

Seismic Installation of VAV Terminal Units		Form ET115.01-N1 (0218)
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INSTALLATION	New Release	Form ET 115.01-N1 (0218)

## INTRODUCTION

Enviro-Tec VAV Terminal Units which are applied in facilities subject to seismic activity and have special construction features and need to be installed as detailed in this document. They can be identified by their seismic labels, which are similar to the example label in Figure 1. The label lists:

- The unit model
- The applicable test standard(s)
- The applicable building code(s)
- The seismic-resistance test value

The certified Sds rating shown on the label (See Figure 1), is only IBC-certified when installed in accordance with this document. Installations which deviate from these procedures must be approved by an engineer licensed for seismic certification.



FIGURE 1 – SAMPLE LABEL FROM A SEISMIC RATED VAV TERMINAL UNIT

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Cables, threaded rods, and other miscellaneous items are to be supplied by others. Items mounted in the field (such as piping packages, electrical panels, ductwork, etc.) to IBC seismically certified HVAC equipment are not considered part of the equipment certification. Field-mounted items are required to be supported and restrained in accordance with recommended seismic installation practices and may include, but not necessarily be limited to, the use of flexible piping connectors. The installation of these field-mounted items, and any restraints / supports, is the responsibility of the installing contractor.

This seismic Installation document is intended to supplement the standard Installation, Operation, Maintenance manual, and shall take precedence over the standard manual in areas where overlap occurs. This document references all VAV Terminal units.

## ALL VAV CEILING-MOUNTED UNITS

**Note:** For any model, unit size can change the installation method.

Unit is hung from the ceiling using anchor bracketing screwed to the top of the unit on all four corners. See Figure 2.





**FIGURE 2 – SECTIONS OF 45-DEGREE AND 90-DEGREE BRACKETS WITH 1/2" DIAMETER ALL-THREADED ROD AND 3/16" DIAMETER STEEL CABLING ARE USED TO HANG THE VAV UNITS.**

Each unit is to be mounted to an interface frame using 1/2-inch diameter all-thread rod and four manufacturer-provided 12-gage 90-degree brackets, each attached to the unit with four #14 sheet metal screws. Shear brackets are to be placed on top of each 12-gage 90-degree bracket; each shear bracket to be attached to the unit with four #14 sheet metal screws each. Lateral bracing recommended to consist of 3/16-inch diameter steel cable (field provided), saddle clamps (field provided), and manufacturer-provided 12-gage 45-degree brackets. The 45-degree brackets are to be attached to the Interface frame with 1/2-inch diameter Grade 5 bolts (field provided). A 1/2-inch all-threaded rod is run to the top corner of the unit. Each rod is stiffened with unistrut, and B-line, 1/2-inch clips, spaced no more than 22 inches on center. Lateral bracing is provided by 14-gauge, 45-degree brackets, washers, and 3/16-inch cable with four saddle clamps (wire rope grips) per cable (two grips at each connection). Grips are installed as per FEMA 414. See Figure 3.

Also, see Table 1 for list of brackets supplied by ENVIRO-TEC.

Brackets as listed are minimum gauge thickness. Actual thickness may vary.

**VAV unit ceiling mounts –** The unit was ceiling-mounted using (4) 90 degree brackets on the side and 4 flat brackets on the top of each of the four corners. Each bracket was attached to unit using four #14 SMS. Each flat bracket overlapped the 90 degree bracket, and a 1/2" threaded rod was attached through each and up into the fixture frame attached directly or indirectly to ceiling.

Lateral bracing was performed using 14 gage 45 degree brackets provided by JCI, 3/16" cable with 4 saddle clamps per cable (2 saddle clamps at each connection). The lateral bracing is attached to the ceiling interface support fixture or frame. 1/2" diameter Grade 5 bolts. Threaded rod, 5/8-inch diameter, grade 2, is run through the manufacturer-supplied, 12-gauge, 1-5/8-inch strut on the bottom of the unit, and the solid strut screwed to the top of the unit. The approximate length of the threaded rod = 10-1/2". See Figure 4.

The unit shall be laterally braced using 45-degree, 12-gauge, 1-inch thick, galvanized-steel, outside angle brackets and 3/8-inch diameter, general-purpose cable (6 x 19 Class IWRC) with four saddle clamps (wire rope grips) per cable (two grips at each connection). Grips are installed as per FEMA 414.

Each bracket shall attach to the frame using a 1/2-inch, grade 5 bolt. The brackets attached to the solid strut at the top of the unit shall be sandwiched between one 3-inch square, 12-gauge plate washer on the bottom and two 4-inch square, 12-gauge plate washers on top.



**FIGURE 3 – LATERAL SUPPORT COMPONENTS FOR VAV**

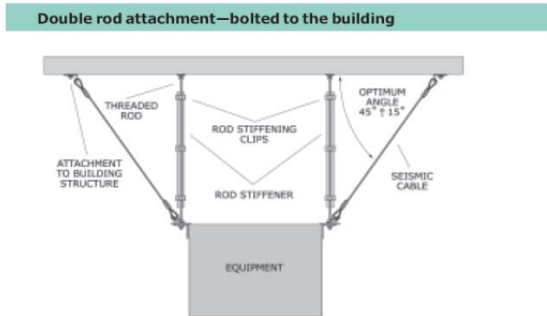
Also, see Table 1 for list of brackets supplied by ENVIRO-TEC. Brackets as listed are minimum gauge thickness. Actual thickness may vary.

**TABLE 1 – BRACKETS SUPPLIED BY ENVIRO-TEC**

VAV Models	Brackets (per mounting point)
All VAV models	Four 45-degree, 12-gauge brackets
	Four 90-degree, 12-gauge brackets
	Four 3" x 3" 12 gauge plate washers
	Eight 4" x 4" 12 gauge plate washers
	#14 Sheet metal screws

SEISMIC BRACKET,45 DEG  
SEISMIC BRACKET,90 DEG

**All sizes** – Threaded rod, 5/8-inch diameter, grade 2, is run through the manufacturer-supplied, 12-gauge, 1-5/8-inch strut on the bottom of the unit, and the solid strut screwed to the top of the unit. The approximate length of the threaded rod = 10-1/2". See Figure 4.



**FIGURE 4 – RECOMMENDED LENGTH OF THREADED ROD**

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The unit shall be laterally braced using 45-degree, 12-gauge, 1-inch thick, galvanized-steel, outside angle brackets and 3/8-inch diameter, general-purpose cable (6 x 19 Class IWRC) with four saddle clamps (wire rope grips) per cable (two grips at each connection). Grips are installed as per FEMA 414.

Each bracket shall attach to the frame using a 1/2-inch, grade 5 bolt. The brackets attached to the solid strut at the top of the unit shall be sandwiched between one 3-inch square, 12-gauge plate washer on the bottom and two 4-inch square, 12-gauge plate washers on top.

**MODEL VAV CEILING-MOUNTED UNITS**

Unit is ceiling-mounted using four 12-gauge, 90-degree brackets, four 12-gauge, flat brackets and four 12-gauge, 45-degree brackets at the corners. Each of the flat brackets and the 90-degree brackets is attached to the unit using four #12, 3/4-inch sheet metal screws. Each 45-degree bracket is located on top of the flat bracket. A 1/2-inch, threaded rod is run through each flat bracket, 90-degree angle bracket, and 45-degree angle bracket, and a nut and washer placed on the top and the bottom of the brackets. See Figure 5.



**FIGURE 5 – OVERLAPPED FLAT, 90° AND 45° BRACKETS.**

Each threaded rod is stiffened using a length of unistrut and three B-line, 1/2-inch clips. Clips are placed two inches from the top and bottom of the unistrut, and one is placed at the approximate middle. Lateral bracing is accomplished using 12-gauge, 45-degree brackets. Brackets are attached to 3/16-inch

cable with four saddle clamps (wire rope grips) per cable (two grips at each connection). Grips are installed as per FEMA 414. It is recommended that the cables be adjusted prior to final tightening of the top locking nut on the threaded rod. See Figure 6. Also, see Table 2 for ENVIRO-TEC supplied brackets.

**TABLE 2 – BRACKETS SUPPLIED BY ENVIRO-TEC**

VAV Models	Brackets (per mounting point)
	Four 3" x 6" x 14-gauge plate – 90 degrees
	Four 2" x 4" x 14-gauge plate – 45 degrees
	Four 2" x 4" x 14-gauge plate – flat

Hanger brackets listed above are minimum gauge thickness requirements. Actual thickness may vary. An instructional document will ship with the units, detailing the locations where the brackets should be installed.

VAV Model	Item p/n	Description	Quantity
All VAV models	00-13137-02	KIT, Seismic, hanger, medium duty	1
	00-00069-01	Seismic bracket, 90 degree	4
	00-00070-01	Seismic bracket, 45 degree	4
	00-00071-01	Seismic bracket, flat plate	4
	PH-00-0161	Screw, #14 x 3/4" Hex tek sms	32

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