Senergy®

Technical Bulletin

EIFS & Associated Products Test Results

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Senergy® EIFS & Associated Products Test Results

Technical Information
Consult our Technical Services Department for specific recommendations concerning all other applications. Consult the Senergy website, www.senergy.basf.com, for additional information about products and systems and for updated literature.

Senershield - Air/Water-Resistive Barrier

Test	Result
Fire Tests: **ASTM E84** Surface burning	Flame spread =2 Smoke developed = 6 (Class A)
Physical Tests: **ASTM E96 Method B** Water vapor transmission	11.1 Perms (grains/Hr. in Hg. ft^2)
ICC-ES AC212, ASTM D2247 Water resistance	No sign of deleterious effects after 14 day exposure (Tested over gypsum sheathing, DensGlass exterior sheathing, cement board)
ASTM E331 (Modified) Water penetration	No water penetration after 75 min @ 6.24 psf (Preconditioned in accordance with ASTM E1233)
ASTM E2178 Air permeance of building materials	.00024 cfm/ft^2 @ 1.57 psf
ICC-ES AC 212 Freeze-thaw	No sign of deleterious effects after 10 cycles (Tested over gypsum sheathing, DensGlass exterior sheathing, cement board)
ASTM E283 Rate of air leakage	.004 cfm/ft^2 [Rated as type lll air barrier (Canada)]
ASTM C297 Tensile adhesion	21.27 psi (Tested over exterior gypsum sheathing)
ASTM C297 Tensile bond (before & after freeze-thaw)	>15 psi avg; No failure of the lamina after 10 cycles freeze-thaw (Tested over various substrates)
ICC-ES AC212, ASTM C297 Tensile Bond	>15 psi avg (Tested over gypsum sheathing, DensGlass exterior sheathing, cement board; pvc and galvanized flashing)
ICC-ES AC212, ASTM E1233, ASTM E72 Structural, racking and restrained environmental conditioning	Passed with no signs of cracking or tearing in field, at joints or interface of flashing (Tested over gypsum sheathing)
ICC-ES AC212 (UV Exposure, Accel Aging, Hydro Pressure AATCC 127) Weathering test	No signs of failure after UV and Accel Aging; passed 5 hrs @ 21.7" head water (Tested over exterior gypsum sheathing, DensGlass exterior sheathing, cement board)
Lab Procedure Hydrostatic head	Pass 12" @ 48 hours

Senershield-R - Air/Water-Resistive Barrier

Test	Result
Physical Tests: **ASTM E2178** Air permeance of building materials	0.0049 l/s·m^2 @ 75 Pa (0.00098 cfm/ft^2 @ 1.57 psf)
ASTM E283 Rate of air leakage	0.0185 l/s·m^2 @ 75 Pa (0.0037 cfm/ft^2 @ 1.57 psf) [Rated as type III air barrier (Canada)]
ASTM E96 Method B Water vapor transmission	5.8 Perms (grains/Hr. in Hg. ft^2) @ 10 mils
ICC-ES AC212, ASTM E1233, ASTM E72, ASTM E331 Structural, racking and restrained environmental conditioning	Passed with no signs of cracking or tearing in field, at joints or interface of flashing and no water penetration after 90 min @ 299 Pa (6.24 psf) (Tested over OSB and gypsum sheathing)
CCMC Tech Guide 07240 Joint disruption resistance	No cracking, delamination or other deleterious effects at L/180 deflection
CCMC Tech Guide 07240 Joint relaxation resistance	Pass Max water transmission rate 2 x 10^{-7} kg/m^2 · s (4.1 x 10^{-8} lbs/ ft^2 · s) after extension and environmental cycling
ASTM D4541 Pull-off strength of coatings	Pass Min. 110 kPa (15.9 psi) or substrate failure (Tested over exterior gypsum sheathing, ASTM C1177 glass-mat sheathing, cement board, OSB, plywood; pvc and galvanized flashing)
ICC-ES AC212, ASTM C297 Tensile bond	>103kPa (15 psi) avg (Tested over exterior gypsum sheathing, ASTM C1177 glass-mat sheathing, cement board, OSB, plywood, CMU; pvc and galvanized flashing)
ASTM D5034 **ICC-ES AC148 (AAMA 711)** Tensile strength	All samples meet the minimum requirement of 3.5 n/mm (20 lbs/in)
ASTM D5034 **ICC-ES AC148 (AAMA 711)** Peel adhesion	All samples meet the minimum requirement of .263 n/mm (1.5 lbs/in) (Tested over ASTM C1177 glass-mat sheathing, OSB, plywood, pvc and uncoated aluminum)
ICC-ES AC148 (AAMA 711) Resistance to peeling	No signs of distress or failure After 24 hours of exposure at room temperature, 50° C (122° F), 65° C (149° F), 80° C (176° F)
CCMC Tech Guide 07240 Adhesive/cohesive bond	Pass Min 0.3 MPa (43.5 psi) in dry state, 0.1 MPa (14.5 psi) after 48 hour water immersion
ASTM C297 Tensile bond (before & after freeze-thaw)	>103 kPa (15 psi) avg; no failure of the lamina after 10 cycles freeze-thaw (Tested over various substrates)
ASTM D1970 **ICC-ES AC148 (AAMA 711)** Cold temperature pliability	No cracking after bending around a 25 mm (1") mandrel after 2 hour exposure to -18° C (0° F)
ASTM D1970 Nail sealability	Pass No water penetration at galvanized roofing nail penetration under 127 mm (5") head of water after 3 days at 4° C (40° F)
ASTM D1970 (Modified) **ICC-ES AC148 (AAMA 711)** Nail sealability	No water penetration at galvanized roofing nail penetration under 32 mm (1.25") head of water after 24 hours at 4° C (40° F)
CCMC Tech Guide 07240 Nail popping resistance	No cracking or delamination around nail head following 1 mm (0.04") protrusion
ASTM E2485 (Method B) **ICBO ES AC 212** Freeze-thaw	No sign of deleterious effects after 10 cycles (Tested over exterior gypsum sheathing, ASTM C1177 glass-mat sheathing, cement board, OSB, plywood)
ICC-ES AC148 (AAMA 711) Thermal cycling	No failures observed after 25 cycles (Tested over ASTM C1177 glass-mat sheathing, OSB, plywood, pvc and uncoated aluminum)
ICC-ES AC212, ASTM D2247 Water resistance	No sign of deleterious effects after 14 day exposure (Tested over exterior gypsum sheathing, ASTM C1177 glass-mat sheathing, cement board, OSB, plywood)

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Senershield-R - Air/Water-Resistive Barrier

Test	Result
Physical Tests: **ICC-ES AC148 (AAMA 711)** Water immersion	Complied. No visibile effects (swelling or change in appearance) after 7 days of immersion (Tested over ASTM C1177 glass-mat sheathing, OSB, plywood, pvc and uncoated aluminum)
CCMC Tech Guide 07240 Water absorption	Pass Maximum 0.004 $kg/m^2 \cdot s$ (0.0008 $lbs/ ft^2 \cdot s$)
ASTM E331 (Modified) Water penetration	No water penetration after 75 min at 299Pa (6.24 psf) (Preconditioned in accordance with ASTM E1233)
ICC-ES AC212 (UV Exposure, Accel Aging, Hydro Pressure AATCC 127) Weathering test	No signs of failure after UV and Accelerated Aging; passed 5 hrs @ 55 cm (21.7") head water (Tested over exterior gypsum sheathing, DensGlass, cement board, OSB, plywood)
ICC-ES AC148 Hydrostatic pressure test, AATCC 127	No signs of failure after UV and Accelerated Aging; passed 5 hrs @ 55 cm (21.7") head water
ICC-ES AC148 UV light exposure	No visible surface or structural changes such as peeling, chipping, cracking, flaking, or pitting when observed under 5X magnification
ASTM G154 **ICC-ES AC148 (AAMA 711)** Accelerated aging	No visible surface or structural changes such as peeling, chipping, cracking, flaking, or pitting
CCMC Tech Guide 07240 Accelerated weathering resistance	No visible effects (cracking, flaking, other deleterious effects) after 334 total hours
Fire Tests: **ASTM E84** Surface burning	Flame spread =15 Smoke developed = 95 (Class A)

Senergy Wall System Coatings

Test	Result
Fire Tests: **UL 723/ASTM E84** Surface burning characteristics of SENERFLEX Coatings	Flame spread < 25 Smoke developed < 450
Physical Tests: **ASTM E96 Method B** Perms water vapor transmission of SENERFLEX Coatings	SILCOAT CLASSIC Finish with NC-II BASE/FLEXGUARD 4: 6.53 Perms CLASSIC Finish with NC-II BASE/FLEXGUARD 4: 7.3 Perms SILCOAT CLASSIC Finish with STANDARD Base Coat/FLEXGUARD 4 & HI-IMPACT 20: 11 Perms CLASSIC Finish with STANDARD Base Coat/ FLEXGUARD 4 & HI-IMPACT 20: 11.7 Perms SAHARA Finish with STANDARD Base Coat/ FLEXGUARD 4: 15.1 Perms SILCOAT SAHARA Finish with STANDARD Base Coat/FLEXGUARD 4: 16 Perms AURORA TC-100 Finish with STANDARD Base Coat/FLEXGUARD 4: 16.2 Perms ASAP/CLASSIC Finish With STANDARD Base Coat/FLEXGUARD 4: 17 Perms SILCOAT CLASSIC Finish with STANDARD Base Coat/FLEXGUARD 4: 18.4 Perms ASAP with STANDARD Base Coat/FLEXGUARD 4: 19.5 Perms SILCOAT CLASSIC Finish With ALPHA DRY Base Coat/FLEXGUARD 4: 21.4 Perms CLASSIC FINISH with ALPHA DRY Base Coat/ FLEXGUARD 4: 22.4 Perms
ASTM D2247 Water resistance of Coatings in 100% R.H.	No deleterious effects after 14 days exposure.
ASTM B117 Salt fog resistance	No change after 300 hours.
Mil. Std. 810B Method 508 Mildew resistance	No fungus growth after 28 days.

Test	Result
Singapore Test— SS 345: 1990 (Appendix B)	FINE Finish showed no algae growth after 8 weeks.
Chemical Resistance (Determined by spot testing the sample surface with turpentine, mineral spirits, and 10% hydrochloric acid for 4 hours).	Turpentine = slight softening Mineral spirits = slight softening 10% Hydrochloric acid = slight softening
ASTM D968 Abrasion resistance	Finish Coat not worn through after 686 liters of falling sand.
ASTM G53 Accelerated weathering	No deleterious effects after 7500 hours.
ASTM G23 Accelerated weathering	No deleterious effects after 2000 hours.
Acid Rain	Finish Coat was slightly soft upon removal, but recovered upon overnight drying.
Silcoat® Finish	
Water vapor transmission of SENERFLEX Coatings with SILCOAT Finish	Maximum average 21.4 perms
Hydrostatic Water resitance of SENERFLEX Coatings with SILCOAT Finish	No water penetration with minimum 304 mm (12") head for more than 24 hours.
Senerlastic™ Coating	
ASTM D412 Ultimate elongation Elongation recovery Stormer viscosity Ultimate tensile strength	 344% Elongation 97% 127 KU 396 psi
ASTM D4541 Adhesion	210 psi
ASTM 1653 Vapor permeability	10 Perms
EN 062-6 CO_2 diffusion resistance	1.99 10^5
Flexibility	1/8" mandrel at -30˚F
ASTM C67 Freeze thaw resistance TT-C-555B - Wind driven rain	 60 cycles Passes
ASTM G53 Weathering	No deleterious effects after 5000 hours
ASTM D3273/ASTM D3274 Mildew resistance	No growth
ASTM B117 Salt spray resistance	300 hours
Percent Solids By volume By weight	 50% 65%

Senergy® EIFS & Associated Products
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Senerflex® Classic PB Wall System

Test	Result
Fire Tests: **Modified ASTM E108**	The Senergy Finish Coat did not contribute significantly to the vertical or horizontal flame spread on the exterior of the wall. The intact Finish Coat and Reinforcing Mesh layers were capable of preventing flame intrusion into the wall cavity. The Finish Coat did not produce significant amounts of smoke during either of the tests. The removal of the Finish Coat and fiberglass mesh layer to expose the foam core did not adversely affect the fire performance of the Senerflex Wall System.
UBC Standard 26-4 **Full Scale Multi-Story Fire Test**	The Senerflex Wall System successfully met all of the following criteria: 1. Self-propagating flame did not occur over the exterior facings of the panels. 2. Flame propagation did not occur vertically or laterally through the core insulation to the limits of the test panels. 3. Flame propagation did not occur to the first floor wall panels that simulate adjacent lateral spaces either through core insulation or over exterior or interior test panel surfaces. 4. Temperatures measured 25 mm (1") from the interior surface of test panels within the second story did not exceed 177˚C (350˚F). 5. Flames did not penetrate the second floor either through the wall/floor intersection or on the interior face of the test panels.
UBC Standard 26-9/NFPA 285 **Intermediate Scale Fire Test**	Successfully met all of the following criteria using 13" thick EPS insulation boards. 1. Self-propagation flame did not occur over the exterior facings of the panels. 2. Flame propagation did not occur vertically or laterally through the core insulation to the limits of the test panels. 3. Flame propagation did not occur to the first floor wall panels that simulate adjacent lateral spaces either through core insulation or over exterior or interior test panel surfaces. 4. Temperatures measured 25 mm (1") from the interior surface of test panels within the second story did not exceed 177˚C (350˚F). 5. Flames did not penetrate the second floor either through the wall/floor intersection or on the interior face of the test panels.
ASTM E119 Method for fire tests of building construction and materials	The Senerflex Wall System did not reduce the fire resistance of the basic wall assembly.
NFPA 268 Radiant heat exposure	Satisfied conditions of acceptance for 13" thick EPS insulation.
CAN/ULC-S101-M Standard methods of fire endurance tests of building construction and materials	The Senerflex Wall System with ALPHA BASE/ALPHA DRY BASE satisfied conditions of acceptance.
CAN4-S114-M Standard test for determination of non-combustibility in building materials	ALPHA DRY BASE satisfied conditions of acceptance.
Impact Tests: **ASTM E695** Impact resistance	No cracks in the exterior insulation and finish system from a drop height of 1.83 m (6'). Maximum cumulative indentation did not exceed 8.5 mm (5/16").

Test	Result
EIMA Impact Standard 101.86	FLEXGUARD 4/STANDARD Base Coat: standard impact resistance INTERMEDIATE 6/STANDARD Base Coat: standard impact resistance INTERMEDIATE 12/STANDARD Base Coat: medium impact resistance INTERMEDIATE 12 & FLEXGUARD 4/STANDARD Base Coat: high impact resistance STRONG 15 & FLEXGUARD 4/STANDARD Base Coat: ultra high impact resistance HI-IMPACT 20 & FLEXGUARD 4/STANDARD Base Coat: ultra high impact resistance
Physical Tests: **Dade County Testing Application Standard (TAS) 201** Impact tests (large and small missile) **Dade County Testing Application Standard (TAS) 202** Uniform static air pressure tests **Dade County Testing Application Standard (TAS) 203** Cyclic wind pressure tests	
Assemblies: Senerflex Channeled Adhesive Design with Senershield or Senershield-R with Hi-Impact 20 & Flexguard 4 over 3 5/8", 18 and 20 gauge steel studs, 1/2" DensGlass exterior sheathing, GlasRoc sheathing or Securock™ glass-mat sheathing	Passed TAS 201 (Large Missile), 202 & 203 +/- 2873 Pa (60 psf) design pressure - 18 gauge +/- 1436 Pa (30 psf) design pressure - 20 gauge
Senerflex Channeled Adhesive Design with Senershield or Senershield-R with Flexguard 4 over 3 5/8", 18 and 20 gauge steel studs, 1/2" DensGlass exterior sheathing, GlasRoc sheathing or Securock™ glass-mat sheathing	Passed TAS 201 (Small Missile), 202 & 203 +/- 2873 Pa (60 psf) design pressure - 18 gauge +/- 1436 Pa (30 psf) design pressure - 20 gauge
Senerflex Classic PB System with Senershield or Senershield-R with Hi-Impact 20 & Flexguard 4 over 3 5/8", 18 and 20 gauge steel studs, 1/2" DensGlass exterior sheathing or GlasRoc sheathing	Passed TAS 201 (Large Missile), 202 & 203 +/- 2873 Pa (60 psf) design pressure - 18 gauge +/- 1436 Pa (30 psf) design pressure - 20 gauge
Senerflex Classic PB System with Flexguard 4 over 3 5/8", 18 and 20 gauge steel studs, 1/2" DensGlass exterior sheathing or GlasRoc sheathing	Passed TAS 201 (Small Missile), 202 & 203 +/- 2873 Pa (60 psf) design pressure - 18 gauge +/- 1436 Pa (30 psf) design pressure - 20 gauge
Senerflex Classic PB System with Hi-Impact 20 & Flexguard 4 over 3 5/8", 18 gauge steel studs with Intermediate 12 on 5/8" DensGlass exterior sheathing, GlasRoc sheathing or Securock™ glass-mat sheathing	Passed TAS 201 (Large Missile), 202 & 203 +/- 3112 Pa (65 psf) design pressure
Senerflex Classic PB System with Flexguard 4 over CMU	Passed TAS 201 (Large Missile), 202 & 203 +/- 5985 Pa (125 psf) design pressure
Senerflex Channeled Adhesive Design with Senershield-R with Flexguard 4 over 2" x 4" wood studs, 5/8" plywood sheathing	Passed TAS 201 (Large Missile), 202 & 203 +/- 3591 Pa (75 psf) design pressure

Senergy® EIFS & Associated Products
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Test	Result
EIMA 101.01 (Modified ASTM C67) Freeze/thaw resistance	No deleterious effects after 60 cycles
Fed. Spec. TT-C-555B Wind driven rain	An average weight gain of 24 grams was sustained without back dampness or leaking through. Tested in full-scale configuration to positive and negative pressures.
ASTM E330 Wind-load	In excess of 7182 Pa (150 psf) without bond failure
ASTM E331 Water penetration of exterior windows, curtain walls, and doors by uniform static air pressure difference	No water penetration to the innermost face of the test specimens occurred at 574 Pa (12 psf) pressure differential
ASTM C297 Tensile bond strength	Exceeds 103 kPa (15 psi) on various substrates, including masonry, gypsum sheathing, and wood-based sheathing.
Absorption-Freeze Resistance (Sample subjected to 4 days of water soakage to 60 cycles of 2 hours each at - 10˚C and + 20˚C)	A weight gain of 0.38 grams was sustained without any visible damage.

Senerflex® Secondary Weather Barrier Design

Physical Tests: **ASTM C297** Tensile bond strength SENERSHIELD/Base Coat/EPS on:	
Cement-board	30.1 psi
DensGlass exterior sheathing	34.5 psi
Exterior gypsum sheathing	24.0 psi

Senerflex® Flashed Opening Design

Physical Tests: **EIMA 200.03 (Modified ASTM E331)** Test method for determining the draining performance and drying potential of Class PB Exterior Insulation and Finish Systems.	Pass. No signs of leakage and no significant amount of water on the interior of the specimen.

Senerflex® Channeled Adhesive Design

Fire Tests: **CAN/ULC S101-M89**	The Senerflex Channeled Adhesive Design met test criteria.
UBC Standard 26-9/NFPA 285 **Intermediate Scale Multi-story Fire Test**	Met test criteria with 12” thick EPS insulation.
ASTM E119 Methods for fire tests of building construction and materials	1 hour rating with maximum 4” thick EPS insulation
NFPA 268 Radiant heat exposure	Met test criteria with 12” thick EPS insulation.
Physical Tests: **Modified ASTM E331**	Pass. No signs of leakage and no significant amount of water on interior of the specimen.

Test	Result
ASTM E330 Wind-load Assembly description: Steel stud framing (20 gauge) 16"o.c., 1/2" gypsum sheathing, R-4 REINFORCING FABRIC over sheathing joints, SENERSHIELD-R, Senergy Adhesive, 1" expanded polystyrene insulation board, Senergy Base Coat, FLEXGUARD 4 REINFORCING MESH, Senergy Finish.	Average ultimate loads: - 3126 Pa (- 65 psf) + 2633 Pa (+ 55 psf) not taken to failure
Assembly description: Wood assembly (2' x 4') 16"o.c., 7/16" Exposure 1 OSB, R-4 REINFORCING FABRIC over sheathing joints, SENERSHIELD-R, Senergy Adhesive, 1" expanded polystyrene insulation board, Senergy Base Coat, FLEXGUARD 4 REINFORCING MESH, Senergy Finish.	Average ultimate loads: - 8379 Pa (- 175 psf) + 3591 Pa (+ 75 psf) not taken to failure
ASTM E2273 Drainage efficiency	99.1% with Senershield 98.7% with Senershield-R Meets 90% minimum

Senerflex® Channeled Insulation Design

Fire Tests: **UBC Standard 26-9/NFPA 285** **Intermediate Scale Fire Test:**	Met test criteria with 12” thick EPS insulation
ASTM E119 Methods for fire tests of building construction and materials	1 hour rating with maximum 4” thick EPS insulation
NFPA 268 **Radiant Heat Exposure**	Met test criteria with 12” thick EPS insulation
Physical Tests: **ASTM E2273** Determining the drainage efficiently performance of Exterior Insulation Finish Systems (EIFS) Clad Wall Assemblies	Pass. No signs of leakage and no significant amount of water on interior the specimen.
ASTM E330 Wind-load Assembly description: Steel stud framing (20 gauge) 16" o.c., 1/2" gypsum sheathing, 4" FLEXGUARD 4 on sheathing joints, SENERSHIELD, Senergy Adhesive, 1" expanded polystyrene insulation board, Senergy Base Coat, FLEXGUARD 4 REINFORCING MESH, Senergy Finish.	Average ultimate loads: - 3112 Pa (- 65 psf) + 4644 Pa (+ 97 psf) (no failure)
ASTM E2273 Drainage efficiency	99.2% with Senershield 98.7% with Senershield-R Meets 90% minimum

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Senerflex® Adhered Mat Design

Test	Result
Physical Tests: **EIMA 200.03 (Modified ASTM E331)** Performance and Test Method for determining the drainage and drying potential of Class PB Exterior Insulation and Finish Systems.	No signs of leakage and no significant amount of water on the interior of the specimen.
ASTM E330 Wind-load Assembly description: Steel stud framing (16 gauge) 16" o.c., 1/2" gypsum sheathing,15 # felt paper, metal lath,1"expanded polystyrene insulation board, Senergy Base Coat, FLEXGUARD 4 REINFORCING MESH, Senergy Finish.	Average ultimate loads: + 7804 Pa (163 psf) - 7421 Pa (+ 155 psf)
ASTM E283 Air Leakage Senerflex Adhered Mat Wall assembly with SENERSHIELD and including window and air seal.	0.0457 l/s/m^2 (0.009 cfm/ft^2)
Hydrostatic Pressure Resistance	Pass
ASTM E96 Method D Water Vapor Transmission	Average 20.3 perms

Senerflex® Pressure Equalized Design

Test	Result
Fire Tests: **UBC Standard 26-9/NFPA 285** Intermediate scale fire test	Successfully met all of the following criteria: 1. Self-propagation flame did not occur over the exterior facings of the panels. 2. Flame propagation did not occur vertically or laterally through the core insulation to the limits of the test panels. 3. Flame propagation did not occur to the first floor wall panels that simulate adjacent lateral spaces either through core insulation or over exterior or interior test panel surfaces. 4. Temperatures measured 25 mm (1") from the interior surface of test panels within the second story did not exceed 177˚C (350˚F). 5. Flames did not penetrate the second floor either through the wall /floor intersection or on the interior face of test panels.
NFPA 268 Radiant heat exposure	Satisfied conditions of acceptance. No ignition upon 20 minute radiant heat exposure at 1.25 W/cm^2.
Pressure Equalization Response Assembly description: 16 gauge 38 mm x 89 mm (1.5" x 3.5" steel studs), 15.75" o.c, 5/8" DensGlass exterior sheathing , 38 mm (1.5") EPS	87%–100% Pressure Equalization Index rating with pressures between 500 Pa ± 250 Pa and 1500 Pa ± 500 Pa at frequencies of 1.0 and 2.0 Hz
ASTM E330 Wind-load Assembly description: Steel stud framing (16 gauge) 20" o.c., 1/8" gypsum sheathing, 4" FLEXGUARD 4 on sheathing joints, SENERSHIELD, starter track, EPS closure blocks, Adhesive, SENERQUICK, DRAINAGE MAT, 1.5" expanded polystyrene insulation board, mechanical fasteners, Senergy Base Coat, FLEXGUARD 4 Reinforcing Mesh, Senergy Finish.	Average ultimate loads: - 684 pa (- 143 psf) 4309 pa (90 psf)

Senerflex® Pressure Equalized Design (Continued)

Test	Result
UL 723/ASTM E84 Surface burning characteristics of SENERFLEX Coatings	Flame spread < 25 Smoke developed < 450
Physical Tests: **ASTM C297** Tensile bond strength: Cement board DensGlass exterior sheathing Exterior gypsum sheathing	 28.7 psi 34.4 psi 21.3 psi
ASTM D522 Flexibility mandrel bend	4˚C (40˚F) Passes 4" mandrel
ASTM D2247 Water resistance	No deleterious effects after 14 days exposure
ASTM E283 Air leakage rate SENERSHIELD over DensGlass exterior sheathing and 16 gauge steel studs at pressure differential of 75 Pa (1.57 psf)	0.013 l/s/m^2 (0.003 cfm/ft^2) Type III air barrier

Senturion™ System I

Physical Tests: **ASTM E2273** Drainage efficiency	95.3% with Tyvek Stuccowrap (Meets 90% minimum)
ASTM E330 Wind-load Assembly description: steel stud framing (3 5/8" studs, 18 gauge) 406 mm (16") o.c., 15/32" exterior grade, exposure 1 plywood, housewrap, EPS insulation board with 8 Wind Devil 2 plates per board. See current Senergy Technical Bulletin *Methods of Attachment* for fastener layout.	Average ultimate loads: 25 mm (1") EPS: - 4166 Pa (- 87 psf), + 3016 Pa (+ 63 psf) 38 mm (1 1/2") EPS: - 6224 Pa (- 130 psf), + 3926 Pa (+ 82 psf) 50 mm (2") EPS: - 6272 Pa (- 131 psf), + 3974 Pa (+ 83 psf)
Same as above assembly but with 9 Wind Devil 2 plates per board. See current Senergy Technical Bulletin, *Methods of Attachment* for fastener layout.	25 mm (1") EPS: - 4261 Pa (- 89 psf), + 3782 Pa (+ 79 psf) 38 mm (1 1/2") EPS: - 5458 Pa (- 114 psf), + 3782 Pa (+ 79 psf)

Senturion™ System II

Physical Tests: **ASTM E2273** Drainage efficiency	98.5% (Meets 90% minimum)
ASTM E330 Wind-load Assembly description: 2" x 4" wood framing 406 mm (16") o.c., 7/16" OSB sheathing, 37 mm (1 1/2") channeled insulation with 8 Wind Devil 2 plates per board. See current Senergy Technical Bulletin *Methods of Attachment* for fastener layout.	Average ultimate loads: - 4022 Pa (- 84 psf), + 7373 Pa (+ 154 psf)

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Senturion™ System III

Test	Result
Fire Tests: **UBC Standard 26-9/NFPA 285** Intermediate scale fire test	Met test criteria with 4" of EPS insulation
NFPA 268 Radiant heat exposure	Met test criteria with 4" of EPS insulation
Physical Tests: **ASTM E2273** Drainage efficiency	98.1 (Meets 90% minimum)
ASTM E330 Wind-load Assembly description: 2" x 4" Wood framing 406 mm (16") o.c., 7/16" OSB sheathing, expanded polystyrene insulation board with 8 Wind Devil 2 plates per board. See current Senergy Technical Bulletin *Test Results and Methods of Attachment* for fastener layout.	Average ultimate loads: 25 mm (1") EPS: - 5123 Pa (- 107 psf), + 3974 Pa (+ 80 psf) 50 mm (2") EPS: - 5841 Pa (- 122 psf), + 4021 Pa (+ 84 psf)

Senerflex® with polyisocyanurate insulation board

(Test performed on Thermax Quik-R insulation board can be obtained from the Dow Chemical Co., Midland, Michigan)

ASTM D1623—Tensile strength	255 kPa (37 psi) avg.
ASTM D1622—Density	Nominal 32 kg/m^3 (2 lbs.ft^3)
ASTM D1621—Compressive strength	Minimum 110 kPa (16 psi)
ASTM E96—Water vapor transmission	1.7 Perm inch
ASTM C272—Water absorption	<1.5% by volume; 24 hours
UL 723/ASTM E84 Surface burning characteristics 50 mm (2") Thickness	Core material — Finished face board Flame spread: 20 — 50 Smoke developed: 90–130 — 115
ASTM C518 Thermal Resistance (R-Value)	25 mm (1") = 5.6; 38 mm (1 1/2") = 8.4; 50 mm (2") = 11 @ 24°C (75°F) mean temp.
EIMA Impact Standard 101.86 Impact resistance	FLEXGUARD 4 / STANDARD Base Coat: standard impact resistance INTERMEDIATE 12 / STANDARD Base Coat: medium impact resistance HI-IMPACT 20 & FLEXGUARD 4 / STANDARD Base Coat: ultra high impact resistance
ASTM C297 Tensile bond strength	Senerflex System using Quik-R and STANDARD Base Coat: 232 kPa (33.7 psi) avg.
ASTM E331 Water penetration of exterior windows, curtain walls, and doors by uniform static air pressure difference	No water penetration occurred at the innermost face of the test specimen when tested at 574 Pa (12 psf) pressure differential.

Atlas Stucco Shield II is an acceptable insulation board for use with the Senerflex Classic PB, Senturion I and III systems.

Notes

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Note
BASF Wall Systems is an operating unit of BASF Corporation (herein referred to as "BASF Wall Systems")

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