

Fastener Sealability

Information for use with GE Elemax* 2600 AWB

One performance criterion that is of great interest to design professionals in regards to air and water-restive barriers (AWBs) is fastener sealability. Being able to form a seal around fasteners that are installed post air barrier installation is critical to performance of such systems. The current standard that is utilized to evaluate fastener sealability is ASTM D1970 “Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection”. Unfortunately D1970 was developed for self-adhering materials used as roofing underlayments and utilizes roof nails (not screws) to determine sealability.

When evaluating fastener sealability of an AWB, utilizing typical commercial fasteners (e.g., self-tapping screws) in testing is more representative when assessing this performance feature. In order to simulate a realistic application, said fasteners were tested on a vertical wall subjected to simulated wind-driven rain; as follows:

Purpose: Determine fastener sealability of GE Elemax 2600 AWB utilizing ASTM E331 “Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference” as the method to simulate wind-driven rain.

Test Specimen: Testing was performed on an 8’ x 8’ (2.4m x 2.4m) Specimen 1 (Opaque Wall) wall panel that had been previously tested in accordance with ASTM E2357 “Standard Test Method for Determining Air Leakage of Air Barrier Assemblies” and CAN/ULC - S742-11 “Standard for Air Barrier Assemblies - Specifications”. Upon successful completion of these air leakage tests, various fasteners were installed through sheathing into studs leaving an approximate ¼” (6.4mm) gap between the screw head and sheathing to simulate the attachment of insulation, metal lath, etc.. In addition, fasteners were utilized to install brick ties, metal c studs (simulate hat channels, z-girts, etc.) and fasteners with neoprene washers were installed flush with the sheathing surface.

Testing: Water leakage of fastener penetrations was evaluated utilizing ASTM E331 as the method to simulate wind-driven rain. The water spray system was set up to deliver water uniformly across the test specimen at a rate of 5 gal/sf per hour. The selected pressures were run for 15 minute intervals. Results are listed in the attached table.

- P1** - 2.86 psf (0.14 kPa) static pressure and 5 gal/sf per hour water application for 15min
- P2** - 6.24 psf (0.30 kPa) static pressure and 5 gal/sf per hour water application for 15min
- P3** – 12 psf (0.57 kPa) static pressure and 5 gal/sf per hour water application for 15 min
- P4** – 20 psf (0.96 kPa) static pressure and 5 gal/sf per hour water application for 15min
- P5** – 25 psf (1.2 kPa) static pressure and 5 gal/sf per hour water application for 15min



		P1	P2	P3	P4	P5
Line	Fastener Type	2.86 psf (0.14 kPa) 33 mph	6.24 psf (0.30 kPa) 50 mph	12.0 psf (0.57 kPa) 50 mph	20.0 psf (0.96 kPa) 50 mph	25.0 psf (1.2 kPa) 50 mph
1	#8 x 1½" self-drilling screw	Pass	Pass	Pass	Fail @ 9 minutes	X
2	#12 x 1½" self-drilling screw with neoprene washer	Pass	Pass	Pass	Pass	Pass
3	#12 x 1½" self-drilling screw with no washer	Pass	Pass	Pass	Fail @ 7 minutes	X
4	#14 x 1¼" self-drilling screw	Pass	Pass	Pass	Fail @ 7 minutes	X
5	Dovetail brick tie with (1) #12 x 1½" self-drilling screws	Pass	Pass	Pass	Pass	Pass
6	DW-10 brick tie with (2) #12 x 1½" self-drilling screws	Pass	Pass	Pass	Pass	Pass
7	Corrugated brick tie with (1) #8 x 1½" self-drilling screw	Pass	Pass	Pass	Fail @ 13 minutes	X
8	1½" x 4" 20ga. C stud fastened with (2) #12 x 1½" self-drilling screws	Pass	Pass	Pass	Pass	Pass
9	1½" x 4" 20ga. C stud fastened with (2) #12 x 1½" self-drilling screws with neoprene washer	Pass	Pass	Pass	Pass	Pass
10	#6 x 1¼" self-drilling screw (Fastener tip dipped in GE Elemax 5000 liquid flashing prior to installation)	Pass	Pass	Pass	Pass	Pass
11	#8 x 1½" self-drilling screw (Fastener tip dipped in GE Elemax 5000 liquid flashing prior to installation)	Pass	Pass	Pass	Pass	Pass
12	#12 x 1½" self-drilling screw with neoprene washer (Fastener tip dipped in GE Elemax 5000 liquid flashing prior to installation)	Pass	Pass	Pass	Pass	Pass
13	#12 x 1½" self-drilling screw no washer	Pass	Pass	Pass	Pass	Pass
14	#14 x 1¼" self-drilling screw (Fastener tip dipped in GE Elemax 5000 liquid flashing prior to installation)	Pass	Pass	Pass	Pass	Pass

15	Corrugated brick tie with (1) #8 x 1½" self-drilling screw (Fastener tip dipped in GE Elemax 5000 liquid flashing prior to installation)	Pass	Pass	Pass	Pass	Pass
16	1½" x 4" 20ga. C stud set in bead of GE Elemax 500 liquid flashing and fastened with (2) #12 x 1½" self-drilling screws	Pass	Pass	Pass	Pass	Pass



Test Specimen prior to testing



Test Specimen during testing



Close up of fastener

Please be advised that the above referenced testing was completed under test lab conditions and does not take into account any fasteners that may be improperly installed. Improperly installed fasteners should be removed and the vacated holes properly sealed with GE Elemax 5000 liquid flashing or any GE SilPruf sealant. The use of additional post/pre fastener treatment such as neoprene washers and or liquid flashing/sealant is the sole responsibility of the design professional.

Job site inspections and quality control measures are recommended to ensure a watertight wall assembly is achieved.

If you have any questions or require additional information please contact Momentive Performance Materials Technical Service Department.