CE-CPD REPORT

Of Conformity With European Directives 89/106/EEC

FORERUNNER BUILDING PRODUCTS OF TAISHAN LTD.
DRAGONHILL INDUSTRIAL DISTRICT, DUANFEN,
TAISHAN CITY, GUANGDONG, CHINA.

TEST REPORT
No. CPD/0912TS6601

BS EN 12467:2004; BS EN 1604:1996

EN 12664:2001; ISO 1182:2002; EN 13501-1:2007

TEST REPORT

No.CPD/0912TS6601

BS EN 12467:2004; BS EN 1604:1996
EN 12664:2001; ISO 1182:2002; EN 13501-1:2007

Applicant: FORERUNNER BUILDING PRODUCTS OF TAISHAN LTD.

Address: DRAGONHILL INDUSTRIAL DISTRICT, DUANFEN, TAISHAN CITY, GUANGDONG, CHINA.

Product Description: DRAGONBOARD® A KIND OF MGO CONSTRUCTION PANEL

Type and Model: 3mm; 4mm; 5mm; 6mm; 7mm; 8mm; 9mm; 10mm; 11mm
12mm; 13mm; 14mm; 15mm; 16mm; 17mm; 18mm; 19mm
20mm; 21mm; 22mm; 23mm; 24mm; 25mm

Test Type: 12 mm

Difference Between
Models: Other models are different from 12 mm in thickness.

Standard: BS EN 12467:2004; BS EN 1604:1996
EN 12664:2001; ISO 1182:2002; EN 13501-1:2007

Test Data: Dec.01,2009~Dec.28,2009

Issuance Date: Dec.28,2009

Test Result: Compliance with BS EN 12467:2004; BS EN 1604:1996
EN 12664:2001; ISO 1182:2002; EN 13501-1:2007

Tested By: Aleck Wei -Engineer

Standard:

BS EN 12467:2004	Fibre-cement flat sheets — Product specification and test Methods.
BS EN 1604:1996	Thermal Insulating Products for Building Applications - Determination of Dimensional Stability under Specified Temperature and Humidity Conditions-Incorporating Corrigendum and Amendment A1:2006.
EN 12664:2001	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance.
ISO 1182:2002	Reaction to fire tests for building products. Non-combustibility test
EN 13501-1:2007	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire test.

Test Report Content

This test report consists of:
Main report

General information:
The test results presented in this report relate only to the object tested and information given from applicant or manufacturer.
Test case verdicts:
P = Pass, F = Fail, N/A = Not applicable. Placed in the column marked "Verdict".
This is a Computer generated Test Report.
All other information in "Regular" or "Regular and bold" font style is a part of this "Test Report Form".

1.1	**Scope**		
	This document specifies the technical requirements and establishes methods of inspection and test as well as acceptance conditions for fibre-cement flat sheets, siding shingles and planks (referred to as sheets later in this document) for one or more of the following uses:	-	-
	Internal wall and ceiling finishes	-	-
	external wall and ceiling finishes.		
3	**Terms and definitions**		
3.1	**Acceptance test**		
	test to establish whether a batch of sheets conforms to a specification. The test is performed on samples drawn either from continuous production or from a consignment (ISO 390)		
3.2	**type test**	-	-
	Test carried out to demonstrate conformity with the requirements of this document or for the approval of a new product and/or when a fundamental change is made in formulation and/or method of manufacture, the effects of which cannot be predicted on the basis of previous experience. The test is performed on the as delivered product, but is not required for each production batch.		pass
3.3	**acceptable quality level (AQL)**	-	-
	quality level which in a sampling plan corresponds to a specified, relatively high probability of acceptance. It is the maximum percent defective (or maximum number of defects per 100 units) that for purposes of sampling inspection can be considered satisfactory as a process average	A sampling scheme with an AQL of 4% means that batches containing up to 4% defective items have a high probability of acceptance.	pass
3.4	**apparent density**	-	-
	density based on the external dimensions of the sample to calculate the volume. This is an average density of material and pores.	1100±100 Kg/m3	pass
3.5	**as-delivered**	-	-

	same condition as the producer intends to supply the product after completing all aspects of the process including maturing and, when appropriate, painting	-	-
3.6	**upper face**	-	-
	face normally exposed		Pass
3.7	**under face**	-	-
	reverse of upper face	-	-
3.8	**textured sheets**	-	-
	sheets which have a relief pattern embossed or applied as a coating on their upper face before delivery.		Pass
4	**Symbols and abbreviations**		
5	**Requirements**		
5.1	**General**		
5.1.1	**Composition**		
	Sheets shall consist essentially of cement or a calcium silicate formed by a chemical reaction of a siliceous and a calcareous material, reinforced by fibres. The cement shall comply with EN 197-1 or with technical specifications relevant in the country of use.		Pass
	Type AT (Asbestos Technology) for sheets the formulation of which contains chrysotile asbestos,		-
	continuous strands or tapes;		-
	nets or webs.		-
5.1.2	**Appearance and finish**		-
	The exposed face of the sheets can be with or without texture. The sheets can be coloured or left in their natural colour. The sheets can also receive adherent coloured or uncoloured coatings on their surface. Variations of the surface appearance which do not impair the fitness for purpose of the sheets are permitted.		Pass
5.2	**Classification**		
5.2.2	**Category A**	WIDTH 600 MM, THICKNESS 12 MM CLASS 1, CATEGORY A REACTION TO FIRE A1	Pass

	Sheets which are intended for applications where they may be subjected to heat, high moisture and severe frost.		
5.2.3	**Category B**		N/A
	Sheets which are intended for applications where they may be subjected to heat, moisture and occasional frost, e.g. where they are either protected from or not subjected to severe weathering conditions.		
5.2.4	**Category C**		N/A
	Sheets which are intended for internal applications, where they may be subjected to heat and moisture, but not to frost.		
5.2.5	**Category D**		N/A
	Sheets for rigid underlayer applications.		
5.2.6	**Groups of sizes**		N/A
5.2.6.1	**Small size sheets**	-	-
	Sheets for which the method of installation includes horizontal overlap. Their dimensions are generally such that their area is < 0,4 m² and have a length/width relation δ 3.		Pass
5.2.6.2	**Large size sheets**		-
	Sheets which do not correspond to indicators for small size sheets. Large sheets may be declared as "small size sheets" provided tolerances for small size sheets apply and are specified in the manufacturer's literature.		Pass
5.3	**Dimensions and tolerances**	-	-
5.3.1	**General**	-	-
5.3.1	**General**	-	-
	There are two levels of tolerances for length, width, straightness and squareness of edges. Sheets shall comply with the requirements of the same level for the four sets of tolerances.	-	-
5.3.2	**Nominal length and width**	-	-

	The manufacturer shall specify the nominal length and width of the sheets. NOTE Sheets are normally available in nominal lengths up to 3 000 mm and nominal width up to 1 250 mm. Greater nominal lengths and widths can be supplied.		-
5.3.3	**Thickness** The manufacturer shall specify the nominal thickness of the sheets. For non textured sheets the nominal thickness refers to the average thickness. For textured sheets the nominal thickness refers to the maximum thickness.		Pass
5.3.4	**Tolerances on nominal dimensions** 1		Pass
5.3.4.1	**Tolerances on length and width** Tolerances on length and width shall be in accordance with Table 1, for the appropriate level.		Pass
5.3.4.2	**Tolerances on thickness**	-	-
5.4.3	**Mechanical characteristics – Bending strength**	-	-
	When tested as specified in 7.3.2, the minimum modulus of rupture of the sheets, expressed in megapascals,shall be as specified in Table 6. The *MOR* shall be the average of the values obtained from testing the samples in both directions.		Pass
5.4.4	**Water impermeability for Categories A, B and D**	-	-
	When tested in accordance with 7.3.3, traces of moisture may appear on the under surface of the sheet, but in no instance shall there be any formation of drops of water.		Pass
5.4.5	**Water vapour permeability for Category D**	-	-
	For flat sheets used as rigid underlays, the water vapour resistance value ⌈ shall be determined according to 7.3.4 and shall be specified in the manufacturer's literature. The ⌈ value obtained from the test shall not be higher than the value specified by the manufacturer.		Pass
5.5	**Durability requirements**	-	-

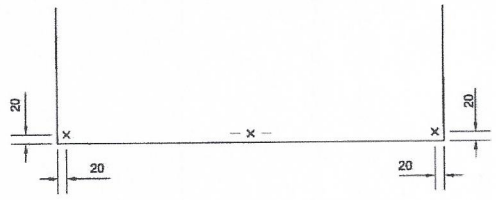
5.5.1	**General**	-	-
	Mechanical and material properties are normally determined for sheets as delivered. The results shall be identified as applying to coated or uncoated material. The performance of the coating in the following tests shall not be considered in the assessment of the product.	-	-
5.5.2	**Freeze-thaw for Categories A, B and D**	-	-
	When tested in accordance with 7.4.1, after 100 freeze-thaw cycles for Category A and 25 cycles for Category B and D, the ratio R_L as defined in 7.4.1.4 shall be not less than 0,75.	-	-
5.5.3	**Heat-rain for Categories A and B**	-	-
	When tested in accordance with 7.4.2, after 50 heat-rain cycles for Category A and 25 cycles for Category B, any visible cracks, delamination, warping and bowing or other defects in the sheets shall not be of such a degree as to affect their performance in use. (a) Water tightness is tested according to 5.4.4. (b) Warping and bowing are visually assessed.		Pass
5.5.4	**Warm water for Categories A, B, C and D**		
	When tested in accordance with 7.3.5, after 56 days at 60 ℃, the ratio R_L as defined in 7.3.5.4 shall be not less than 0,75.	⩾0,75	Pass
5.5.5	**Soak-dry for Categories A, B , C and D**		
	When tested in accordance with 7.3.6, after 50 soak-dry cycles for Category A and 25 cycles for Categories B, C and D the ratio R_L as defined in 7.3.6.4 shall be not less than 0,75.	⩾0,75.	Pass
5.6	**Fire and safety**		
5.6.1	**Reaction to fire**	—	—
	When subject to regulatory requirements, the reaction to fire of the sheets shall be declared in accordance with 7.5.	Non combustible	Pass
5.6.2	**Release of dangerous substances**		
5.7	**Product information**		
6	**Evaluation of conformity**		

6.1	**General**		
6.2	**Type testing**		
6.2.1	**General**		
	Type tests shall be carried out on sheets as delivered. If several formats, sizes and nominal thicknesses are being produced from the same composition and by the same production method, type tests only need to be carried out on the maximum and minimum thickness. If the ratio of the maximum to minimum thickness is greater than three then an additional intermediate thickness shall be tested. All characteristics listed in Table 8 shall be subject to initial type testing, except reaction to fire Class A1 without testing and external fire performance "deemed to satisfy" products. The type tests relevant for eachcategory are listed in Table 7.		Pass
6.2.2	**Initial type testing**		
	Initial type testing shall be performed to demonstrate conformity to this document. Tests previously performed in accordance with the provisions of this document (same product, same characteristic(s), test method, sampling procedure, same attestation of conformity, etc.) may be taken into account. In addition initial type testing shall be performed for the approval of a new product, a fundamental change in formulation or method of manufacture the effects of which cannot be predicted on the basis of previous experience. The results of all type tests shall be recorded and held by the manufacturer for at least 5 years.		pass
6.2.3	**Further type testing**		
	Whenever a change occurs in the fibre-cement sheet design, the raw material or supplier of components, orthe production process, which would change significantly one or more of the characteristics, the type test shall be performed for the appropriate characteristic(s).	-	-

6.3.6	**Non-conforming products**		
6.3	**Factory production control (FPC)**		
6.3.1	**General**		
	The manufacturer shall establish, document and maintain a FPC system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product. A manufacturer who has established a Quality management system according to EN ISO 9001, is considered to satisfy the above requirements. The results of inspections, tests or assessments requiring action shall be recorded, as shall the action(s) be taken.		Pass
6.3.2	**Acceptance tests**	-	-
	The specifications of acceptance tests apply to the product as delivered, but may be carried out at an earlier stage of maturity.		Pass
7	**Test methods**		
7.1	**General**		
	This part of the document details both acceptance and type testing.		
7.2	**Dimensional and geometrical tests**		
7.2.1	**Preparation of specimen**		
	The test shall be performed on whole sheets as delivered and without conditioning.		
7.2.1	**Preparation of specimen**		

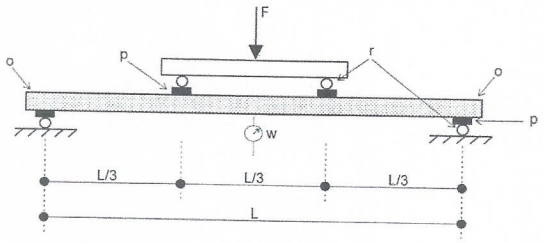
	The test shall be performed on whole sheets as delivered and without conditioning.		
7.2.1.1	**Small size sheets**		
	Five randomly sampled sheets are tested. One sheet is tested.		
7.2.2	**Apparatus**		
7.2.1.2	**Large size sheets**		
7.2.2	**Apparatus**		
7.2.2.1	Smooth, flat, rigid inspection surface of standard quality of dimensions appropriate to the dimensions of the sheets.	-	-
	Two metal rules shall be fixed at right angles along adjacent edges of the inspection surface. The straightness of each metal rule shall be at least 0,3 mm/m and the right angle shall be accurate to at least 0,1 % (less than 1 mm deviation from normal per metre of length) or 0,001 rad. Alternatively a portable square of at least 1 000 mm in each direction may be used. The same requirements for straightness and angularity apply.	-	Pass
7.2.2.3	Suitable short metal rulers capable of being read to 0,5 mm.A micrometer, reading at least to 0,1 mm, with flat parallel metal jaws between 10 mm and 15 mm in diameter.	-	pass
7.2.2.3	A suitable metal tape capable of measuring the length of the sheet to an accuracy of 1 mm.	-	-
7.2.3	**Procedure**		
7.2.3.1	**Measurement of length and width**		
7.2.3.1.1	**General**		
	Avoid taking the measurement over a local deformation which could be considered as a visual defect. Smooth any rough areas. Take each reading to the nearest 1 mm.		pass

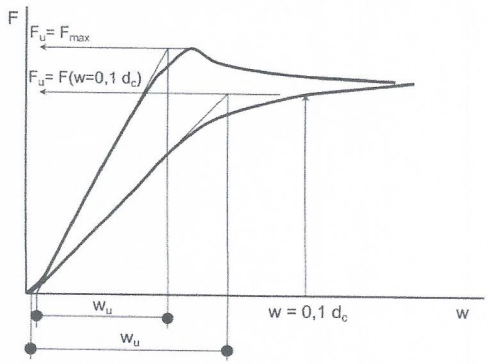
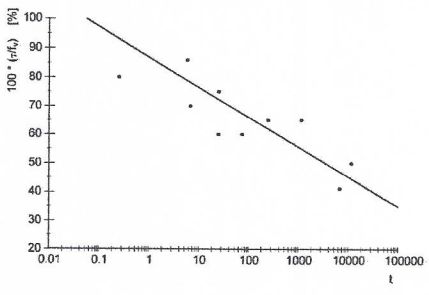
	For large size sheets measure on all four edges the greatest distance between the edge of the sheet and a string or wire stretched from one corner of the panel to the adjacent corner with a steel rule capable of reading to an accuracy of 0,5 mm.		
7.2.3.4	**Measurement of out squareness of sheet** Place two adjacent corners of the sheets in succession between the arms of the square keeping one side against the full length of the large arm and the other side in contact with the small arm at least at one point.In this position measure to the nearest 0,5 mm the greatest distance of the sheet edge from the small arm of the square. Report each result.		pass
7.2.4	**Expression and interpretation of results**		
7.3	**Tests for physical performance and characteristics**		
	7.3.1 Apparent density		
7.3.1.1	**Preparation of specimen** **The specimen shall preferably be a piece of a fibre-cement sheet used for the bending strength test.**		
	A ventilated oven capable of achieving a temperature of 100 ℃ to 105 ℃ with a full load of specimens.		pass
	A balance accurate to within 0,1 % of the specimen mass and equipped to determine both the immersed mass and the non immersed mass of the sp**7.3.2.1.1**ecimen.		pass
	Shapes, dimensions of specimens and test span The dimensions of specimens and test span shall be such that: a) ratio span/nominal thickness is greater than or equal to 15; b) ratio span/deflection at rupture is greater than or equal to 20; c) length of specimens is greater than or equal to span plus 40 mm; d) width of specimens is greater than or equal to five times the nominal thickness of specimens.		pass

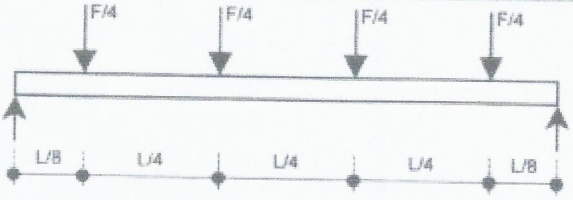
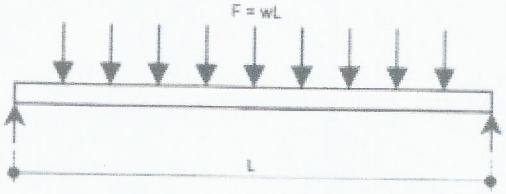
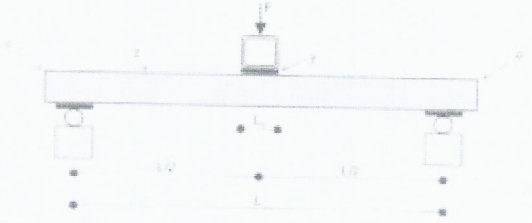
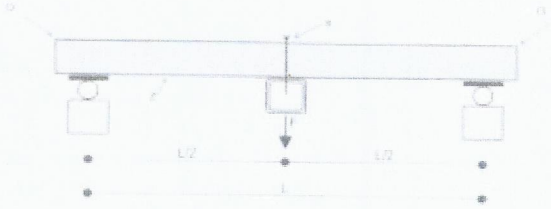
7.2.3.1.2	**Small size sheets**		
	For each dimension carry out two measurements on each sheet i.e. one at about 50 mm from either end.		Pass
	Large size sheets one end of the sheet as indicated in Figure 1a.		N/A
7.2.3.2.1	**Non-textured sheets**		
	a) Carry out three measurements with a dial gauge, taking each reading to an accuracy of 0,1 mm. Report the individual results. Calculate the arithmetic mean and difference between extreme values. Assess the results against the tolerances given in 5.3.4.2.		Pass
	a1) Small size sheets Carry out two measurements on each sheet, approximately 20 mm from the edge in the middle of two adjacent sides of the sheet.		Pass
	a2) Large size sheets Carry out three measurements across the width at one end of the sheet as indicated in Figure 1a.		-
		Dimensions in millimetres	Pass
7.2.3.2.2	**Textured sheets**		
	a) Carry out the measurements with a dial gauge, taking each reading to an accuracy of 0,1 mm. Report the individual results. Calculate the arithmetic mean of the measurements and the difference between extreme values.		pass
a1)	Small size sheets Measure the maximum thickness in the middle of all four sides of each sheet between 20 mm and 50 mm from the edge.		pass
a2)	Large size sheets Measure the maximum thickness of each test sheet at the eight positions as shown in Figure 1b between 20 mm and 50 mm from the edge.		-
7.2.3.3	**Measurement of straightness of edges**		

	Thermal shock resistance	See EN ISO 10545-9	-
	Release of dangerous substances	See EN ISO 10545-15	-
7.4	**Factory production control**		
	The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed n the market conform with the stated performance characteristics. The FPC system shall consist of rocedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.	It is in compliance with this requirement.	pass
	The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded and retained for the period pecified in the manufacturer's FPC procedures.	It is in compliance with this requirement.	pass
	The manufacturer shall maintain and apply documented procedures to control, calibrate and maintain inspection,measuring and test equipment, used to demonstrate the conformance of product to the specified requirements. Equipment shall be used in a manner which ensures that measurement uncertainty is known and is consistent with the required measurement capability.	It is in compliance with this requirement. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.	pass

8	**Product testing and evaluation**	The manufacturer shall carry out all final inspection and testing in accordance with the quality plan or documented procedures to complete the evidence of conformance of the finished product to the specified requirements.	pass
	Inspection and test records	Inspection and test records shall be maintained for a minimum of one year;	pass
9	**Dimensional tolerances**		
	Thickness of the panel a *D* δ 100 mm ± 2 mm *D* > 100 mm ± 2 % D.2.1 Deviation from flatness (according to the length of measurement *L*) For *L* = 200 mm – Deviation from flatness 0,6 mm For *L* = 400 mm – Deviation from flatness 1,0 mm For *L* > 700 mm – Deviation from flatness 1,5 mm		N/A
9.1	**Air permeability**	**m³/m².h at 50 Pa**	pass
9.2	Airborne sound insulation Rating	$R_w(C;C_r)_b$	N/A
10	Sound absorption Single value rating	α_{wb}	N/A

11	The test shall be carried out at one of the three temperature levels (T) that reflect the maximum temperatures that may be reached in end use, according to the colour of the exposed facing: test temperature 90 ℃ for dark colours; test temperature 75 ℃ for light colours; test temperature 65 ℃ for very light colours. The reflectivity definition of the three colour ranges is listed in the note in E.3.3.		N/A
12	**Test specimens**		
	 **Key** *F* applied load *r* rollers, radius 15 mm *w* measured deflection *p* metal load spreading plates of width L_s *o* overhang not exceeding 50 mm	**Four point bending test**	pass

			
		**Typical shear failure**	Pass

	   **Simulated central support test – downward load**  **Simulated central support test – uplift load**		Pass
		d_S (0.01 mm	Pass