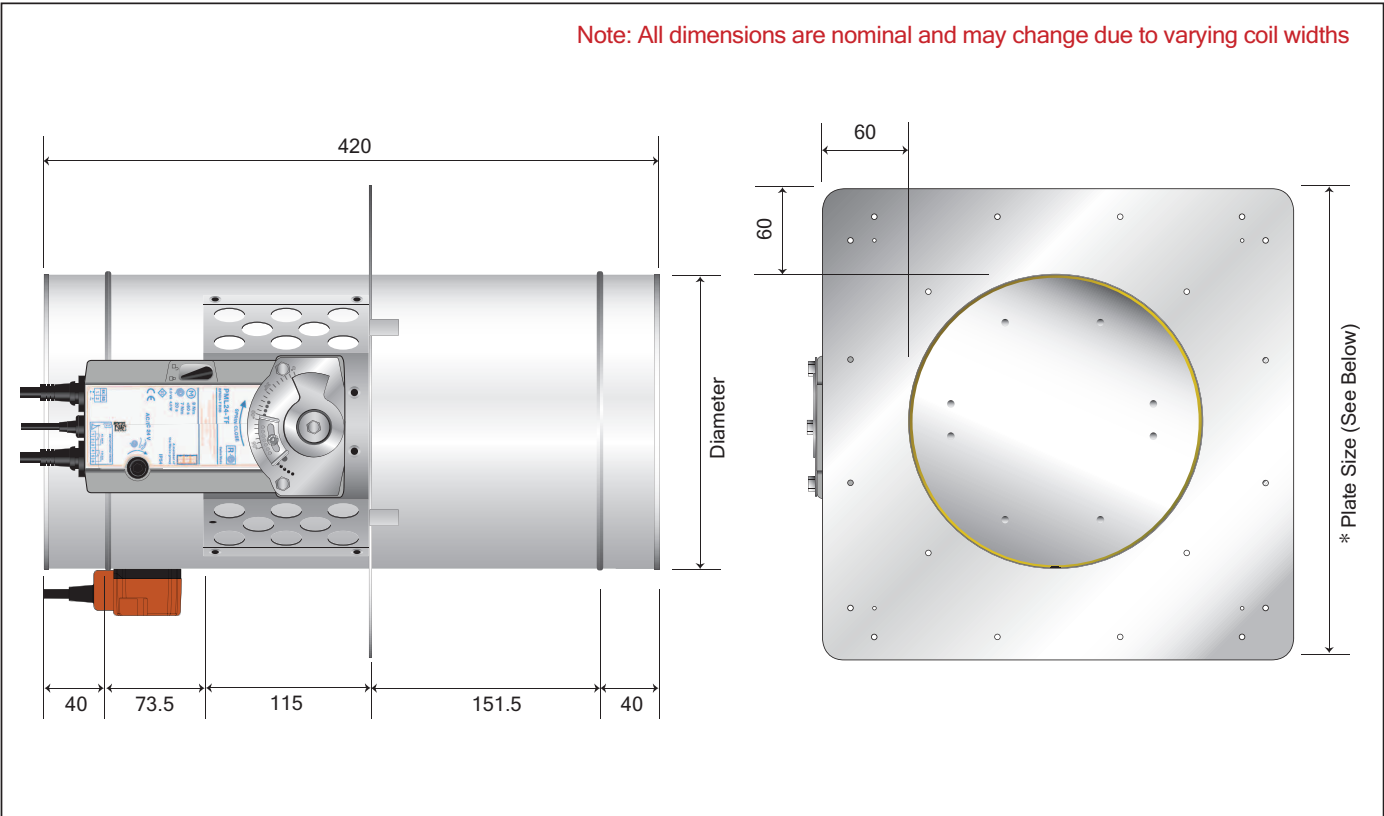


FSD-C Series

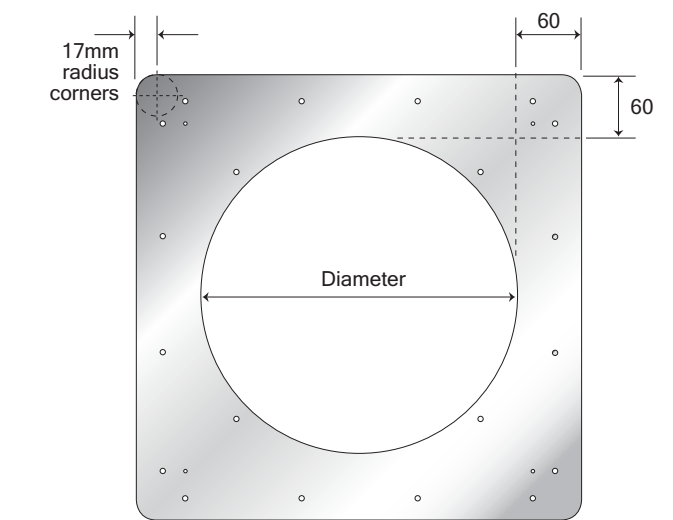
Single Blade Combination Fire and Smoke Dampers - Product Dimensions



The FSD-C Series - Fire/Smoke Damper

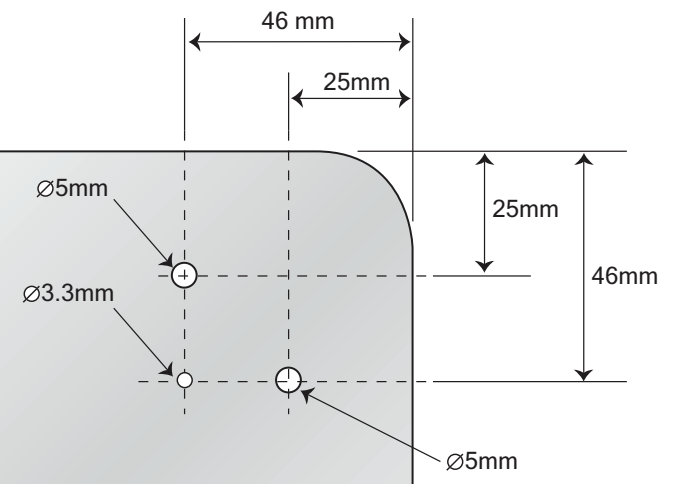


Installation Plates



Model	Dia. (mm)	Plate Size (mm ²)	Flange Size (mm)	Spigot Length (mm)
FSD-C100	100	220	60	40
FSD-C125	125	245	60	40
FSD-C150	150	270	60	40
FSD-C160	160	280	60	40
FSD-C200	200	320	60	40
FSD-C250	250	370	60	60
FSD-C300	300	420	60	60
FSD-C315	315	435	60	60

Installation Plate Fixing Hole Detail



Damper Free Area

Model	Free Area	Model	Free Area
FSD-C100	74%	FSD-C200	88%
FSD-C125	80%	FSD-C250	90%
FSD-C150	84%	FSD-C300	92%
FSD-C160	85%	FSD-C315	92%

FSD-C in Blockwork Wall

Tested to BS EN 1366-2

The FSD-C series damper has been tested both ways, with access side inside the furnace and non-furnace side.

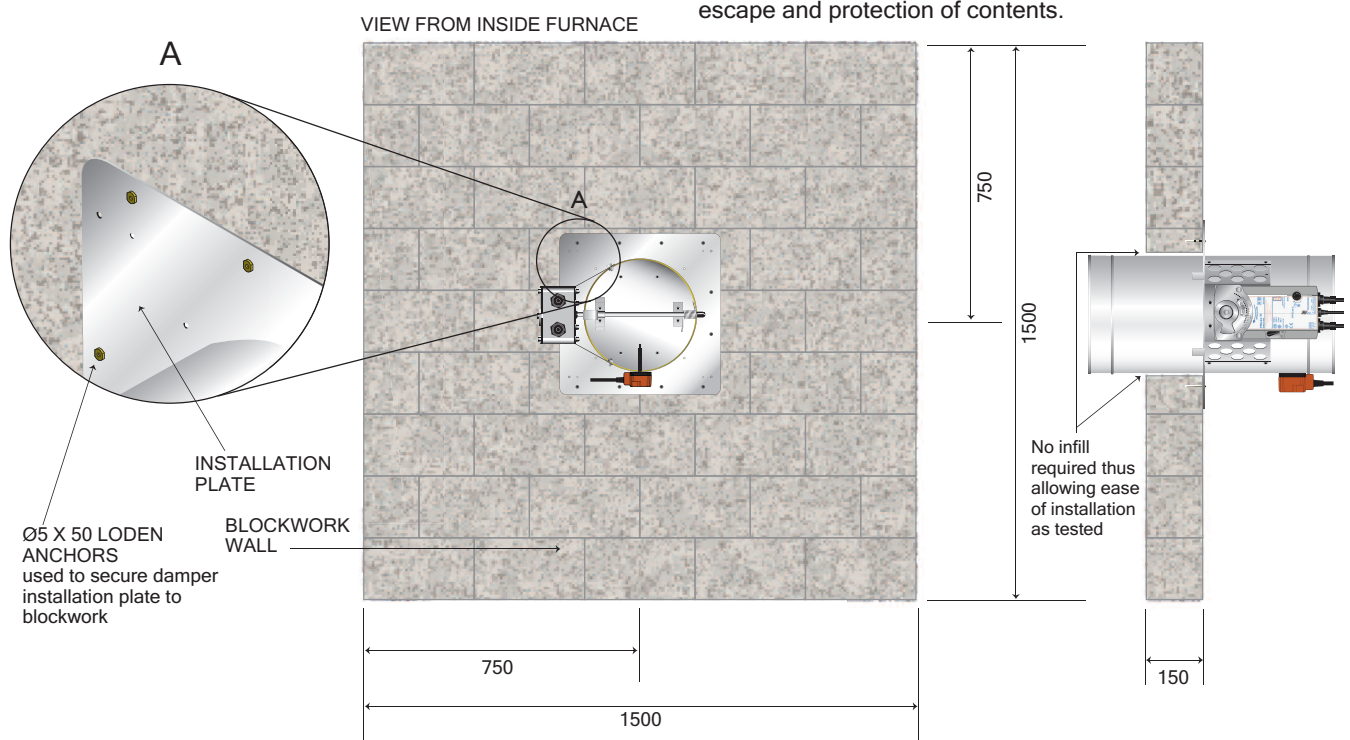
- Tested to BS EN 1366-2 and BS EN 13501-3
- E180 integrity classification.
- ES120 integrity classification.
- ES90 horizontal concrete floor.
- Complies with classes A, B & C of DW144.
- Surpasses minimum requirements on case leakage
- Surpasses minimum requirements on blade leakage

Test Conclusions:

The FSD-C combination Fire and Smoke Damper satisfied the requirements of BS EN 1366-2 and BS EN 13501-3 achieving the lowest closed blade leakage of any damper within its class.

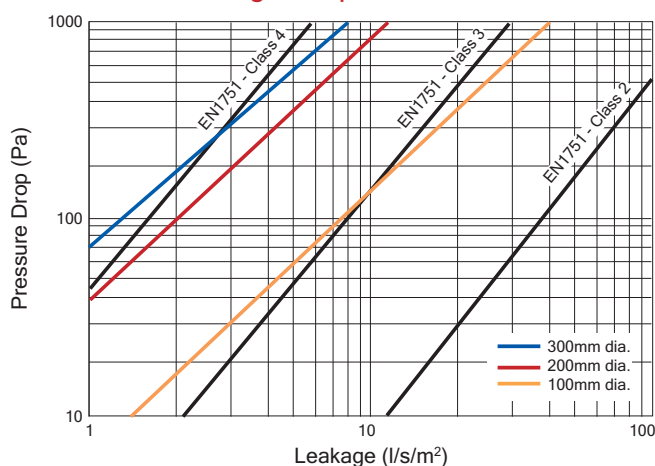
Dampers were tested affixed to the inside of the furnace wall and also to the external wall of the furnace with the damper closed blade being fully exposed to the furnace rapid rising temperature.

The achieved ES classification ensures that in a fire condition the non fire side is fully protected (from radiated heat) for the achieved period, providing vital time for the emergency services to respond, ensuring safe passage of escape and protection of contents.

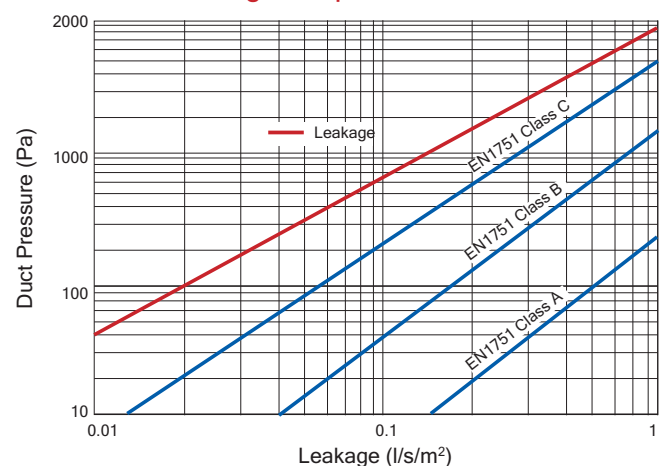


The addition of the PML actuator allows this tested product to become fully automatic in its operation via the fire detection system or one of the BSB control panels. To comply with the forthcoming revision of the fire damper test standard.

Blade Leakage Graph



Case Leakage Graph - Model FSD-C100



See Page 5 for Pressure Drop Graphs

FSD-C in Dry Wall - Actuator inside and outside of furnace

Tested to BS EN 1366-2

Test Report No. 279799 refers

- Tested to BS EN 1366-2 and BS EN 13501-3
- E120 integrity classification.
- ES120 integrity classification.
- Complies with classes A, B & C of DW144.
- Surpasses minimum requirements on case leakage
- Surpasses minimum requirements on blade leakage
- Damper casing conforms to BS EN 1506

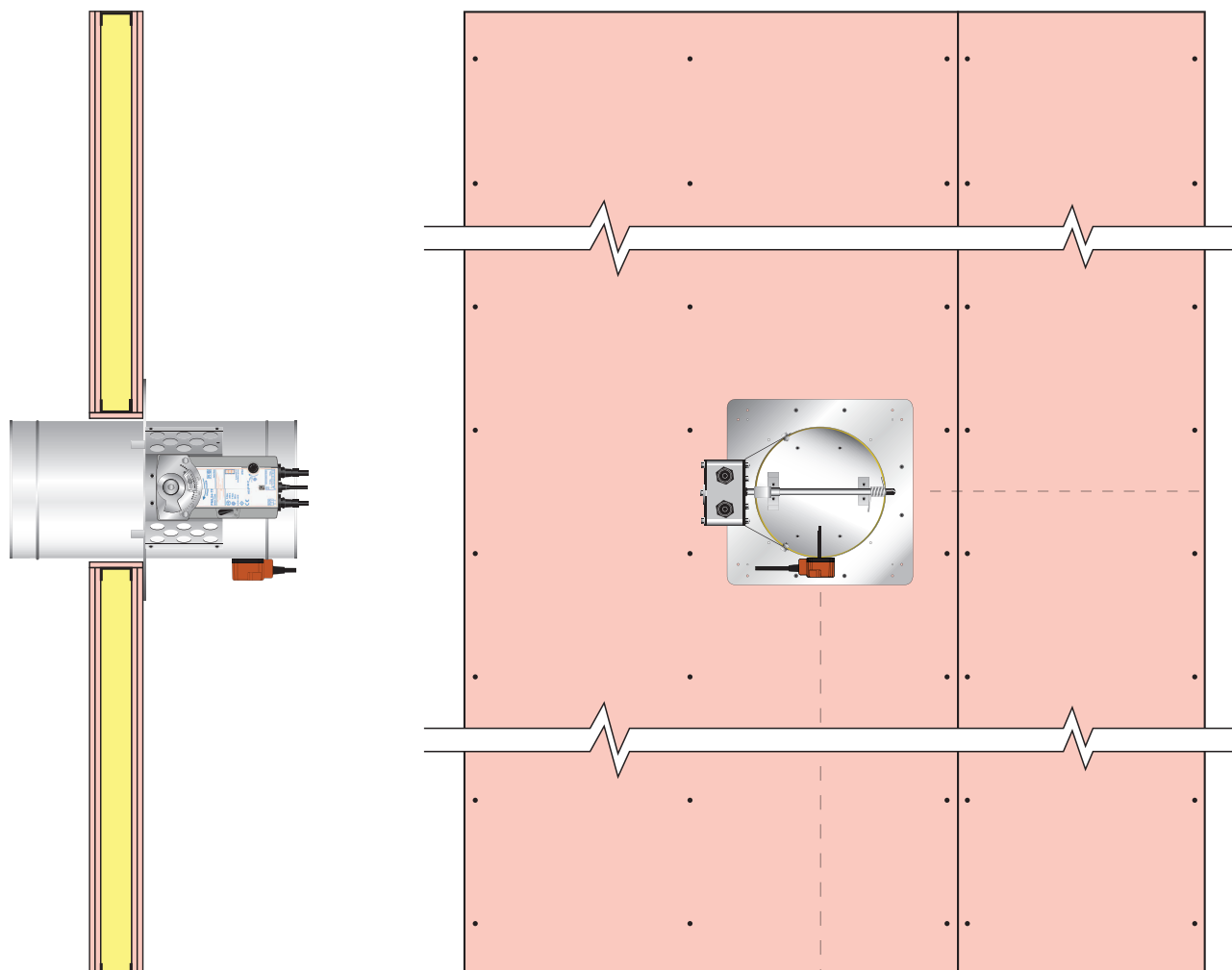
Test Conclusions:

The FSD-C combination Fire and Smoke damper satisfied the requirements of BS EN 1366-2 and BS EN 13501-3 achieving the lowest closed blade leakage of any damper within its class.

Dampers were tested affixed to the inside of the furnace wall and also to the external wall of the furnace with the damper closed blade being fully exposed to the furnace rapid rising temperature.

The achieved ES classification ensures that in a fire condition the non fire side is fully protected (from radiated heat) for the achieved period, providing vital time for the emergency services to respond, ensuring safe passage of escape and protection of contents.

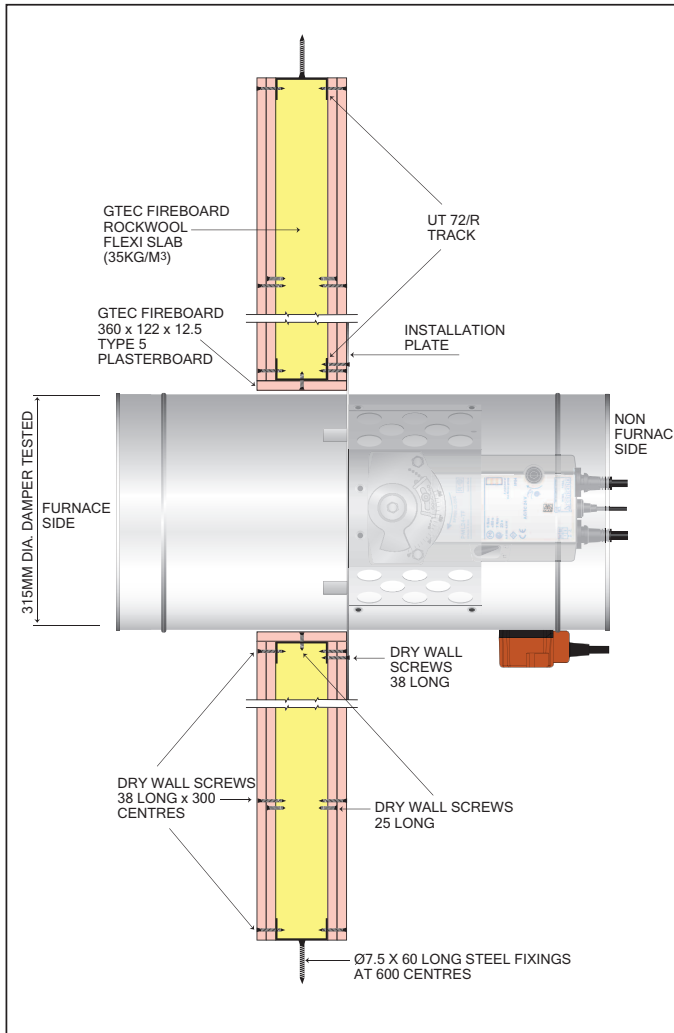
VIEW FROM NON-FURNACE SIDE



The FSD-C single blade combination fire and smoke damper with its unique feature of requiring only a single installation plate when being installed within tested applications, and without the need for any infill between the damper body and the structure that it sits within. Is the first damper of its type to achieve and exceed the requirements of classification EN1366-2.

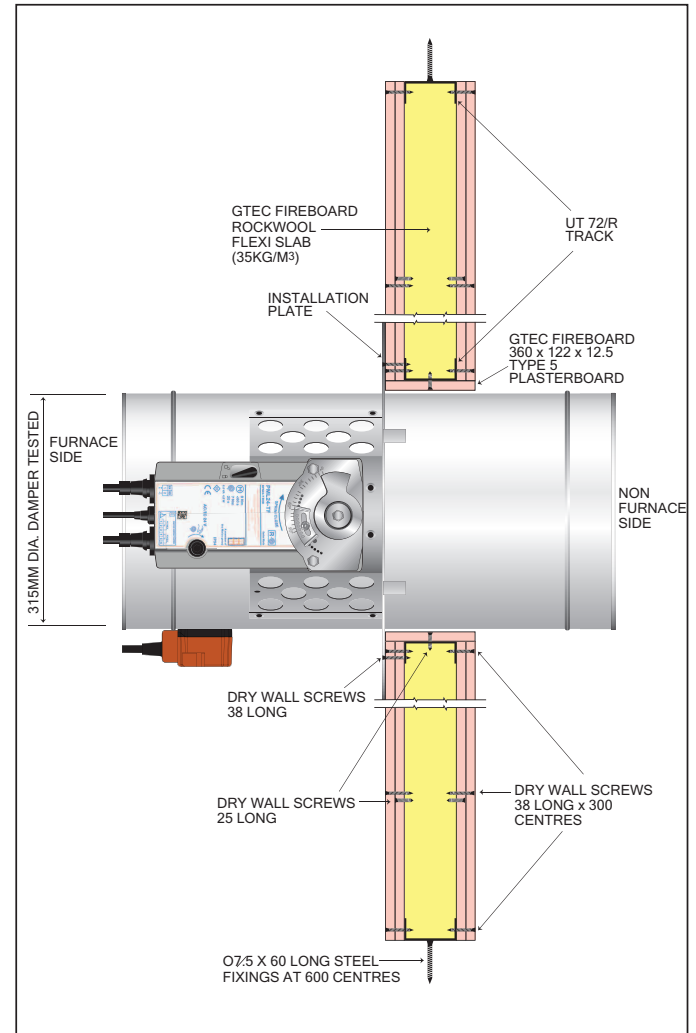
FSD-C in Dry Wall

Test Report No. 279799 refers
Actuator outside of furnace

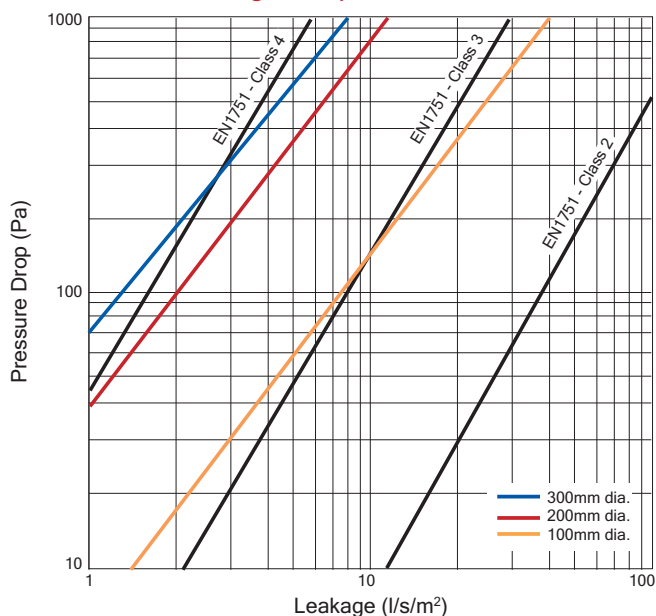


FSD-C in Dry Wall

Test Report No. 279799 refers
Actuator inside of furnace

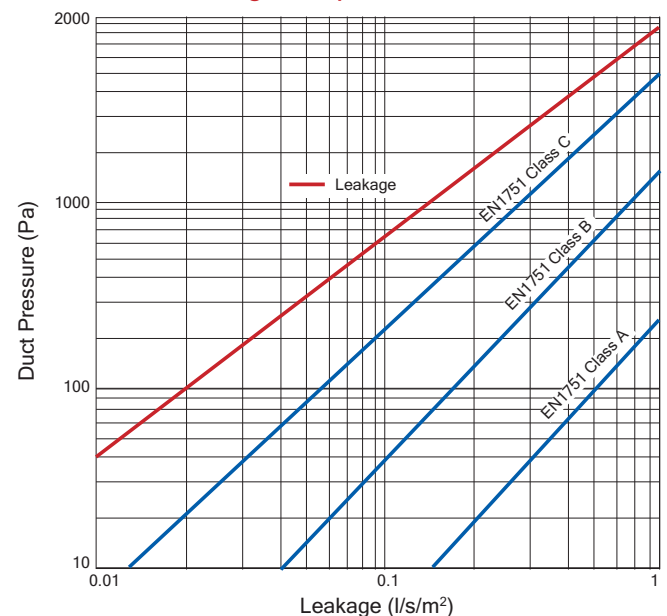


Blade Leakage Graph

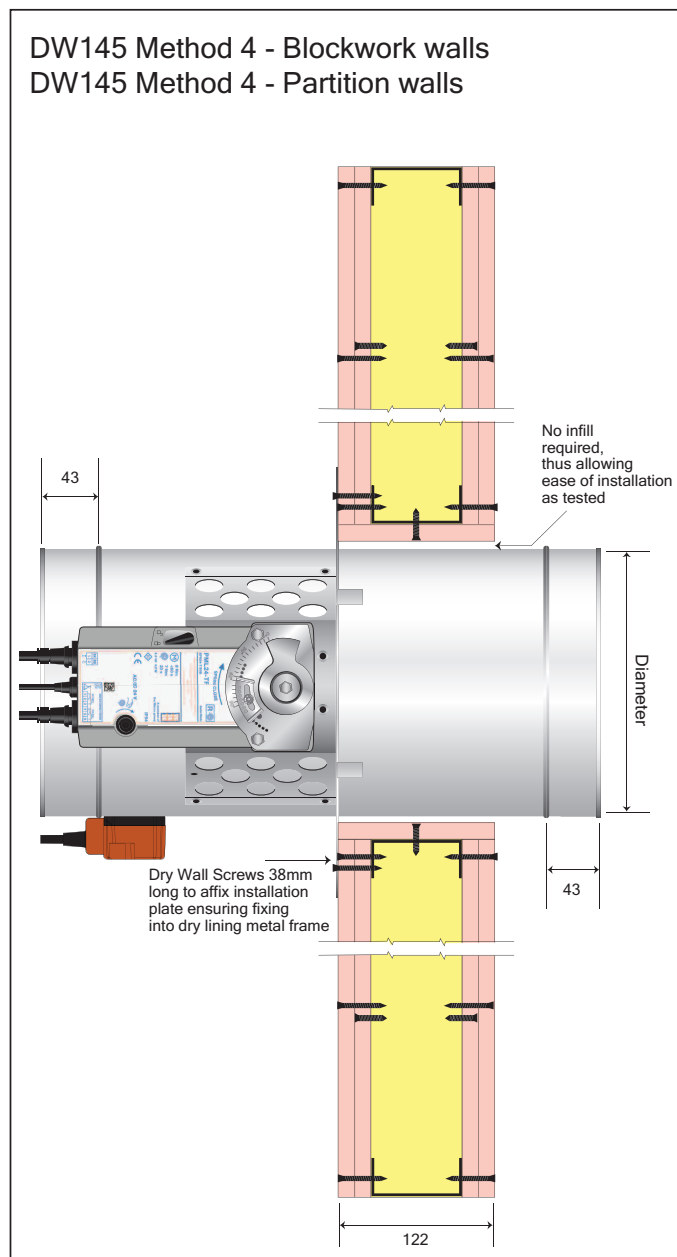


See Page 5 for Pressure Drop Graphs

Case Leakage Graph - Model FSD-C100



Installation Method



Maintenance Notes

FSD-C Series combination Fire and Smoke Dampers are designed for normal dry filtered air systems. A programme of planned inspections should be carried out to include full operational checks, correct interface with, and function of, any control systems, cleaning and light lubrication.

As a guide, this should take place annually. Please refer to BSB Operating and Maintenance instructions.

Reference should be made to BS 9999 for more information.

Records of damper installation and position shall be kept. Records of the condition of the dampers and their functionality/repair etc should be kept as these products come under the requirements of the Regulatory Reform (Fire safety) Order (RRFSO).

These inspection and maintenance programmes may need to be repeated more regularly if the dampers are exposed to inclement/dusty conditions or fresh air intakes and the frequency of such checks should be developed based on site experience.

BSB FSD-C-TF Electric Actuator Specifications

BSB PML24-TF

DAMPER ENERGISED OPEN / SPRING CLOSED

Supply 24V AC/DC 50/60 Hz

- Wiring diagram shows switch positions based on no power to actuator
- Power On - Damper blades drive open
- Power Off - Damper to spring closed
- Electric thermal release rated at 72°C
- External position indicator
- Adjustable blade position stop

 Connect via safety isolation transformer

Release Time: 15 secs ; Reset Time: 40 secs

7VA Typically 5W motoring, 2.5W holding

For wiring size - I_{max} 5.8A @ 5ms

Operating temperature range -30° to +50° continuous.

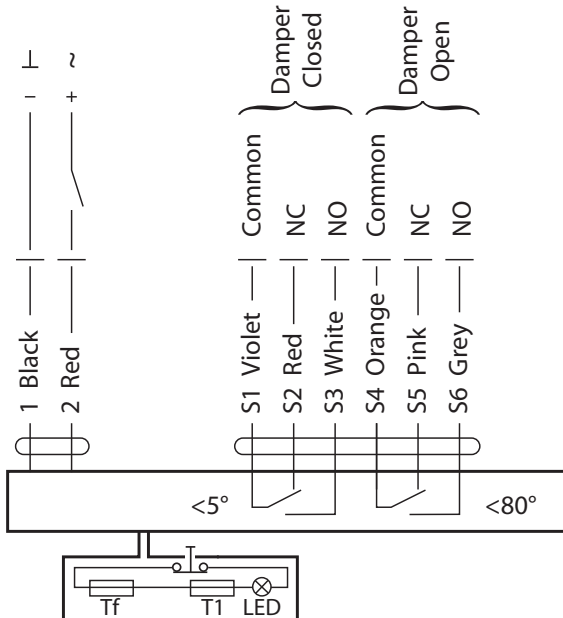
Connecting cables need to be protected from sharp edges

Unused cores should be isolated

For damper closed indication use terminals 1 & 2

For damper open indication use terminals 4 & 6

Terminals 1 & 4 can be linked where required as an option



BSB PML230-TF

DAMPER ENERGISED OPEN / SPRING CLOSED

Supply 230V AC 50/60 Hz

- Wiring diagram shows switch positions based on no power to actuator
- Power On - Damper blades drive open
- Power Off - Damper to spring closed
- Electric thermal release rated at 72°C
- External position indicator
- Adjustable blade position stop

For disconnection from the supply, a separate device must be incorporated in the fixed wiring (at least 3mm contact gap in all poles)

Release Time: 15 secs ; Reset Time: 40 secs

7VA Typically 5W motoring, 4W holding

For wiring size - I_{max} 5.8A @ 5ms

Operating temperature range -30° to +50° continuous.

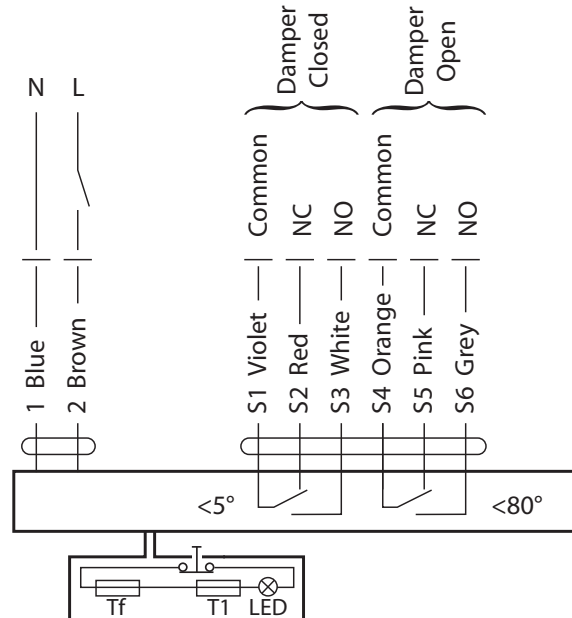
Connecting cables need to be protected from sharp edges

Unused cores should be isolated

For damper closed indication use terminals 1 & 2

For damper open indication use terminals 4 & 6

Terminals 1 & 4 can be linked where required as an option



Where the manual adjustment is required and fitted, open indication to be provided by contacts 1 and 3.

Motor Weights: PML24-TF / PML230-TF: 1.5kg PML24-NTF / PML230-NTF: 1.8kg

The FSD-C FS Fire/Smoke Damper is supplied fitted with either a PML24-TF or PML230-TF spring return actuator where the damper fail safe operation is via a thermal fuse or purpose supplied damper control panel

	PML24-TF (as illustrated)	PML230-TF
Voltage	24volt AC/DC	230volt AC
Power Consumption	Operating: 4W (watts); At rest: 1.4W (watts)	Operating: 5W (watts); At rest: 2.1W (watts)
Cable Fitted Power:	1m, 2 x 0.75mm ²	1m, 2 x 0.75mm ²
Cable Fitted Aux. Switch:	1m, 6 x 0.75mm ²	1m, 6 x 0.75mm ²
(Cables are halogen free)		
Control	Spring return closed	Spring return closed
Torque	Motor: 9Nm	9Nm
Spring Return:	7Nm	7Nm
Running Time:	Motor: 40 seconds	40 seconds
Spring Return:	15 seconds	15 seconds
Sound Power Level	55dB (A)	55dB (A)
Spring Return:	67dB (A)	67dB (A)
Operating Temp. Range	-30°C to +55°C	-30°C to +55°C
Degree of Protection	IP54	IP54
Mounting	Actuator coupling is located onto a 12mm square on the 8mm dia shaft and secured by two bolts through the actuator into rivet nuts affixed to the three position mounting bracket. A centre bolt and pointer are also used.	

FSD-C Series

Single Blade Fire and Smoke Dampers - Cleats



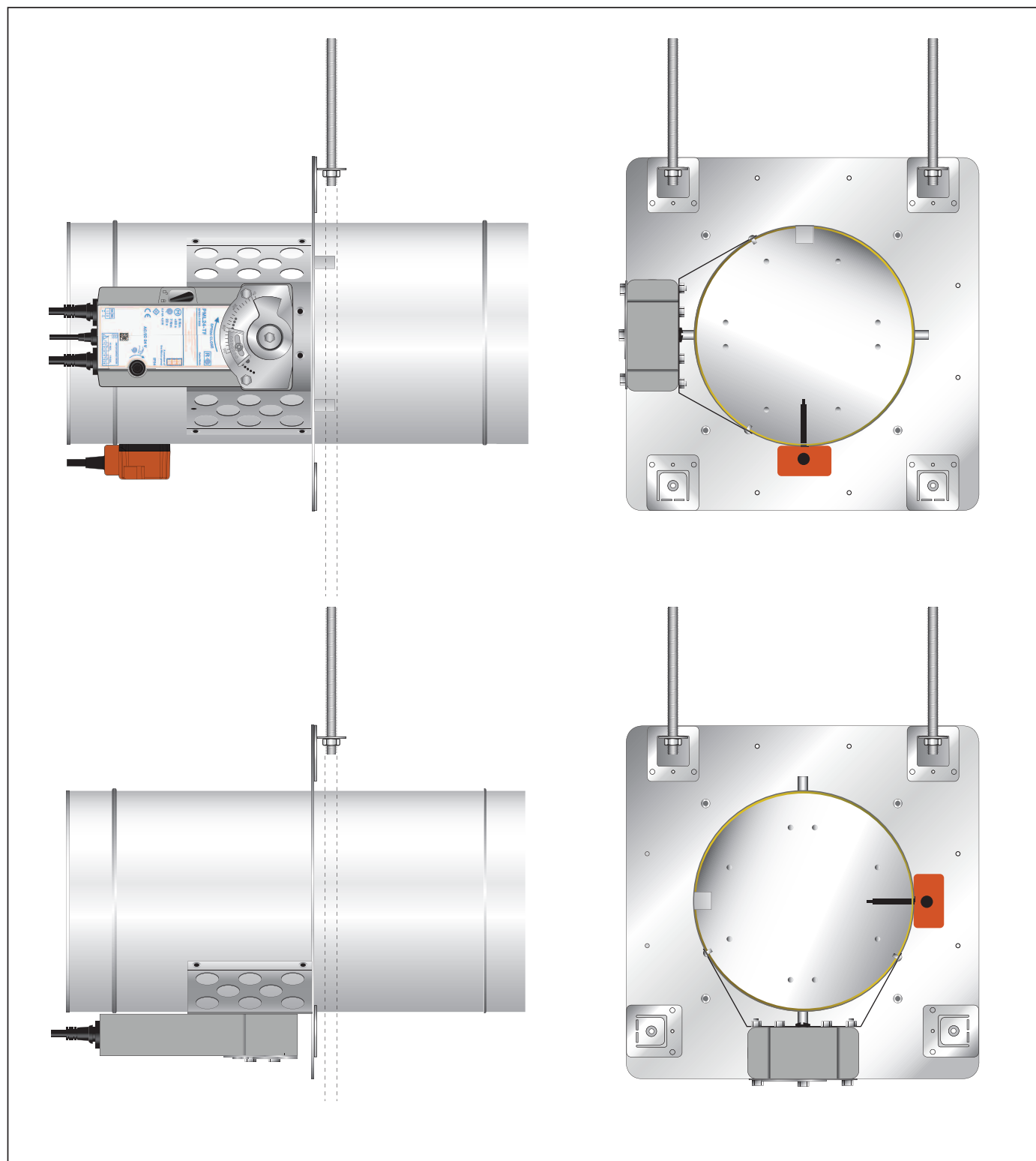
Rotatable Easy Bend Cleats

The optional Rotatable Cleat Easy Fix System will be supplied factory fitted to the FSD-C Series dampers.

The installation plate should be fitted to the fire separation barrier to ensure test conformity is maintained. The Easy Bend Cleat is available factory fitted four per plate. The cleats should only be used where the fire separation element is not yet in place, offering a temporary installation support. The cleats must not be the sole independent method of supporting the fire damper.

The cleats can easily be bent out using a flat head screwdriver. Supporting drop rods are used in the normal way.

The cleats can be rotated through 90 degrees to suit handle position where the damper requires to be installed with the handle either left, right, top or bottom giving full flexibility during installation.



Cleats

Rotatable cleats are available as an optional accessory where requested and will be provided factory fitted as shown right.

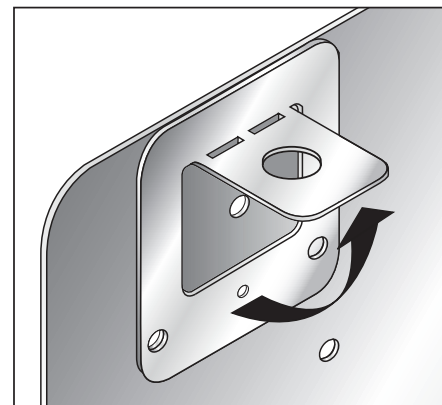
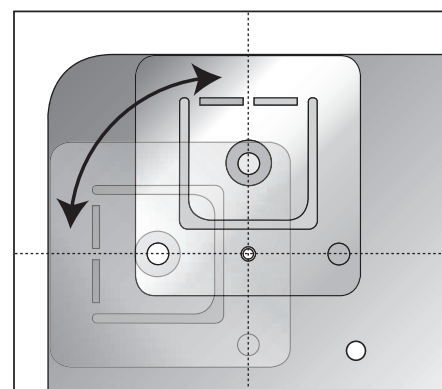
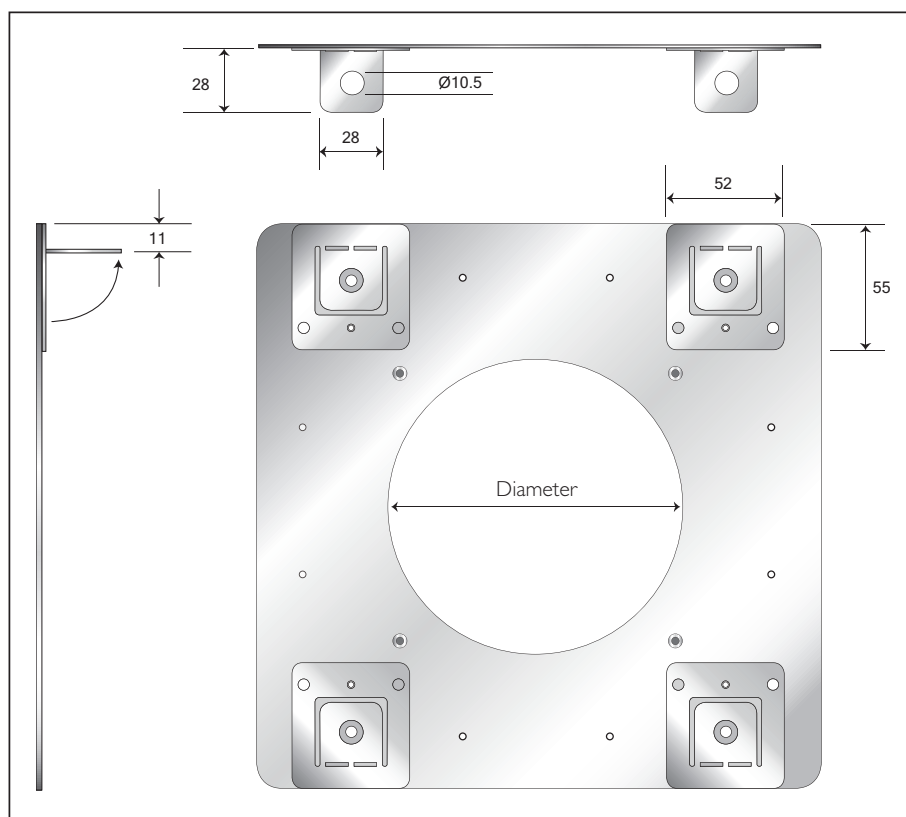
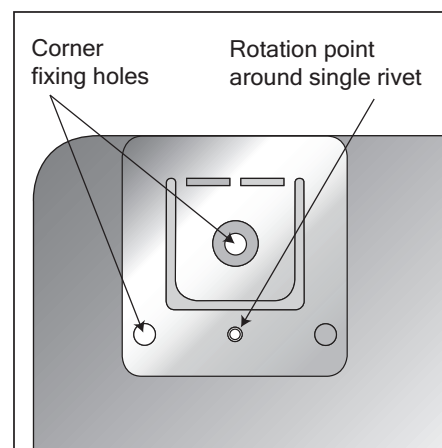
The FD-C series damper must be installed as per BSB installation, operating and maintenance document to comply with CE marking.

The use of cleats as the sole installation/support method will not comply with CE marking rules.

Where cleats are requested to be fitted and local authority approval has been given, the drop rod system will be the responsibility of others.

Fixing Kit

Fixing cleat (4) kits are available for retro fixing, please refer to the sales office.



Drop Rod Studding Minimum Recommended Diameter

Minimum loads are taken from the ASFP Blue Book and refers to unprotected steel studding, generally up to 1.5m long. Figures shown must be read in conjunction with the ASFP Blue Book.

60 mins - 15n/mm² Min. load

	OD	Pitch	Core D	CSA (mm ²)	Max. load per pair of studs (kg)
M6	6	1.00	4.772	17.9	54.7
M8	8	1.25	6.465	32.8	100.4

120 mins - 10n/mm² Min. load

	OD	Pitch	Core D	CSA (mm ²)	Max. load per pair of studs (kg)
M6	6	1.00	4.772	17.9	36.5
M8	8	1.25	6.465	32.8	66.9

FSD-C Series

Single Blade Circular Fire Dampers - Ordering Codes



FSD-C		G	IP	CL	200	PML24-TF
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Model: _____
FSD-C
 Externally Resettable Circular
 Single Blade Combination
 Fire and Smoke Damper

Blade Material: _____
G Galvanised Mild Steel
S 430 Grade Stainless Steel

Installation Plate: _____
IP Installation Plate

Accessories: _____
CL Cleats

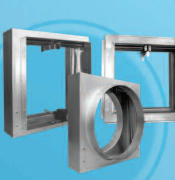
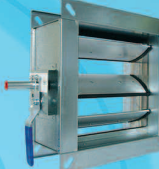
Application / Motor Type:

PML24-TF	24 volt Spring Return Actuator with Thermal Fuse
PML230-TF	230 volt Spring Return Actuator with Thermal Fuse
PML24-NTF	24 volt Spring Return Actuator no Thermal Fuse
PML230-NTF	230 volt Spring Return Actuator no Thermal Fuse

Diameter:

100	100mm Diameter
125	125mm Diameter
150	150mm Diameter
160	160mm Diameter
200	200mm Diameter
250	250mm Diameter
300	300mm Diameter
315	315mm Diameter

Other Air, Fire and Smoke Control Products in the BSB Range:

A60 Series Marine Fire Dampers 	ETD Series Elevated Temperature Dampers 	FD Series Fire Dampers 	FD-C Series Circular Fire Dampers 	FSD-TD Series Fire/Smoke Dampers 
BD Series Backdraught Dampers 	HD Series Heavy Duty Dampers 	SS Series SlimSeal Dampers 	VC Series Volume Control Dampers 	Control Systems Standard Electrical Mechanical Premier Electrical Mechanical Addressable

For full details of the complete BSB Product Range, please refer to our individual product brochures, sales office or website.



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For purchase orders and order related enquiries, please email: orders@bsb-dampers.co.uk

For pricing, technical and general enquiries, please email: enquiries@bsb-dampers.co.uk

Website: www.bsb-dampers.co.uk • A member of the Maico group

BSB Engineering Services Ltd. reserves the right to modify or withdraw any specification without prior notice that may result from continuous product development. The information contained within this brochure is correct at the time of going to press. (FSDC-03-2020)

