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September 28, 2020

Standards Equivalency Determination

Reference: SimEx White Rigid Poly Vinyl Chloride (PVC) Exterior Profile Extrusions
ETC Laboratories Report #ETC-97-264-4091.0

I have performed an evaluation of the testing performed by ETC Laboratories in Rochester, NY in their test report ETC-97-264-4091.0. The testing was performed for AAMA and used for general qualification of white PVC material due to testing multiple manufacturers and documenting similar performance, and is therefore being submitted to qualify SimEx, Inc. white colored PVC extrusions. This is the same testing used for Miami-Dade material Master Filing, the current basis for AAMA-certified extruders in the HVHZ. This report is based on older or different versions of the various ASTM standards than those referenced in the Miami-Dade Checklist #0445 and Florida Building Code 2020; therefore I analyzed the standards for equivalency and current code compliance. Please see the table below for the findings:

As-Tested in ETC-97-264-4091.0	As-Required in Checklist #0445 / FBC 7th Edition (2020)	Equivalent / Meets FBC 7th Ed. (2020)?
ASTM D1929-96 Ignition Temperature, with samples tested showing an average ignition temp. of 925°F	ASTM D1929-16, with required results of ignition temperature > 650°F. The '16 version compared to the '96 version has formatting and editorial revisions, additional clarifying notes, additional precision/bias data, and the allowance for entry of thermocouple 2 wire through the bottom rather than the top, however with the thermocouple sensor location unchanged. In my judgement these differences do not functionally affect the test results.	Yes

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As-Tested in ETC-97-264-4091.0	As-Required in Checklist #0445 / FBC 7th Edition (2020)	Equivalent / Meets FBC 7th Ed. (2020)?
ASTM D2843-93 Smoke Density, with samples tested showing an average smoke density value of 43	ASTM D2843-16, with required results of smoke density <= 75. The '16 version compared to the '93 version has identical standard test sample size, burner assembly and pressure, chamber size, and photometric equipment. The primary difference is the heat shield below the burner in '93 was specified as asbestos and in '16 is specified as calcium silicate. Other changes are that temperature compensation is now as-required (mandatory in '93 version) and allows more software automation including more frequent measurements than every 15s if desired, however 15s is still the max. frequency as was required in the '93 version. Because the smoke density rating is the area under the curve of measured values, a smoother curve due to more frequent measurements would result in a lower smoke density rating, therefore the older as-tested method is more stringent. In my judgement these differences do not otherwise functionally affect the test results.	Yes
ASTM D635-96 Rate of Burning, with samples tested all achieving a combustibility classification of Class C-1 (burn extent <= 1")	ASTM D635-14, with required results of Class CC1 (corresponds to Class C-1) or CC2. The '14 version compared to the '96 version has identical test duration, sample and flame size and orientation, and test apparatus, except that the wire gauze in the '14 version is positioned more directly under the test sample to catch falling embers, which does not affect the rate of burning. The '14 version loosens tolerances on the conditioning room chamber to +/- 10% RH rather than +/-5% RH, and also changes the test chamber required RH to simply <=75% from the previously required 45% to 75% RH. Because the as-tested conditions under the '96 version fall within the criteria of the '14 version they are in compliance.	Yes
ASTM G26-95 Method A Xenon UV Exposure, with testing protocols of 6500W lamp, daylight filter (0.35 W/m^2*nm @ 340nm), 4500 hours, intermittent water spray.	ASTM G26 or G155 per Checklist, ASTM G155-13/D2565-99(2008) per FBC: Testing complies explicitly with G26. G155/D2565 also requires 6500 W lamp, daylight filter (0.35 W/m^2*nm @ 340nm), 4500 hours, however FBC2020 does not require water spray. Intermittent water spray represents more stringent "torture test" of product.	Yes

As-Tested in ETC-97-264-4091.0	As-Required in Checklist #0445 / FBC 7th Edition (2020)	Equivalent / Meets FBC 7th Ed. (2020)?
ASTM D638-96 Tensile Test after G26 test exposure, with samples tested showing an average of 4.98% difference in Yield Strength between exposed and unexposed samples	ASTM D638-03, with required results of change in Yield Strength of < 10%. The '03 version compared to the '96 version has identical prescribed dog-bone geometry and tolerances, environmental pretreat and test conditions, and test speed per Table 1 of standard.	Yes

Based on these assessments, the testing performed in ETC-97-264-4091.0 is compliant with FBC 7th Edition (2020) and Miami-Dade Checklist #0445 for the standards tested.

An additional standard that is referenced in the FBC 7th Edition (2020) Section 2615.2 Approved Plastic definition, but not in the Checklist #0445, is impact testing on the samples per ASTM D256-03 (pendulum test) after the UV exposure. This testing is not prescribed in the Checklist #0445 because it is felt that it does not significantly help to characterize performance changes in the samples for non-exposed vs. exposed samples, and that the ASTM D638 testing is more meaningful in this regard. As such, ASTM D256 testing was not performed in ETC-97-264-4091.0. However, an impact drop test per ASTM D4226 is performed after 6, 12, and 24 month weathering per AAMA 303, with more stringent AAMA requirements of 5340 J/m min. brittle impact results, as a prerequisite for member participation in the AAMA Fenestration Exterior Thermoplastic Profile Certification program. Because of this broad array of ongoing impact testing by AAMA members, after varying levels of exterior weathering, it is my determination that the ASTM D4226 testing should be considered under FBC 7th Edition (2020) Sect. 104.11 as an Approved alternative to the D256 testing requirement.

If you have further questions or for more discussion, please feel free to contact me at 941-380-1574.

Best Regards,

9/28/2020
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