

TEST REPORT

No. : GZMR110509115

Date : May 31, 2011

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SWB GLOBAL SOLUTIONS
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The following sample(s) was/ were submitted and identified on behalf of the client as:

Sample Name : SWB COMPDECK
Sample Information : 25MM*140MM BAMBOO AND RECYCLED PLASTIC COMPOSITE DECKING
SGS Ref No. : GP110520193, KV-11-04226X, AJD201101934
Test Performed : Selected test(s) as requested by applicant
Date of Receipt : May 18, 2011
Test Period : May 18, 2011 to May 25, 2011

Test result(s) : Please refer to the following page(s)

*****To be continued*****

Signed for and on behalf of
SGS-CSTC Ltd.

May Huo
Engineer

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Test Information:

Sample description: Wood plastic block (see photo)

| No. | Test item | Test method | Test condition | Result |
|-----|--|---|--|------------------------|
| 1 | Tension parallel to L direction | With reference to ASTM D7031-04 Section 5.6, ASTM D4761-05 Section 24~29 and client's requirement | Specimen width: 54mm Specimen thickness: 24mm Testing speed: 1mm/min | 15.9MPa (2306psi) |
| 2 | Flexural strength | ASTM D7031-04 Section 5.5 and ASTM D6109-10 Method A | Specimen: 550×139×24mm Testing speed: 11.3mm/min Span: 380mm | 34.0MPa (4931psi) |
| 3 | Flexural modulus | | | 4320MPa (626560psi) |
| 4 | Compression parallel to L direction | With reference to ASTM D7031-04 Section 5.7, ASTM D4761-05 Section 30~36 and client's requirement | Specimen: 50×24×50mm Testing speed: 2mm/min | 35.8MPa (5192psi) |
| 5 | Compression perpendicular to L direction | With reference to ASTM D7031-04 Section 5.8, ASTM D143-09 Section 12 and client's requirement | Specimen: 50×50×24mm Testing speed: 2mm/min | 41.1MPa (5961psi) |
| 6 | Shear parallel to L direction | With reference to ASTM D7031-04 Section 5.9.1, ASTM D143-09 Section 14 and client's requirement | Shear area: 38×52mm ² Testing speed: 0.6mm/min | 5.97MPa (866psi) |

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| No. | Test item | Test method | Test condition | Result |
|-----|------------------------------------|---|---|--------------------------------------|
| 7 | Shear perpendicular to L direction | With reference to ASTM D7031-04 Section 5.9.2, ASTM D143-09 Section 14 and client's requirement | Shear area: 13×50mm ² Testing speed: 0.6mm/min | 6.03MPa (875psi) |
| 8 | Specific gravity | ASTM D7031-04 Section 5.14 and ASTM D792-08 Method B | Absolute alcohol, 23±0.5°C | 1.416 |
| 9 | Static coefficients of friction | With reference to ASTM D7031-04 Section 5.16 and ASTM D2394-05 ^{ε1} Section 33~37 | Specimen: 550×140×24mm Sliding unit weight: 12.2kg Contact area: 102×114mm Testing speed: 1.27mm/min | 0.40 (see note 1) |
| | Sliding coefficients of friction | | Specimen: 550×140×24mm Sliding unit weight: 12.2kg Contact area: 102×114mm Testing speed: 51mm/min | 0.20 (see note 1) |
| 10 | Taber abrasion | With reference to ASTM D4060-10 and client's requirement | Wheel: CS-10 Load: 1000g/wheel (total 2000g) | Wear Index (1000•mg/cycle): 90 |
| 11 | Moisture content | ASTM D7031-04 Section 5.15 and ASTM D4442-07 Method A | Specimen: 150×140×23mm Drying condition: 103±2°C, 30h | 0.16% (see note 2) |
| 12 | Water absorption | ASTM D7031-04 Section 5.19 and ASTM D1037-06a Section 23 Method B | Specimen: 152×140×23mm Submersion condition: 20±2°C, 24h, vertical submersion | 0.26% (see note 3) |

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| No. | Test item | Test method | Test condition | Result |
|-----|-------------------------------------|--|---|---------------------------|
| 13 | Flexural strength after freeze-thaw | ASTM D7031-04 Section 5.5, Section 5.20 and ASTM D6109-10 Method A | Freeze-thaw condition: ① underwater, 24h, ② -29°C, 24h, ③ 23±2°C, 24h ①②③ as 1 cycle, total 3 cycles. Specimen: 550×139×24mm Testing speed: 11.3mm/min Span: 380mm | 32.0MPa (4641psi) |
| | Retention rate of flexural strength | | | 94.1% (see note 4) |
| 14 | Flexural modulus after freeze-thaw | | | 4150MPa (601910psi) |
| | Retention rate of flexural modulus | | | 96.1% (see note 5) |
| 15 | Mechanical fastener holding test | With reference to ASTM D7031-04 Section 5.11 and ASTM D1037-06a Section 14 | Specimen thickness: 23mm Testing speed: 1.5mm/min Diameter of steel nail: 3.0mm | 700N (see note 6) |
| 16 | Impact resistance | With reference to ASTM D7031-04 Section 5.12, ASTM D4495-00(2005) and client's requirement | Specimen thickness: mm Mass of the falling weight: kg | Mean failure energy: J |

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17. Coefficient of linear thermal expansion

Test Equipment:

| Name | Brand | Model |
|---------------------------|-------|-------|
| Thermomechanical Analyzer | TA | Q-400 |

Test Method:

Ref. ASTM D696 - 08

Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between
-30°C and 30°C With a Vitreous Silica Dilatometer.

Test Condition:

Test temperature range : Ramp 10°C/min from -30°C to 30°C

Purge gas : Nitrogen (N₂), Purity 99.995%, Flow rate 50ml/min.

Measurement Direction: Length

Test Result:

| Test Item | Test Result |
|---|------------------------------------|
| Coefficient of linear thermal expansion(1/°C) | -30°C~30°C: 37.92×10^{-6} |

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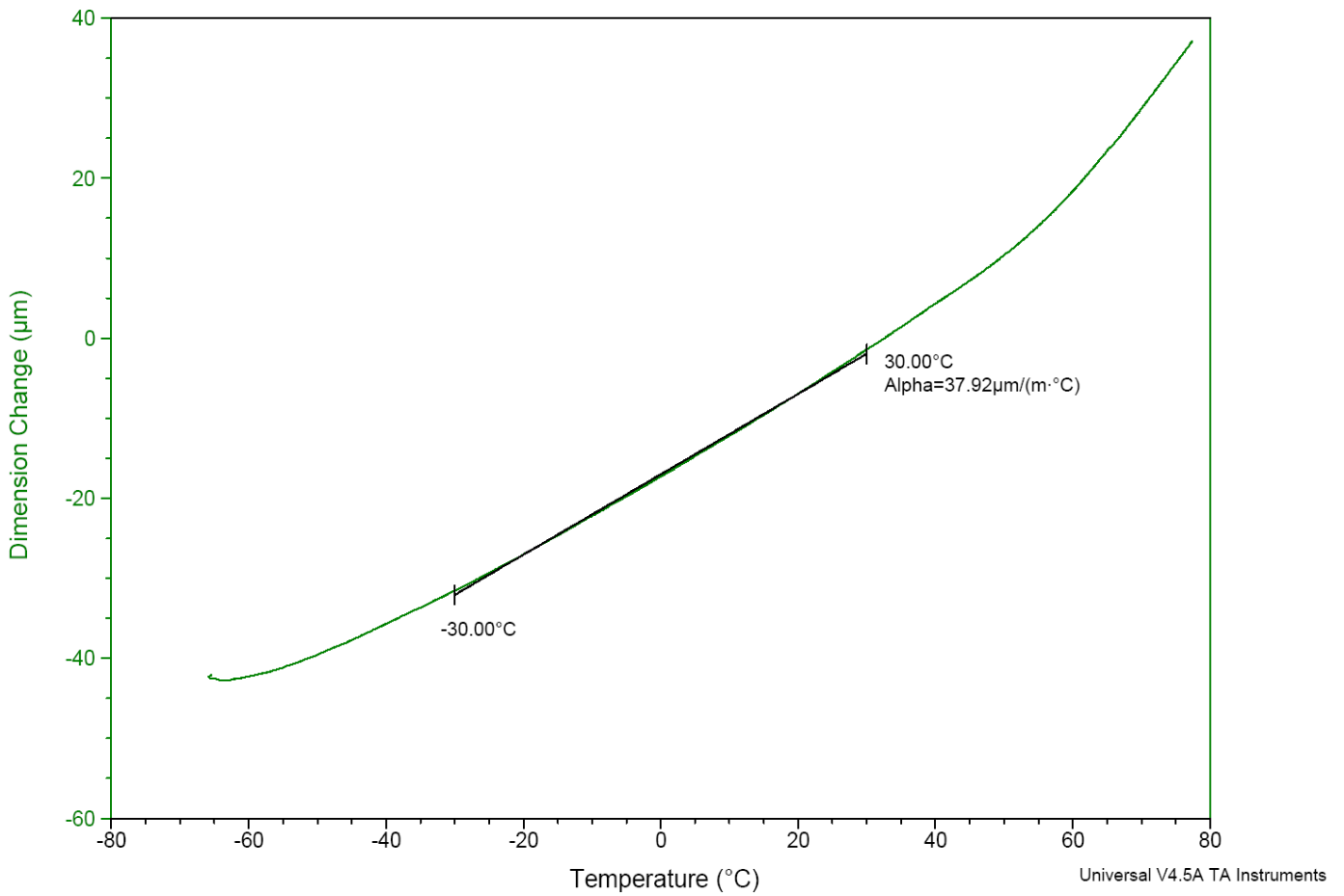
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Test Spectrum:

Sample: KV-11-04226
Size: 13.2505 mm

TMA

File: C:\TA\Data\TMA\2011.05\KV-11-04226.001
Operator: Mina Hsu
Run Date: 17-May-2011 14:28
Instrument: TMA Q400 V7.4 Build 93



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18. Flame-spread index

Test Requested:

To determine the flame spread index (FSI) and smoke-developed index (SDI) of the sample's surface burning characteristics when it is subjected to the conditions of specified in ASTM E84:2010b "Standard Test Method for Surface Burning Characteristics of Building Materials"

I. TEST CONDUCTED

This test was conducted in accordance with ASTM E84:2010b Standard Test Method for Surface Burning Characteristics of Building Materials.

II. INTRODUCTION

The method, designated as ASTM E 84:2010b, "Standard Method of Test for Surface Burning Characteristics of Building Materials", is designed to determine the relative surface burning characteristics of materials under specific test conditions. Results are expressed in terms of flame spread index (FSI) and smoke developed index (SDI).

The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements.

III. TEST PROCEDURE

The tunnel is preheated to 150 °F, as measured by the floor-embedded thermocouple located 23.25 feet downstream of the burner ports, and allowed to cool to 105 °F, as measured by the floor-embedded thermocouple located 13 feet from the burners. At this time the tunnel lid is raised and the test sample is placed along the ledges of the tunnel so as to form a continuous ceiling 24 feet long, 12 inches above the floor. The lid is then lowered into place.

Upon ignition of the gas burners, the flame spread distance is observed and recorded every 15 seconds. Flame spread distance versus time is plotted ignoring any flame front recessions. If the area under the curve (A) is less than or equal to 97.5 min-ft, $FSI = 0.515 \cdot A$; if greater, $FSI = 4900 / (195 - A)$. Smoke developed is determined by comparing the area under the obscuration curve for the test sample to that of inorganic reinforced cement board and red oak, arbitrarily established as 0 and 100, respectively.

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IV. CONDITIONING

Prior to testing, the sample was conditioned,

To a constant weight at a temperature of $73.4 \pm 5^\circ\text{F}$ ($23 \pm 2.8^\circ\text{C}$) and at a relative humidity of $50 \pm 5\%$

V. SAMPLE DETAILS

The details of the tested specimen given below have been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

| | |
|------------|--------------------------------------|
| Material | Bamboo and Plastic Composite Decking |
| Color | Light Salmon |
| Density | Approximate 31.3kg/m^2 |
| Thickness* | 23mm |

*Measured by Laboratory

Exposed face:

One face of Specimen

MOUNTING METHODS:

The metal rods, 6.3mm diameter as supports spanned the width of the tunnel and was placed approximately 2in. (51mm) from each end of each panel and approximately 2-ft intervals starting with the fire end of each panel.

The specimen consisted of 28 pieces of 140mm wide \times 1050mm long \times 23 nominal mm thickness and all sections jointed end-to-end.

VI. TEST RESULTS

| | |
|-----|-----|
| FSI | SDI |
| 25 | 400 |

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RATING:

The National Fire Protection Association Life Safety Code 101, Chapter 10, Section 10.2.3 "Interior Wall and Ceiling Finish Classification", has a means of classifying materials with respect to Flame Spread and Smoke Developed when tested in accordance with NFPA 255, ASTM E84, UL 723 "Method of Test of Surface Burning Characteristics of Building Materials".

International Building Code, Chapter 8, Interior Finishes, Section 803 "Wall and Ceiling Finishes", was classified in accordance with ASTM E 84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

The classifications are as follows:

| | Class A | Class B | Class C |
|-----------------------|---------|---------|---------|
| Flame Spread Index | 0-25 | 26-75 | 76-200 |
| Smoke-developed Index | 0-450 | 0-450 | 0-450 |

Since the tested sample received a Flame Spread Index 25 and a Smoke Developed 400, it would meet the requirement of Class A interior Wall & Ceiling Finish Category.

OBSERVATIONS

| | |
|------------------------|-----|
| Time to ignition (sec) | 16 |
| Time to Max. FS (sec) | 437 |
| Maximum FS (feet) | 7 |

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GRAPHICAL RESULTS:

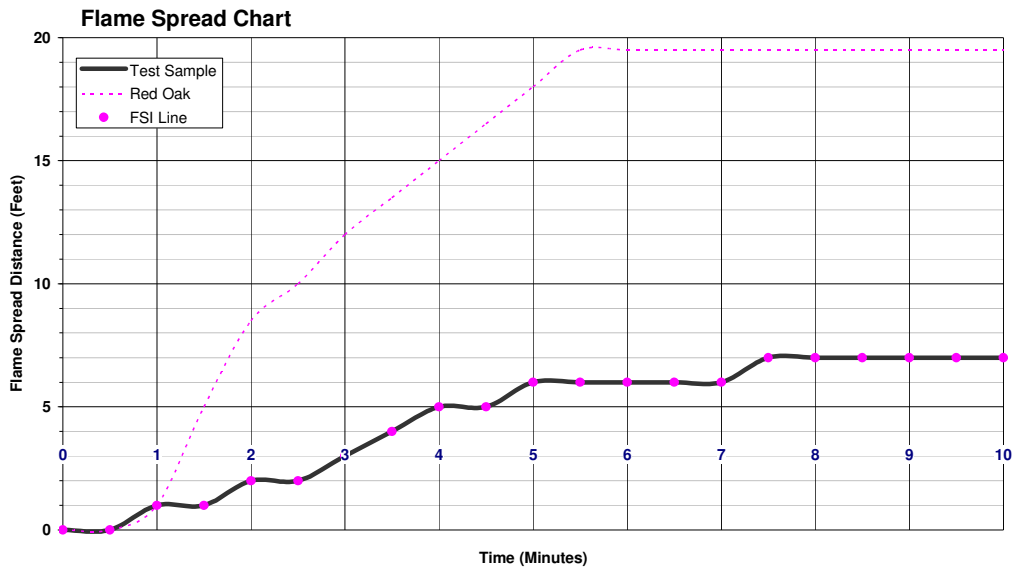


Figure 1 Flame Spread Chart

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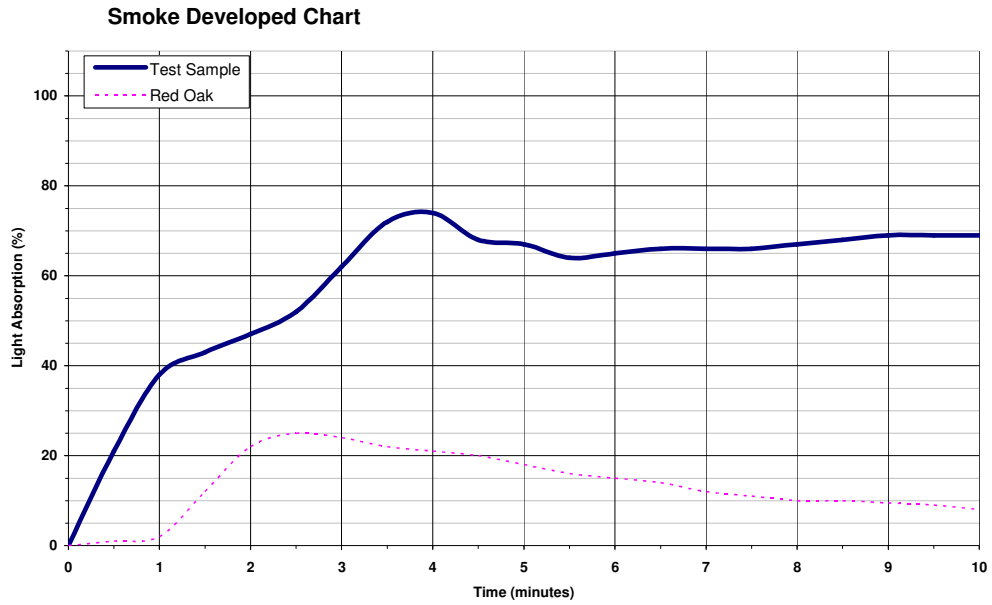


Figure 2 Smoke Developed Chart

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WARNING:

The use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support.

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

The test results relate only to the specimens of the product in the form in which were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product, which is supplied or used, is fully represented by the specimens, which were tested.

Note: 1. The material of contact surface was supplied by SGS.

2. Moisture content, % = $(\text{Weight before drying} - \text{Weight after drying}) / \text{Weight after drying} \times 100$.

3. Water absorption, % = $(\text{Weight after submersion} - \text{Original weight}) / \text{Original weight} \times 100$.

4. Retention rate of flexural strength, % = $\text{Flexural strength after freeze-thaw} / \text{Flexural strength as received} \times 100$.

5. Retention rate of flexural modulus, % = $\text{Flexural modulus after freeze-thaw} / \text{Flexural modulus as received} \times 100$.

6. The steel nail was supplied by SGS.

7. The test item 17 and 18 were carried out by SGS laboratory.

8. 1MPa = 145.0377psi.

*****To be continued*****

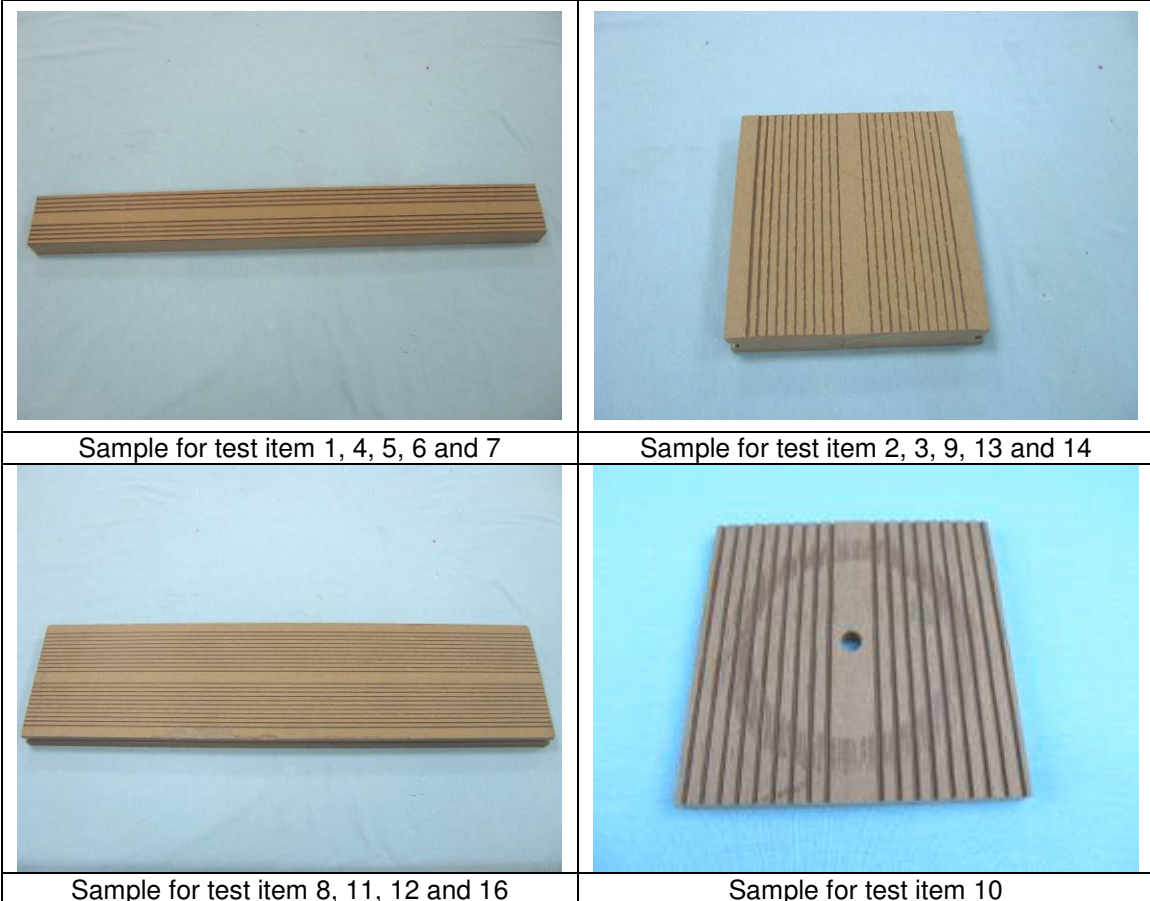
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Photo:







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| | |
|--|---|
|  |  |
| <p>Sample for test item 15</p> | <p>Sample for test item 18</p> |
|  |  |
| <p>Contact surface: Pigskin (supplied by SGS)</p> | <p>Steel nail (supplied by SGS)</p> |

*****End of report*****