

Large-Sized Ceramic Tile "GRANCERA" and Composite Panel "GRANCERA WALL"*

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1 Introduction

Ceramic tiles have recently been re-evaluated for their unique texture and durability. With the use of ceramic tiles increasing, Kawasaki Steel Techno-research (KTEC) has developed large-sized machinable tiles jointly with Clay Burn Ceramics Co., Ltd. and is proceeding with development of their application. As one result of this effort, KTEC is able to offer interior decorating materials **GRANCERA** and **GRANCERA WALL**, which provide a completely new concept for architectural space. Outlines of these are given below.

2 Large-sized Machinable Tile GRANCERA

2.1 Outline

One of the features of GRANCERA as shown in **Table 1** is its very large dimensions (900 mm × 2 600 mm maximum). Twenty-two standard colors are available, with a wide variety of colors when ordered. In addition, embossed or multi-colored tiles are also available, as illustrated in **Photo 1**, which shows the "GRANCERA Alhambra Series."

The physical properties of GRANCERA are shown in **Table 2**. In terms of durability, including factors such as

Table 1 Size of GRANCERA (mm)

Manufacturing range	
Max. board size	900 × 2 600
Thickness	3 to 7
Standard board size	900 × 900 × 4 900 × 1 800 × 4 900 × 2 400 × 4

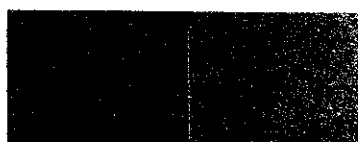
Table 2 Properties of GRANCERA

Bulk density	2.0
Moisture content* ¹	≤0.1 %
Coefficient of water absorption* ¹	7~10 %
Resistance to cracking* ²	Acceptable
Freezing and thawing test* ²	Acceptable
Surface hardness (Morse hardness)	5~7
Surface abrasion resistance* ²	Acceptable (Weight loss 0.04 g)
Bending strength	350~400 kg/cm ²
Modulus of elasticity	4.5~5.0 × 10 ⁵ kg/cm ²
Coefficient of linear expansion	5~6 × 10 ⁻⁶ /°C
Thermal conductivity	0.345~0.375 kcal/m·h·°C

*¹ JIS A5403 *² JIS A5209



Emboss type



No emboss type

Photo 1 GRANCERA Alhambra series

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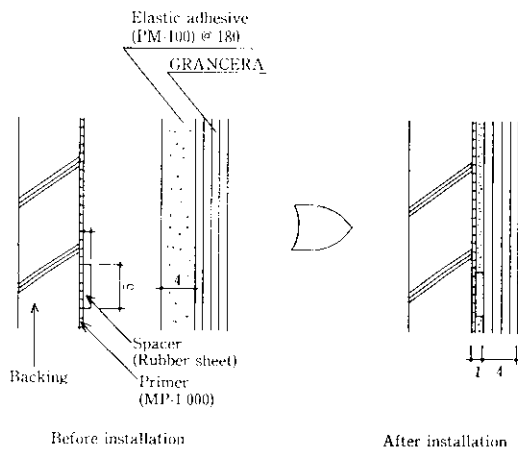


Fig. 1 Installation of GRANCERA

resistance to cracking and freeze cracking, as well as temperature stability due to a small coefficient of linear expansion, GRANCERA has properties equal or superior to existing tiles.

GRANCERA also provides excellent workability and can easily be worked on-site with common tools such as a diamond saw and drills.

2.2 Application of GRANCERA

The application methods for GRANCERA are shown in Fig. 1. Elastic adhesives are first applied in beads to the surface of GRANCERA and then it is fastened to a gypsum board or mortared surface which has been finished to a surface accuracy of 2 mm/2 m or less. GRANCERA is pressed to the backing. Since the adhesives have proper adhesion, GRANCERA will not peel off, even if pressure by hand is released from GRANCERA. There is therefore no need for support during the time of adhesive setting. Being elastic, the adhesives absorb the movement of the backing caused by temperature change or seismic effects (earthquakes) thereby relieving the load applied to GRANCERA.

3 GRANCERA WALL

3.1 Outline

Taking into consideration handling for working efficiency at the work site when a large-sized board of GRANCERA is to be used, a composite panel called "GRANCERA WALL" with a steel backing plate has been developed (Fig. 2). This wall has been made by fixing GRANCERA to a shaped galvanized sheet using elastic epoxy resin type adhesives. The steel sheet backing increases the strength of GRANCERA WALL, allowing it to sustain the maximum distributed pressure stipulations in JIS A6512 "Movable Partition" and the provisions of JIS A6516 "Porcelain Steel Sheet Wall Panel" with respect to impact strength.

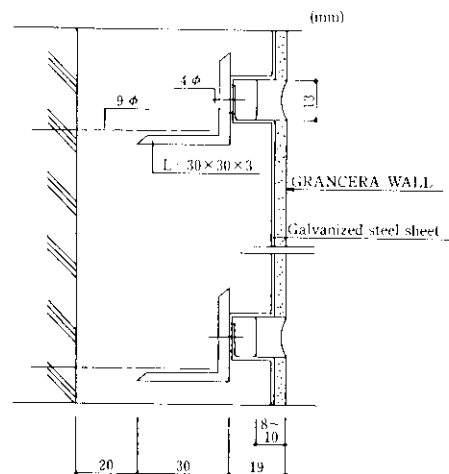


Fig. 2 Installation of GRANCERA WALL

3.2 Construction with GRANCERA WALL

As shown in Fig. 2, GRANCERA WALL was clamped to a lightweight steel frame with tapping screws. Joints are caulked with an elastic sealant. In the standard type, the joint width is 13 mm, but a fine-joint type is also available, in which a joint width as narrow as 3 mm can be obtained.

4 Construction Example

A construction example using GRANCERA is shown in Photo 2. In construction of the wall surfaces of Shinjuku Lumine-2 building, GRANCERA was fastened to the gypsum backing in stairwell walls and to a mortar-finished backing in toilet cubicles. By using GRANCERA in the toilet cubicles, design effectiveness was improved, and the Shinjuku Lumine 2 has thus won enthusiastic acclaim from various quarters. In the application of GRANCERA to the lobby walls in the Kawasaki Steel Corp. Hospital in Chiba, a GRANCERA WALL panel measuring about 800 mm × 2 500 mm, (nearly the maximum dimensions), was used. The embossed surface provides the aesthetic appearance of tile, in spite of the large dimensions of the material units.

5 Concluding Remarks

At present, GRANCERA and GRANCERA WALL are on the market and are winning acceptance for their excellent design properties. The authors are now proceeding with the development of new composite materials for interior decoration and steel-sheet composite panels for external facing, and endeavoring to further enhance their function and aesthetic appeal for meeting varied design requirements of customers.

Stairwell walls in Shinjuku
Lumine 2



Walls and partitions in a
rest room in Shinjuku
Lumine 2



Walls used in the lobby
of Chiba Hospital of
Kawasaki Steel Corp.

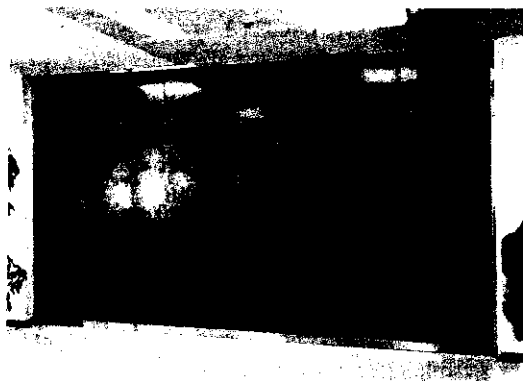


Photo 2 Installation examples

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