

# Tech Hotline

No. 0821-M

## Quick Reference Guide on Adhered Masonry Veneers in Exterior Wall Construction

Table 1 is a summary of building code and industry standard requirements for the use of adhered masonry veneer (AMV) in exterior wall construction. It is intended to assist the user in proper design, selection, and use of AMV for exterior wall construction.

Table 1. Selection and Use of Adhered Masonry Veneers (AMVs) in Exterior Wall Construction

Requirements for AMVs	Adhered Masonry Veneer (AMV) Units			
	Thin Brick <sup>1,2,4</sup>	Manufactured Stone <sup>1,2,3,4</sup>	Thin Natural Stone <sup>1,2,4,5</sup>	Ceramic, Porcelain Tile <sup>1,2,4,6,8</sup>
Must comply with	ASTM C1088	ASTM C1670	ASTM C1242	ANSI 137.1
Maximum allowable thickness	2 in (51mm)	2-5/8 in (67mm)	5/8 in (16mm)	5/8 in (16mm)
Maximum allowable weight	15 lb/sq ft (70 kg/m <sup>2</sup> )	15 lb/sq ft (70 kg/m <sup>2</sup> )	15 lb/sq ft (70 kg/m <sup>2</sup> )	9 lb/sq ft (44 kg/m <sup>2</sup> )
Maximum lineal dimension and area <sup>7</sup>	36 in & 5 sq ft (914mm & 0.46m <sup>2</sup> )	36 in & 5 sq ft (914mm & 0.46m <sup>2</sup> )	24 in & 3 sq ft (610mm & 0.28m <sup>2</sup> )	24 in & 3 sq ft (610mm & 0.28m <sup>2</sup> )
Use in Freeze/Thaw Climate Zones <sup>7</sup>	Some restrictions apply. Consult with AMV unit manufacturer for testing and history of use in freeze/thaw climate zones (see Notes 6&7)			
Requirements for Exterior Wall Construction	Thin Brick <sup>1,2,4</sup>	Manufactured Stone <sup>1,2,3,4</sup>	Thin Natural Stone <sup>1,2,4,5</sup>	Ceramic, Porcelain Tile <sup>1,2,4,6,8</sup>
Types of Construction	All Types	All Types	All Types	All Types
Maximum allowable deflection <sup>9</sup>	L/360	L/360	L/1000	L/360
Maximum allowable height above grade	Unrestricted	30 ft (10m)	30 ft (10m)	Unrestricted
Maximum Joint spacing <sup>10</sup>	18 ft & 144 sq ft	18 ft & 144 sq ft	15 ft & 144 sq ft	12 ft & 144 sq ft
Open-Joint (Dry-Stack) installation <sup>11</sup>	Grout joint required	Some restrictions (see notes 1-4 & 11)	Grout joint required	Grout joint required

- Limited to Type V (Combustible) construction when foam plastic, combustible WRB, combustible cladding, or other combustible component is in the wall assembly, unless tested and compliant with acceptance criteria of NFPA 285 and NFPA 268, or otherwise evaluated for compliance with these standards.
- Limited to non-fire-resistance rated wall construction unless tested in accordance with ASTM E119, modeled, or otherwise evaluated for hourly rating.
- Height generally limited to 30 ft (10m) above grade. Some manufacturer requirements may vary, including recommendations to seek approval by the local building code official for heights in excess of 30 ft (10m).
- See special requirements for use over EIFS, Table 2 – Note 1.
- Field test adhesion during construction, inspect at 1 year, then every 4 years. Some natural stones such as white marble require the use of a white adhesive mortar. Consult with stone supplier.
- “Where installation will be subjected to freeze/thaw cycles, degradation can occur over time.” [From *Handbook for Ceramic, Glass, and Stone Tile Installation*, Tile Council of North America, Inc.]
- Some AMVs may not be suitable for use in freeze/thaw climate zones. Consult with AMV unit manufacturer for guidance on selection, testing, and history of use in freeze/thaw climate zones and any restrictions that may apply.
- Large format veneer units can have warpage that creates practical installation difficulties. Verify history of use and successful applications with AMV unit manufacturer.
- Stiffer criteria may apply depending on requirements of AMV unit manufacturer, other components in the wall construction, design professional, or erection and handling requirements if pre-fabricated panel wall construction.
- Maintain aspect ratio of joint layout at 2-1/2 to 1 or less.
- Open-joint construction increases risk of water infiltration into the wall assembly, efflorescence, and freeze-thaw damage to AMV units. Consult with AMV unit manufacturer and incorporate design details to reduce risk. Refer to Sto Tech Hotline Nos. 0403-BSc, *Critical Detail Checklist for Wall Assemblies*, and 0603-BSc, *Moisture Control Principles for Design and Construction of Wall Assemblies*.

Table 2 is a supplement to Table 1 and is intended to provide additional guidance to the user on design, selection, and use of AMV in Sto exterior wall systems (unique requirements or differences with Table 1 highlighted in yellow).

Table 2. Guidelines for the Use of Adhered Masonry Veneers in Sto Exterior Wall Systems

AMV Units	Sto Exterior Wall System				
	StoVentec® MVF	StoTherm® ci MVES <sup>1</sup>	StoPowerwall® Systems <sup>2</sup>	StoQuik® Silver DS	StoPanel® Classic NEXt ci
Masonry Veneer Unit Types	Thin Brick only	All AMV Types - Refer to Table 1			
Maximum allowable thickness	5/8 in (15mm) <sup>3</sup>	Refer to Table 1			
Maximum allowable Weight	Refer to Table 1 (except for StoPowerwall® ci, see note 2)				
Exterior Wall Construction	StoVentec® MVF <sup>4</sup>	StoTherm®ci MVES <sup>1,4</sup>	StoPowerwall® Systems <sup>2,4</sup>	StoQuik® Silver DS <sup>4</sup>	StoPanel® Classic NEXt ci <sup>1,4</sup>
Types of Construction	All Types	All Types	All Types	All Types	All Types
Maximum allowable deflection	L/400	L/360, (L/1000 if Natural Stone)	L/360, (L/1000 if Natural Stone)	L/360, (L/1000 if Natural Stone)	L/360, (L/1000 if Natural Stone)
Maximum allowable height above grade <sup>4</sup>	6 stories or 72 ft (22m) for thin brick	6 stories or 72 ft (22m) for thin brick, tile	6 stories or 72 ft (22m) for thin brick, tile	6 stories or 72 ft (22m) for thin brick, tile	20 stories or 240 ft (73m) for thin brick, tile
Maximum joint spacing	Refer to Table 1	Refer to Table 1	Refer to Table 1	See Note 5	Refer to Table 1
Open-Joint (Dry-Stack) installation <sup>6</sup>	Grout joint required	See Note 6, Refer to Table 1	See Note 6, Refer to Table 1	See Note 6, Refer to Table 1	Grout joint required

- The use of adhered masonry veneer in wall construction is governed by the 2018 IBC in Chapter 14 and the 2018 IRC in Chapter 7, which cite TMS 402 (The Masonry Society Standard 402). This industry standard requires minimum 50 psi shear bond strength to supporting wall construction. This shear bond strength generally will not be achieved by the foam plastic insulation. However, ICC Evaluation Service has established criteria which includes fire testing, shear bond strength testing, freeze/thaw and other durability tests to accommodate the use of EIFS with foam plastic insulation as a substrate for adhered masonry veneer. Refer to [Sto Certification No. 5700](#), *StoTherm ci MVES Statement of Testing and Code Compliance*.
- StoPowerwall ci requires special design by qualified design professional to accommodate added AMV load on lath fasteners.
- Refer to Intertek [Design Listing CWP 30-01](#). Thickness limitation applies to use on noncombustible construction.
- Manufactured stone and Thin Natural Stone limited to 30ft (10m) – Refer to Table 1.
- 16 ft (4.9m) spacing, unless Thin Natural Stone, Ceramic or Porcelain Tile – Refer to Table 1
- Height limited to 30 ft. Open-joint construction increases risk of water infiltration into the wall assembly, efflorescence, and freeze-thaw damage to AMV units. Consult with AMV unit manufacturer and incorporate design details to reduce risk. Refer to Tech Hotline Nos. 0403-BSc, *Critical Detail Checklist for Wall Assemblies*, and 0603-BSc, *Moisture Control Principles for Design and Construction of Wall Assemblies*.

#### References

- American Society of Testing and Materials International (ASTM), *Standard Guide for Selection, Design, and Installation of Dimension Stone Attachment Systems*, ASTM C1242-20, 2020, pp. 13-22.
- American Society of Testing and Materials International (ASTM), *Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer*, ASTM C1780-16a, 2016.
- American Society of Testing and Materials International (ASTM), *Standard Specification for Adhered Manufactured Stone Masonry Veneer Units*, ASTM C1670/1670M, 2016.
- American Society of Testing and Materials International (ASTM), *Standard Specification for Thin Veneer Brick Units Made from Clay or Shale*, ASTM C1088-14, 2014.
- American Society of Testing and Materials International (ASTM), *Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste*, ASTM C482-02, 2014.
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- Eldorado Stone, *Frequently Asked Questions*, pp. 6-8.
- International Code Council Evaluation Service, *Acceptance Criteria for Adhered Manufactured Stone Masonry Veneer*, AC 51, 2018.
- International Code Council, Inc., *2018 International Building Code (IBC)*, 2018, pp. 333-334.
- International Code Council, Inc., *2018 International Residential Code (IRC)*, 2018, Section 703.12.
- Intertek Design Listing, *Sto Corp Exterior Wall Systems StoVentec R, StoVentec C, Sto Ventec M, StoVentec S, NFPA 285*, Design Listing Nos. STO/CWP 30-01, 2020, pp.4.
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- The Masonry Society, *Building Code Requirements and Specification for Masonry Structures*, TMS 402/602-16, 2016, pp. C-189, S-63.
- Masonry Veneer Manufacturers Association, *Installation Guide and Detailing Options for Compliance with ASTM C1780 for Adhered Manufactured Stone Veneer*, 4<sup>th</sup> edition, 2014, pp. 7-12.
- National Concrete Masonry Association, TEK 3-6C, *Concrete Masonry Veneers*, 2012, pp.7.
- National Gypsum Company, *PermaBase Brand Cement Board Exterior Applications Guide*, 2019., pp.6.
- Sto Corp., *StoTherm ci MVES Statement of Testing and Code Compliance*, Sto Certification No. 5700, 2021.
- Tile Council of North America, Inc., *Handbook for Ceramic, Glass, and Stone Tile Installation*, 2020, pp. 186-193, 360-367, 430-437, 467-468.