

Fire and Smoke Rated Motorised Steel Damper – HFS

Model: HFS

The Holyoake HFS damper is a fire, fire-smoke, smoke, and air control (smoke exhaust) rated motorised steel damper, designed to impede the spread of fire through ducted air systems whilst maintaining barrier integrity. A self-contained opposed blade damper, and externally operable by a spring return actuator, the HFS damper offers supreme fire and smoke leakage performance due to the uniquely patented sealing system.

Minimal airflow impedance was a primary consideration in the HFS damper's design to comply with Energy Efficiency requirements as per NCC Volume 1 - Section J in Australia, and NZBC - Clause H1 in New Zealand. Ease of installation was also a key consideration, with only minimal labour required, the HFS damper can be quickly and easily installed.

HFS Fire /Smoke Damper Rating

Tested in accordance with AS 1530.4:2014 and AS 1530.7:2007, integrity was maintained for more than four hours and smoke leakage below 56L/s/m². Leakage integrity rates are based on the European ISO Standard 10294-1 'S' Classification.

For the purposes of the Australian Construction Code and New Zealand Building Code, the damper has a FRL / FRR of -/240/- and is constructed to the requirements of AS 1668.1 and AS 1682.1.

Certification

- **CSIRO**

Fire Short Form Report No. FCO - 3512

in accordance with AS 1530.4:2014 - Section 11.

Certified for up to 240 minute fire rating with leakage integrity performance as low as 20L/s/m² @ >1100°C and 300Pa.

- **Warringtonfire**

Smoke Summary of Assessment No. SOA - 220327

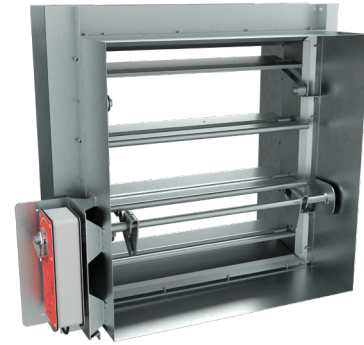
in accordance with AS 1530.7:2007.

Leakage as low as 38 L/s/m² @ 200°C and 300Pa as per the performance requirements of AS 1682.1:2015 Table 4 & 5 for smoke and air dampers respectively.

(Available upon request).

Features

- Fire rated smoke damper.
- Fire leakage integrity rated to AS 1530.4:2014.
- Smoke leakage rated to AS 1530.7:2007.
- Tested as an air damper (smoke exhaust) as per the performance requirements in AS 1682.1:2015 Table 5.
- Available in sizes up to 1200 x 1200 mm for single sections.
- Multiple section damper sizes available up to 2400 x 2400 mm in two wide by two high configurations.
- Each damper section will be supplied with a factory fitted actuator complying with AS 1682.1:2015. Multiple section dampers with have up to four mounted actuators (two on each side).
- Multiple ducted connections are available in a multiple section damper configuration.
- Performance in vertical and horizontal applications, with airflow from either direction.



Installation

- Suitable for vertical and horizontal installations with airflow and fire/smoke from either direction in a wall and from below in a floor.
- Mounting sleeves are supplied raw-edged, with duct flanges available on request.
- Breakaway joints are required up to 150 mm from the wall or 250 mm from the wall on the actuated side.
- Dampers installed within the same construction element need to be separated by at least 200 mm and all dampers need to be installed 75 mm from an adjacent construction element.
- Actuators used to operate the damper must not exceed a travel time of 30 seconds in either direction.
- HFS fire and fire-smoke dampers must be installed within the fire barrier and as per Holyoake's installation instructions and details.
- HFS smoke (only) dampers may be installed up to 600 mm away from or within the smoke barrier and as per Holyoake's installation instructions and details.
- Dampers must not be installed with the blades vertical.

Configurations

- HFS fire damper activated by a fusible link and closed by constant force springs.
- HFS combination fire and smoke damper activated by a fusible link or smoke activation attachment (by others) - closed by constant force springs or, on smoke detection, spring return actuator.
- HFS smoke damper activated by a smoke activation attachment (by others) and closed by spring return actuator.
- HFS air control (smoke exhaust) damper operated by a spring return actuator, suitable for smoke dampers that require a high temperature rating.

Construction

Frame and Blades:	1.15 mm G250 Z275 galvanised steel
Sleeve Material:	0.75 mm G250 Z275 galvanised steel
Mounting Angles:	2 mm G250 Z275 galvanised steel angle (four on each side of the penetration, eight total), with 3 mm thick high temperature seal pre-installed on fixed angles
Damper Seals:	301 and 304 stainless steel
Components:	G250 Z275 galvanised steel
Finish:	Mill
Minimum Nominal Size:	200 (wide) x 200 mm (high)
Maximum Nominal Size:	1200 (wide) x 1200 mm (high)
Maximum Nominal Size:	2400 (wide) x 2400 mm (high)
	(multiple section)

HFS – Fire and Smoke Rated Motorised Steel Damper

Installation Guide

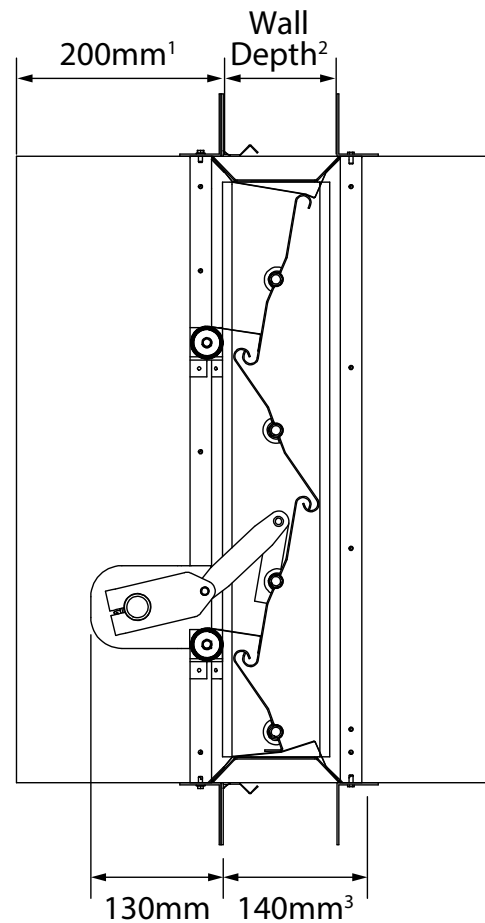
The following installation guide with associated method and diagrams shown on the following pages are presented as the method by which Holyoake HFS fire and smoke rated dampers must be installed.

Fire and smoke dampers are required to be installed as per the manufacturer's instructions with general comments being provided by AS 1682.1:2015 and AS 1682.2:2015.

Dampers must be installed as tested or assessed.

1. The casing shall completely penetrate the separating element and be retained:
 - (a) On both sides by four mounting angles such that it can expand in a fire without distorting the blades in a closed position; or
 - (b) On the accessible side only by four mounting angles. These will be factory fitted to the fire damper and will permit the damper to be fixed to the fire barrier through oversized holes and penny washers (on-site alteration). Fixings should be finger tight (to allow movement for thermal expansion) but locked, i.e. with double nut (lock nut); or
 - (c) On the top side of the horizontal element when the underside is not accessible or is formed and does not provide a level surface.
2. The overall clearance (total expansion gap) in both height and width should be 22 mm for dampers up to 1200 mm, and 30 mm for dampers up to 2400 mm. Never should the total expansion gap exceed 50% of the damper angle's face width that rests against the separating element.
3. The damper shall be installed so that the airflow does not impede its closure. Consideration should also be taken for appropriate air velocities so that they do not exceed 10m/s.
4. The pressure differential across the closed damper should not exceed 750Pa. Consideration should also be taken to comply with the local government's energy efficiency pressure drop requirements.
5. The method of attaching ductwork to the damper must be such that any deformation or collapse of the ductwork in a fire does not dislodge the damper or affect its performance. This is best achieved using slip joints which allow damaged ductwork to fall away. Refer to "Breakaway Joints" within AS 1682 parts 1 and 2.
6. Holyoake dampers do not require packing between the sleeve and penetration.
7. Dampers are required to be installed with a 200 mm separation between dampers, and a 75 mm separation between the damper and an adjacent element of construction.
8. Access doors or removable pressed panels must be provided for duct entry to inspect the damper, confirm operation, and remove any obstructions.
9. When installed and closed, the blade and pivots must be fully contained within the penetrated element and within the casing. Only exception is when installed solely as a smoke damper: the HFS smoke damper is permitted to be installed up to 600mm away from the smoke barrier.
10. Holyoake dampers must be sleeve mounted using the factory fitted sleeves and angles.
11. Holyoake dampers must be installed with no obstructions and in accordance with the "this way up" arrow. Airflow may be from either direction.
12. Holyoake dampers include a completed installer's label compliant with AS 1682.2 - 2015.

HFS Damper Dimensions



¹ Sleeve length to accommodate actuator bracket and duct flange.

² Maximum wall/floor depth with standard 450mm sleeve is 170mm, for deeper walls/floors specify depth when ordering.

³ Depth of open blades into the wall/floor penetration.

Notes

The damper and fixed retaining angles are factory fitted to the sleeve. The loose angles must be fixed to the factory fitted sleeve (no extensions) and through every second pre-punched hole (175mm spacing) with 10g x 16mm long hex head self-drilling screws - available to purchase.

Retaining angles are a minimum thickness of 2 mm as tested (AS 1530.4:2014). They are mandatory on all four sides of at least one face. Contact your local Holyoake branch for more details..

Materials for the damper, sleeve, and retaining angles comply with AS 1682.1:2015, which specifies using galvanised steel with a coating class of not less than Z275.

Fire and smoke damper certifications are consistently being updated. Contact your local Holyoake branch for updated installation details and compliant wall and floor constructions.

Vertical Damper Installation

Masonry & Concrete construction

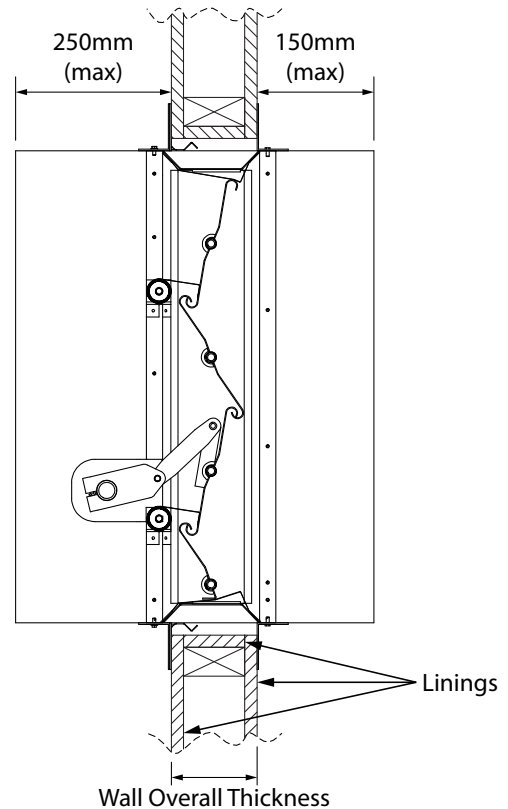
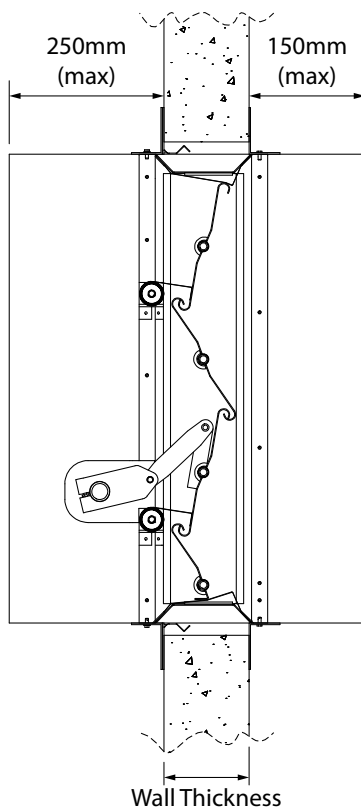
- For applications up to 120 minutes: wall thickness must be a minimum of 110 mm.
- For applications up to 240 minutes: wall thickness must be a minimum of 150 mm.

Speedpanel construction

- For applications up to 120 minutes: wall system must be constructed from 78mm Speedpanel.

Plasterboard construction

- For applications up to 60 minutes: overall wall thickness must be a minimum of 90 mm with linings of 1 x 16 mm fire grade plasterboard.
- For applications up to 90 minutes: overall wall thickness must be a minimum of 96 mm with fire rated plasterboard linings of 2 x 16 mm in New Zealand or 2 x 13mm in Australia.
- For applications up to 120 minutes: overall wall thickness must be a minimum of 116 mm with fire rated plasterboard linings of 2 x 19 mm in New Zealand or 2 x 16mm in Australia.
- Wall systems may be comprised of either timber or steel framing



Notes

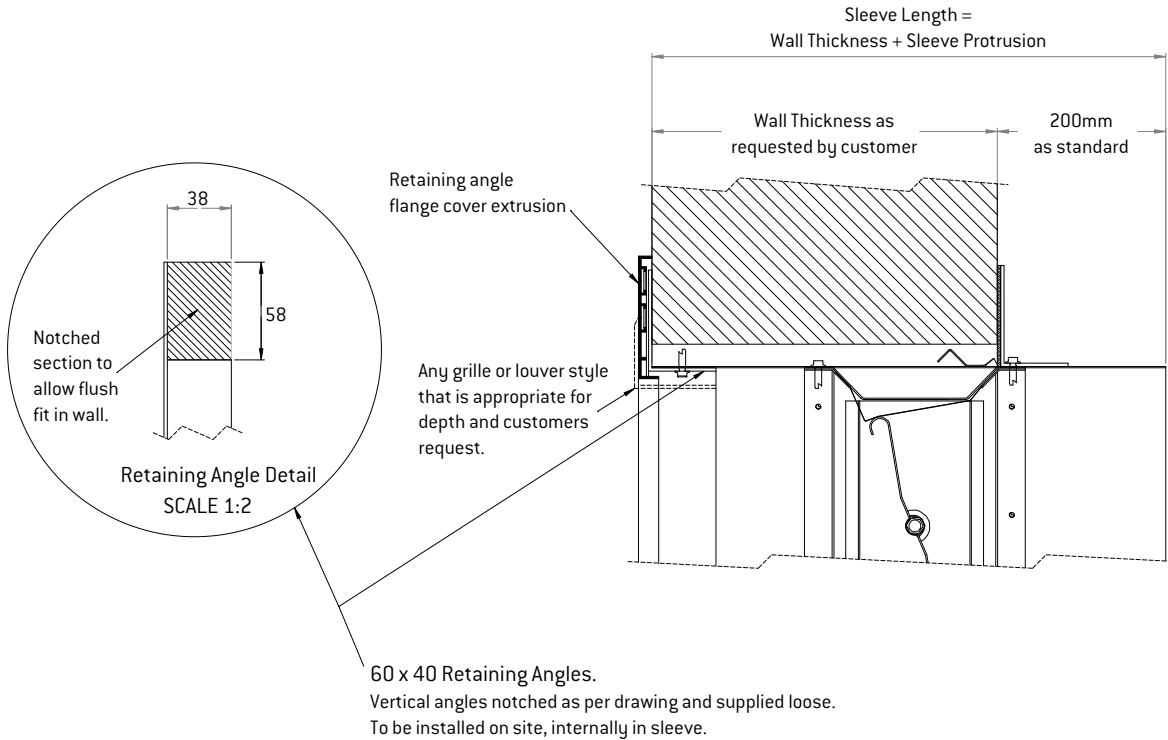
- The damper must be installed in accordance with the “this way up” arrow. Airflow can be from either direction.
- Breakaway joints must comply with the requirements of AS 1682.2 Clause 6.1[a] & [b]. The damper sleeve must not extend beyond the face of the wall by more than 150 mm on either side, unless an actuator is fitted allowing the sleeve to extend up to 250 mm on the actuator side only.
- The overall clearance (total expansion gap) between the damper and penetration must be 22 mm, and must not exceed half the width of the mounting angle.
- Supporting construction must be tested or assessed to achieve the FRL/FRR of the damper when an aperture is made.
- These details are provided as guides for the compliant installation of the HFS damper in a vertical element as per CSIRO Short Form Report FCO-3495.
- For detailed installation instructions refer to the Installation Guide on page 2.

HFS – Fire and Smoke Rated Motorised Steel Damper

Vertical Damper Installation

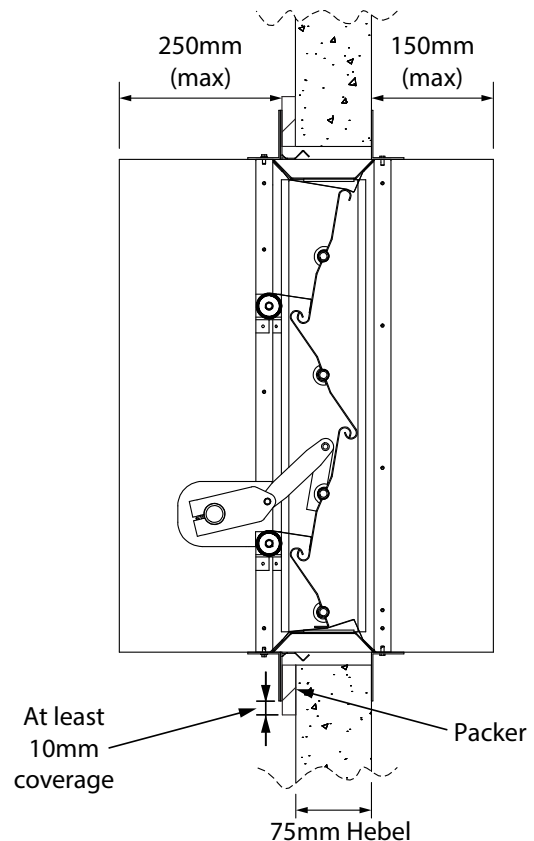
Duct to Grille

- Louvers and grilles can be installed flush with the wall system, provided the wall depth is suitable.



Hebel construction

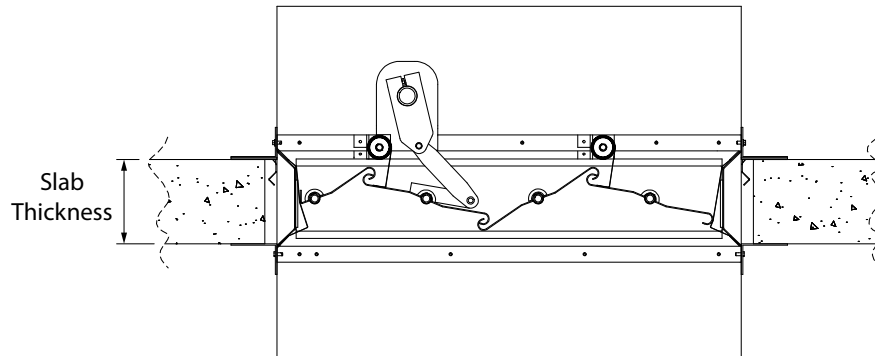
- For applications up to 60 minutes: 75 mm Hebel system must be fitted with a packer around the aperture of 1 x 16 mm fire grade plasterboard.
- For applications up to 90 minutes: 75 mm Hebel system must be fitted with a packer around the aperture of 2 x 16 mm fire grade plasterboard.
- For applications up to 120 minutes: 75 mm Hebel system must be fitted with a packer around the aperture of 1 x 75 mm AAC (Hebel).



Horizontal Damper Installation

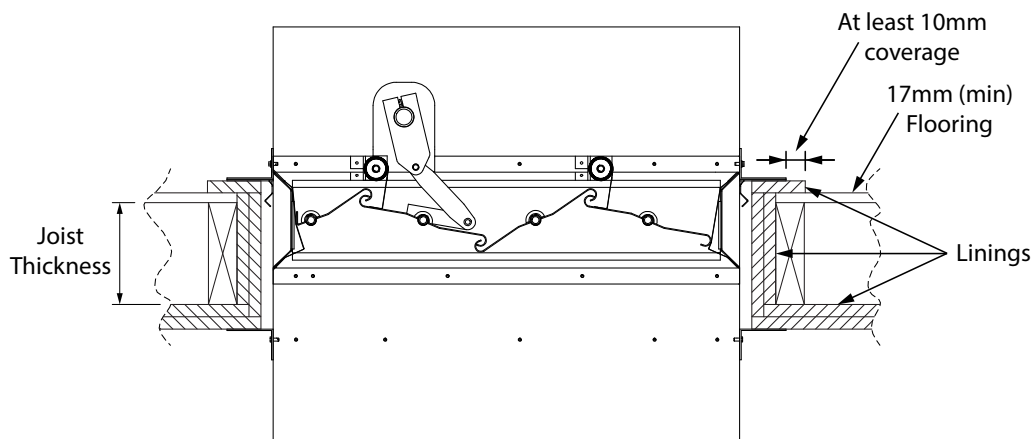
Masonry & Concrete construction

- For applications up to 120 minutes: slab thickness must be a minimum of 120 mm.
- For applications up to 240 minutes: slab thickness must be a minimum of 150 mm.



Timber construction

- For applications up to 60 minutes: joist thickness must be a minimum of 150 mm with linings of 2 x 13 mm fire grade plasterboard.
- For applications up to 90 minutes: joist thickness must be a minimum of 150 mm with linings of 2 x 16 mm fire grade plasterboard.
- For applications up to 120 minutes: joist thickness must be a minimum of 150 mm with linings of 2 x 19 mm fire grade plasterboard in New Zealand and 3 x 16 mm fire grade plasterboard in Australia.
- Timber floor dampers can only be installed as single sections (maximum size: 1200 x 1200mm).
- Lining on the top of the floor construction can be reduced by one layer but internal and underside layer requirements are as specified above.



Notes

- The factory fitted angles must be located on the top of the penetration in accordance with the “this way up” arrow.
- Insulated ductwork mounted above a fire damper should be installed so it will not breakaway or collapse in a fire. This will prevent ignition of adjacent materials to the extent required by AS 1682.2 Appendix A(h).
- The overall clearance (total expansion gap) between the damper and penetration must be 22 mm, and must not exceed half the width of the mounting angle.
- Supporting construction must be tested or assessed to achieve the FRL/FRR of the damper when an aperture is made.
- These details are provided as guides for the compliant installation of the HFS damper in a horizontal element as per CSIRO Short Form Report FCO-3495.

Multiple Section Installation

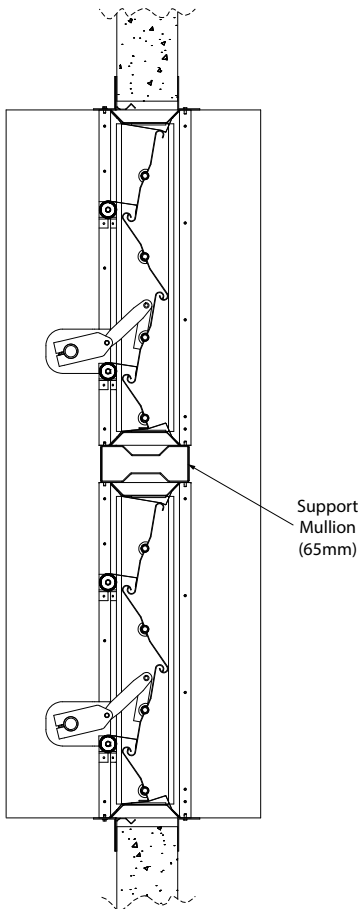
Multiple section dampers are installed as per single section dampers, including the separating element details.

Dampers may be arranged in a modular arrangement up to maximum overall nominal dimension of 2400 x 2400 mm, incorporating structural mullions between sections.

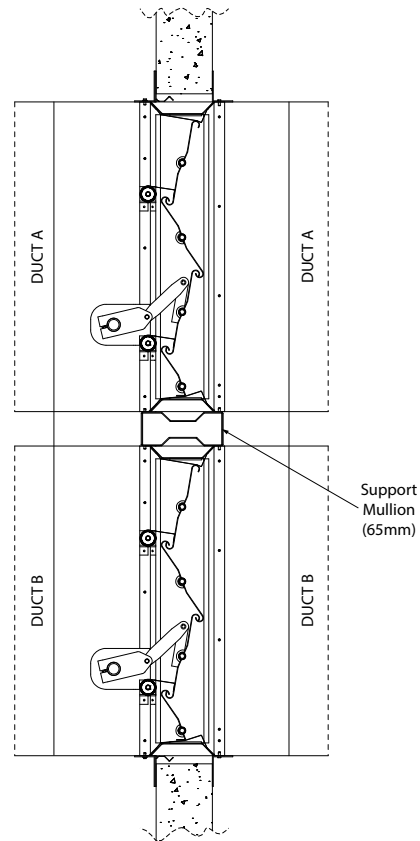
Dampers installed within the same construction element must be separated by 200 mm. This causes problems when multiple ducts run within 200 mm, or through one penetration. Multiple adjacent ducts can be incorporated into one damper by allowing duct runs to be installed at least 65 mm away and removing the 200 mm separation requirement.

Modular dampers constructed for use with adjacent ducts can vary in width and height as appropriate, and are certified for installation in wall and floor systems.

Model: HFS - Single Ducted Damper



Model: HFS - Multiple Ducted Damper



Notes

- The damper must be installed in accordance with the “this way up” arrow. Airflow can be from either direction.
- Breakaway joints must comply with the requirements of AS 1682.2 Clause 6.1(a) & (b). The dampers sleeve must not extend beyond the face of the wall by more than 150 mm on either side, unless an actuator is fitted allowing the sleeve to extend up to 250 mm on the actuator side only.
- Insulated ductwork mounted above a fire damper should be installed so it will not breakaway or collapse in a fire. This will prevent ignition of adjacent materials to the extent required by AS 1682.2 Appendix A(h).
- The overall clearance (total expansion gap) between the damper and penetration must be 30 mm, and must not exceed half the width of the mounting angle.
- Supporting construction must be tested or assessed to achieve the FRL/FRR of the damper when an aperture is made.
- These details are provided as guides for the compliant installation of the HFS damper in a vertical or horizontal element as per CSIRO Short Form Report FCO-3495.

Fire and Smoke Rated Motorised Steel Damper – HFS

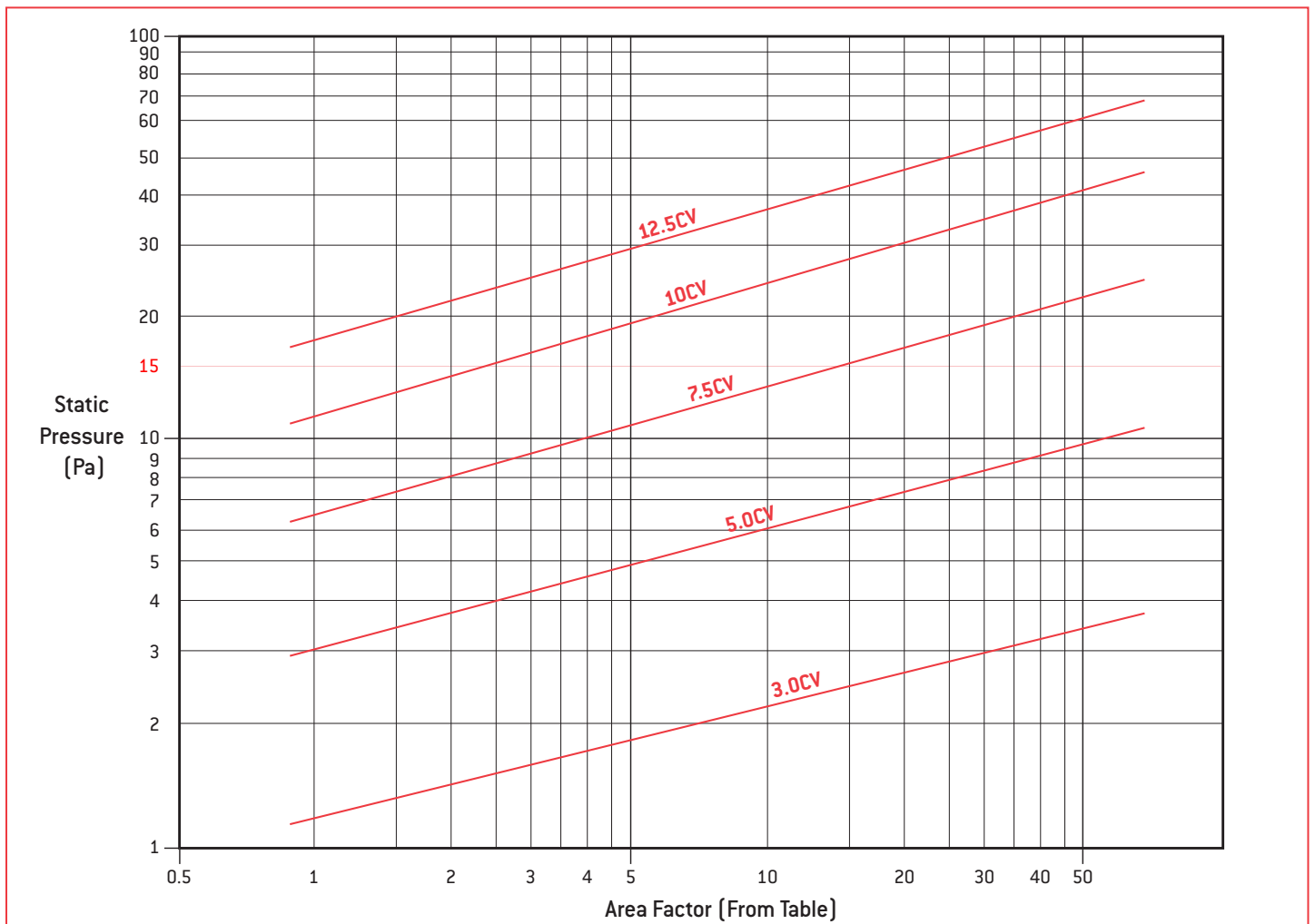
Model: HFS

Height (mm)	AREA FACTOR TABLE										
	Width (mm)										
	200	300	400	500	600	700	800	900	1000	1100	1200
240	51.59	30.03	21.18	16.36	13.33	11.24	9.72	8.56	7.65	6.91	6.31
386	26.23	15.27	10.77	8.32	6.78	5.72	4.94	4.35	3.89	3.52	3.21
532	17.95	10.45	7.37	5.69	4.64	3.91	3.38	2.98	2.66	2.41	2.20
678	13.43	7.82	5.52	4.26	3.47	2.93	2.53	2.23	1.99	1.80	1.64
824	10.87	6.33	4.46	3.45	2.81	2.37	2.05	1.80	1.61	1.46	1.33
970	9.03	5.26	3.71	2.86	2.33	1.97	1.70	1.50	1.34	1.21	1.10
1116	7.79	4.54	3.20	2.47	2.01	1.70	1.47	1.29	1.16	1.04	0.95
1200	7.16	4.17	2.94	2.27	1.85	1.56	1.35	1.19	1.06	0.96	0.88

[All dimensions include 6 mm clearance total between outside of damper frame and inside of duct].

For pressure drop through an open HFS fire and smoke rated damper, use the following procedure:

1. Enter duct width and height into the table above to find the Area Factor.
2. Determine the Conversion Velocity (CV) by multiplying the Area Factor by airflow in m^3/s [$CV = \text{Area Factor} \times m^3/s$].
3. Enter the pressure drop chart below with the Area Factor (Step 1) and establish the intersection with the Conversion Velocity line (Step 2); read the resulting pressure drop off the left hand side of the chart.

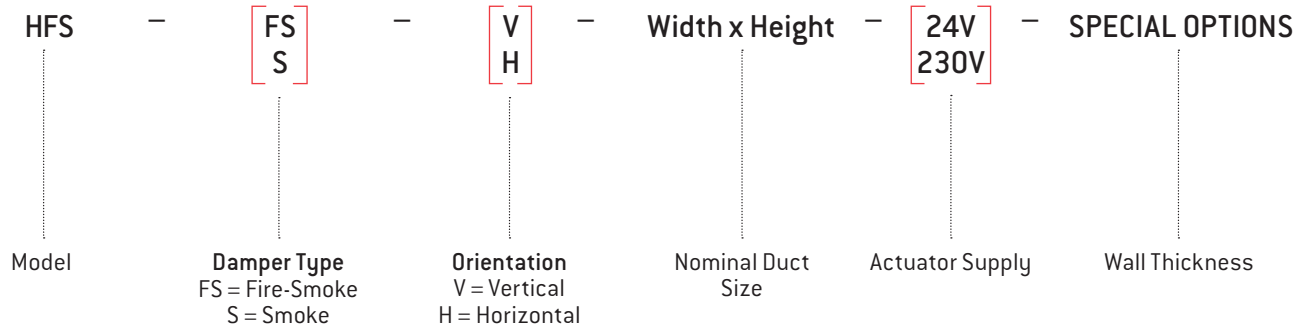


Notes

1. Static Pressure and Conversion Velocities are correct for $1.2 \text{ kg}/m^3$ air density.
2. Ratings are based on dampers installed in accordance with details in this catalogue, with ductwork upstream and downstream.
3. For dampers between sizes, use the data figures from the smaller sized damper.
4. Pressure drop data has been obtained through CFD analysis.

HFS – Fire and Smoke Rated Motorised Steel Damper

Product Ordering Key and Suggested Specifications



Holyoake HFS fire and smoke dampers shall be of single or multiple opposed blade type construction, with stainless steel seals; conforming to AS 1530.4:2014 Section 11 and AS 1530.7:2007 leakage requirements with up to a 4 hour fire rating.

Fire and smoke leakage rated dampers shall be for vertical and horizontal mounting and close by either a 71°C fusible link in fire and fire-smoke applications with constant force springs or smoke activation (by others) with a spring return actuator that complies with AS 1682.1 Section 2.5.4.

External access to the actuator guarantees a simple and straightforward maintenance program for testing the operation of the damper without needing to access the blades or remove fusible links in order to then test and reset the blades. Inspection and testing of all dampers should be completed as stipulated by AS 1851 Section 13.

Fire and smoke leakage rated dampers shall be installed in walls and floors utilising factory fitted angles fitted to the damper sleeve as shown in the manufacturer's instructions and drawings within this manual.

HFS fire and fire-smoke dampers comprise the same components and shall be the Holyoake Series HFS-FS and shall be manufactured and supplied by Price Holyoake.

HFS smoke and air control (smoke exhaust) dampers comprise the same components and shall be the Holyoake Series HFS-S and shall be manufactured and supplied by Price Holyoake.