

BVTS System

The BVTS (Brick Veneer Tie Support), as presented in *Figure 2*, is designed to satisfy the requirements of CSA Standard CAN3-A370-04 "Connectors for Masonry", in particular, Section 9.2.1.2, which states "Strip ties shall be connected directly to the studs or other structural backing". The BVTS also satisfies the requirements of ACI/ASCE/TMS/518 and the U.B.C.

Windward exterior lateral loads applied to the veneer are transferred through the masonry tie onto the BVTS, which in turn bears directly on the structural backup wall.

Suction exterior lateral loads applied to the veneer are transferred to the structural backup wall via the masonry tie and fastener used to attach the BVTS to the backup wall. *Figures 2 through 4* illustrate various applications of the BVTS connector.

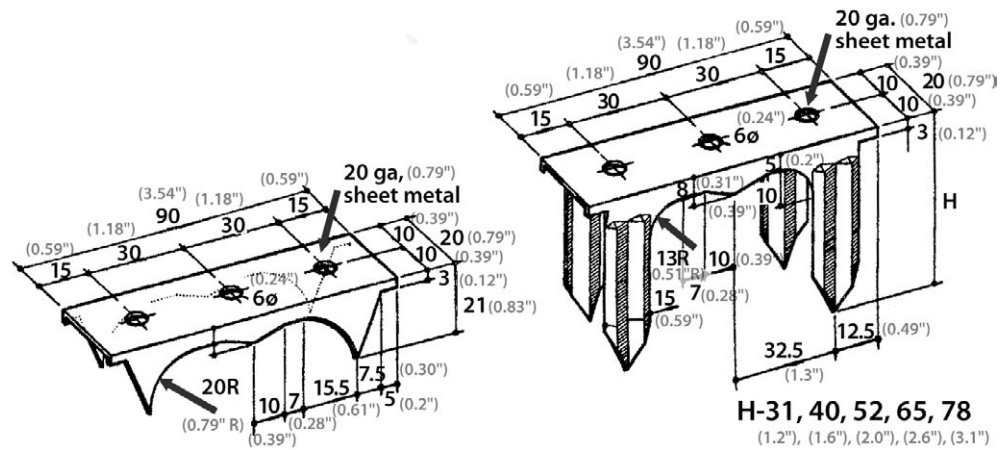


Figure 1
Configuration and Dimensions of the BVTS

BVTS Description

Every BVTS is constructed of 20 gauge (1.01 mm [0.04"] thick) sheet metal conforming to ASTM Standard A570. Three 6 mm (0.24") diameter holes are provided to facilitate the attachment of a corrugated strip tie or an adjustable masonry tie. BVTS heights of 21 (0.83"), 31 (1.22"), 40 (1.57"), 52 (2.0"), 65 (2.56") and 78 mm (3.07") are available. *Figure 1* illustrates the physical dimensions of the available BVTS. BVTS are available in hot dipped galvanized finish (conforming to the CSA CAN3-A370-04 and ASTM A153 requirement of 458 g/m²/side [1.5 oz/ft²/side] of zinc coating).

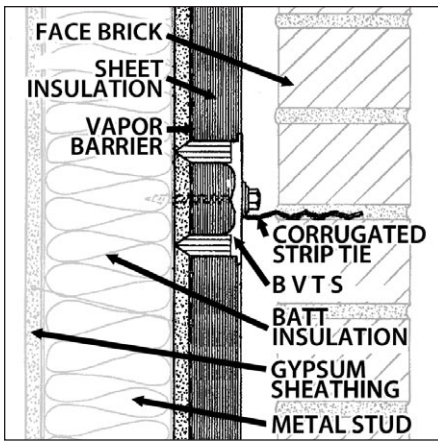


Figure 2
BVTs Application Through Insulation
and Gypsum Sheathing

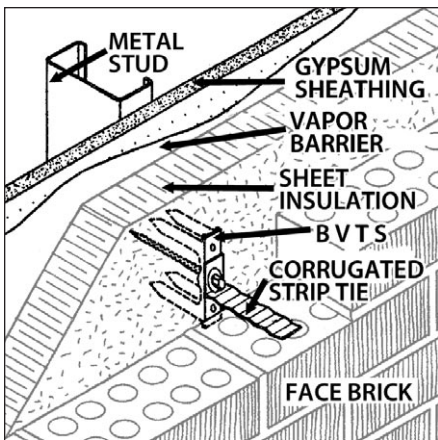


Figure 3
BVTs Application Through Insulation and
Gypsum Sheathing

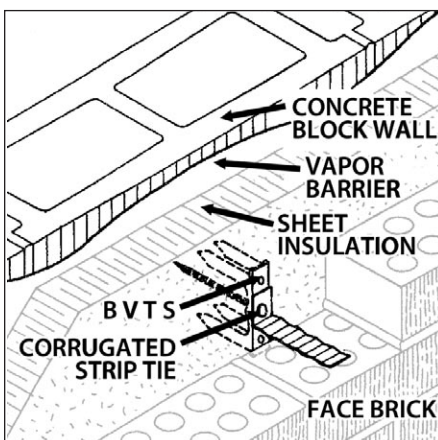


Figure 4
BVTs Application Through Insulation
Onto Concrete Block Backup Wall

Advantages of the BVTs System

THE BVTs SYSTEM:

- provides a positive connection between the masonry tie and the structural backup wall without having to rely on gypsum sheathing and insulation to provide compressive support, as gypsum sheathing or insulation may deteriorate under repeated loading cycles and/or exposure to moisture;
- reduces thermal bridging;
- provides fixity of the sheet insulation in all three directions thereby minimizing separation at sheet insulation junctions;
- allows for the tie installation to be carried out after or during the installation of the insulation to assure proper tie location;
- is cost effective.

BVTs Air Leakage Results

Air leakage tests were conducted in accordance with ASTM E283 "Standard Test Methods for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors." The 2000 mm x 2000 mm (6.6' x 6.6') test specimen assembly was identical to the wall configuration presented in Figures 2 and 3.

Twenty five 65 mm (2.56") BVTs (spaced at 600 mm (24") o.c. vertically and 400 mm (16") o.c. horizontally) were inserted through the 52 mm (2") rigid insulation, vapour barrier and 12 mm (0.5") gypsum sheathing onto the metal studs and fastened to the metal studs with 4.8 mm (0.19") diameter self-tapping screws. The vapour barrier consisted of Perm-A-Barrier (W.R. Grace) and was applied on the exterior face of the gypsum sheathing.

Positive and negative test pressures were placed on the wall specimen. At pressures up to 500 Pa (0.0725 psi), the air leakage was less than the least detectable value (as dictated by the monitoring system equipment) of 0.02 l/s/m² (0.025 gal/min/ft²). At pressures up to 1250 Pa (0.18 psi) the air leakage was less than the detectable value of 0.1 l/s/m² (0.123 gal/min/ft²). The equivalent wind velocity comparable to a 1250 Pa (0.18 psi) pressure is 158 km/h (98 mph). It should be noted that ASTM E283 provides a default test pressure of only 75 Pa (0.01 psi).

BVTS Installation Caution

Ensure that all legs of the BVTS are in contact with the structural backup wall system.

BVTS Applications

The BVTS system is extremely versatile and can be incorporated with the following wall component materials:

- backup wall systems of concrete block, metal studs, wood studs, clay brick or concrete;
- rigid or semi-rigid sheet insulation;
- exterior gypsum or plywood sheathing;
- exterior veneers of brick, aluminum siding, vinyl siding, stucco, etc.;
- application of gypsum sheathing and sheet insulation on the interior of single wythe masonry.

Recommended Design Load and Deflections

1. Free Play (maximum):	0.00 mm (0")	
2. 0.45 kN (100 lbs) Deflection	0.95 mm (0.037")	
3. Recommended Design Load:	0.36 kN (81 lbs)	
4. Recommended Design Load Deflection - free play not included:	0.73 mm (0.029")	
5. Maximum Recommended Spacing:	Horizontal:	Vertical:
	400 mm (16")	600 mm (24")

Notes

- (i) The above design values reflect both the windward and leeward capacity of the BVTS tie system, with the governing values listed.
- (ii) The tabulated FERRO tie system design values were formulated using working stress design following the procedures of CSA CAN3-A370-04 "Connectors for Masonry", ACI/ASCE/TMS/518 and U.B.C. The values have been reduced to account for test result variation, and reflect a factor of safety of 2.25 (i.e., 75% of 3.0), as per Table 3 (A370).
- (iii) The allowable mortar pull-out and push-out design load for 22 gauge corrugated strip ties embedded a minimum of 50 mm (2") into 90 mm (3.5") brick veneer utilizing either Type M, S or N mortar, exceeds or equals the recommended BVTS tie system design load.
- (iv) The above design values relate to the capacity of the FERRO tie component. A compatible fastener capable of resisting the design load must be selected.
- (v) The above design values are based on test results utilizing 78 mm (3.07") BVTS, standard 22 gauge corrugated masonry strip ties and a 100 mm (4") cavity. No insulation or drywall sheathing was used. Note that for smaller cavity widths and/or with the addition of insulation and gypsum sheathing providing lateral tie support, increased tie system design loads and reduced tie system deflections may be realized.

BVTS Specification Guidelines

The BVTS is available in 21 (0.83"), 31 (1.22"), 40 (1.57"), 52 (2"), 65 (2.56") and 78 mm (3.07") heights.

For penetrating only sheet insulation (i.e., fastening onto plywood sheathing, concrete block, concrete or clay brick), order the BVTS size to be the thickness of the insulation. For penetrating gypsum sheathing and sheet insulation, add the thickness of the gypsum sheathing to the thickness of the insulation and order the BVTS size to be the sum of the two.



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