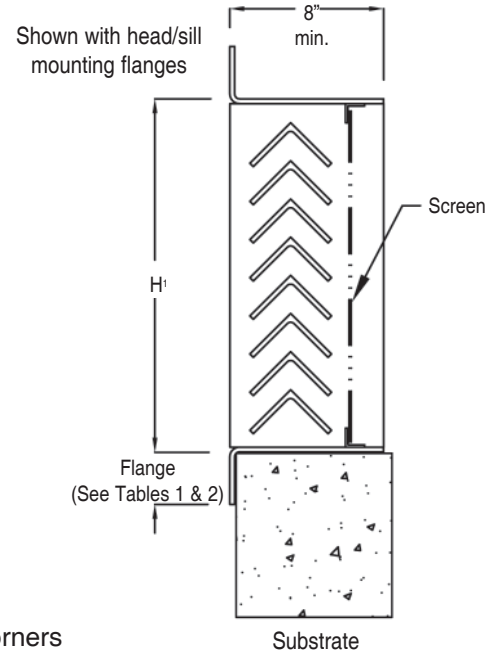


CARNES COMPANY 448 S. Main St., P. O. Box 930040, Verona, WI 53593-0040 Phone: (608)845-6411 Fax: (608)845-6504 www.carnes.com

The Carnes FEMA Louver is a heavy duty steel louver/grille designed to protect exterior wall openings against severe circumstances on FEMA 320 or 361 compliant safe rooms and storm shelters. Usually the FEMA Louver is mounted in front of wall louvers, but can be installed in front of exterior wall openings that require protection. Grille design consists of inverted "V" blades which provide high free area and relatively low pressure drop. Carnes FEMA Louver provides the ultimate protection against high wind loads and wind-born debris and is designed to comply with **FEMA 361**, and **ICC 500** storm shelter and safe room standards. Carnes FEMA louver/grille is built to withstand wind loads of up to **265 psi**.



### Standard Specifications

**Frame:** 8" deep x .25" hot rolled steel, mounting flanges located at either Head/Sill, Jamb or both with welded construction. See page 2 for details on special flange options.

#### Specify Flange Configuration

- Head/Sill Flange
- Jamb Flange
- Both Head/Sill/Jamb Flanges →  Open Corners  Closed Corners

**Blades:** 3" x 3" x .25" hot rolled steel, welded in place

**Screen:** .50" x 18 ga galvanized steel

- Optional 304 stainless steel screen

**Finish:** zinc rich primer (ready to paint)

**Minimum Size:** 12"w x 12"h

**Maximum Single Section Size:**

120"w x 76"h or 76"w x 120"h

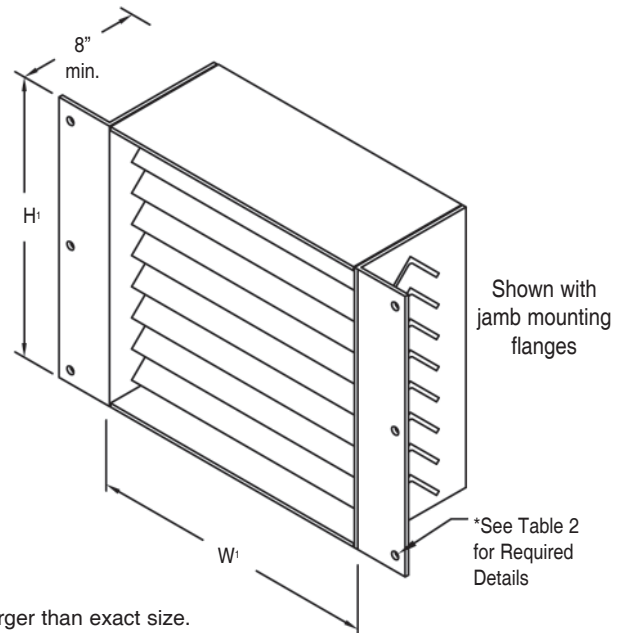
#### Substrate

- |                                   |  |  |
|-----------------------------------|--|--|
| <input type="checkbox"/> Concrete | <input type="checkbox"/> 1/4" Tapcon   | <input type="checkbox"/> 1/2" Red Head |
| <input type="checkbox"/> CMU      | <input type="checkbox"/> 1/4" Tapcon   | <input type="checkbox"/> 1/2" Red Head |
| <input type="checkbox"/> Steel    | <input type="checkbox"/> 3/8" Bolt     |  |
| <input type="checkbox"/> Wood     | <input type="checkbox"/> 1/4" Lag Bolt |  |

#### Fastener Hole Size

#### Available Finishes:

- Baked Enamel
- Kynar



<sup>1</sup>Dimensions are exact size. Opening in substrate is suggested to also 1/2" larger than exact size.

Tag	Qty.	Size		Frame	Variations
		Width	Height		

**Project**  
**Arch./Engr.**  
**Representative**

**Location**  
**Contractor**  
**Date**

# Carnes Speciality Products — FEMA Louver/Grille (Internal Mount)

# FEMA LOUVER PERFORMANCE DATA

## Suggested Specification

Furnished and install FEMA louver/grille as hereinafter specified where shown on plans or as described in schedules. Grilles shall be a UL listed and labeled product for installation into FEMA 361 and ICC 500 Windstorm-rated Assemblies. These units shall ship as a completed assembly. The units are to be installed via flanges located at the (**Head/Sill** or **Jamb** specifier select one). Grille frame and blades are to be a minimum of .25" steel. Units are to have 18 ga steel expanded screen located behind the blades for added protection. The units are to be installed (**internal** or **external**, specifier select one) to the wall. The units are to ship from the factory with (specifier select type of finish desired) finish. Grilles shall be by the Carnes Company.

## PRESSURE DROP

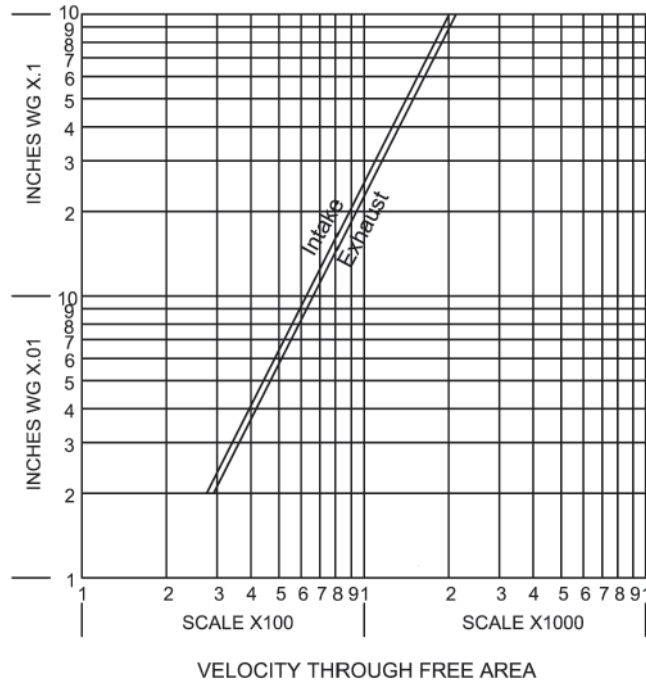


Table 1

Mounting Angle Leg Length	
Substrate Type	Min. Leg Length <sup>2</sup>
Concrete (Min. 3000 psi)	3.75 Inches
CMU (Grout Filled, Min. 1500 psi)	3.75 Inches
Steel (Min. Fy 65,000 psi)	1.75 Inches
Wood (G=0.55)	1.375 Inches

Table 2

Anchor/Fasteners Requirements				
Substrate Type	Anchor/Fastener Type	Min. Edge Distance	Min. Embedment	Spacing (oc)
Concrete (Min. 3000 psi)	1/4" Tapcon	3.25 Inches	2.5 Inches	8 Inches
Concrete (Min. 3000 psi)	1/2" Red Head	3.25 Inches	2.5 Inches	12 Inches
CMU (Grout Filled, Min. 1500 psi)	1/4" Tapcon	3.25 Inches	2.5 Inches	8 Inches
CMU (Grout Filled, Min. 1500 psi)	1/2" Red Head	3.25 Inches	2.5 Inches	12 Inches
Steel (Min. Fy 65,000 psi)	3/8" Bolt	1.0 Inches	0.25 Inches	12 Inches
Wood (G=0.55)	1/4" x 3" Lag Bolt	.75 Inches	2.75 Inches	8 Inches

Based on STANDARD AIR - .075 lb. per cubic foot. Performance and free area does not include the effects of any additional louver installed with the FEMA Louver/Grille.

## FEMA FREE AREA IN SQ.FT.

Louver Height Inches	Width - Inches																Louver Height Inches			
	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102		108	114	120
12	0.44	0.67	0.90	1.13	1.36	1.59	1.82	2.05	2.28	2.52	2.75	2.90	3.21	3.44	3.67	3.90	4.13	4.36	4.59	12
18	0.68	1.04	1.40	1.75	2.11	2.47	2.82	3.18	3.54	3.89	4.25	4.49	4.96	5.32	5.68	6.03	6.39	6.75	7.10	18
24	0.92	1.40	1.88	2.37	2.85	3.33	3.81	4.29	4.77	5.25	5.73	6.06	6.70	7.18	7.66	8.14	8.62	9.10	9.58	24
30	1.25	1.89	2.54	3.19	3.84	4.49	5.14	5.79	6.44	7.09	7.74	8.17	9.04	9.69	10.34	10.99	11.64	12.29	12.94	30
36	1.49	2.26	3.04	3.81	4.59	5.36	6.14	6.91	7.69	8.46	9.24	9.75	10.79	11.56	12.34	13.11	13.89	14.66	15.44	36
42	1.73	2.63	3.53	4.43	5.33	6.23	7.13	8.03	8.93	9.83	10.73	11.34	12.54	13.44	14.34	15.24	16.14	17.04	17.94	42
48	1.97	2.99	4.02	5.05	6.07	7.10	8.12	9.15	10.18	11.20	12.23	12.91	14.28	15.31	16.33	17.36	18.39	19.41	20.44	48
54	2.21	3.36	4.51	5.66	6.82	7.97	9.12	10.27	11.42	12.58	13.73	14.50	16.03	17.19	18.34	19.49	20.64	21.79	22.95	54
60	2.53	3.85	5.17	6.49	7.81	9.12	10.44	11.76	13.08	14.40	15.72	16.60	18.36	19.68	21.00	22.32	23.64	24.95	26.27	60
66	2.77	4.21	5.66	7.10	8.55	9.99	11.44	12.88	14.33	15.77	17.21	18.18	20.10	21.55	22.99	24.44	25.88	27.33	28.77	66
72	3.01	4.58	6.15	7.72	9.29	10.86	12.43	14.00	15.57	17.14	18.71	19.76	21.85	23.43	25.00	26.57	28.14	29.71	31.28	72
78	3.25	4.95	6.64	8.34	10.03	11.73	13.43	15.12	16.82	18.51	20.21	21.34	23.60	25.30	26.99	28.69	30.38	32.08	33.78	78
84	3.49	5.31	7.13	8.96	10.78	12.60	14.42	16.24	18.06	19.89	21.71	22.92	n/a	n/a	n/a	n/a	n/a	n/a	n/a	84
90	3.73	5.68	7.63	9.57	11.52	13.47	15.41	17.36	19.31	21.26	23.20	24.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a	90
96	4.05	6.17	8.28	10.39	12.51	14.62	16.74	18.85	20.97	23.08	25.19	26.60	n/a	n/a	n/a	n/a	n/a	n/a	n/a	96
102	4.29	6.53	8.77	11.01	13.25	15.49	17.73	19.97	22.21	24.45	26.69	28.19	n/a	n/a	n/a	n/a	n/a	n/a	n/a	102
108	4.53	6.90	9.26	11.63	14.00	16.36	18.73	21.09	23.46	25.82	28.19	29.76	n/a	n/a	n/a	n/a	n/a	n/a	n/a	108
114	4.77	7.26	9.75	12.24	14.73	17.23	19.72	22.21	24.70	27.19	29.68	31.34	n/a	n/a	n/a	n/a	n/a	n/a	n/a	114
120	5.02	7.63	10.25	12.87	15.48	18.10	20.72	23.33	25.95	28.57	31.18	32.93	n/a	n/a	n/a	n/a	n/a	n/a	n/a	120