# OLS

# FIRE-SMOKE
# CURTAIN TYPE DAMPER

Designed to provide 2- and 4-hour resistance with low air leakage and low resistance to air flow.

*We take a very serious view of fire damper as a life support device in the ACMV system. We strive to produce the best quality fire damper.*

# features

## EASY TO INSTALL

RC400 fire dampers are supplied with sleeve and retaining angles for easy installation on wall or floor. All installer needs to do is to remove one set of retaining angles from the damper, slide the damper into the wall opening, fill clearance between damper and wall/floor/drywall with high temperature insulation and fix back the retaining angles.

## ROBUST CONSTRUCTION

Sleeves are constructed of heavy gage galvanized steel full welded at all corner joints. Excellent quality weld prevents corrosion at the joints, increase rigidity of the damper and resistant to distortion during handling and installation. This ensures damper will function properly after installation.

## 4 HOURS RATING AND LOW LEAKAGE

OLS fire dampers were subjected to rigorous laboratory testing to relevant Australian Standard AS1682 and AS1530 Part 4, British Standard BS 476 Part 20 and Part 22 and Singapore Standard SS333 for fire resistance, closing reliability, closing spring force and air leakage performance. The fire dampers were tested to 4-hour fire resistance in single and multiple-module construction on the wall and the floor. The vertical model, RC400V was also tested on drywall partition to 2-hour fire resistance. RC400 fire dampers have been designed to minimize smoke leakage when closed.

## FLEXIBILITY

OLS fire dampers have three variations which make them suitable for low to high velocity system. It can be easily adapted to round or oval duct. Due to its low air leakage, it may be used with appropriate external actuating device such as ETL electro thermal link or solenoid to serve as a smoke damper upon receipt of early signal from fire alarm.

## LOW AIR RESISTANCE

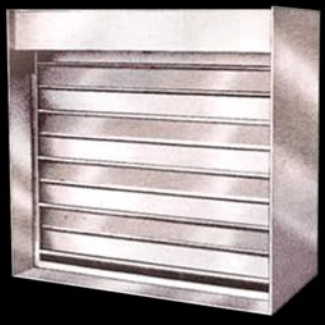
OLS curtain fire damper is modular in construction and large module size means higher free area and reduces resistance to air flow. The largest single module is 1500 X 1500 mm for wall mounted damper and 1200 X 1680 mm for floor mounted damper. Where static pressure loss is an important consideration, the fire damper may be supplied with appropriate adaptor fitted to the damper sleeve such that the blade stack and blade guides are entirely out of the air stream.

# types of dampers

## type A

Type A damper is for use with low velocity rectangular ductwork. When used with rectangular duct, the damper nominal size is similar to size of the duct.

## type B

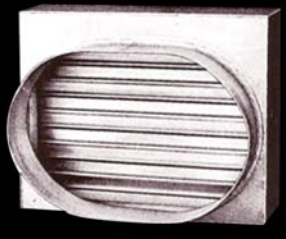


Type B damper is for use with low to medium velocity rectangular duct where it is desirable to keep the blade stack out of the air stream. When the damper is open, the stack of blades is entirely contained within an enclosed space above the duct. The damper nominal width is similar in size to the duct width, but the damper height is larger in size by the blade stack dimension. For dimension of blade stack height and wall opening dimension refer to relevant Engineering Data document.

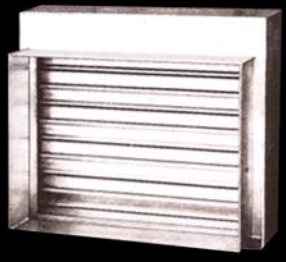
## type C

**ROUND**

**FLAT-OVAL**

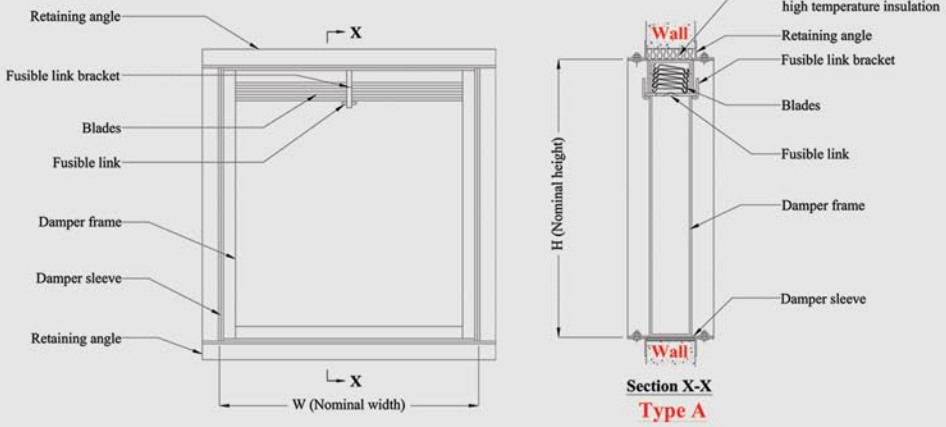


**RECTANGULAR**



All Type C fire dampers may be used in low velocity ducts and should be used in high velocity ducts. The dampers have adaptor of fitting size on both sides of the damper sleeve for attaching the duct. When a single-module Type C damper is open, the blade stack and the blade guides are entirely out of the air stream, thus providing a totally unobstructed flow area with a minimum pressure drop across the damper. However, this feature is partially negated when large damper is supplied in multiple modules. For dimensions of blade stack height and wall opening refer to our relevant Engineering Data sheet.

# construction




1. Sleeve – 1.5 to 2.5 mm galvanized steel full welded at the corner joints.
2. Retaining Angles – 1.5 to 2.5 mm galvanized steel cold-formed with slotted holes on one leg for minor adjustments to suit wall and floor thickness. Size of retaining angles should be compatible with damper size and required thermal expansion at the fire temperature. The side of the retaining angle that butt against the wall or floor should overlap the expansion gap by 100 percent.
3. Blade – roll-formed from 1.0 mm thick galvanized steel sheet. Blade assembly is fastened to the top of the sleeve with steel rivets.
4. Blade Guide – cold-formed and 1.2 mm thick spot welded to sleeve also serve to increase the rigidity of the damper.
5. Top and Bottom Channels - cold-formed and 1.2 mm thick spot welded to the sleeve also serve to increase rigidity of the damper.
6. Fusible Link - standard type 165 degree F or 74 degrees C.

*All OLS curtain fire dampers are also available in stainless steel type 304 or 316 material, except for the fusible link part.*

# testing and performance

OLS curtain fire dampers were subjected to rigorous laboratory testing to relevant Australian Standard AS1682 and AS1530 Part 4, British Standard BS 476 Part 20 and Part 22 and Singapore Standard SS333 for fire resistance, air leakage performance, closing reliability test and spring load test for floor mounted fire damper. The fire dampers were tested to 4-hour resistance in single and multiple-module construction on the wall and the floor. The vertical model, RC400V was also tested on drywall partition to 2-hour fire resistance as shown on the cover page. Fire resistance test follows the furnace time-temperature curve as shown in figure 1. Figure 4a to 4d (page 5) shows a fire damper at various stages of the fire resistance test. All fire resistance tests were conducted with fire damper initially in the open position as closing

Furance Time - Temperature Curves
Thermo couples Group 3.02.

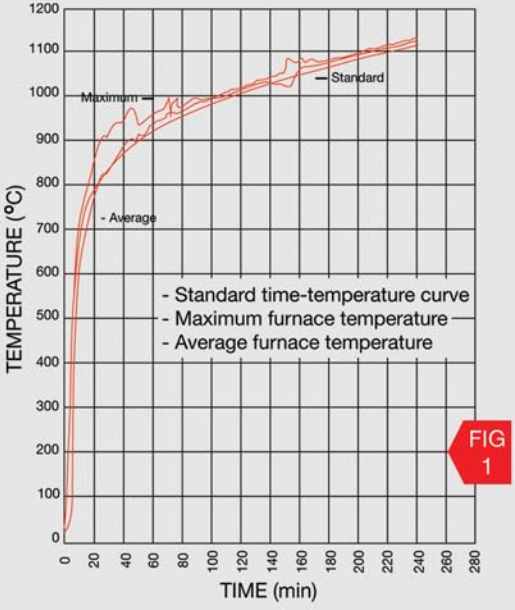



FIG 1

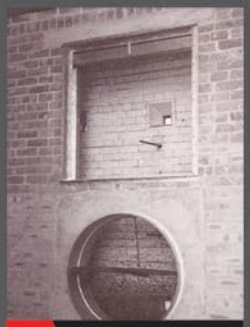


FIG 4A Fire dampers before the fire resistance test.

FIG 4B Fire dampers 145 minutes after the start of fire resistance test.

FIG 4C Fire dampers 198 minutes after the start of fire resistance test.

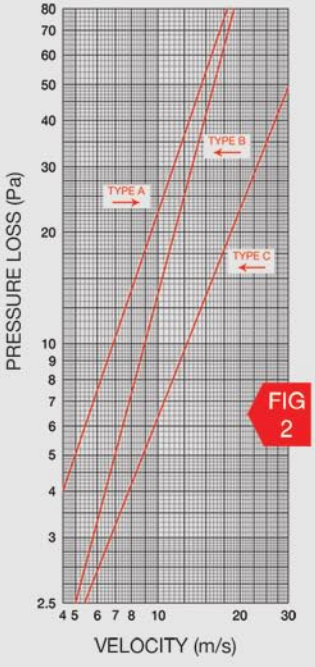
FIG 4D Fire dampers 240 minutes after the start of fire resistance test.

mechanism forms part of the test. The same fire damper was used for the air leakage and fire resistance test. For large damper, they were constructed of multiple modules and the largest damper that the furnace can accommodate was tested. Page 3 shows a RC400V 4-module fire damper of size 2540 X 2540 mm tested on the masonry wall and Page 2 shows a RC400H 4-module fire damper of size 2400 X 3160 mm tested on the masonry floor.

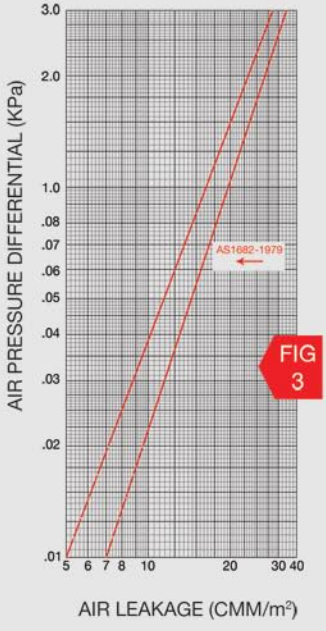
OLS fire dampers have been designed to minimize air leakage when closed and tested to pressures at 250 pascals increments from 250 to 1250 pascals. Damper air-leakage performance meets with the requirements of Australian Standard AS1682. A typical air leakage performance is shown in figure 2.

OLS fire dampers were tested for airflow and pressure loss according to the British Standard BS1042: "Methods of Measurement of Fluid Flow in Closed Conduits". Result of test is shown in figure 1. Type C fire damper shows exceedingly low pressure loss due to its 100% free area.

OLS curtain fire dampers meet the requirements of the Government Departments and Fire Control Authorities throughout the British Commonwealth.




Pressure Loss for Type A, B and C Fire Damper




Air Leakage of Fire Damper

# fire damper configuration

**RC400V Fire Damper Mounted On Masonry Wall**

| | |
|---|---|
| Minimum size single module: | 150 x 150 mm |
| Maximum size single module: | 1500 x 1500 mm |
| Maximum size 2 by 2 modules: | 3000 x 3000 mm |
| Maximum size 1-row, 6-module: | 7620 X 1270 mm |
| Maximum size 2-row, 12-module: | 7620 X 2540 mm |
| Maximum size 4-row, 16-module: | 5270 X 5080 mm |

For size larger – consult factory

**RC400H Fire Damper Mounted Masonry Floor**

| | |
|---|---|
| Minimum size single module: | 150 x 150 mm |
| Maximum size single module: | 1200 x 1680 mm |
| Maximum size multiple module: | 2400 X 3360 mm |

**RC400V Fire Damper Mounted On Dry Wall Partition**

| | |
|---|---|
| Minimum size single module: | 150 x 150 mm |
| Maximum size single module: | 1500 x 1500 mm |
| Maximum size multiple module: | 3000 x 3000 mm |
| | 3810 x 1270 mm |
| | 5080 x 1270 mm |

For size larger – consult factory

# fire damper installation considerations

Special attention is needed on the installation of a fire damper. To ensure proper functioning of the damper during a fire, care should be taken to ensure that the manufacturer instructions are strictly adhered to during installation. A fire damper, if not installed correctly may fail to function from the early stage of a fire.

For installation on masonry wall the fire damper should be positioned centrally within the wall opening and rest on the wall. Hence vertical thermal expansion gap will appear at the top of the fire damper. Ensure that the retaining angles are sufficiently large to cover this gap. Retaining angles are factory pre-punched with elongated holes of size 20 X 8 mm for adjustment to suit the wall or floor thickness. When installed properly, the retaining angles on each end of the fire damper must butt firmly against the wall, must not be embedded in the wall plastering, must not be secured to the wall, floor or drywall partition. For damper installed on masonry wall or floor, thermal expansion gap or minimum clearance between the damper sleeve and the side of the penetration should be calculated using the following formula:

FOR GALVANIZED STEEL DAMPER

E (side) = (overall width X 1.01 + 10)/2 mm for both vertical and horizontal fire damper

E (top) = (overall height X 1.01 + 10) mm for vertical fire damper

FOR STAINLESS STEEL DAMPER

E (side) = (overall width X 1.015 + 10)/2 mm for both vertical and horizontal fire damper

E (top) = (overall height X 1.015 + 10) mm for vertical fire damper

where E is the thermal expansion gap.

The calculated thermal expansion gap is the minimum required and may be slightly larger. Where damper opening is larger than that required for minimum clearance, the retaining angle size should be increased so that the width of the flange is not less than twice the clearance between the fire damper and the penetration.

For installation on masonry floor the fire damper should be positioned centrally within the wall opening so that the thermal expansion gap is equal all round. Installation of fire damper on drywall is much more complicated and should not be underestimated. Drywall partitions are generally not load bearing wall and the weight of the fire damper should not rest on the drywall. Fire damper should be independently suspended from the building structure to prevent failure of drywall partition during a fire. This is the most secured way to install fire damper on dry wall. As the damper is suspended, vertical thermal expansion gap should be allowed under the damper. The calculation of the vertical thermal expansion should include that of the suspension rod. Horizontal thermal expansion should be calculated as for the masonry wall installation.

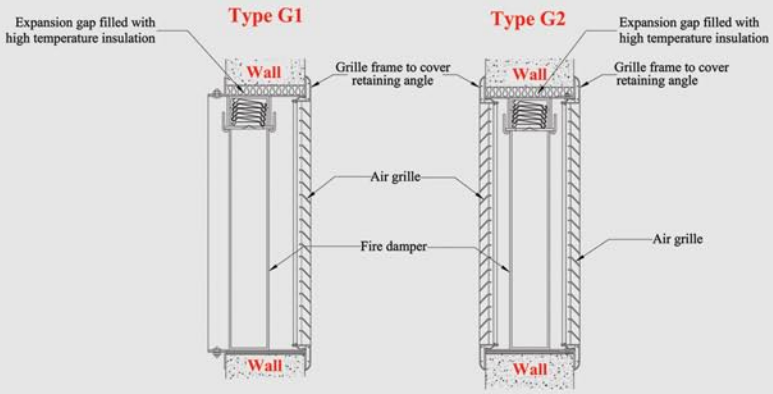



Figure 5: INSTALLATION WITH GRILLES

All thermal expansion gaps should be filled with high temperature insulation such as ceramic or high temperature mineral wool.

Duct connection to damper must be done in such a way that the damper will stay in place within the wall or floor opening even though the duct is disrupted during a fire. Duct must not continue through the wall opening or be secured to the fire damper with steel fasteners. In high pressure system flange connection should be considered in which case consult the manufacturer or distributor to ensure damper sleeve is extended to accommodate the connecting flanges.

Air grille may be installed on either one or both sides of fire damper as shown in figure 5. One end of the sleeve is bent to form a flange butting against the wall. The flange ofthe retaining angle must be covered with grille frame as shown. For large fire damper where grille is required on either or both sides of the fire damper, early planning is required to ensure the wall may be constructed as shown in figure 6 to allow space for installation of grille. Consult our factory to determine the dimensions of the wall or floor openings. Where the masonry wall is very thick due to structural reason, the wall may be constructed according to figure 7 to allow the installation of fire damper at one end of the wall opening.

If either or both sides of a large damper are exposed (or not duct connected), it is advisable to have the exposed side protected by wire screen to prevent passage of personnel through the damper. This safety precaution will prevent possibility of personel injury due to unexpected closing of the damper.

Installation details and instructions are provided on our relevant Engineering Data Sheet.

*In summary sufficient thermal expansion gap must be allowed, expansion gap need to be filled with high temperature insulation, retaining angles must be large enough to cover the expansion gap, duct connection must allow it to break free from the damper if it should collapse and for installation on drywall the weight of the damper must not rest on the partition.*

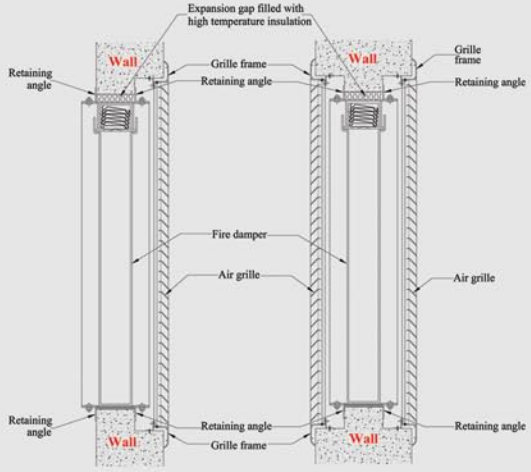



Figure 6: INSTALLATION ON WALL WITH NICHE

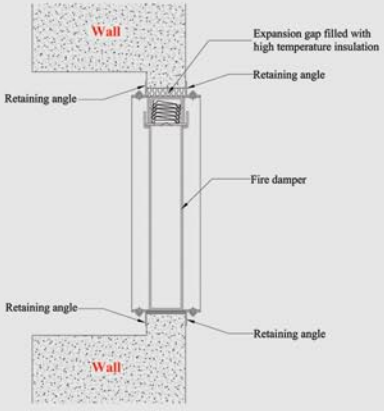
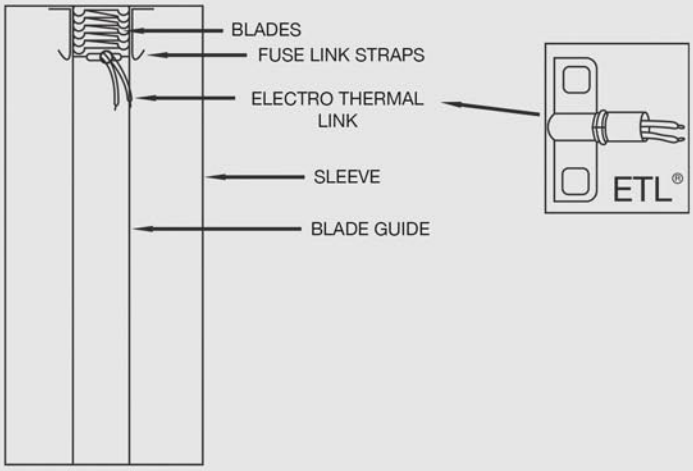



Figure 7: INSTALLATION ON THICK WALL

# fire smoke dampers

**ELECTRO THERMAL LINK ETL ACTUATION**




# ordering information

Fire Damper Models can be ordered as follows:

1. Type A for use in low velocity rectangular ductwork.
2. Type B for use similar to Type A, except where it is desired to keep the blade stack out of the air stream.
3. Type C, Round, is for use in round duct system.
4. Type C, Flat oval, is for oval duct system.
5. Type C, Rectangular, is for use where the rectangular configuration is needed, but where 100% free area is desired.

The order must specify the following:

RC400X-XXXXXXX

V: Vertical on masonry wall
H: Horizontal on masonry floor
D: Vertical on drywall

00: No sleeve and retaining angles
0A: Type A
0B: Type B
0C: Type C with adaptor both side
G1: With grilles 1 side
G2: With grille 2 sides

GS000: Galvanized steel
SS304: Stainless steel type 304
SS316: Stainless steel type 316

1. Size, identifying width and height.
2. Wall thickness.
3. Size and shape of connecting duct if Type C is specified.

# specifications

Fire dampers shall be tested in accordance to Singapore Standard SS333 or other recognized test standards for fire resistance and shall maintain their integrity for a period of 2 or 4 hours as required. For large fire damper, manufacturer shall show proof of a large and multiple-module damper being tested on the furnace. Fire damper exceeding 4 modules in construction and size of 9 square metres shall be supplied with appropriate mullion to ensure rigidity of the damper assembly. Single module shall be sized 1500 X 1500 mm and 1200 X 1680 mm for wall and floor mounted damper respectively. Evidence of approval from local authority for such damper shall be submitted for approval. Fire damper shall be of the low leakage type. Air leakage shall not exceed the values as indicated in the table. The fire damper tested for fire resistance shall be the same one that was tested for air leakage. Test data of air leakage from a recognized laboratory must be submitted for approval.

| Air Pressure Differential (kPa) | Maximum Allowable Leakage ($m^3/s/m^2$) |
|---|---|
| 0.25 | 0.19 |
| 0.50 | 0.25 |
| 0.75 | 0.31 |
| 1.00 | 0.35 |
| 1.25 | 0.39 |

Fire damper shall also be tested for closing reliability and floor-mounted damper shall be tested for its spring closing force to SS333.

Fire dampers shall be installed as indicated and to the requirements of the local fire regulations. All fire dampers shall be supplied with sleeve and retaining angle complete for installation on site. Fire dampers shall be of robust construction and sleeve shall be full welded assembly of 1.5 mm to 2.5 mm galvanized steel depending on size of the damper. Tack welding on the sleeve joint is not acceptable. Roll formed inter-locking blades shall be of 1.0 mm galvanized steel. Blade guides constructed to 1.2 mm galvanized steel shall be spot welded to the sleeve to permit greater damper rigidity. Installer shall adhere to the installation instructions provided by the damper manufacturer. Fire damper installed on drywall shall be suspended independently from the building structure above it so that its weight is not rested on the drywall partition. This is in addition to any stud or frame that may have been added to the fire rated drywall partition for mounting the damper. All fire dampers shall be model RC400V or RC400H as manufactured by OLS Manufacturing Co. or equivalent.

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