

## Loss Mitigation Grant Program Wind Resistive Device (WRD) Product Evaluation

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The product as described herein has been evaluated by the Department of Commerce and Consumer Affairs (DCCA) for compliance with the technical requirements for wind resistive devices installed in single or multi-family residential dwellings. Installation costs of approved products are partially reimbursable under the provisions of the Loss Mitigation Grant Program. The results of the product evaluation are presented in the following report.

### 1.0 Product Information

#### 1.1 Product Name:

Plywood Attachment System

#### 1.2 Description:

Plywood Attachment System is a 43% glass filled nylon clamping device that mounts to the interior of a window frame and is designed to lock in place a piece of plywood which will provide impact protection to the opening.

#### 1.3 Category:

Submitted for evaluation as a WRD option 3- Exterior opening protection

#### 1.4 Submitted By:

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## 2.0 Product Evaluation

### 2.1 Wind Loads:

#### a. Static Pressure:

The Plywood Attachment System was tested per ASTM E330-02, "Test Method for structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference." This test was conducted on a 48" wide x 62" high opening, using 3/4" thick plywood. Although the results are dependant upon the size and thickness of the plywood used as opening protection, they do indicate that the clamps are an effective securing mechanism for this application. The results of these tests and allowable loads are given in table 1.

Table 1. Static Pressure Test Results

Test Method	Test Conditions	WRD Requirements	Test Conclusion
Static Load Test	+50.0 psf, -50.0 psf	IBC Section 1714.5.2	PASS

#### b. Cyclic Wind Pressure Loading:

Following large missile impact testing, units were tested under ASTM E1886-99, "Standard test method for performance of exterior windows, curtain walls, doors and storm shutters impacted by missile and exposed to cyclic pressure differentials." The results of the test are included in table 2.

Table 2. Cyclic Loading Test Results

Test Method	Test Conditions	Deflections	Test Conclusion
Cyclic Load Test	+50.0 psf, -50.0 psf	+1.25/-1.5 in	PASS

Again these test results are dependant upon the size and thickness of plywood used. The recorded deflections may be in excess of the maximum possible glass separation using this system.

### 2.2 Impact Resistance:

The Plywood Attachment System was tested per ASTM E1996 missile impact D criteria, and the panel passed per ASTM E1996 requirements.

Table 3. Impact Test Results

Test Method	Test Conditions	WRD Requirements	Test Conclusion
Impact Test	Missile Type D	Missile Type C	PASS

This indicates that the attachment system is capable of withstanding the required impact loads for WRD certification, if plywood of appropriate thickness and size is used as opening protection.

### 2.3 Installation:

A detailed set of installation drawings was not provided for this product. Some drawings of the test assembly are provided with the test report, and basic installation instructions are available on the manufactures website. However, neither of these documents specifies

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a minimum separation from the glass of the opening being protected, and both tend to indicate a minimal separation that was exceeded during test conditions. Furthermore, no specification of product applicability for opening sizes greater than that of the test specimen are provided.

**2.4 Substantiating Data:**

- a. Test Report Prepared by Hurricane Test Laboratory, LLC dated 4/14/06, Report No. G425-0408-06, signed and sealed by Vinu J. Abraham, P.E. (FL License No. 53820)

**3.0 Findings**

Insufficient test data has been submitted at this time to approve the Plywood Attachment System. Therefore, acceptance as a WRD under the requirements of the loss mitigation grant program is conditional. A detailed set of installation drawings is required for product approval. In particular these drawings must indicate the minimum required glass separation from the plywood. The Plywood Attachment System has been conditionally approved as an acceptable WRD, subject to the following limitations:

**3.1 Limitations:**

- a. Plywood thickness shall be 3/4" minimum.
- b. Detailed installation instructions must be submitted for re-review or incorporated in plans prepared by a Hawaii-licensed structural engineer.
- c. No details or test results have been provided for single wall construction common to Hawaii. Additional data must be submitted for WRD approved use on this construction type.



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