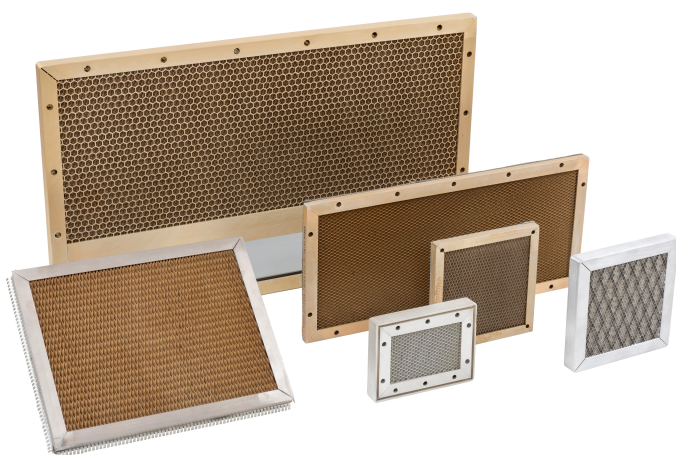


# Honeycomb Ventilation Panels

## EMI/RFI Shielded Ventilation Panels 3000 Series

MAJR's line of ready-to-install honeycomb ventilation panels provide optimum EMI/RFI shielding with minimum pressure drop for airflow. High shielding effectiveness is accomplished using waveguide design principle while maintaining thin foil cell walls allowing for easy passage of air.

The choice of which shielded honeycomb panel will meet design considerations is based on three main criteria: Shielding, Air Flow and Mounting. For most applications chromate conversion coating over aluminum (Code-32) using MAJR's mounting frame and preinstalled EMI/RFI gasket will provide an adequate degree of attenuation as seen in Table 1. (Code-42) Tin plated Aluminum is used for higher E and PW requirements. However, for the lower frequency range (H-Field) it is necessary to specify MAJR's material Tin Plated Steel (Code-44). Although heavier in weight than aluminum, an increase of 40-60 dB H-field shielding effectiveness can be achieved in the lower frequency range by the use of the higher permeable tin-plated steel option.



### Radiated emission testing of 12 in. x 12 in. x 0.5 in honeycomb vent panels:

Aluminum, non-hexavalent chromate coated, (Plane Wave, 30 dB to 18 GHz)

Aluminum, tin plated, (Plane Wave, 60 dB to 18 GHz)

Steel, tin plated, (Plane Wave, 70 dB to 18 GHz) and (Magnetic H-Field, 45 dB at 10 kHz and 60 dB at 100 kHz)

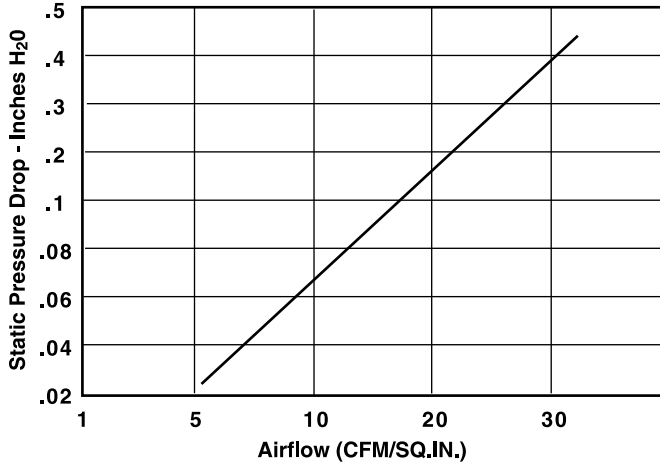
Brass (Plane Wave, 65 dB to 18 GHz)

### Features

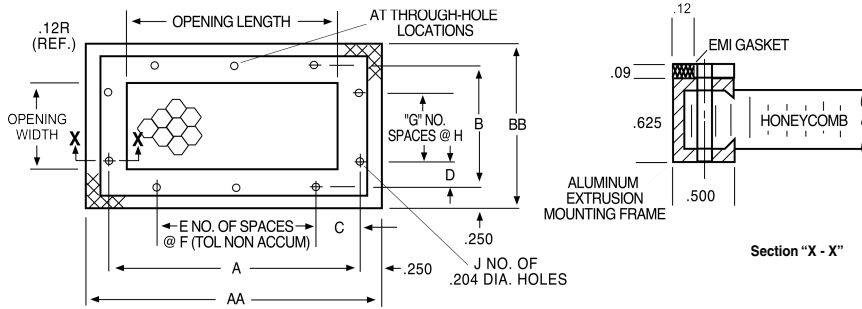
- **Ease of Installation**  
Shielded air vents are supplied with EMI gasket and mounting holes or captive fasteners so as to be ready for installation into the cabinet.
- **Special Designs**  
MAJR's engineering group can assist with applications requiring special mounting or shape.
- **Painted Units**  
Vents mounted on the outside of cabinet can be supplied with exposed surfaces painted to meet the Military Standard color of the cabinet.
- **Optimum Shielding and Air Flow**  
Installation of the honeycomb — with its 4:1 opening to depth ratio — provides the waveguide below cut-off effect required to attenuate EMI/RFI interference while not impeding the air flow required to cool the packaged enclosure.
- **Standard Configurations**  
A broad selection of sides provides the widest choice in meeting design objectives.
- **RoHS compliant available**

## Air Flow Resistance — Figure 1

The low resistance to air flow of MAJR'S shielded honeycomb panels will minimize pressure drop within cabinet, allowing air to move freely through the intake and exhaust to perform the desired cooling function. The curves in Figure 1 show the resistance per square inch for standard honeycomb vents.



**Figure 7 - Style 3031**  
EMI/RFI Shielded Ventilation Panel with Through Holes



**Dimensions — Table 1**

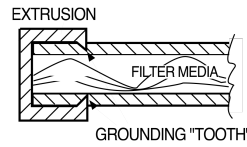
OPENING		Part Number -32 Material	FRAME DIMENSIONS										
Width	Length		AA	BB	A	B	C	D	E	F	G	H	J
3.00 (76.2)	3.00 (76.2)	3031-20303-xx	4.00 (101.6)	4.00 (101.6)	3.50 (88.9)	3.50 (88.9)	1.75 (44.5)	1.75 (44.5)	—	—	—	—	4
3.00 (76.2)	5.00 (127.0)	3031-20305-xx	6.00 (152.4)	4.00 (101.6)	5.50 (139.7)	3.50 (88.9)	1.00 (25.4)	1.75 (44.5)	1	3.50 (88.9)	—	—	6
3.00 (76.2)	11.00 (279.4)	3031-20311-xx	12.00 (304.8)	4.00 (101.6)	11.50 (292.1)	3.50 (88.9)	1.25 (31.8)	1.75 (44.5)	3	3.00 (76.2)	—	—	10
4.00 (101.6)	4.00 (101.6)	3031-20404-xx	5.00 (127.0)	5.00 (127.0)	4.50 (114.3)	4.50 (114.3)	.750 (19.1)	2.25 (57.2)	1	3.00 (76.2)	—	—	6
4.00 (101.6)	9.00 (228.6)	3031-20409-xx	10.00 (254.0)	5.00 (127.0)	9.50 (241.3)	4.50 (114.3)	1.25 (31.8)	2.25 (57.2)	2	3.50 (88.9)	—	—	8
5.00 (127.0)	5.00 (127.0)	3031-20505-xx	6.00 (152.4)	6.00 (152.4)	5.50 (139.7)	5.50 (139.7)	1.00 (25.4)	1.00 (25.4)	1	3.50 (88.9)	1	3.50 (88.9)	8
5.00 (127.0)	11.00 (279.4)	3031-20511-xx	12.00 (304.8)	6.00 (152.4)	11.50 (292.1)	5.50 (139.7)	1.25 (31.8)	1.00 (25.4)	3	3.00 (76.2)	1	3.50 (88.9)	12
6.00 (152.4)	6.00 (152.4)	3031-20606-xx	7.00 (177.8)	7.00 (177.8)	6.50 (165.1)	6.50 (165.1)	1.50 (38.1)	1.50 (38.1)	1	3.50 (88.9)	1	3.50 (88.9)	8
6.00 (152.4)	9.00 (228.6)	3031-20609-xx	10.00 (254.0)	7.00 (177.8)	9.50 (241.3)	6.50 (165.1)	1.25 (31.8)	1.50 (38.1)	2	3.50 (88.9)	1	3.50 (88.9)	10
7.00 (177.8)	14.00 (355.6)	3031-20714-xx	15.00 (381.0)	8.00 (203.2)	14.50 (368.3)	7.50 (190.5)	.750 (19.1)	.750 (19.1)	4	3.25 (82.6)	2	3.00 (76.2)	16
9.00 (228.6)	9.00 (228.6)	3031-20909-xx	10.00 (254.0)	10.00 (254.0)	9.50 (241.3)	9.50 (241.3)	1.25 (31.8)	1.25 (31.8)	2	3.50 (88.9)	2	3.50 (88.9)	12
11.00 (279.4)	11.00 (279.4)	3031-21111-xx	12.00 (304.8)	12.00 (304.8)	11.50 (292.1)	11.50 (292.1)	1.25 (31.8)	1.25 (31.8)	3	3.00 (76.2)	3	3.00 (76.2)	16
14.00 (355.6)	14.00 (355.6)	3031-21414-xx	15.00 (381.0)	15.00 (381.0)	14.50 (368.3)	14.50 (368.3)	1.25 (31.8)	1.25 (31.8)	4	3.00 (76.2)	4	3.00 (76.2)	20
18.00 (457.2)	18.00 (457.2)	3031-21818-xx	19.00 (482.6)	19.00 (482.6)	18.50 (469.9)	18.50 (469.9)	1.75 (44.5)	1.75 (44.5)	5	3.00 (76.2)	5	3.00 (76.2)	24

-xx = Required Finish : -32 (chromate aluminum), -42 (tin aluminum), -44 (tin steel), -90 (RoHS compliant)

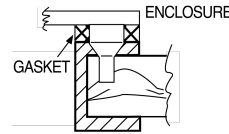
## Mounting Installation

Four mounting frames are offered as a standard for installation into the cabinet. In each case, the extruded aluminum frame is designed with a "tooth" that bites into the filter grill to ensure grounding of frame to filter media.

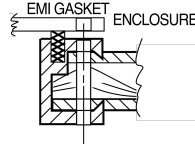
**Figure 2**



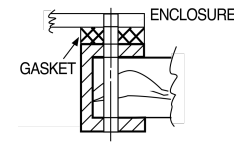
**Figure 4**  
Captive Fastener Style 3032



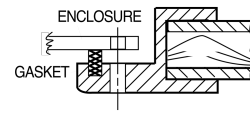
**Figure 6**  
Through Hole Style 3033



**Figure 3**  
Through Hole Style 3031



**Figure 5**  
Recess Mount Style 3036



## Shielding Effectiveness vs Frequency — Table 2

Shielding Effectiveness dB

Field	Aluminum Non-hexavalent Chromate Finish   Material Code – 90   0.5" thick x .125" cell					
	Frequency					
	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>E</b>	60	50	50	—	—	—
<b>PW</b>	—	—	—	45	40	40

Field	Aluminum – Tin Plate   Material Code – 42   0.5" thick x .125" cell					
	Frequency					
	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>E</b>	100	90	85	—	—	—
<b>PW</b>	—	—	—	80	70	60

Field	Brass   Material Code – 43   1.0" thick x .125" cell					
	Frequency					
	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>E</b>	75	95	110	—	—	—
<b>PW</b>	—	—	—	105	85	85

Field	Brass   Material Code – 43   1.0" thick x .188" cell					
	Frequency					
	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>E</b>	70	80	80	—	—	—
<b>PW</b>	—	—	—	85	75	65

Field	Brass   Material Code – 43   0.5" thick x .125" cell					
	Frequency					
	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>E</b>	60	80	80	—	—	—
<b>PW</b>	—	—	—	80	75	70

## Shielding Effectiveness vs Frequency — Table 2 (continued)

Shielding Effectiveness dB

Field	Steel – Tin Plate   Material Code – 44   1.0” thick x .125” cell							
	Frequency							
	10 kHz	100 kHz	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>H</b>	40	55	—	—	—	—	—	—
<b>E</b>	—	—	75	100	120	—	—	—
<b>PW</b>	—	—	—	—	—	120	120	115

Field	Steel – Tin Plate   Material Code – 44   1.0” thick x .188 cell							
	Frequency							
	10 kHz	100 kHz	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>H</b>	40	55	—	—	—	—	—	—
<b>E</b>	—	—	75	100	100	—	—	—
<b>PW</b>	—	—	—	—	—	110	110	110

Field	(Corrosion Resistant) Painted Steel with Brass Frame   Material Code – 39   1.0” thick x .125” cell							
	Frequency							
	10 kHz	100 kHz	1 MHz	100 MHz	500 MHz	1 GHz	10 GHz	18 GHz
<b>H</b>	40	55	—	—	—	—	—	—
<b>E</b>	—	—	75	110	110	—	—	—
<b>PW</b>	—	—	—	—	—	110	95	85

The data in Table 2 shows shielding characteristics for standard MAJR shielded vents. Note that the data indicated is tested under laboratory conditions per MIL-STD 285. This data is for comparison between shielded vent panel configurations and is not to be stated as a pass/fail specification for a manufactured EMI/RFI waveguide vent panel.

Yellow chromate (-32) finish available upon request. Tin Plated Steel (-44) data reflects a steel honeycomb and steel frame construction. Not all mounting frame options are available in steel.

**Honeycomb Waveguide Panels**  
EMI/RFI Shielded Ventilation Panels 3000 Series



**Design Data: Airflow**

