

Scope of Work

PHASE II: Experimental Evaluation of Pressure Equalization Factors and Wind Resistance of Vinyl Siding Systems Using a Multi-Chamber Pressure Test Bed

The State of Florida Department of Business and Professional Regulation

Florida Building Commission

And

University of Florida, Engineering School of Sustainable Infrastructure and Environment (ESSIE)

Project Leader: David O. Prevatt, PhD Civil Eng., F. ASCE, Univ. of Florida

1. Introduction

The University of Florida, Engineering School of Sustainable Infrastructure and Environment (ESSIE) shall conduct experimental studies using the vinyl siding pressure test chamber that has been built in Project Phase I. Identifying the effects of spatio-temporal varying loads on the pressure distributions on vinyl siding wall systems.

The project will be led by David O. Prevatt, Associate Professor of Civil Engineering, in collaboration with Dr. David Roueche, Assistant Professor, from Auburn University (sub-contract).

Despite recent ongoing research by IBHS, UF and others (as documented in Phase 1 Final Report) there is no consensus on the appropriate laboratory-based method to determine the pressure equalization factor (PEF) for discontinuous cladding systems, including vinyl siding. ~~There remains continuing debate whether the PEF should be 0.36, 0.50 or some other value.~~

This proposed Phase II testing herein will explore a method that will reproduce the spatial pressure distribution and simultaneous temporal changes occurring on real buildings in a reproducible laboratory-based manner. By matching the pressure variation to reality, there would be reasonable assurance ~~the pressure measured would yield correct PEF values.~~ The research is a fundamental step in ~~further understanding establishing whether or not the current uniform, single chamber static pressure test approach to obtain~~ the PEF value ~~used withfor~~ ASTM D3679 ~~and other standards is appropriate.~~

2. Tasks

- a. The Contractor shall invite interested parties from IBHS, the University of Western Ontario and the Vinyl Siding Institute and standard testing agencies to participate in an Advisory Panel for this project. The advisory panel shall meet by teleconference ~~no more than as necessary and at least~~ three or four occasions and they would be invited to view the experimental testing as they see fit at the University of Florida.

Comment [MD1]: This is not true, PEF was agreed upon as part of the ASTM consensus building process which is arguably to leading forum of expert knowledge on this topic.

Comment [MD2]: This seems like a conclusion ahead of research.

- b. The Contractor and Advisory Panel shall develop performance characteristics of the multi-chamber pressure test bed, including vinyl siding installation methods, peak pressures characteristics, and pressure frequency response based on existing research.
- c. The Contractor shall share with the Advisory Group, the reviewed literature on wind resistance testing and pressure-equalization factors for vinyl siding systems from Phase 1 and seek their input to derive a pressure test protocol that represents typical wind pressure distributions (wind pressure distribution from cornering winds on side and leeward building surfaces).
- d. The Contractor shall conduct tests on a vinyl siding system and shall review product approval standards and specifications and identify the wind resistance (per ASTM D5206 test protocol) for each system, which will be used as a baseline for current tests. The Contractor shall document the geometry of the system and its installation into the test bed. Installation will be done in conjunction with guidance from the Advisory Panel
- e. The Contractor shall subject the vinyl siding system to a series of pressure tests for simulating the wind loading characteristics identified in full-scale wind tunnel testing at IBHS. By generating equivalent spatial pressure distributions, the experiment will measure the pressure equalization factors appropriate for wind load design and evaluate their compatibility to the PEFs derived in the IBHS full-scale wind tunnel tests for cornering winds.
- f. The Contractor shall summarize the experimental results representing wind loading on in wall separation zones of the installed vinyl siding system, including a record of the PEFs, and chamber pressures. The results will be summarized in an enveloped table of pressure equalization factors and pressure distributions.

3. Method of Payment

A purchase order will be issued to the University of Florida/ Engineering School of Sustainable Infrastructure and Environment (ESSIE). This project shall start on the date of execution of the purchase order and end at midnight on June 30, 2020. The purchase order shall not exceed \$126,593, and shall cover all costs for labor, materials, and overhead. Payment will be made for the study after the Contract Manager, Program Manager and the Commission's Structural Technical Advisory Committee (TAC) have approved the final report.

4. Deliverables

- a. An interim report shall be prepared and delivered no later than March 17, 2020. The interim report shall address each task as enumerated above and shall summarize the project progress to date. In addition, the Interim report shall summarize the results of

tasks “a and b” and shall describe the tests that have been executed at the time, the parameters that have been varied, as well as the failure mechanisms found. The report shall be presented to the ~~Advisory Panel for comment and then to the~~ Commission’s Structural Technical Advisory Committee (TAC) at a time agreed to by the Contractor and the Department’s Program Manager.

- b. A final report shall be prepared and delivered no later than June 19, 2020 comprising of the information in the interim report augmented by TAC feedback and including test results. ~~Pressure equalization factors recommended for the two systems, the failure mechanisms observed (if any) and recommendations for a future Product Approval standard for vinyl siding systems.~~ In addition, the final report shall be presented to the Commission’s Structural Technical Advisory Committees at a time agreed to by the Contractor and Department’s Program Manager.

Comment [MD3]: This is a conclusion and standard testing proposal.

5. Performance Measures and Financial Consequences

ESSIE is solely and uniquely responsible for the satisfactory performance of the tasks and completion of the deliverables as described in this Scope of work.

Failure to complete the task and deliverables in the time and manner specified in Sections 3 and 5 shall result in a non-payment of invoice until corrective action is completed as prescribed by the program manager or contract manager.

6. Contract Manager and Program Manager

The Contract Manager for this purchase order is Barbara Bryant and the Program Manager is Mo Madani.

