REPORT OF

PRODUCT TESTED TO

ASTM INTERNATIONAL

**TEST METHODS OF CONDUCTING STRENGTH TESTS
OF PANELS FOR BUILDING CONSTRUCTION
DESIGNATION: ASTM E 72 – 02**

AND

**PRACTICE FOR STATIC LOAD TEST FOR SHEAR RESISTANCE OF
FRAMED WALLS FOR BUILDINGS
DESIGNATION: ASTM E 564 – 00**

CONDUCTED ON

THE REZIST-IT SYSTEM

FOR

**GLOBAL PACIFIC TECHNOLOGY, LLC
20 VALLEY VIEW DRIVE
ORINDA, CA 94563**

REPORT PREPARED BY

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PREFACE

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INTRODUCTION

Intertek Testing Services NA Ltd. (Intertek) has conducted a strength test program for Global Pacific Technology, LLC (Global) on a structural wall product. Transverse and compression load tests were carried out in general accordance with ASTM Internationals' *Test Methods of Conducting Strength Tests of Panels for Building Construction*, designation E 72 - 02 (referred to as E 72 in this report). In addition, shear resistance tests were performed in general accordance with ASTM Internationals' *Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*, designation E 564 - 00 (referred to as E 564 in this report).

SAMPLE SELECTION

Intertek representative Robin L. Zevotek witnessed the manufacture and randomly selected a series of structural panels on July 20 and 21, 2004. The panels were manufactured at the W.A. Brown & Son production facility located at 209 Long Meadow Drive, Salisbury, North Carolina.

The sampled panels were identified as components of the ReZist-It system and measured 2 and 4 ft in width by 10 ft in length by 4 ½ in. Each panel consisted of a metal frame, interior and exterior facings, and core insulation. Detailed drawings of the ReZist-It system and system connections are included in Appendix A. A general description of the ReZist-It system tested was summarized as follows:

- Metal Frame: 16-gauge steel channel profile with a G 60 galvanized finish. The metal frame consisted of a 1-¾ in. wide by 1 ¾ in. deep channel to receive the connection system.
- Interior Facing: ½ in. regular gypsum board.
- Exterior Facing: 5/16 in. cement fiberboard.
- Core Insulation: 2.3 lbs class 1 fire-rated urethane foam filling the enclosed cavity.
- System Connection: The panels were fastened together using galvanized steel components of the UniStrut® system. The UniStrut® components included a 1 5/8 in.^{2} by 12-gauge channel with elongated holes at 2 in. on centre, spring-loaded channel nut, and a 1 5/8 in. square by 3/16 in. thick plate washer. These components were used in conjunction with standard ½ in. unified coarse threaded steel rod (tie rods) and nuts. The UniStrut® channels were set inside the top and bottom receiving channels of the panels and fastened on both sides with # 14 x 1 in. pan head tek screws at 8 in. on centre and 1 in. from the base. The tie rods were suspended inside the vertical receiving channels of the panel, and tensioned to a torque of 40 ft-lbs.
- Structure Connection: The tie rods were secured through the test frame at 24 or 48 in. on centre, depending on the width of the panel.

TEST PROCEDURE

1. GENERAL

This testing evaluation was carried out in accordance with E 72 and E 564, and the supplementary test specifications and methods described herein. The tested system configurations were designed to simulate the product installed in the field to the manufacturers' specifications. Evaluation of the system connection to the structure was not within the scope of this test program.

2. CONDITIONING

The test panels were held at room temperature before testing for at least 7 days at a temperature of 23 ± 5°C and a relative humidity of 30 to 70 %.

3. TRANSVERSE LOAD TEST

Four test systems of varying configuration were loaded in increments to failure as per 72-02. A wooden test frame was constructed using 2-inch by 6-inch solid beams, and then fastened and sealed to the floor. The inside length and width of the frame was made approximately ½-inch greater than the length and width of the test system to allow for free downward movement of the panels during testing. The system was supported at each end on 4-inch diameter steel rollers fitted with 4-inch wide bearing plates. During testing, uniformly distributed loading was developed by sealing the topside of both the test system and frame, and then reducing the air pressure under the panels. Deflection readings were recorded for each test to establish deformation and set characteristics. The test systems were loaded at a rate to achieve the incremental loads between 10 seconds and 5 minutes. The incremental test loads were held for five minutes before the load was released.

4. COMPRESSIVE LOAD TEST

Three test systems of varying configuration were loaded in increments to failure in accordance with E 72-02. A load was applied to the test systems uniformly along a line parallel to the inside face, and one-third the thickness of the product from the inside face. The axial force was created using a hydraulic ram assembly. To measure compression, four brackets supporting four metal rods were attached to the system near the upper end, each approximately 12-inch from each vertical edge. Four corresponding brackets were also attached to the system near the lower end of the panels in the same orientation. A deflection gauge was then mounted on each of the lower brackets to monitor movement of the rod, and hence shortening of the specimen. To measure lateral movement, two deflection gauges were positioned at midheight, each approximately 12-inch from each edge. Deflection readings were recorded for each test to establish deformation and set characteristics for compressive and lateral movement. The test systems were loaded at a rate to achieve the incremental loads between 10 seconds and 5 minutes. The incremental test loads were held for five minutes before the load was released.

5. SHEAR RESISTANCE

Three test systems of varying configuration were loaded in increments to failure as per E 564. Each test system in turn was installed and fastened to a steel reaction frame. Deflection gauges were then mounted in appropriate locations in order to monitor base slip, uplift, top plate horizontal displacement, and vertical displacement. This would enable deformation and set characteristics to be determined for the various forms of movement. Racking loads were applied parallel to and at the top of the test system, in the central plane of the wall system using a hydraulic ram assembly. The racking loads were accomplished using a hydraulic ram assembly and monitored using a load cell. The test systems were loaded at a rate of 100 lbs/s to achieve the incremental loads. The incremental test loads were held for at least one minute before the load was released.

TEST RESULTS

The ReZist-It System test results are summarized in Table 1 below. A more comprehensive set of test data is included in the Appendices B to D.

Table 1. Strength Test Results of the ReZist-It system

Appendix	Property	System Configuration	Test Result[1]
B	Transverse Load	1A – One 4 ft by 10 ft panel (cement fiberboard in tension) • Apparent Bending Stiffness, lbs-ft² • Maximum Bending Moment, lbs/ft-width	 1373 124850
		2A – One 4 ft by 10 ft panel (cement fiberboard in tension) • Apparent Bending Stiffness, lbs-ft² • Maximum Bending Moment, lbs/ft-width	 1331 122125
		1B – One 4 ft by 10 ft panel (gypsum board in tension) • Apparent Bending Stiffness, lbs-ft² • Maximum Bending Moment, lbs/ft-width	 1543 91830
		2B – One 4 ft by 10 ft panel (gypsum board in tension) • Apparent Bending Stiffness, lbs-ft² • Maximum Bending Moment, lbs/ft-width	 1574 91620
C	Compressive Load	1A – One 4 ft by 10 ft panel (cement fiberboard in tension) • Compressive Strength, lbs/ft-width	 8325
		2A – One 4 ft by 10 ft panel (cement fiberboard in tension) • Compressive Strength, lbs/ft-width	 10252
		1B – Two 2 ft by 10 ft panels (cement fiberboard in tension) • Compressive Strength, lbs/ft-width	 12199
D	Shear Resistance	1A – One 2 ft by 10 ft panel • Ultimate Shear Strength, lbs/ft-width • Global Shear Stiffness, lbs/in.	 6089 767
		1C – Two 2 ft by 10 ft panels • Ultimate Shear Strength, lbs/ft-width • Global Shear Stiffness, lbs/in.	 7991 841
		1B – Two 4 ft by 10 ft panels • Ultimate Shear Strength, lbs/ft-width • Global Shear Stiffness, lbs/in.	 9398 805

[1]No safety factor applied

DISCUSSION

For use in design, Intertek would recommend a that minimum safety factor of 2 ½ be applied to the ultimate loads in Table 1, in accordance with the International Building Code (IBC 2003). As wall assemblies are usually only exposed to short-term loading, it is our opinion that 24-hour loading as per IBC 2003 would not apply.

The technical staff at Global also provided detailed photographs (see Appendix A) of a new profile and forming procedure for the panel steel frame. The new profile provided a greater quantity of steel at the corners of the formed frame. Intertek personnel would therefore conclude that the proposed modification to the steel frame panel would provide equal or greater strength properties as the system that was tested in this program.