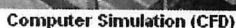
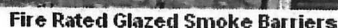
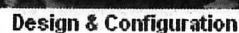
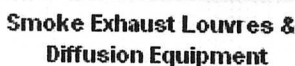




Our design and manufacturing is carried out at our factory where we have the expertise to convert a wide range of materials to produce all the major components and control equipment for our systems.

**HART** designs and supplies complete integrated smoke control systems for buildings and facilities. We have a department known as “Smoke Control” solely dedicated to installations and services inclusive of the following items:

- Smoke Ventilation System
- Smoke Curtain System
- Smoke Extraction System
- Smoke Barrier System
- Smoke Dampers
- Fire Rated Roller Shutters
- Smoke Detection System
- Smoke Ducting System
- Computer Modeling & Simulation

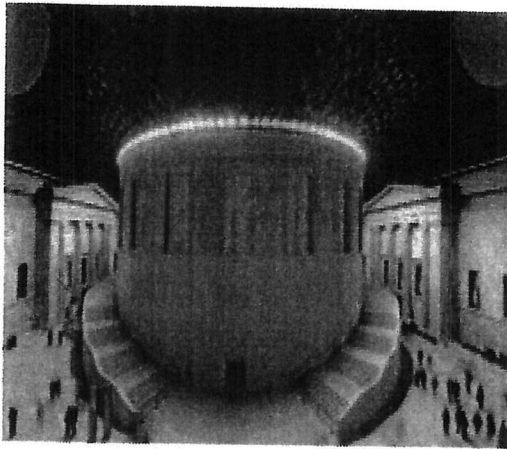


We maintain a highly experienced system team to handle all the design and authority's submission requirements for the prescriptive and performance based design projects. We take total responsibilities in the design and regulatory compliance, construction drawings, selection of products and equipment, well-managed installation, testing and commissioning as well as post installation and handing over, servicing and maintenance of the complete system.

Email: [smokecontrol@hart.com.sg](mailto:smokecontrol@hart.com.sg)

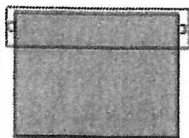
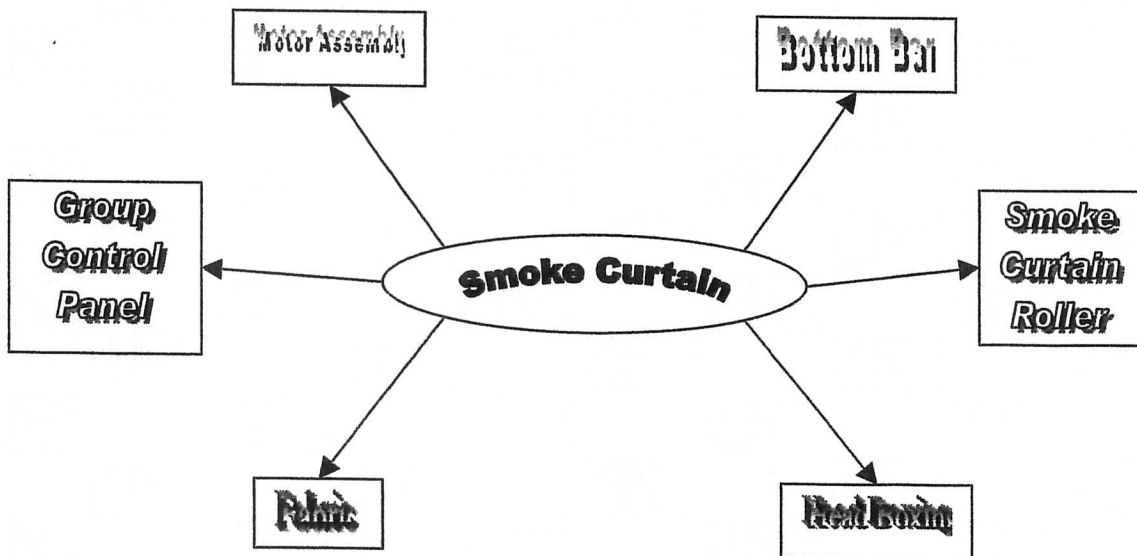
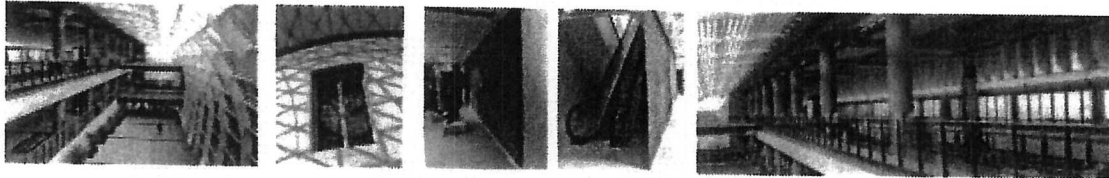


# SMOKE CURTAIN SYSTEM

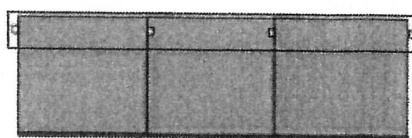


Smoke curtains are totally "fail-safe" with the option of being either "powered down" or "gravity drop". Thus it is one of the most advanced yet cost-effective systems on the market.

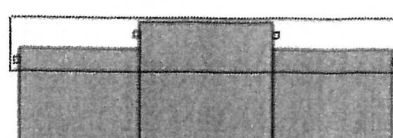
Limit switch control has been replaced with current limiting systems to determine the upper position of the curtain and a motor generated facility ensures a controlled descent of the curtain even in the event of total power failure. The smoke curtain system meets the rigorous requirements of PSB (Singapore) and BS 7346 Part 3: 1990, BS 476 Part 6: 1981 and BS 476 Part 7: 1987. The simplicity of its design ensures high reliability whilst keeping installation and future maintenance cost to a minimum.



Single Head Box



Double Head Box, Side by Side Rollers  
250 mm Wide x 150 mm High



Double Head Box, Over & Under Rollers  
150 mm Wide x 250 mm High



**HART ENGINEERING PTE LTD (Smoke Control Department)**  
 g Junction, HART House, Singapore 339279 Tel: (65) 62912611 Fax: (65) 62935193  
 Email: [smokecontrol@hart.com.sg](mailto:smokecontrol@hart.com.sg)

HART ENGINEERING PTE LTD (Smoke Control Department)



**HART GROUP OF COMPANIES**

No. 26, Kallang Junction, Hart House, Singapore 339279

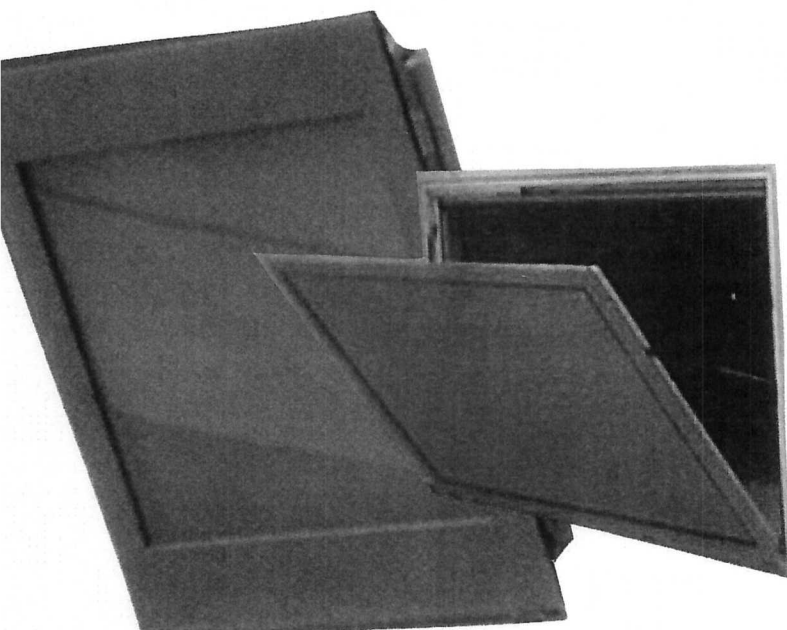
Tel: (65) 2912611

Fax: (65) 2964514 / 2935193

Email: hart@swiftech.com.sg

<http://www.hart.com.sg>

## HART SMOKE CONTROL SYSTEM

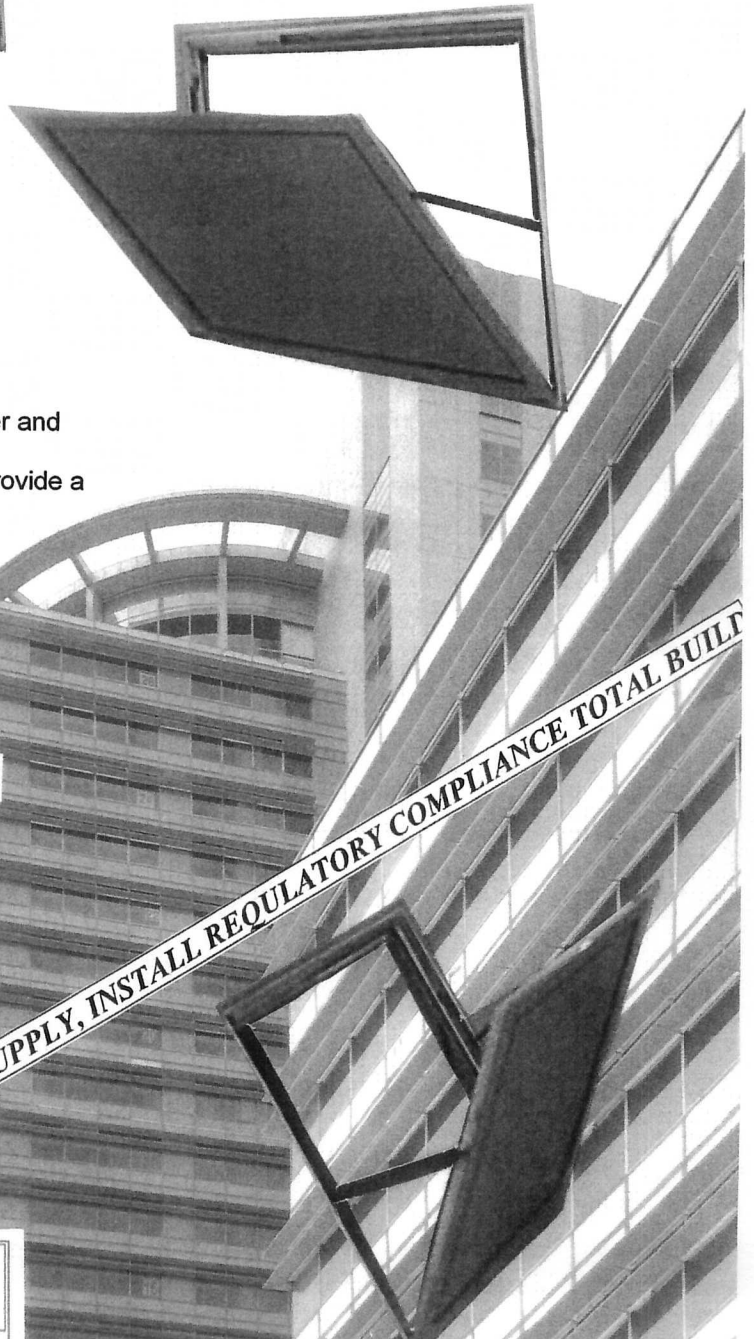


The HART System glazed casement ventilator is designed for the natural extraction of heat, smoke and fumes. The ventilator is ideal for vertical installation in an atrium, multi-storey building or shopping mall where the aesthetics of a glazed façade are required.

The System combines total versatility with enhanced Architectural features and has the capability to be bottom, top or side hung depending on the project requirements. Ventilators can be installed from 80 degrees to the vertical.

Two version of ventilator are available i.e a thermally broken (TB) or non-thermally broken (NTB) version.

The ventilator is comprised of an inner and outer frame with snap on glazing cap. The frames have been designed to provide a unique slim unobtrusive profile. All components are manufactured from aluminum extrusion to BS1474 Grade 6063. The ventilator is fitted with integral gasket. All hinge and operating mechanisms are fully concealed within the outer frame. Operation is by pneumatic or electric actuators.



The ventilator is comprised of an inner and outer frame with snap on glazing cap. The frames have been designed to provide a unique slim unobtrusive profile. All components are manufactured from aluminum extrusion to BS1474 Grade 6063. The ventilator is fitted with integral gasket. All hinge and operating mechanisms are fully concealed within the outer frame. Operation is by pneumatic or electric actuators.

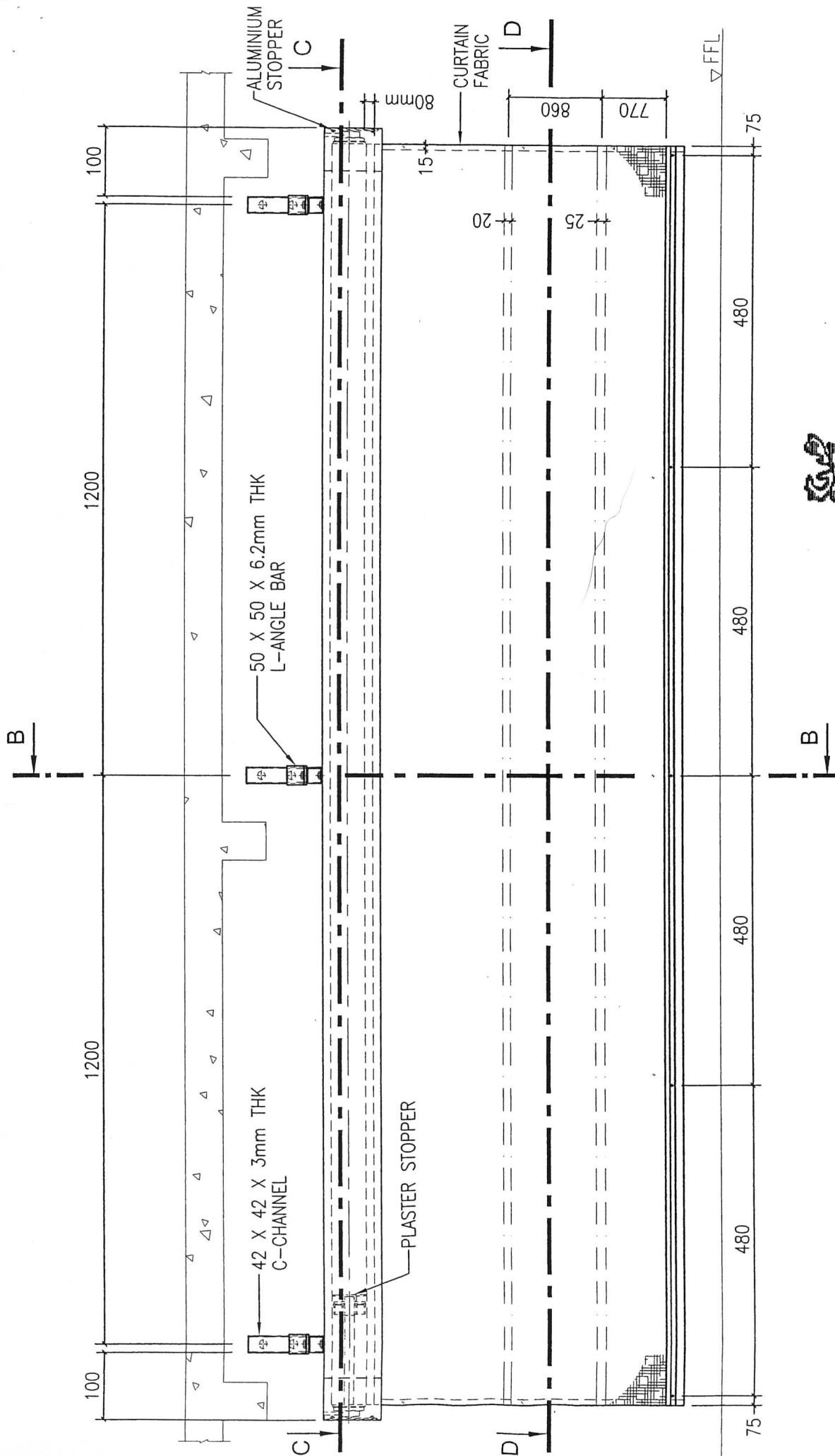


egrated Smoke Control Systems

Glazing options are available from 6mm to 26mm as standard with glass, polycarbonate or acoustic insulation. The System can be supplied with a polyester paint finish from our standard range of colours to **BS6496** as an optional extra. The System has been independently tested to meet the requirements of the **EN12101-2** and also complies with BS7346: Part 1:1990. Weather tested for watertightness and wind resistance performance by a third party test certificate **E 213.8.119** from CEBTP and meets the requirements of **BS5368/BS6375**.

The ventilators can be manufactured from a wide range of sizes dependent upon roof slope, operation and glazing option. Ventilators can be either rectangular or trapezoidal.





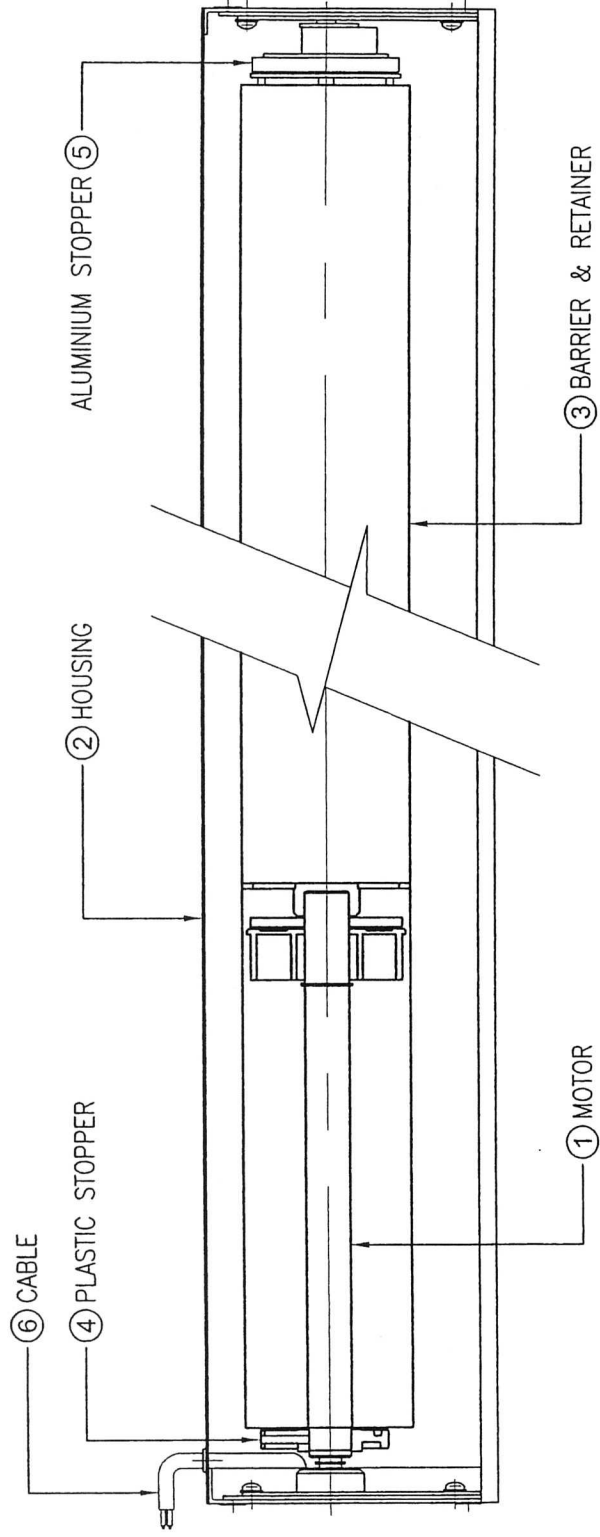
VIEW A



**HART ENGINEERING PTE LTD**

Hart House, 26 Kallang Junction, Singapore 339279.  
Tel : 62912611 Fax : 62964514

DRAWING NO. : HT/SCT-GEN/SK-01/2006



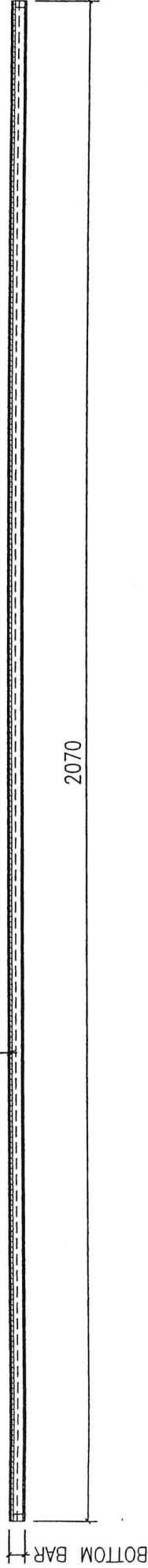
## SECTION C - C



**H.A.R.T. ENGINEERING PTE LTD**

Hart House, 26 Kallang Junction, Singapore 339279.  
Tel : 62912611 Fax : 62964514

THICKNESS OF  
FABRIC



## SECTION D - D

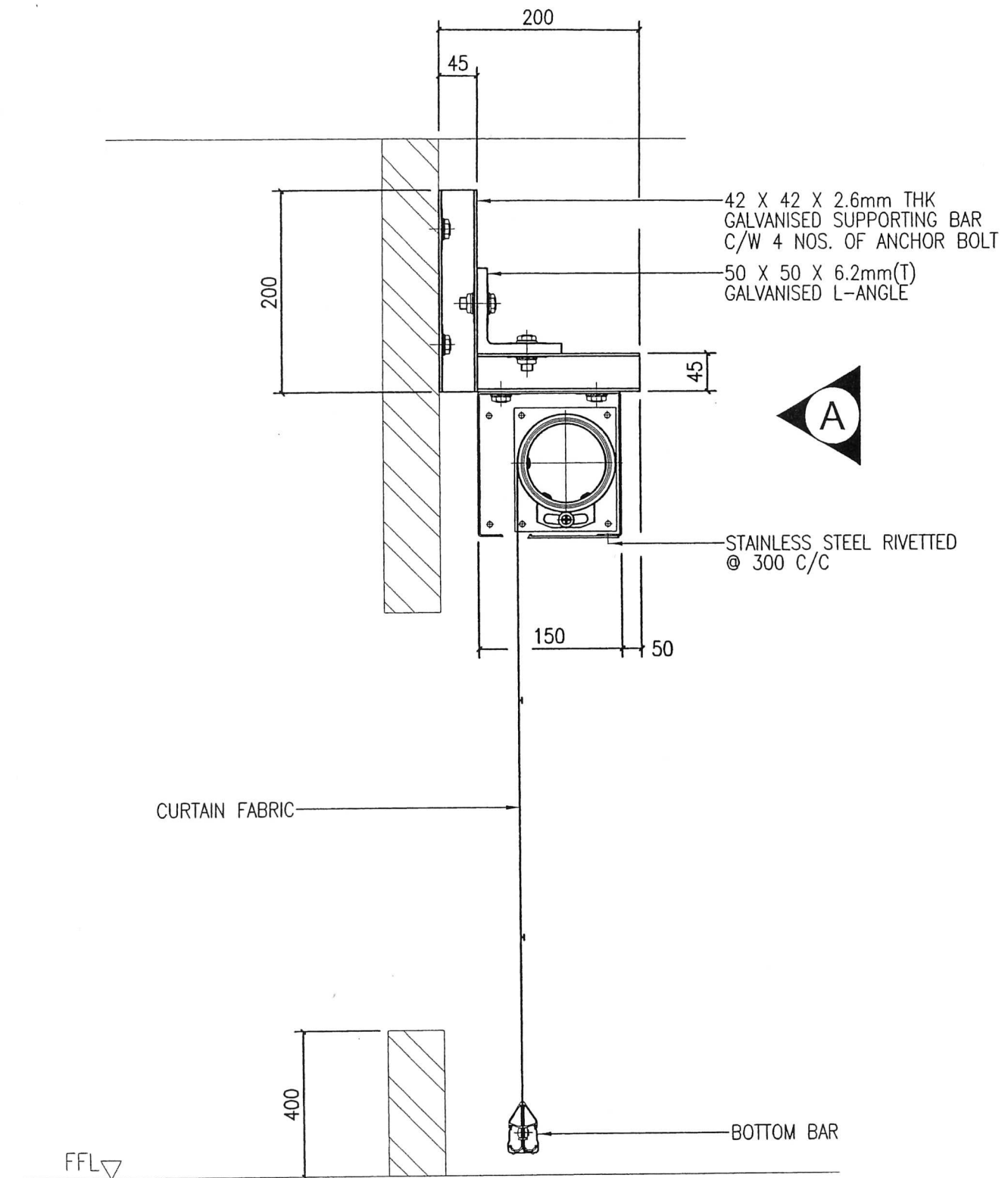


HARRIS

ENGINEERING PTE LTD

Hart House, 26 Kallang Junction, Singapore 339279.  
Tel : 62912611 Fax : 62964514

DRAWING NO. : HT/SCT-GEN/SK-05/2006



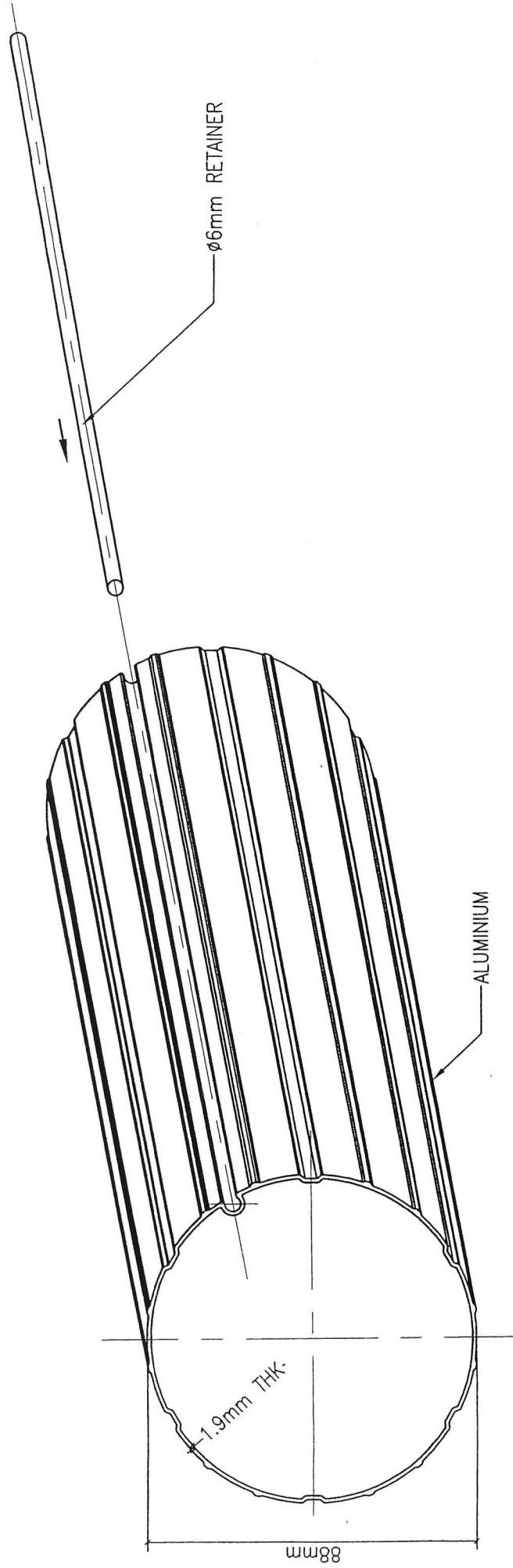
## SECTION B - B



**HART ENGINEERING PTE LTD**

DRAWING NO. :  
HT/SCT-GEN/SK-02/2006

Hart House, 26 Kallang Junction, Singapore 339279.  
Tel : 62912611 Fax : 62964514



## BARRIER



**H.A.R.T. ENGINEERING PTE LTD**

Hart House, 26 Kallang Junction, Singapore 339279.  
Tel : 62912611 Fax : 62964514



# HART

TECHNOLOGIES PTE. LTD.

NO. 26, KALLANG JUNCTION, HART HOUSE, SINGAPORE 339279

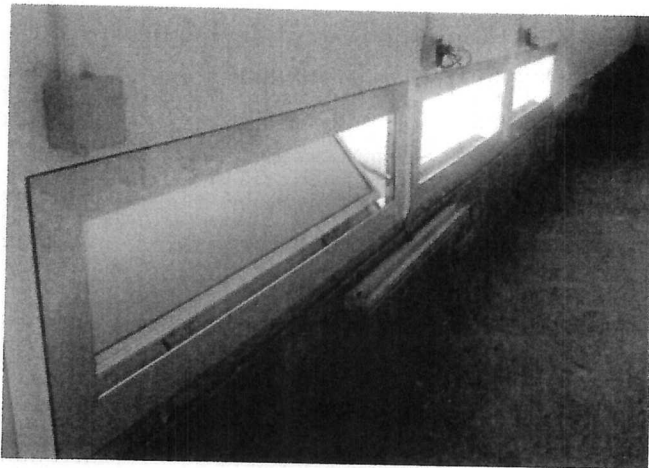
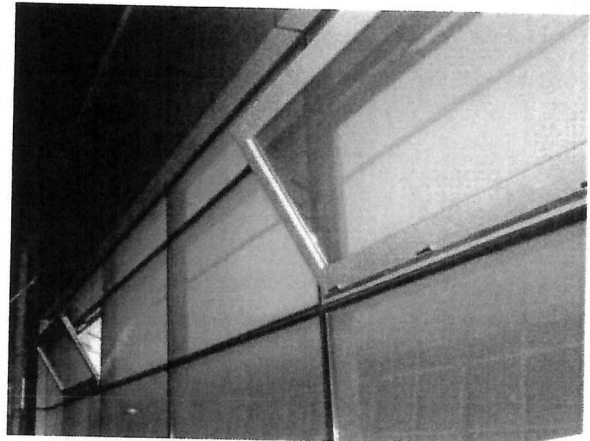
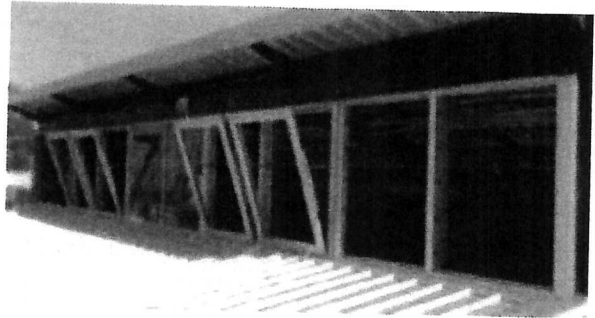
TEL: (65) 62912611 FAX: (65) 62935193 / 62964514 E-MAIL: [info@hart.com.sg](mailto:info@hart.com.sg) <http://www.hart.com.sg>

GST REG NO: M2-0071226-9

**Hart Smoke Ventilator model : HSV – 1000** is manufactured and tested to British Standard BS 7346 : Part 1: 1990.

The ventilator is designed to be installed vertically with the vent panel axis of rotating along its base and direction of opening swung away from the space of fire.

The glazing model of the HSV – 1000 ventilator are made of two portions, the opening glazing panel made of minimum 8mm clear glass (or polycarbonate) and the base frame made of high quality aluminum extrusions in accordance to AA 6063 T5. It is specifically designed for the vertical installation in an atrium, multi-storey building or shopping mall. The frame is designed to provide a unique slim unobtrusive profile. The glazing will be encased a 15mm, SUS 304 stainless steel frame to support its weight.



The HSV – 1000 glazing model is fitted with integral 15mm rubber gaskets which are UV safe and are able to withstand thermal as well as weather performance. All hinges and operating mechanisms of the ventilator are fully concealed within the outer frame.

The external coating for the ventilator will be of natural finish or polyester finish with standard range of colour to BS 5496 or equivalent.

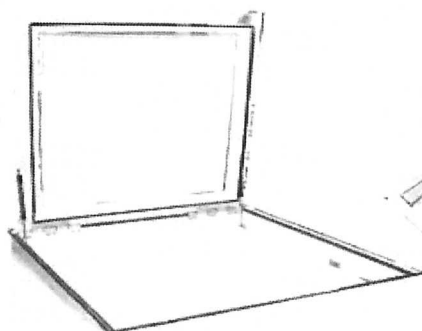
The opening and closing of the ventilator will be by means of two 3mm, SUS 304 stainless steel cable installed on both sides of the ventilator.



Cert. No: Q8616

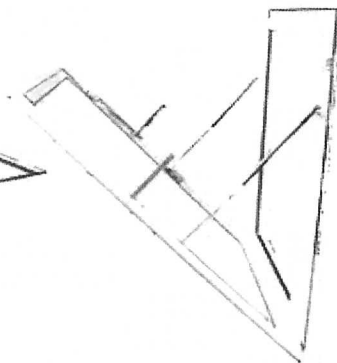


# Smoke Ventilation System



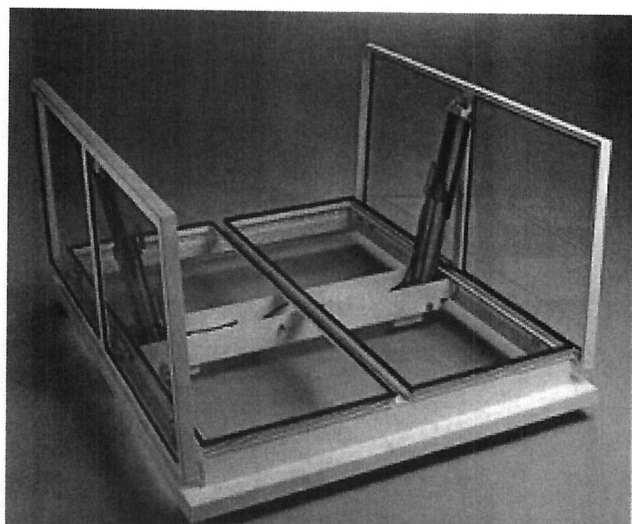
Single (Inclined)

Single Flap (Vertical)

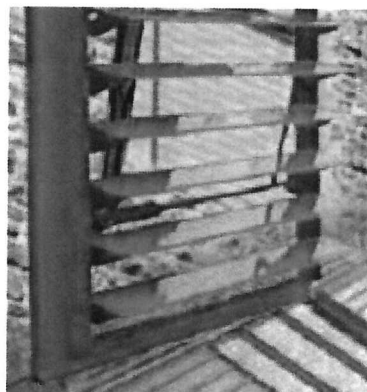


The **HART** casement or louvered smoke ventilator is designed for the natural extraction of heat, smoke and fumes.

It is ideal for vertical and horizontal installation in an atrium, multi-storey buildings, shopping malls, cinemas, lecture theatres or auditoriums.



Double Flap



Louvres

The ventilator comprises of an inner and outer frame with snap-on glazing caps. The frame has been designed to provide a unique slim unobtrusive profile. All components are manufactured from aluminium extrusion to **BS1474 Grade 6063**. The ventilator is fitted with integral gasket. All hinge and operating mechanisms are fully concealed within the outer frame. Operation is by electric actuators.

Glazing options are available from 6mm to 26mm as standard with glass, polycarbonate or acoustic insulation tested to a maximum of **SRI 46 dBA**.

The system can be supplied with a polyester paint finish from our standard range of colours to **BS6496** as an optional extra.

The system has been independently tested to meet the requirements of the **EN12101-2** and also complies with **BS7346: Part 1:1990**. Weather tested for water-tightness and wind resistance performance by a third party test certificate **E213.8.119** from **CEBTP** and meets the requirements of **BS5368/BS6375**.

The ventilators can be manufactured from a wide range of sizes dependent upon roof slope, operation and glazing option. They can be either rectangular or trapezoidal.

**HART ENGINEERING PTE LTD (Smoke Control Department)**  
26 Kallang Junction, HART House, Singapore 339279 Tel: (65) 62912611 Fax: (65) 62935193  
Email: [smokecontrol@hart.com.sg](mailto:smokecontrol@hart.com.sg)



HART ENGINEERING PTE LTD (Smoke Control Department)

# HART SMOKE CONTROL DAMPER



## Introduction

Hart Smoke Control Dampers are design to integrate into building's smoke and fire ventilation system where dampers provide an automatic means of detecting, controlling and regulating the spread of smoke and toxic gas. The two function of a smoke damper can either be;

- 1) To be normally closed and opened only for the channeling of smoke to outdoor during fire breakout.
- 2) To be normally opened and closed only during a fire breakout to prevent the progression of smoke through the system.

The unique and uncomplicated design allows for ease in installation and low cost maintenance. Hart Dampers are suitable for installation in sheet metal ductwork, partition walls, ceiling slabs, concrete or brickwork. Installation is subjected to local building rule and regulation.

Tested in accordance to UL 555S ( AMCA Standard 500-D-98 ). The leakage factor at 0.25kpa or 1" w.g. differential pressure is measured at 9.8 cfm/ft<sup>2</sup>.

## Smoke Control Damper (SCD)

Hart Smoke Control Damper is constructed with a robust casing of 1.5mm thick galvanised steel and blades with 1.0mm thick galvanised steel.

The blades are fitted with diameter 12mm ms spindle in parallel operation and securely linked together on the sides with brass bushing. Stainless Steel grade 304 side seals are fitted to close gap between the casing and the blades.

SCD can be connected by an actuator with electric response to an external control or mounted by a worm gear for manual control operate as an air damper.

Spring return actuator can either be mounted on the side of the damper or inside the ductwork.



# HART SMOKE CONTROL DAMPER ( SCD )



## Introduction

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The unique and uncomplicated design of Hart Smoke Control Damper allows for easy installation and low or zero maintenance cost. Hart Dampers are suitable for installation in sheet metal ductwork, partition walls, ceiling slabs, concrete or brickwork.

Installation of damper is subjected to local building rules and regulations.

## Smoke Control Damper (SCD)

Hart Smoke Control Dampers are constructed with a robust casing of 1.5mm thick galvanised or stainless steel plate and damper blades formed with 1.0mm thick galvanised or stainless steel plate.

The blades are fitted with diameter 12mm steel spindle in parallel operation and securely linked together on the sides with brass bushing or nylon. Stainless Steel grade side seals are fitted to reduce the gap between the casing and the blades.

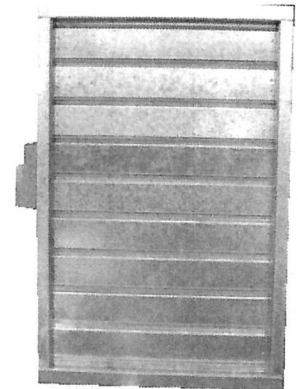
SCD can be connected using an actuator with electric response to an external control panel. Spring returned actuator either be mounted on the side of the damper or inside the ductwork.

SCD can also be mounted by a worm gear for manual control operates as an air damper when requires low leakage function.

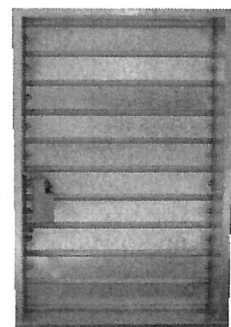
## Testing and Rating of SCD

Hart's SCD are tested in accordance to UL 555S ( AMCA Standard 500-D-98 ). The leakage factor at 0.25kpa or 1" w.g. differential pressure is measured at less than 10 cfm/ft<sup>2</sup>.

Closing Reliability is tested at 28800 cfm with a differential pressure at 4.5" w.g. with operational test at 5000 cycles or 20000 cycles without load



Actuator mounted on the side of SCD

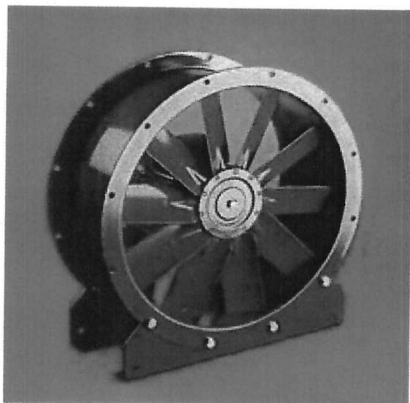


Actuator mounted inside the ductwork.

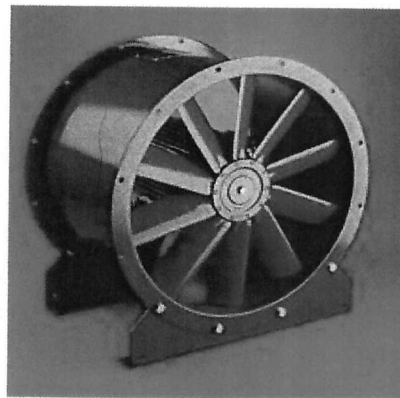
# SMOKE EXTRACT FANS

The **HART** range of standard, **long (LC)** and **short (SC)** cased ducted axial fans, comprise of **160** models to suit most applications. In nominal diameters ranging from 315 to 1250 mm with many alternative impeller blade / hub combinations and operating speeds, a very comprehensive selection of air performance are available as standard.

Industry proven, internationally recognized, foot-mounted totally enclosed metric motors are used. Standard LC series axial units provide **IP54** or **IP55** protection.



**Short Cased (SC) Series Fan**



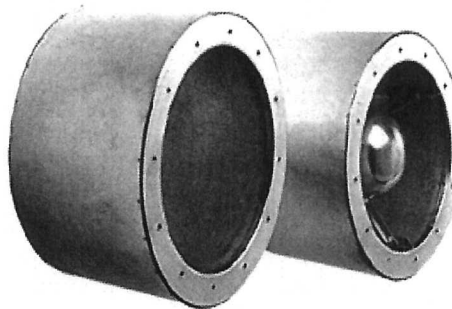
**Long Cased (LC) Series Fan**

The fans are in compliance to **BS 1490**, **BS 729**, **BS 4999 Part 101** and **Part 141**, **IEC 34-1**, **IEC 72**, **BS 500 Part 10** and **EC** standards. All fans are rated at **250°C** for **2 hours**.

## SILENCERS (OPTIONAL EXTRA)

Two styles of **HART** silencer, types **ENP** (without pod) and **EP** (with pod) provide alternative levels of attenuation.

Both series are rigidly constructed in steel, with a highly absorbent sound attenuating lining between the outer casing and inner perforated steel lining. The silencer end faces have a series of threaded holes for direct mounting to the LC, or SC fan mounting flange and Hart accessories, eg. Matching flange, or flexible collar. The EP versions provide increased attenuation. The pod, constructed from perforated sheet steel, has a sound absorbent infill.



Two alternative silencer lengths are available at one, or two t

**Material & Finish:** galvanized sheet steel casing; aluminium pod end.



## OTHER RELATED ACCESSORIES

**HART ENGINEERING PTE LTD (Smoke Control Department)**

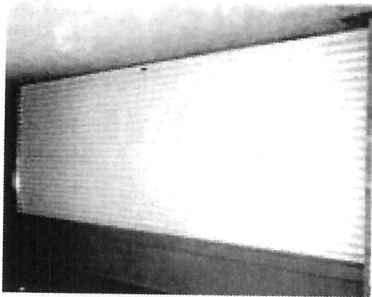
26 Kallang Junction, HART House, Singapore 339279 Tel: (65) 62912611 Fax: (65) 62935193

Email: [smokecontrol@hart.com.sg](mailto:smokecontrol@hart.com.sg)



Cert No. 95/8516

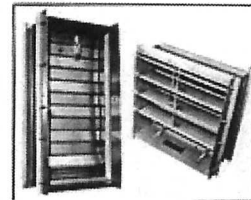
- **FIRE-RATED STEEL ROLLER SHUTTERS**



- Available up to 7m wide without further assessment
- Ranges of finishes
- Various design options
- Fire resistance up to 4 hours rating
- The most rigid steel shutters in the market
- Strength: Wind resistance of 120 kg/m<sup>3</sup> with no damage & deformation

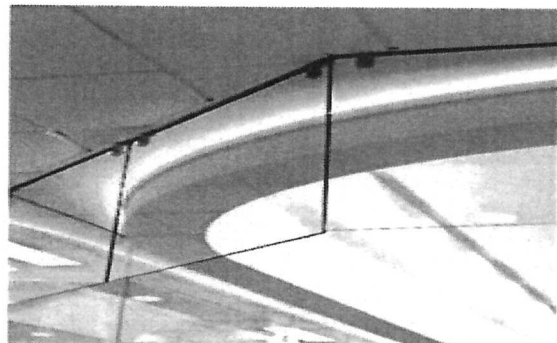
- **SMOKE/FIRE DAMPERS**

- Motorized or fusible linked
- Fire-Rated or standard
- PSB (Singapore) approved, AS 1682, AS 1682, AS 1668 and UL555S standards

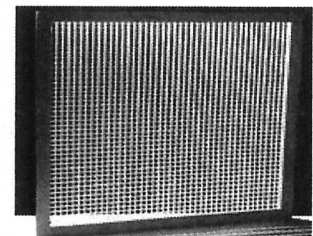
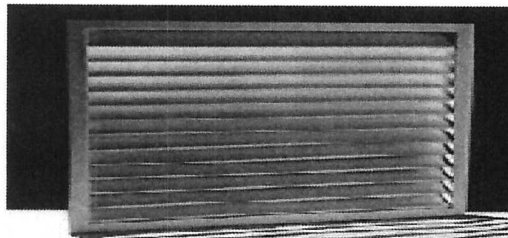
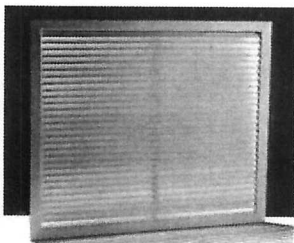


- **FIRE-RATED GLAZED SMOKE BARRIERS**

- Complies to BS 7346 Part 3: 1990 and BS 476 Part 22: 1987
- 90 minutes fire-rated
- Low maintenance cost
- Aesthetically attractive



- **EXHAUST AIR GRILLES & WEATHER PROOF LOURVES**



TESTED TO N.A.T.A. STANDARD (AUSTRALIA)

**HART ENGINEERING PTE LTD (Smoke Control Department)**  
 26 Kallang Junction, HART House, Singapore 339279 Tel: (65) 62912611 Fax: (65) 62935193  
 Email: smokecontrol@hart.com.sg





### **Recommended Specification For Hart's Smoke Curtains**

- 1) Hart smoke curtain system model : APE 7628 is manufactured and tested to British Standard BS 7346 : Part : 1990.
- 2) The fabric for the smoke curtain system is made of light weight silicon coated fiberglass material having density of 480 g / m<sup>2</sup>.
- 3) The fabric is manufactured and tested to British Standard BS 476 : Part 6 : 1989 and BS 476 : Part 7 : 1997.
- 4) All thread used for the joining of the fabrics are made of heat resistant, non melting grade SUS 304 stainless steel wire.
- 5) The motors used for the smoke curtain system are of tubular type with 24VDC input, with operating torque not less than 15N/m<sup>2</sup> and operating speed of 20rpm. Motor is nominally rated at 35 to 40 Watts with operating current about 2 amp.
- 6) The barrel used for the smoke curtain is made of high tensile strength extruded aluminium tube complying to JIS 6061 T6. The material makes the barrel much corrosion resistant and lighter weight than the standard steel barrel and is able to achieve much better uniformity and accurate balancing while under rotation under the winding of curtain fabric.
- 7) The smoke curtain system is designed in such a manner that in case of internal jamming or external resistant, the curtain will be self stopping to prevent damage of the mechanism internally.