Designation: C 1481 – 00 (Reapproved 2006)

Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS)[1]

This standard is issued under the fixed designation C 1481; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide describes the use of single and multi-component, cold-applied joint sealants, or precured sealant systems for joint sealing applications, or both, in buildings using exterior insulation and finish systems (EIFS) on one or both sides of the joint. Refer to 10.1 for joint seal geometries.

1.2 The elastomeric sealants described by this guide meet the requirements of Specifications C 834, C 920, or C 1311.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Notes 1 and 2.

1.5 There are no ISO standards similar or equivalent to this ASTM standard.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

C 717 Terminology of Building Seals and Sealants

C 719 Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

C 794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

C 834 Specification for Latex Sealants

C 920 Specification for Elastomeric Joint Sealants

C 1193 Guide for Use of Joint Sealants

C 1299 Guide for Use in Selection of Liquid-Applied Sealants

C 1311 Specification for Solvent Release Sealants

C 1382 Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints

C 1397 Practice for Application of Class PB Exterior Insulation and Finish Systems

C 1472 Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width

2.2 *ANSI Standard:*

American National Standard for Exterior Insulation and Finish Systems (EIFS)[3]

3. Terminology

3.1 *Definitions*:

3.1.1 Refer to Terminology C 717 for definitions of the following terms used in this guide: *bicellular sealant backing, bond breaker, bridge sealant joint, butt sealant joint, chemically curing sealant, closed cell sealant backing, compatibility, compatible materials, cure, elastomeric, elongation, fillet sealant joint, joint, lap sealant joint, latex sealant, modulus, non-sag sealant, open cell sealant backing, primer, seal, sealant, sealant backing, shelf-life, solvent-release sealant, shrinkage, substrate, tooling, tooling time, working life (pot life).*

3.1.2 Refer to Terminology C 1397 for definitions of the following terms used in this guide: *accessories, base coat, cure, dry, durability, embed, expansion joint, exterior insulation and finish system (EIFS), finish coat, lamina, nonmetallic reinforcing mesh, primers, reinforced base coat, substrate, texture, thermal insulation board, wrap, wrapping.*

4. Significance and Use

4.1 The intent of this guide is to provide information and guidelines for the selection of materials for joint seals in, or adjacent to, EIFS.

[1] This guide is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.10 on Specifications, Guides and Practices.

Current edition approved Jan. 1, 2006. Published January 2006. Originally approved in 2000. Last previous edition approved in 2000 as C 1481-00.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

4.2 Joints need to be designed for the expected movements and construction tolerances so an appropriate joint width can be established.

DESIGN CONSIDERATIONS

5. General

5.1 The major components of a joint seal in, or adjacent to, EIFS that should be considered when selecting or using sealants are as follows: EIFS substrate, primer, sealant backing or bond-breaker, and sealant (see Figs. 1-11).

6. EIFS Substrate

6.1 *Joint Location and Configuration*—In an EIFS-clad building, sealant joints typically are required at the following locations:

6.1.1 At the floor line of multi-level wood frame construction;

6.1.2 At an existing building expansion joint;

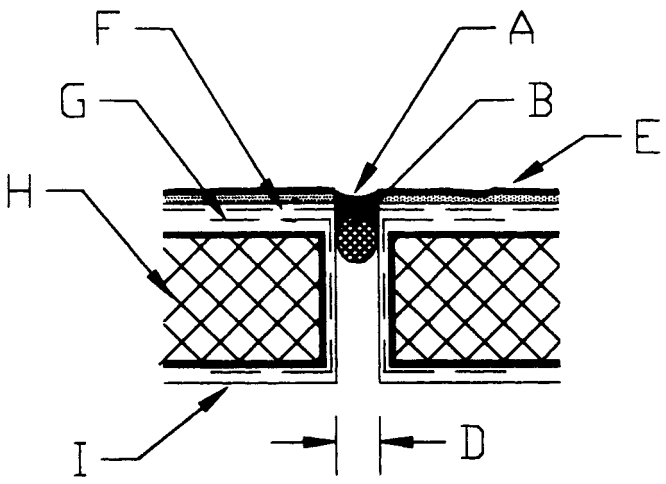
6.1.3 Where dissimilar substrates are bridged;

6.1.4 When an EIFS abuts dissimilar building construction;

6.1.5 Some EIFS manufacturers may require joints in long continuous elevations;

6.1.6 The size and location of joints is the responsibility of the design professional and shall be consistent with the project conditions and guidelines of the EIFS manufacturer.

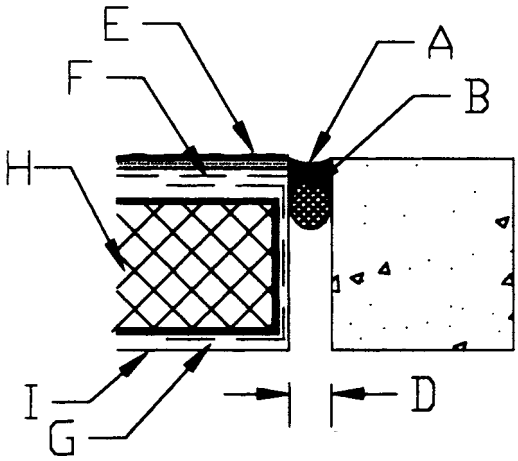
6.1.7 *Joint Configuration*—Industry accepted minimum joint width is 19 mm (¾ in.) with sufficient depth to accommodate the sealant backing and sealant material. Lesser joint widths may be allowable where EIFS abuts adjacent materials. Consider the sealant manufacturer's published sealant movement capability when determining the appropriate joint width. Refer to Guide C 1472. Good architectural practice calls for joint designs that allow for construction tolerances and material variations.



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)

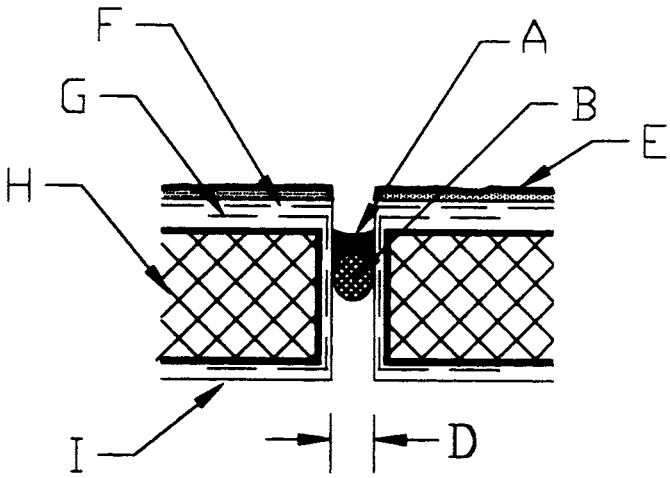
FIG. 1 Sealant Butt Joint Seal (EIFS to EIFS)



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)

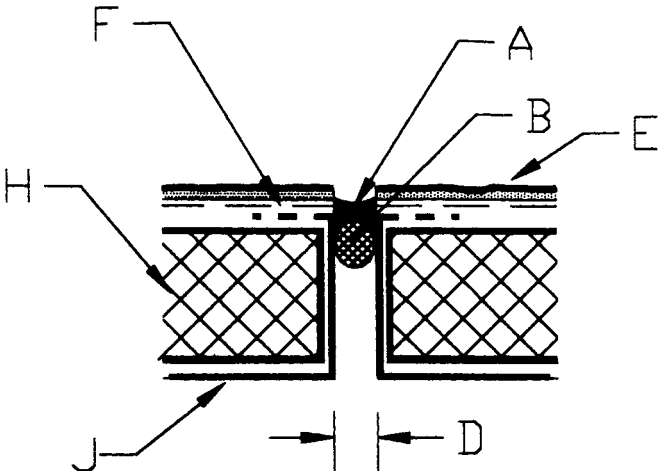
FIG. 2 Sealant Butt Joint Seal (EIFS to Dissimilar Substrates)



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)

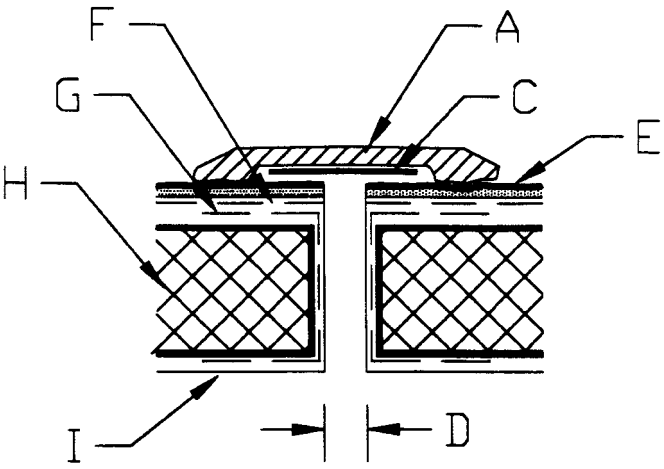
FIG. 3 Recessed Sealant Butt Joint Seal (EIFS to EIFS)



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)
J.	Trim Accessory

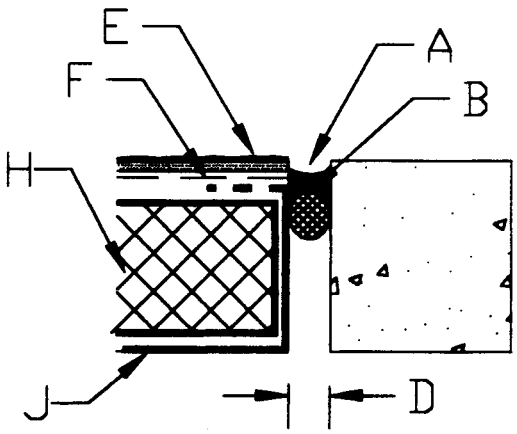
FIG. 4 Sealant Butt Joint Seal (Accessory to Accessory)



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)

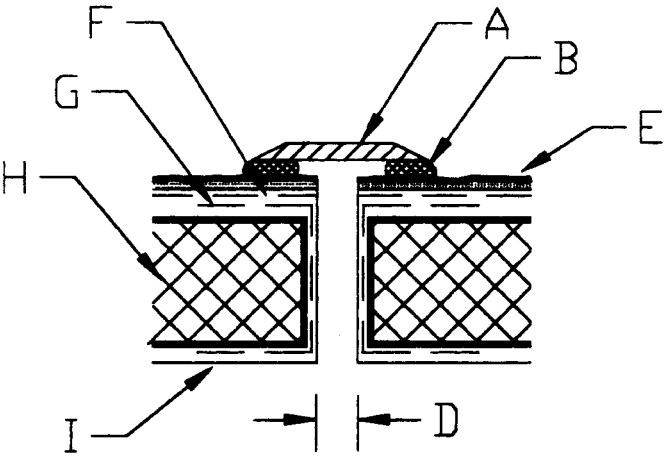
FIG. 6 Sealant Bridge Joint Seal Using Liquid—Applied Sealant and Bond Breaker



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)
J.	Trim Accessory

FIG. 5 Sealant Butt Joint Seal (Accessory to Dissimilar Substrate)



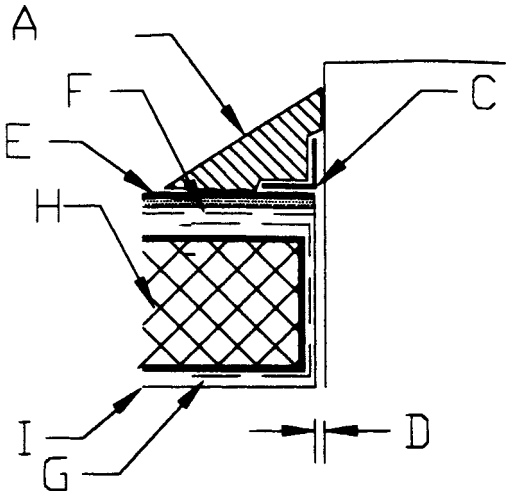
Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)

FIG. 7 Sealant Bridge Joint Seal Using Precured Sealant

6.2 *EIFS Installation*—The EIFS manufacturer's recommended installation procedures should be followed at all times.

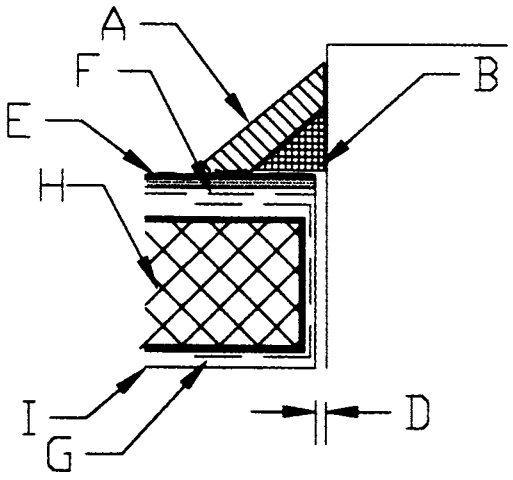
6.2.1 Practice C 1397 provides a minimum requirement for the application of Class PB EIFS.



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)
J.	Sealant Bead

FIG. 8 Sealant Fillet Joint Seal With Bond Breaker

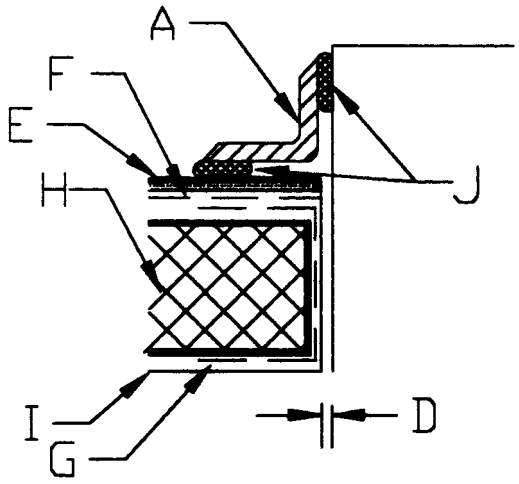


Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)
J.	Sealant Bead

FIG. 9 Sealant Fillet Joint Seal With Triangular Sealant Backing

6.2.2 Exposed edges of thermal insulation board which create the sides of the joint must be protected with EIFS manufacturer's nonmetallic reinforcing mesh fully embedded in their base coat. This procedure is referred to as wrapping. There shall be no exposed mesh at joint locations or elsewhere.



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)
J.	Sealant Bead

FIG. 10 Sealant Fillet Joint Seal Using Precured Sealant

6.2.3 EIFS manufacturers may require the use of an accessory to terminate a joint (see Figs. 4 and 5). Where an EIFS manufacturer's approved accessory is used as a termination and sealant substrate, wrapping may not be required.

6.2.4 The EIFS substrate must be allowed sufficient time to cure or dry before application of sealants. A minimum drying time of 24 h is required. Curing/drying time may be affected by environmental conditions as well as whether the EIFS substrate is cementitious or noncementitious. Consult EIFS manufacturer for recommendations for appropriate curing/drying time.

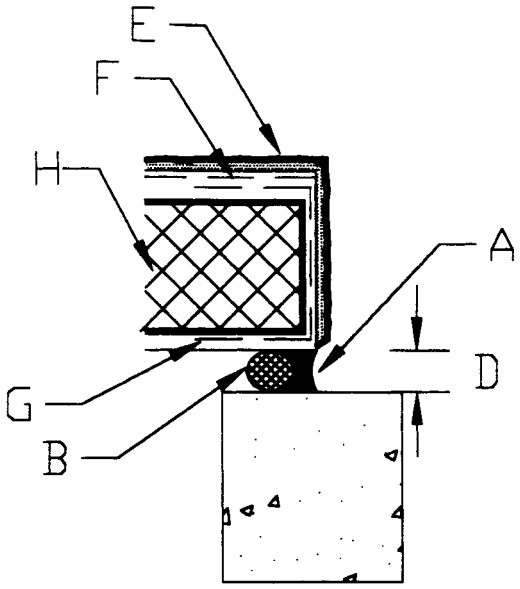
6.2.5 Some EIFS manufacturers require a primer over the base coat. The primer, provided by the EIFS manufacturer, may be used to promote sealant adhesion, protect cementitious base coat from efflorescence and/or provide color uniformity.

6.2.6 The application of finish coat into the joint is generally not recommended by EIFS manufacturers. The test method described in Test Method C 1382 allows evaluation of a specific sealant to a specific EIFS substrate.

6.3 *EIFS Joint Preparation*:

6.3.1 Joints must be clean, dry, and free of frost or other surface contaminants.

6.3.2 Generally joints shall be cleaned with a nonmetallic stiff bristle brush or oil-free compressed air. Solvents may be incompatible with the EIFS or underlying thermal insulation board. Consult the EIFS manufacturer to determine if a specific solvent is compatible with their EIFS.



Legend

A.	Sealant
B.	Sealant Backing
C.	Bond Breaker
D.	Joint
E.	Textured Finish
F.	Reinforcing Mesh Embedded in Base Coat
G.	Backwrap Mesh Around Insulation Board
H.	Insulation Board
I.	Adhesive (If Applicable)

FIG. 11 Sealant Lap Joint Seal

7. Sealant Primer

7.1 The general purpose of a sealant primer is to improve adhesion of a sealant to the EIFS substrate.

7.1.1 In accordance with Test Methods C 794 and C 1382, determine whether a sealant primer is required to a specific EIFS substrate or accessory.

7.1.2 Sealant primer shall not cause damage to the EIFS and underlying thermal insulation board.

7.1.3 With some sealants, different sealant primers may be required on substrates which abut the EIFS. This poses a difficult application problem and should be taken into consideration when selecting a sealant.

7.1.4 Apply sealant primer in accordance with the sealant manufacturer's recommendations and allow the sealant primer to cure or dry as recommended by the manufacturer before installing sealant backing and sealant.

8. Sealant Backing or Bond Breaker

8.1 Proper joint design requires the use of appropriate sealant backing to prevent three-sided adhesion, allow tooling of the sealant and control joint profile. Closed cell and bicellular sealant backings are generally accepted by EIFS manufacturers. Open cell sealant backing, such as open cell polyurethane, can absorb and hold water which may cause a deleterious effect on the EIFS and are not recommended by EIFS manufacturers.

8.1.1 Where sealant backing cannot be installed, a bond breaker must be applied to prevent three sided adhesion.

9. Sealant

9.1 The sealant shall be selected based on the environmental conditions in which it will be used. Test Method C 1382 evaluates the performance of sealants with EIFS in a variety of conditions. Results of this test provide information to the design profession as to which sealant may be the most appropriate for its end use.

9.1.1 Sealant types and classifications are discussed in C 1193 and C 1299.

9.1.2 Section 10.1.4 on Self-Leveling of Guide C 1193 does not apply.

9.1.3 Section 10.10.5 on Tooling Liquids of Guide C 1193 does not apply when sealants are used with EIFS.

10. Joint Seal Geometry

10.1 Sealant joint seals may have any of four joint seal geometry types: butt joint, bridge joint, fillet joint, and lap joint. Good design practice requires a minimum sealant bond contact of 6 mm (¼ in.) for any joint seal geometry type.

10.2 A butt joint is the most common type of sealant joint seal and may be used at EIFS to EIFS (Fig. 1) and joints where EIFS abuts dissimilar materials (Fig. 2). To allow for potential joint restoration should the first joint fail, consider installing the sealant joint recessed from the EIFS surface (Fig. 3). Test Method C 1382 specifically evaluates performance of a sealant with EIFS in a similar joint seal geometry.

10.3 A sealant bridge joint seal is commonly used to restore an existing sealant joint seal in a nondestructive manner but also may be used in new construction. The sealant of a bridge joint seal may be in the form of a liquid-applied sealant (Fig. 6) or a precured sealant joint seal (Fig. 7). A precured sealant joint seal typically uses a compatible liquid-applied sealant as an adhesive to form a watertight joint. A sealant bridge seal may be evaluated in accordance with a modified Test Method C 1382 procedure to the EIFS substrate. Evaluation by a modified Test Method C 1382 procedure will assist the specifier in determining whether application of a sealant bridge joint seal directly to the EIFS finish coat is appropriate.

10.4 A sealant fillet joint commonly is used where EIFS abuts dissimilar materials that are approximately perpendicular to each other. A bond breaker material shall be installed prior to applying the wet sealant to prevent three sided adhesion. The bond breaker material may be in the form of a tape (Fig. 8) or triangular sealant backing material (Fig. 9). A precured sealant joint seal may also be used in this condition (Fig. 10). A modified procedure in Test Method C 1382 may be used to evaluate this joint seal geometry.

10.5 A sealant lap joint (Fig. 11) is applied within the joint between approximately parallel substrates that are face to face. This type joint seal is not commonly found in EIFS applications. Test Method C 1382 is not currently applicable to evaluate a sealant lap joint seal since joint movement is in shear as opposed to tension.

11. Test Methods

11.1 This guide is primarily intended to discuss the use of Test Method C 1382 to evaluate the tensile adhesion properties

of sealants and EIFS. Test Methods C 719 and C 794, additionally, may be considered when qualifying a specific sealant/EIFS combination.

11.2 Test Method C 719 identifies adhesion and cohesion of elastomeric joint sealants under cyclic movement. Use of this test method with foam plastic insulation may be difficult because of the compressive strength of the foam plastic material.

11.3 Test Method C 794 identifies adhesion-in-peel of elastomeric joint sealants. This test method is useful to determine sealant adhesion and sealant primer requirements for a specific EIFS substrate. This test method is intended as a preliminary screen for Test Method C 1382 and should not be considered as a stand alone method to qualify a sealant with EIFS. Test Method C 794 does not evaluate the effect of sealant performance with the EIFS substrate after various environmental exposures.

11.4 Test Method C 1382 determines the tensile adhesion properties of sealants when used in EIFS. This test method describes tensile adhesion properties of sealants to EIFS under dry, wet, frozen, heat-aged, and UV/condensation-aged conditions. This test method provides information to the design professional on the performance of sealants with EIFS including sealant adhesion under dry and wet conditions; sealant modulus change with temperature; sealant property change after accelerated weathering (UV/condensation exposure); integrity of the EIFS substrate; and, effect of sealant modulus on EIFS substrate. When specifying sealants with EIFS, Test Method C 1382 is the recommended test method to determine acceptable performance.

12. Keywords

12.1 exterior insulation and finish systems; EIFS; joint sealant; tensile adhesion