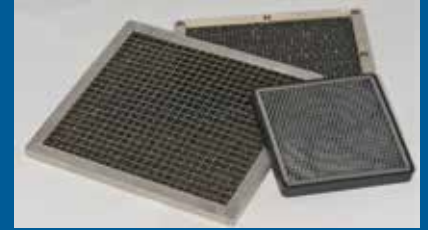


Honeycomb Vent Panels

HONEYCOMB VENT PANELS



Honeycomb Vent Panels



Think Schlegel EMI for Shielding

As the originator of the fabric-clad foam EMI shielding technology, Schlegel EMI is the industry's most trusted name. We continue to set the standard for quality and innovation, designing advanced solutions for a wide range of applications. And our worldwide locations ensure that you get what you need, when you need it.

Modern electronic equipment often requires EMI Gaskets to avoid radiating EMI/RFI susceptibility to outside sources of EMI/RFI. Maintaining electromagnetic compatibility can be an increasing challenge of the designers of today's electronic and electrical products.

How do Honeycomb vents work:

The principle is that of "Waveguide beyond cutoff". The honeycomb vent is series of tubes that acts as a waveguide, guiding electromagnetic waves into or out of the enclosure, but as the tubes are long enough then it attenuates those waves. Typically the tube should be at least 3 times as long as the diameter. Good practice is 4 times. Therefore a 3.18mm cell should be 12.7mm long. Honeycomb material is used because it offers high shielding performance, light weight and good airflow.

We use 5052 grade aluminium foil which is a lightweight material offering superior strength and corrosion resistance over commercial grade aluminium foils. It meets all the requirements of MIL-C- 7438. This material is used to manufacture aircraft floors & wing edges, missile wings, helicopter rotor blades etc, so quality and repeatability is assured. Currently we have 7 frame styles available. To keep down production cost, vent panels made with styles 1701, 1703, 1705, 1706 & 1707 are normally supplied with 3 corners notched and the 4th joined corner welded. If required, all 4 corners of the panel can be supplied fully welded. Frame styles 1702 & 1704 are always supplied with fully welded corners.

All frame styles are supplied with a conductive gasket to provide the best electrical contact between the frame and mating metal surface.

Standard tolerances for overall Finished Vent Dimensions are +/- 0.8mm

Standard tolerances on Hole Centres are +/- 0.4mm

Typical corner radii on frame styles 1701, 1703, 1705, 1706 & 1707 are R3.0mm

Vent panels can be supplied with a range of finishes including:

- Surtec 650 – Trivalent Chromium – standard finish
- Tin or nickel plating
- Painted
- Alochrome 1200 – Hexavalent chromium.

Schlegel's standard finish (Surtec 650) for aluminium vent panels fully meets the RoHS directive.

This process applies a trivalent chromium passivation. The surface finish is conductive with a low contact resistance and meets all requirements of MIL-DTL-5541F Type II Class 3 for corrosion resistance and electrical conductivity. We are also able to offer a comprehensive range of painted finishes to complement our standard Surtec 650 finish.

Aluminium Honeycomb Sizes and Styles

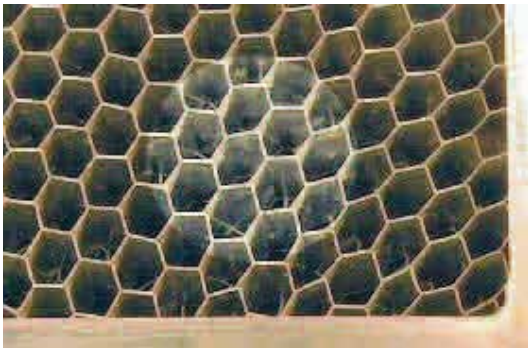
Standard straight cell sizes & thickness held in stock are:

3.2mm (0.125") cell x 12.70mm (0.50") thick

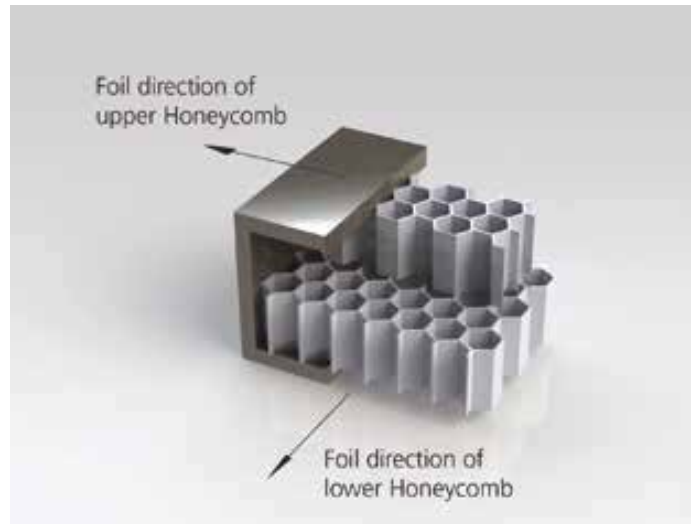
3.2mm (0.125") cell x 6.35mm (0.25") thick

1.6mm (0.0625") cell x 6.35mm (0.25") thick

3.2mm (0.125") cell x 3.2mm (0.125") thick



Schlegel's standard honeycomb vent uses 2 layers of $\frac{1}{8}$ " cell X $\frac{1}{4}$ " thick laid at 90°, this is known as cross cell. Cross cell honeycomb improves shielding performance by eliminating any polarizing effects.

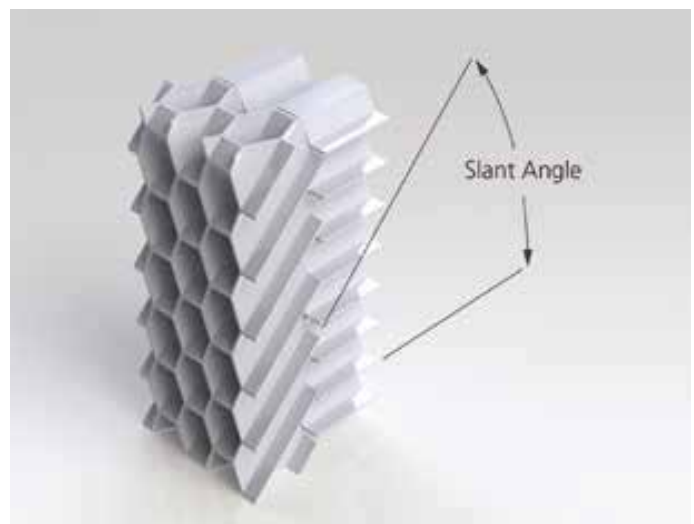


Standard slant cell sizes, angles & thickness held in stock are:

3.2mm (0.125") cell x 6.35mm (0.25") thick x 30°

3.2mm (0.125") cell x 6.35mm (0.25") thick x 45°

3.2mm (0.125") cell x 6.35mm (0.25") thick x 60°

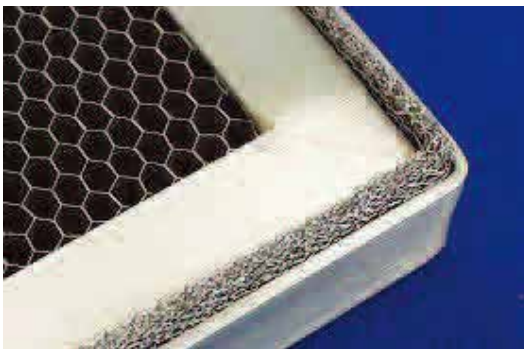


Gaskets

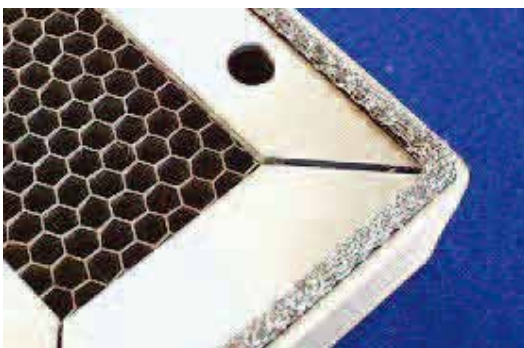
Frame styles 1702 & 1703 are supplied fitted with solid monel mesh EMC gasket as standard. Tinplated Copper Clad Steel (TCS), Aluminium or Stainless Steel solid mesh can also be specified if required. All other frame styles can be supplied with many different types of EMC gaskets including knitted mesh bonded to an environmental seal, oriented wires in silicone, conductive fabric over foam or beryllium copper.



1703 style Attenuvent showing a welded corner
(Rear with EMC Gasket)



1703 style Attenuvent showing notched corners
(Rear with EMC Gasket)

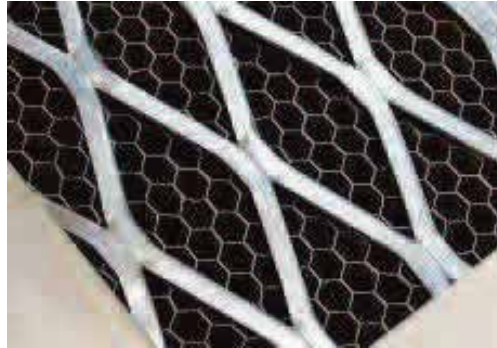


Kick Plates:

For high traffic areas or where honeycomb damage could easily occur kick plates can be fitted. Two types are stocked as standard, however custom designs to customers specific requirements (i.e louvred openings) can be discussed and fitted if requested.

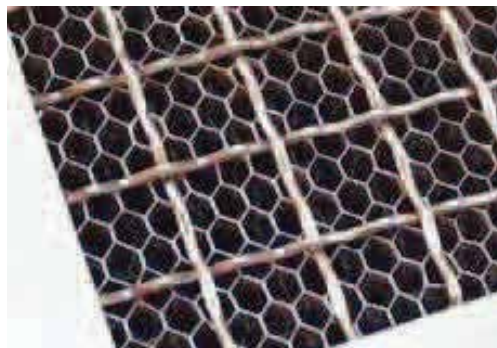
Expanded Aluminium style:

Provides maximum protection but reduced airflow



Woven Stainless Steel mesh

Provides lower protection but with better airflow



Fixings:

Vents are normally supplied with drilled clearance holes to customer specific sizes. Inserts are also offered and are stocked in M3, M4 & M5 sizes. Other styles and sizes are available on request. Standard tolerance on Hole Centres is $\pm 0.4\text{mm}$



Finishes

Vent panels can be supplied with a range of finishes including:

- Painted.
- Tin or nickel plating .
- Sempas (RoHS) Aluminium Passivation process.
- Trivalent chromium (RoHS compliant)
or Hexavalent chromium.

Schlegel's standard finish (Sempas) for aluminium vent panels fully meets the RoHS directive and replaces Alocrom1200 which is a hexavalent chromium process. Schlegel's in-house process applies a permanganate passivation which is a chromate free, inorganic and non toxic coating. The process produces a dense, uniform coating consisting of aluminium and reduced manganese oxides giving a light yellow colour to the surface. The surface finish is conductive with a low contact resistance equalling Alocrom 1200. It also meets all requirements of MIL-C-5541E for corrosion and electrical conductivity. We are also able to offer a comprehensive range of painted finishes to complement our standard Sempas finish. Using industry leading wet paint solutions from Trimite, we offer full painting and preparation to DEF STAN specifications including matt and gloss finishes.

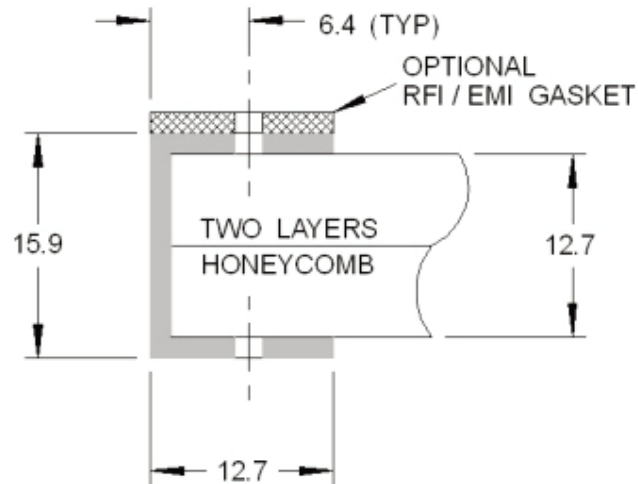
In addition we can also offer Infra Red Reflecting (IRR) matt finishes complying with DEF STAN 00-23, 80-166 and STANAG 2338.



For less critical / commercial applications requiring a protected finish we recommend polyester powder coating. This is tough material that offers excellent resistance to fresh and saltwater, petrol, linseed and penetrating oils, along with limited resistance to various acids. We are happy to advise on specific examples if required. As the epoxy process is an electrostatic method, it offers excellent penetration of the honeycomb cells, further aiding resistance to corrosion. With both processes, we are able to offer a full range of colours to RAL/BS charts.

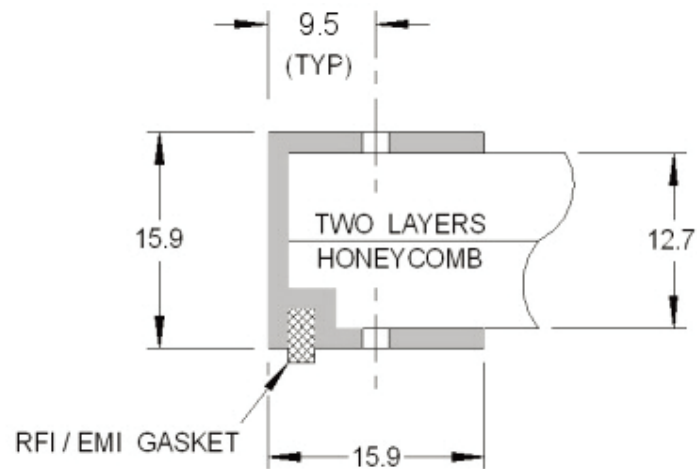
Standard Frames

1701 Will accommodate 2 layers of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Or one layer of 3.2mm cell x 6.35mm thick and one layer of 3.2mm x 6.35mm thick angled honeycomb



FRAME TYPE 1701

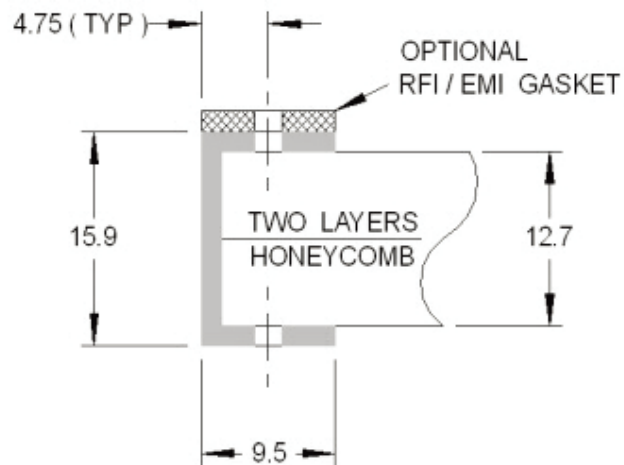
1703 Will accommodate 2 layers of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Or one layer of 3.2mm cell x 6.35mm thick and one layer of 3.2mm x 6.35mm thick angled honeycomb.



FRAME TYPE 1703

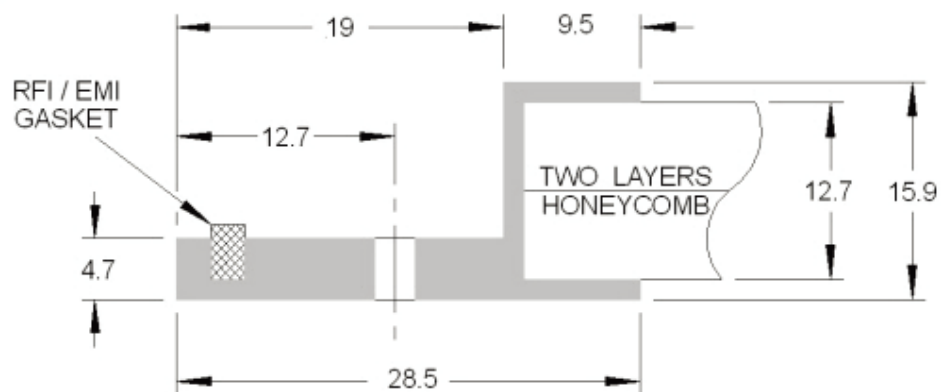
Standard Frames

1707 Will accommodate 2 layers of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Or one layer of 3.2mm cell x 6.35mm thick and one layer of 3.2mm x 6.35mm thick angled honeycomb.



FRAME TYPE 1707

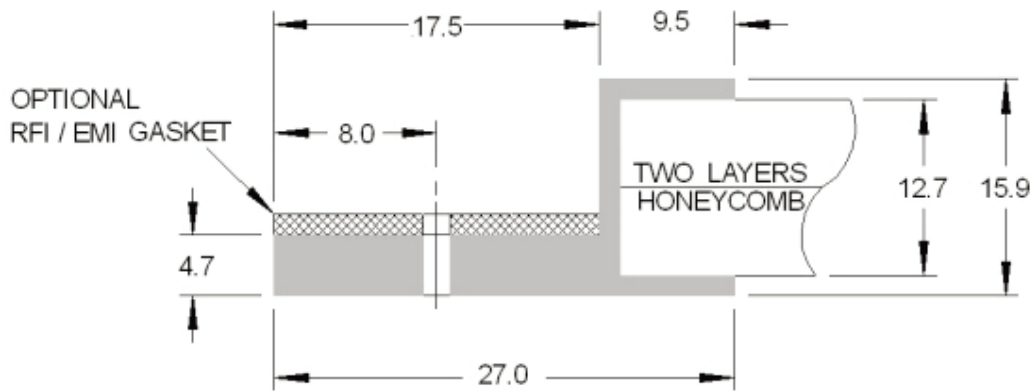
1702 Will accommodate 2 layers of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Or one layer of 3.2mm cell x 6.35mm thick and one layer of 3.2mm x 6.35mm thick angled honeycomb



FRAME TYPE 1702

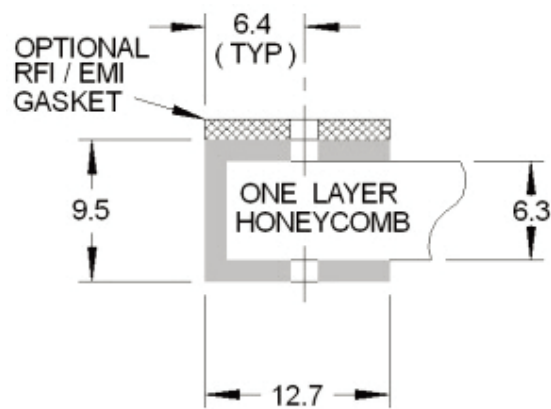
Standard Frames

1704 Will accommodate 2 layers of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Or one layer of 3.2mm cell x 6.35mm thick and one layer of 3.2mm x 6.35mm thick angled honeycomb.



FRAME TYPE 1704

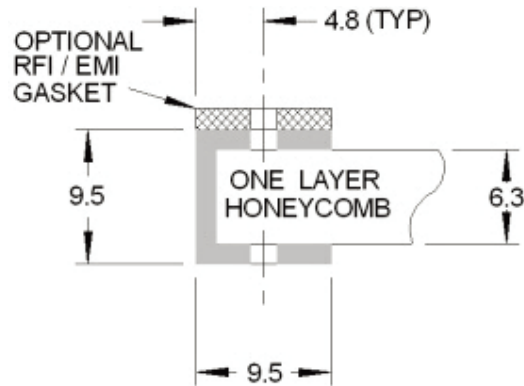
1705 Will accommodate 1 layer of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Also possible to accommodate 2 layers of 3.2mm cell x 3.2mm thick honeycomb



FRAME TYPE 1705

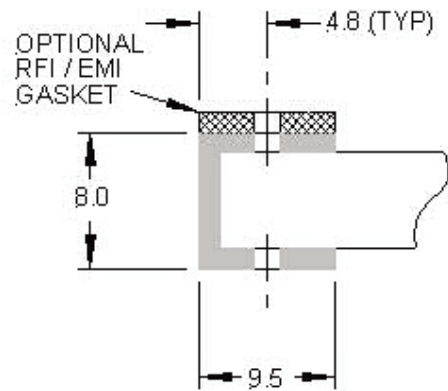
Standard Frames

1706 Will accommodate 1 layer of 3.2 or 1.6mm cell x 6.35mm thick honeycomb. Also possible to accommodate 2 layers of 3.2mm cell x 3.2mm thick honeycomb.



FRAME TYPE 1706

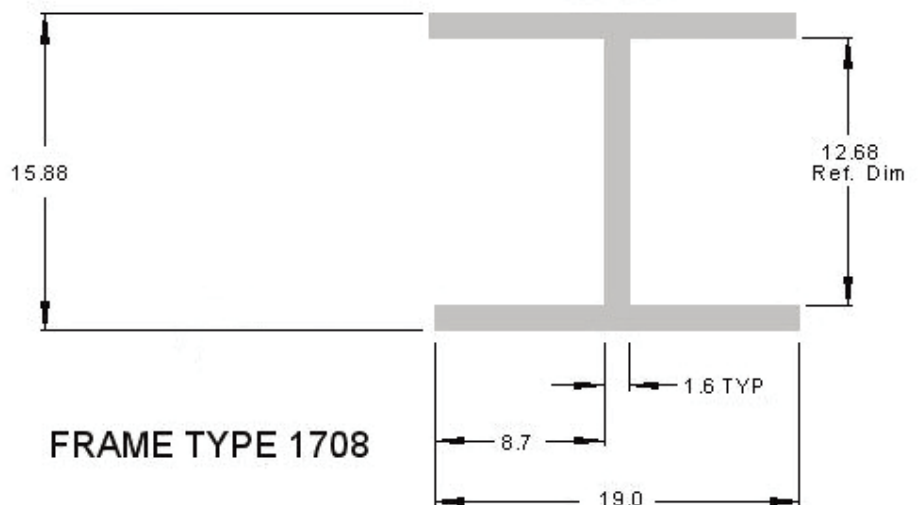
1709 Main use is for dust filter panels that can be fitted over EMC vent panels, but can accommodate one layer of 3.2 or 1.6mm cell x 6.35mm thick honeycomb, however this is not recommended.



FRAME TYPE 1709

Centre Bar Extrusion

Where a vent panel is very large, we can fit a centre strengthening extrusion to provide additional mechanical rigidity to the vent panel. Used with outer frame styles 1701/1702/1703/1704 & 1707 only.



FRAME TYPE 1708

Aluminium Honeycomb Air Ventilation Panels for RFI/EMI Shielding

Optional Removable Dust Filters and Insect Screen

Dust Filter

Dust filters are made with either of the following aluminium frames; 1701, 1705, 1706, 1707 & 1709 which holds a polyester polyurethane dust filter. This is held in place on one side by a stainless steel weld mesh. This frame then mounts on to one side of the honeycomb vent panel by captive screws, a thin soft gasket is the interface between the honeycomb vent and the dust filter. The foam filter is easily removed for cleaning with a mild detergent and rinsed with water.

A range of different filter options are available. 10, 20, 30, 45, 60 and 80 pores per inch stocked in 6.4mm and 12.7mm thicknesses, flame retardant versions are available.

Aluminium honeycomb vent panels fitted with removable dust filters usually require assisted air flow.

Insect Screen

This is a woven aluminium cloth inserted on one face or between the honeycomb and provides protection from the ingress of insects. Wire dia 0.28mm open area 66%.



Aluminium Honeycomb Air Ventilation Panels for RFI/EMI Shielding

Technical Specifications

Tolerances

Standard tolerances for overall finished vent dimensions are +/- 0.8mm.

Standard tolerances on hole centres are +/- 0.4mm.

Typical corner radii on frame styles 1701, 1703, 1705, 1706 & 1707 are R3.0mm.

1702 & 1704 frame styles have square corners and are fully welded.

Specifications

Aluminium Frame	6063-T6
Aluminium Honeycomb	5052 grade
Monel Wire	BS3075 NA13
Neoprene sponge	Mil-R-6130 Type 11 grade A condition soft
Beryllium Copper	alloy 25 (CA172)
Silicone Rubber	ZZ-R-765 Class 2 Grade 40
Aluminium Wire	5056

EMC Performance (db)

Honeycomb Type

Frequency	Field	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
200kHz	H	66	39	65	71	71	78
100MHz	E	105	80	105	105	105	100
500MHz	P	81	55	50	93	93	55
2GHz	P	85	52	60	94	94	96
10GHz	P	85	61	72	82	90	80

Honeycomb

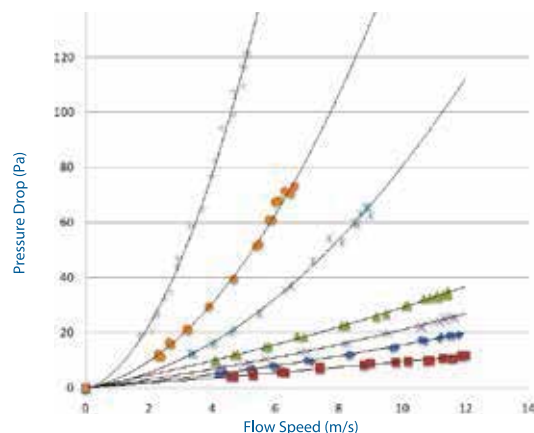
Type 1	2 layers 3.2cell x 3.2mm thick honeycomb (total 6.4mm)
Type 2	1 layer 3.2cell x 6.35mm thick honeycomb
Type 3	1 layer 1.6cell x 6.35mm thick honeycomb
Type 4	2 layers 3.2cell x 6.35mm thick honeycomb (total 12.7mm)
Type 5	1 layer 3.2cell x 6.35 thick honeycomb + 1 layer 3.2cell x 6.35mm thick slant honeycomb (total 12.7mm)
Type 6	1 layer 3.2cell x 12.7mm thick honeycomb

Honeycomb Combinations

Frame Style	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
1701				✓	✓	✓
1702				✓	✓	✓
1703				✓	✓	✓
1704				✓	✓	✓
1705	✓	✓	✓			
1706	✓	✓				
1707				✓	✓	✓
1709		✓				

All of the above frame styles and honeycomb combinations are available with the option of a stainless steel kick-plate

Air Flow Results Graph



Graph Key

+	Type 5 60°
●	Type 5 45°
✱	Type 5 30°
×	Type 4 & Type 6
▲	Type 3
■	Type 2
◆	Type 1

Notice

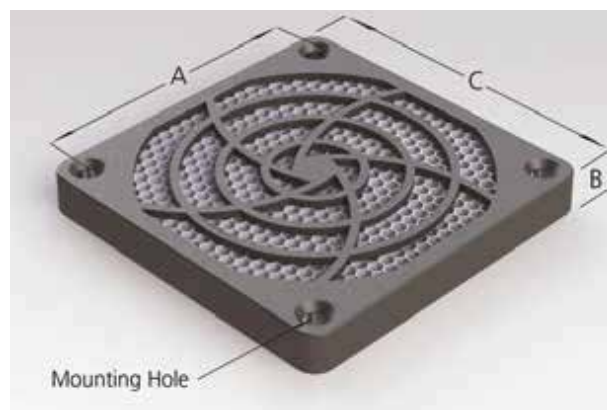
Information supplied in these data sheets is based on independent and laboratory tests which Schlegel believes to be reliable. Schlegel has no control over the design of customer's product which incorporates Schlegel's products, therefore it is the responsibility of the user to determine the suitability for his particular application and we recommend that the user make his own test to determine suitability.

The product described in this data sheet shall be of standard quality, however the products are sold without warranty of fitness for a particular purpose, either expressed or implied, except to the extent expressly stated on Schlegel's invoice, quotation or order acknowledgement. Schlegel does not warrant that products described in this data sheet will be free of conflict with existing or future patents of third parties. All risks of lack of fitness, patent infringement and the like are assumed by the user.

Fan Vents for RFI / EMI Shielding

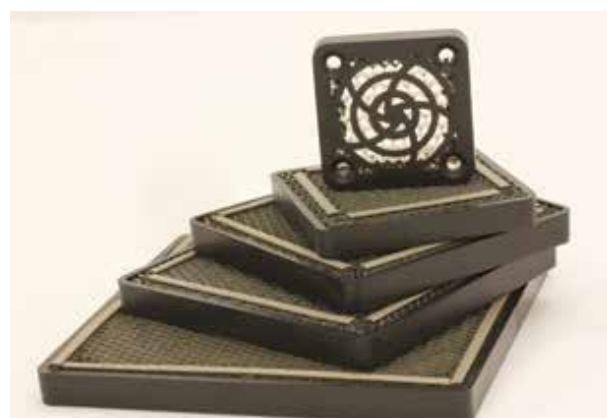
Fan Vents

A range of low cost plastic EMC vents for use with 80mm, 92mm & 120mm fans. They provide EMC shielding where applications demand a low cost solution, whilst still providing an adequate shielding performance. A Hi-impact ABS UL94V-0 fire retardant moulding is fitted with one layer of 3.2mm cell x 6.35mm thick honeycomb and a nickel/copper fabric gasket to ground the honeycomb to the metalwork. The vents have 4 countersunk holes to suit standard fan mountings.



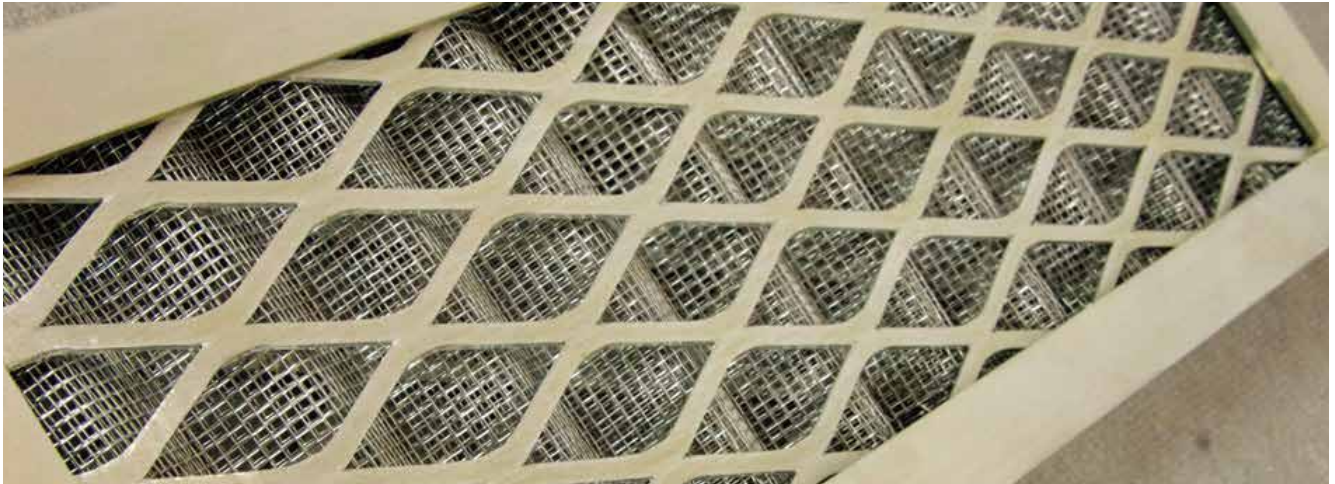
Measured shielding performance in accordance with Mil Std 285 (80mm size tested)

Frequency	Field	Typical (db)
200KHz	H	53
100MHz	E	102
500MHz	P	85
2GHz	P	74
10GHz	P	58



Type	A	B	C
Schlegvent40	32.0mm	8mm	45.5mm
Schlegvent60	50.0mm	9mm	66.0mm
Schlegvent80	71.5mm	10mm	84.5mm
Schlegvent92	82.0mm	10mm	97.0mm
Schlegvent120	104.0mm	10mm	125.0mm

Combined EMC and Dust Filter Ventilation Panels



Aluminium EMC & dust filter ventilation panel consist of 3 layers of pleated aluminium woven mesh trapped between an expanded aluminium kick-plate then held in a rigid extruded aluminium mounting frame, The 3 layers of pleated wire mesh are separated by the pleats being of different height enabling the vent to have a high dust holding capacity. The vent panel can be used dry or air filter oil can be applied to the aluminium filter media to assist in dirt and dust retention.

The frame can be supplied in a range of sizes and profiles and panels can be treated with a variety of finishes to provide corrosion protection or improve conductivity.

Panels can be provided with additional EMI gasketing or environmental sealing if required.

Applications

Ventilation panels are designed for use in electronic enclosures where good air flow is required for cooling and ventilation but where EMC compliance and dust filtration must be ensured. Typical commercial applications are:

- Electronic Enclosures
- Air Conditioning Units
- Fan housings
- EMC Racks

Availability

A large selection of Aluminium, extruded profiles are available offering a variety of fixing and gasketing options.

Custom sizes manufactured with no additional cost. Frames can be supplied with fixing holes or captive threaded inserts to aid mounting.

These ventilation panels can be supplied with a Sempas (RoHS) Aluminium passivation finish.

Design Considerations

Any environmental conditions such as moisture and dust control including

- Air Flow requirement (Generally requires assisted air flow)
- External louvers for rain protection
- Drain holes
- Any additional gasketing
- Cleaning: Vacuum or blow clean with an airline for dry panels or easily cleaned in detergent solution prior to re oiling.

Constructional requirements and finishes including

Rigidity of vent frame and enclosure so as to prevent bowing of either surface when compressing the gasket Fixing requirements e.g. holes or threaded inserts ensuring appropriate position and size of hole-centres. (Holes in the corners of the frame should be avoided.)

If specifying captive inserts in both sides of the frame off-set the positions by 10mm minimum.

Combined EMC and Dust Filter Ventilation Panels

Gaskets for vents

- Knitted wire mesh = Frames with a gasket groove
 - Orientated wire in silicone
 - Knitted Monel wire mesh with a Neoprene sponge carrier 2.4mm thick
 - Beryllium Copper finger stock
- Other gasket options are available

Production Capabilities

Schlegel supplies a range of EMC vent panels using the latest technology and, with the exception of painting and plating, all processes are kept in house, giving us flexibility and total control over quality. Schlegel has invested heavily in this area making us the market leaders for price, delivery, quality and availability.

Fully programmable CNC machines for the notching & cutting of the frame extrusions and drilling of exact and repeatable holes combined with the latest TIG welding equipment allows Schlegel to offer a fast delivery of its competitive range of aluminium woven mesh produced to customer designs. This advanced technology also eliminates the need for additional tooling and set-up charges.

Vent panels made with styles 1701, 1703, are supplied with 3 corners notched and the 4th joined corner welded and have an external corner radii of 3mm.

Finishes

Vent panels can be supplied with a range of finishes including:

- Painted (frame only for dust panels)
- Electro less plated Tin or Nickel
- Sempas (RoHS) Aluminium Passivation process
- Trivalent chromium (RoHS compliant) or Hexavalent chromium

Schlegel's standard finish (SEM-PAS) for aluminium vent panels fully meets the RoHS directive and replaces Alocrom1200, which is a hexavalent chromium process. The in house process applies a permanganate passivation which is a chromate free, inorganic and non toxic coating. The process produces a dense, uniform coating consisting of aluminium and reduced manganese oxides giving a light yellow colour to the surface. The surface finish is conductive with a low contact resistance equalling Alocrom 1200. It also meets all requirements of MIL-C-5541E for corrosion and electrical conductivity.

For less critical / commercial applications requiring a protected finish we recommend polyester powder coating. This is tough material that offers excellent resistance to fresh and saltwater, petrol, linseed and penetrating oils, along with limited resistance to various acids. We are happy to advise on specific examples if required. With both processes, we are able to offer a full range of colours to RAL/BS charts.

Combined EMC and Dust Filter Ventilation Panels

Technical Specifications

Tolerances

Standard tolerances for overall finished vent dimensions are +/- 0.8mm

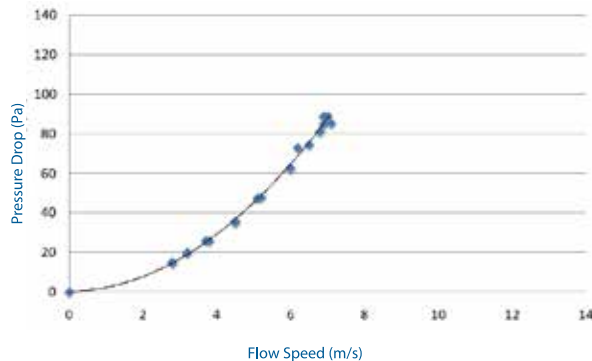
Standard tolerances on hole centres are +/- 0.4mm

Typical corner radii on frame styles 1701 and 1703 are R3.0mm

Specifications

Aluminium frame	6063-T6
Aluminium filter material	wire dia 0.28mm open area 66%
Monelwiregasket	BS3075NA13
Neoprenesponge	ASTMD1056 (84) SCE42
Beryllium copper	alloy 25 (CA172)
Siliconerubber	ZZ-R-765Class 2 Grade 40
Aluminium wire	5056

Air Flow Results Graph

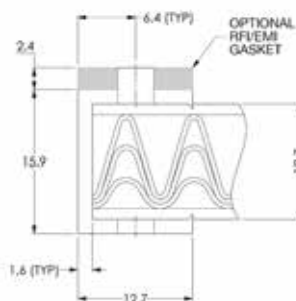


EMC Performance (db)

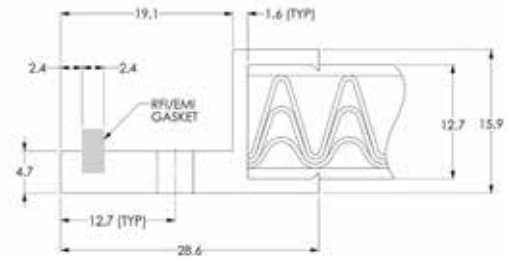
Frequency	db
0.01MHz	42
0.1MHz	53
1.0MHz	61
10.0MHz	81
100MHz	60
1,000MHz	52
10,000MHz	43

Frame Styles

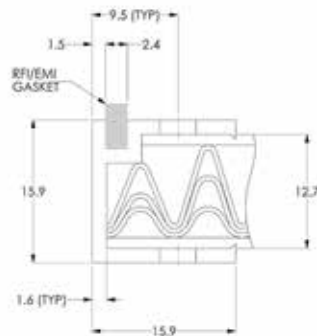
1701



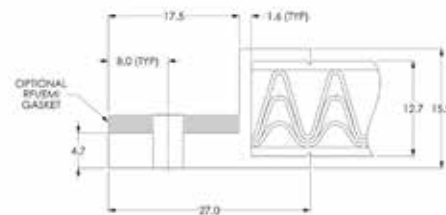
1702



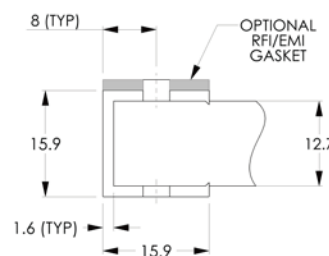
1703



1704



1710



Notice

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Aluminium Screen EMC and Dust Filter Ventilation Panels



Aluminium screen EMC & dust filter ventilation panels consist of multi-layer expanded aluminium foil mesh trapped in a rigid extruded aluminium mounting frame, the frame can be supplied in a choice of sizes and profiles. Panels can be treated with a variety of finishes to provide corrosion protection. Air filter oil can be applied to the aluminium filter media to assist in dirt and dust retention.

Panels with a gasket groove have a knitted monel wire mesh gasket as standard. Other frames can be provided with an additional EMI Gasket.

Applications

Ventilation panels are designed for use in commercial electronic enclosures where air flow is required for cooling and ventilation but where EMC compliance and dust filtration must be ensured. Typical commercial applications are:

- Electronic Enclosures
- Air Conditioning Units
- Fan housings
- EMC Racks

Availability

A selection of aluminium, extruded profiles are available offering a variety of fixing and Gasketing options.

Custom sizes manufactured at no additional cost. Frames can be supplied with fixing holes to aid mounting.

Aluminium screen EMC and dust filter ventilation panels can be supplied with a Sempas (RoHS) Aluminium passivation process finish.

Design Considerations

Any environmental conditions such as moisture and dust control including:

- Air Flow requirement (Generally requires assisted air flow)
- External louvers for rain protection
- Any additional Gasketing
- Cleaning: Vacuum or blow clean with an airline for dry panels or easily cleaned in detergent solution prior to re oiling.

Constructional requirements and finishes including:

- Rigidity of vent frame and enclosure so as to prevent bowing of either surface when compressing the gasket
- Fixing requirements e.g. holes ensuring appropriate position and size of hole-centres. (Holes in the corners of the frame should be avoided.)
- Corrosion, electrical conductivity etc, (see Finishes section)

Aluminium Screen EMC and Dust Filter Ventilation Panels

Production Capabilities

Schlegel offers a range of EMC vent panels using the latest technology and, with the exception of painting and electro less plating, all processes are kept in house, giving us flexibility and total control over quality.

Fully programmable CNC machines for the notching & cutting of the frame extrusions and drilling of exact and repeatable holes combined with the latest TIG welding equipment allows Schlegel to offer a fast delivery of its competitive range of aluminium vent panels produced to customer designs. This advanced technology also eliminates the need for additional tooling and set-up charges. Schlegel holds a large range of aluminium extrusions. In addition to vent panels, Schlegel manufactures a huge range of EMI shielding products, including gaskets to compliment the vent panels.

Finishes

Vent panels can be supplied with a range of finishes including:

- Painted (frame only for dust panels)
- Electro less plated Tin or Nickel
- Sempas (RoHS) Aluminium Passivation process
- Trivalent chromium (RoHS compliant) or Hexavalent chromium

Schlegel's standard finish (Sempas) for aluminium vent panels fully meets the RoHS directive and replaces Alocrom1200, which is a hexavalent chromium process. Schlegel's in-house process applies a permanganate passivation which is a chromate free, inorganic and non toxic coating. The process produces a dense, uniform coating consisting of aluminium and reduced manganese oxides giving a light yellow colour to the surface. The surface finish is conductive with a low contact resistance equalling Alocrom 1200. It also meets all requirements of MIL-C-5541E for corrosion and electrical conductivity.

For less critical / commercial applications requiring a protected finish we recommend polyester powder coating. This is tough material that offers excellent resistance to fresh and saltwater, petrol, linseed and penetrating oils, along with limited resistance to various acids. We are happy to advise on specific examples if required. With both processes, we are able to offer a full range of colours to RAL/BS charts.

Aluminium Screen EMC and Dust Filter Ventilation Panels

Technical Specifications

Tolerances

Standard tolerances for overall finished vent dimensions are +/- 0.8mm

Standard tolerances on hole centres are +/- 0.4mm

Specifications

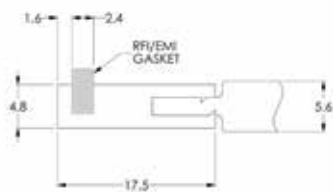
Aluminium frame	6063-T6
Monel wire	B53075 NA13

EMC Performance (db)

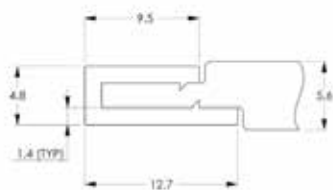
Frequency	db
0.01MHz	31
0.1MHz	49
1.0MHz	67
10.0MHz	116
100MHz	109
1,000MHz	72
10,000MHz	42

Frame Styles

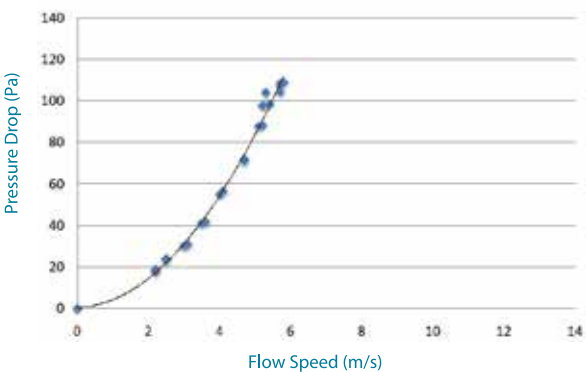
1721



1722



Air Flow Results Graph



Notice

Information supplied in these data sheets is based on independent and laboratory tests which Schlegel believes to be reliable. Schlegel has no control over the design of customer's product which incorporates Schlegel's products, therefore it is the responsibility of the user to determine the suitability for his particular application and we recommend that the user make his own test to determine suitability. The product described in this data sheet shall be of standard quality, however the products are sold without warranty of fitness for a particular purpose, either expressed or implied, except to the extent expressly stated on Schlegel's invoice, quotation or order acknowledgement. Schlegel does not warrant that products described in this data sheet will be free of conflict with existing or future patents of third parties. All risks of lack of fitness, patent infringement and the like are assumed by the user.

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