

1. INTRODUCTION

This specification covers the requirements for application of Aluminium Honeycomb Air Ventilation Panels & Kemvents for RFI/EMI Shielding products which are designed to provide Radio Frequency Interference / Electro-Magnetic Interference (RFI/EMI) shielding / sealing solutions. These products give consistent shielding performance over the life of the application.

The Aluminium Honeycomb Air Ventilation Panels and Kemvents referred to in this specification are manufactured to a specified shape and size and therefore considerations of application must be made to ensure that the appropriate product is selected and utilized correctly, so that the performance of the Vent in service is optimized.

This specification will provide technical advice on article selection & design considerations when implementing Aluminium Honeycomb Air Ventilation Panel & Kemvent products.



TE Connectivity / Kemtron Ltd manufactures a range of Aluminium Honeycomb Air Ventilation Panel & Kemvent products providing a cost-effective solution to high shielding performance applications in both the magnetic and electrical fields.

Aluminium Honeycomb Air Ventilation Panels consist of an aluminium honeycomb foil held in a rigid extruded aluminium mounting frame. These vents are equipped with a knitted wire mesh gasket ensuring excellent RFI/EMI performance. The dual layer honeycomb in the 1702 and 1703 frame types is oriented at 90°, often referred to as 'cross-cell configuration', this further enhances the RFI/EMI shielding performance.

Kemvents consist of a high impact ABS plastic frame with a layer of aluminium honeycomb foil. There is a conductive nickel copper fabric gasket around the perimeter of these vents ensuring excellent RFI/EMI performance.

The honeycomb foil used by TE Connectivity / Kemtron Ltd is laminated, glued, and then perforated ensuring excellent electrical conductivity throughout. The honeycomb foil is available in a range of thicknesses, cell sizes, and angles.

2. REFERENCE MATERIAL

2.1. Engineering Drawings

TE Connectivity Customer Drawings for specific products are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by TE Connectivity/Kemtron Ltd.

The appropriate drawings for the product referenced herein are detailed as follows:

- Customer Drawing **1702-1270-1270-C**
- Customer Drawing **1702-2540-1270-C**
- Customer Drawing **1703-1270-1270-C**
- Customer Drawing **1703-2540-1270-C**
- Customer Drawing **KEM_1651-KEMVENT_40-C**
- Customer Drawing **KEM_1651-KEMVENT_60-C**
- Customer Drawing **KEM_1651-KEMVENT_80-C**
- Customer Drawing **KEM_1651-KEMVENT_92-C**
- Customer Drawing **KEM_1651-KEMVENT_120-C**
- Customer Drawing **1703-0762-0762-C**
- Customer Drawing **1703-1016-1016-C**
- Customer Drawing **1703-1524-1016-C**
- Customer Drawing **1703-2032-1016-C**
- Customer Drawing **1703-3048-1016-C**
- Customer Drawing **1703-1778-1270-C**
- Customer Drawing **1703-1524-1524-C**
- Customer Drawing **1703-2032-1524-C**
- Customer Drawing **1703-3048-1524-C**
- Customer Drawing **1703-1778-1778-C**
- Customer Drawing **1703-2540-1778-C**
- Customer Drawing **1703-2032-2032-C**
- Customer Drawing **1703-2540-2032-C**
- Customer Drawing **1703-3048-2032-C**
- Customer Drawing **1703-2540-2540-C**
- Customer Drawing **1703-3048-3048-C**
- Customer Drawing **KEM_1651-KEMVENT_50-C**
- Customer Drawing **KEM_1651-KEMVENT_70-C**
- Customer Drawing **KEM_1651-KEMVENT_140-C**
- Customer Drawing **KEM_1651-KEMVENT_200-C**

2.2. Specifications

Product specification 108-120074 provides material specific product performance and test specification details.

2.3. Instructional Material

The TE Connectivity/Kemtron Ltd catalogue provides extensive instruction on the range of product alternative shapes and sizes that are on offer. If an alternative dimension or shape of product is required that is not covered by the scope of this specification, please consult the catalogue and seek technical sales advice from your customer service representative.

3. REQUIREMENTS

3.1. Safety

Care should be taken when handling products containing knitted wire mesh, protective gloves should be worn when handling the material to prevent any sharp or loose wires from causing cuts or abrasions to the product handler.

Small sharp burs may be present where the honeycomb is cut or drilled.

3.2. Storage & Handling

Vent and Kemvent products should be packaged in clean & dry clear polythene bags or wrapped in plastic. The packaging should protect the product from exposure to debris, dirt, or any fluid contaminants.

When handling or repackaging Vents, care should be taken not to dent or scratch the honeycomb material, which is very fragile. Carefully insert a piece of rigid plastic or cardboard in front of the honeycomb to protect it during transit or storage.

Protective gloves and eye protection should be worn when handling the product to protect the product handler from any cuts or abrasions.

Vents and Kemvents should be stored under the following conditions:

- In original packaging or equivalent packaging to protect the product from contamination
- Free from compression by another product
- At ambient temperature and humidity
- Isolated from corrosive materials

Under these conditions, Vents and Kemvent products have a shelf-life of 20 years.

4. ALUMINIUM HONEYCOMB AIR VENTILATION PANELS

4.1. Working principle

The principle is that of "Waveguide beyond cut-off". 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 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, is light weight, and has good airflow characteristics.

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

Typical applications are:

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

4.2. Honeycomb

Honeycomb can be supplied in a variety of configurations to suit different EMI/RFI shielding performance requirements. Standard perforated honeycomb is available in various slanted types. The slanted honeycomb is used for reducing rainwater ingress and can be used to direct airflow. It is available as 30°, 45°, 60° and 90° angles.

Drain holes or slots can be added to allow rainwater to escape.

For situations where the vent is vulnerable, optional expanded aluminium kickplate or weld mesh can be installed during the manufacturing process.

Removable dust filters or insect screens can be mounted to the front of the vents and can include captive screws.

Design consideration should be given to the following environmental and application conditions where moisture and dust are present:

- Air flow requirement
- Adding external louvres or slanted honeycomb
- Drain holes
- Dust filters
- Additional gasketing

4.3. Tolerances

Linear: $\pm 0.8\text{mm}$.

Hole centre: ± 0.5

Angular: $\pm 0.5^\circ$

Typical corner radii on frame styles 1701, 1703, 1705, 1706 & 1707 - R3.0mm
1702 & 1704 frame styles have square corners and are fully welded.

4.4. Gasket for Vents

Optional gaskets available to suit application requirements:

Knitted wire mesh in various wire types (only on frames 1702 & 1703)

Oriented wire in silicone (plain silicone or fluorosilicone with Monel or aluminium wires)

Knitted Monel wire mesh with a Neoprene sponge carrier 2.4 mm thick

Beryllium Copper finger stock

4.5. Extrusion profiles

Vents are available in various extrusion frame styles. These frames can be folded or joined into a variety of sizes.

<p>1701</p>	<p>1702</p>
<p>1703</p>	<p>1704</p>
<p>1705</p>	<p>1706</p>
<p>1707</p>	<p>1708</p>
<p>1709</p>	<p>1710</p>

Note: 1702 and 1704 the 'front face' is classified as the face without the gasket at the bottom of the section view.

Captive threaded inserts can be installed to aid mounting. Captive inserts are available in various metric and imperial sizes. If specifying captive inserts in both front and rear faces, they must be offset at a minimum of 10mm.

5. KEMVENTS (FAN VENTS)

A range of plastic EMC vents for use with 40mm, 60mm, 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 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

5.1. Tolerances

Linear: $\pm 0.8\text{mm}$.

Hole centre: ± 0.5

Angular: $\pm 0.5^\circ$

6. REVISION HISTORY

Revision number	Change request	Date	Incorporated By
A	-	18-Oct-2022	Dominic Hemmings
A1	Kemvent plastic frame material details updated	2-Nov-2022	Dominic Hemmings
A2	New AI-Honeycomb and Kemvents drawing references added	10-Jun-2024	Basavaraja D A