Spira’s Shielded Air Vent Honeycomb Filters are designed to provide consistent, reliably high levels of shielding while allowing cooling air to penetrate an electrical equipment cabinet. There are three types for different levels of shielding: Econo-Cell; Spira-Cell; and Brass-Cell.

**Design Advantages (All Types)**

Due to their construction and materials, our honeycomb filters offer several cost-effective advantages over the other honeycomb filters on the market.

**Competitive Cost**
A fully automated machine is used to cut the frame to size. This machine is coupled with several automated and semi-automated processes used to apply epoxy to the frame/honeycomb panel interface for mechanical strength of the filter, and to install the electromagnetic (EM) bonding spiral gasket to the extrusion. These machines and processes significantly reduce the time required to manufacture and assemble the filters, and we pass that savings on to our customers.

**Shielding Advantage**
The honeycomb panels we use offer high, reliable levels of shielding. The Brass-Cell uses brass foils soldered together which provide extremely high, reliable shielding. The aluminum panels used for the Econo-Cell and Spira-Cell filters are processed using a patent-pending process that ensures a reliable conductive path across the epoxy joints of the honeycomb cells. Tests have shown as much as a 40 dB improvement for single panel filters and 70 dB improvement for double panel filters over the use of panel material which has not been processed. See page 40 for complete performance data.

**Reliable Joint Surfaces**
We use 6061 aluminum for our frame members because of its high surface conductivity and corrosion resistant properties. We augment this with tin or tin/lead plating (when specified) to meet higher levels of shielding and/or corrosion compatibility requirements. Chemical film plating can also be employed when the high levels of shielding associated with tin plating are not required. Any plating is done prior to assembly which guarantees that the acids and other chemicals used in the pre-plating etch process are totally removed from the components, thus ensuring a long, reliable life of the filter.

**Spiral Bonding**
Spira EMI gasket materials are used to obtain an excellent, reliable frame-to-chassis bond on all types of filters. The gaskets are also employed for the honeycomb panel-to-frame electromagnetic bond on the Spira-Cell and Brass-Cell filters. The spiral gaskets are employed for the purpose of absorbing thermal expansion and contraction, shock, and vibration to insure an excellent electromagnetic bond throughout the life of the filter.
Available Options (All Types)

Frame Style
The honeycomb panel frames are used to hold the honeycomb panel material in place and to reference the honeycomb panels to equipment chassis ground potential. The frame comes in two basic styles. These are: knife-edge panel bonding (for the Econo-Cell filter); and spiral EMI gasket panel bonding (for the Spira-Cell and Brass-Cell filters).

Knife-Edge Frame
The extrusion used for the Econo-Cell filter has a single knife edge at the top of the extrusion for the single-panel filter and a knife edge on both the top and bottom for the double-panel filter. This extrusion shape has limited life characteristics and is only recommended for extremely cost-sensitive applications.

Spiral-Bonding Frame
The extrusions used for the Spira-Cell and Brass-Cell filters have built-in dovetail grooves. These grooves are used to hold the spiral EM bonding gasket in place during the manufacturing process and allow the gasket to move unrestricted during compressed applications. This unrestricted movement allows the gasket to absorb movement of the joint surfaces during thermal expansion and contraction, vibration and shock. This results in reliable EM bonding between the honeycomb panel and the frame throughout the life of the filter.

Custom “h” Frame
An “h” extrusion, which allows the honeycomb material to penetrate the wall of an enclosure, is available on special request.

Cell Width
All of the standard filters use a 1/8” cell. Other cell sizes are available through special order. Call us for availability.

Cell Thickness
The standard panel thicknesses are illustrated in Table 1. The configurations offered are designed to optimize the shielding versus cost. Other configurations are available by special order. Call us for availability.

Threaded Inserts
Filters can be made either with through holes of varying sizes or fitted with threaded inserts. For cost efficiency, we recommend even spacing of holes. Threaded inserts are not available on the 1/8” thick panels.

Econo-Cell
This filter was designed to meet relatively low level EMI requirements at a very low cost. It features a knife-edge extrusion to achieve the honeycomb panel-to-frame EM bond. This design is recommended for applications where a low to moderate level of shielding is required, low cost is essential and long life is not anticipated. (For designs requiring longer life, we recommend our Spira-Cell filters.) The other filter components consist of an aluminum frame, honeycomb processed with our patent-pending process (for consistent, reliable shielding) and stainless steel gasket (Quick-Shield) for the frame-to-chassis electromagnetic bond. The filter is for use in a relatively low humidity environment.

Spira-Cell
The Spira-Cell filter is a high reliability air vent filter supplying moderate to high levels of shielding. The filter uses aluminum honeycomb material specially proc-
essed for high, reliable shielding and comes in both single and double panel configurations. The single panel configuration uses a 6061-T4 aluminum frame and tin-plated stainless steel gasket (Ultra Quick-Shield) for the electromagnetic bonding between the panel and frame and frame-to-chassis. The double panel configuration uses a tin-plated 6061-T4 aluminum frame and tin-plated stainless steel gaskets for the electromagnetic bonding. Versions are available for high humidity and salt fog environments (through selective plating of the frame, honeycomb panel and gasket).

**Brass-Cell**

This filter gets its name by using brass honeycomb panels. The brass foil is soldered together ensuring consistent, reliable shielding of the filter. The filter offers a reliable, high level of shielding at a relatively low cost. The filter is designed to operate in a relatively low humidity environment due to potential material incompatibilities. A version is available for high humidity and salt spray environments.

**Shielding Quality**

The \( \frac{1}{4}'' \) thick panel offers shielding quality of approximately 110 dB at 1 GHz, the \( \frac{1}{2}'' \) thick panel offers shielding quality in excess of 120 dB and the \( 1'' \) thick panel exceeds 140 dB at 1 GHz. The actual shielding you obtain may vary depending on the variables associated with your specific application. See page 40 for complete performance data.

**Plating**

The filter consists of a tin-plated aluminum frame, tin-plated stainless steel gasket (Ultra Quick-Shield) and brass honeycomb panels. The high humidity/salt spray version uses our edge tin/lead plated beryllium copper gasket (Spira-Shield) and tin-plated brass honeycomb, along with the standard tin-plated aluminum frame.

**Honeycomb Panel Configurations**

These are our standard honeycomb panel configurations. If you need something special, please call us for availability.

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Number of Panels</th>
<th>Width (W)</th>
<th>Thickness (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econo-Cell</td>
<td>1</td>
<td>( \frac{3}{8}'' )</td>
<td>( \frac{1}{8}'' )</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>( \frac{3}{8}'' )</td>
<td>( \frac{1}{6}'' )</td>
</tr>
<tr>
<td>Spira-Cell</td>
<td>1</td>
<td>( \frac{3}{8}'' )</td>
<td>( 1/4'' )</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>( \frac{3}{8}'' )</td>
<td>( 1/6'' )</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>( \frac{3}{8}'' )</td>
<td>( 1/4'' )</td>
</tr>
<tr>
<td>Brass-Cell</td>
<td>1</td>
<td>( \frac{3}{8}'' )</td>
<td>( 1/2'' )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \frac{3}{8}'' )</td>
<td>( 1'' )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Hole Sizes</th>
<th>Standard Threaded Insert Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>.120&quot;</td>
<td>4-40</td>
</tr>
<tr>
<td>.147&quot;</td>
<td>6-32</td>
</tr>
<tr>
<td>.173&quot;</td>
<td>8-32</td>
</tr>
<tr>
<td>.204&quot;</td>
<td>10-24</td>
</tr>
</tbody>
</table>

818/764-8222  www.spira-emi.com
Static Pressure Drop Versus Air Speed

Air Speed - feet per minute
(ft/min.)
1,150  2,300  3,450  4,600

Static pressure drop - inches of water
0.4  0.3  0.2  0.1

Air Flow - cubic feet per min. per square inch
0  8  16  24  32

1.  \(\frac{3}{8}\)" X \(\frac{3}{8}\)" aluminum
2.  \(\frac{3}{8}\)" X \(\frac{3}{8}\)" aluminum
3.  2 panel \(\frac{3}{8}\)" X \(\frac{3}{8}\)" aluminum
& Brass Cell \(\frac{3}{8}\)" X \(\frac{3}{8}\"
4.  2 panel \(\frac{3}{8}\)" X \(\frac{3}{8}\)" aluminum
& Brass Cell \(\frac{3}{8}\)" X \(\frac{3}{8}\"
5.  Brass Cell \(\frac{3}{8}\)" X 1"

Shielding Effectiveness

1. Threshold Test Limit
2. Econo-Cell
   2 panel, \(\frac{3}{8}\)" wide X \(\frac{3}{8}\"
   deep.
3. Econo-Cell
   1 panel, \(\frac{3}{8}\)" wide X \(\frac{3}{8}\"
   deep.

Shielding Effectiveness of Econo-Cell Filters

1. Threshold Test Limit
2. Brass-Cell
   \(\frac{3}{8}\)" cell x 1" deep
3. Brass-Cell
   \(\frac{3}{8}\)" cell x \(\frac{3}{8}\"
   deep.
4. Brass-Cell
   \(\frac{3}{8}\)" cell x \(\frac{3}{8}\"
   Spira-Cell, 2 panel
   \(\frac{3}{8}\)" cell x \(\frac{3}{8}\"
   deep.
5. Spira-Cell
   \(\frac{3}{8}\)" cell x \(\frac{3}{8}\"

Shielding Effectiveness of Brass-Cell & Spira-Cell Filters
Ordering Information

To order, please send us a drawing that specifies the following information:

- Econo-Cell, Spira-Cell, Brass-Cell
- Cell size and number of panels (see Table 1 on page 25)
- Benign or salt spray environment
- Size of filter
- Hole placement
- Through holes or threaded inserts (see Table 2 on page 25)

If you require something other than our standard configurations, call us with your requirements and we’ll check availability.

Honeycomb Filter Specifications

Standard tolerances are:
XX ± .03
XXX ± .015 unless noted otherwise.

All dimensions in inches.