CHIYODA GYPSUM BOARD

CHIYODA UTE CO., LTD.

In the hope of each production stage becoming a vessel for realizing a recycle-oriented society.

At Chiyoda Ute, more than 50% of our current production activity takes place with recycled material.

We aim for zero plant emissions through recycling, using byproduct gypsum for the core, recycled paper for the paper facing, and wood chips produced from recycled wood from demolished houses as fuel for use during the manufacturing process. We also work on the recycling of waste gypsum boards. We promote recycling in all aspects of gypsum board production as well as at building construction and demolition sites. We also take pride in contributing to the protection of forests by replacing wood construction material with gypsum boards. In this day and age, where a recycle-oriented society is absolutely necessary to conserve global resources, the social responsibility of gypsum board manufacturing businesses is to establish a recycling system for the various stages of production, thereby contributing to environmental protection. We will continue to exert our efforts in protecting the global environment.

ZERO EMISSION-ORIENTED PLANTS

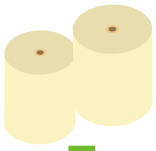
Construction Sites

We promote recycling of waste gypsum boards by collecting scrap gypsum board from construction sites and regenerating new boards from the scrap.
In 1997, Chiyoda Ute was designated as a Wide-range Area Recycling Industrial Waste Disposal Firm, the 6th to be designated in Japan, by the Minister of Health, Labour and Welfare.

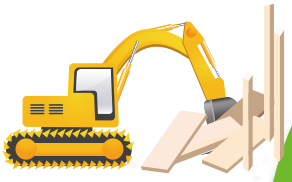
Recycled Paper Facing

The base paper for the board is almost 100% from recycled paper such as newspapers, this helps to protect forests.

Collection and Reutilization of Scrap Gypsum board



Recycled Paper



Demolition Sites

Scrap wood chips are used as fuel in our plants. We actively work on setting up a system for the entire industry to effectively collect and reuse wood generated from the demolition of old houses.

Chiyoda Ute Plants Zero-Emission Plants

All our plants are zero-emission oriented with an aim to reduce waste through using byproduct gypsum and recycled paper as raw material and scrap wood chips as fuel for the production process.

Synthetic Gypsum

CHIYODA Gypsum board

Preserve Forests by Substituting Wood Construction Material

Gypsum boards have been used in Japan for the past 80 years or so, replacing wood in home construction to prevent deforestation.

Utilization of Byproduct Gypsum

Synthetic gypsum, a byproduct generated from thermal power plants and fertilizer mills, is used as the gypsum board core.

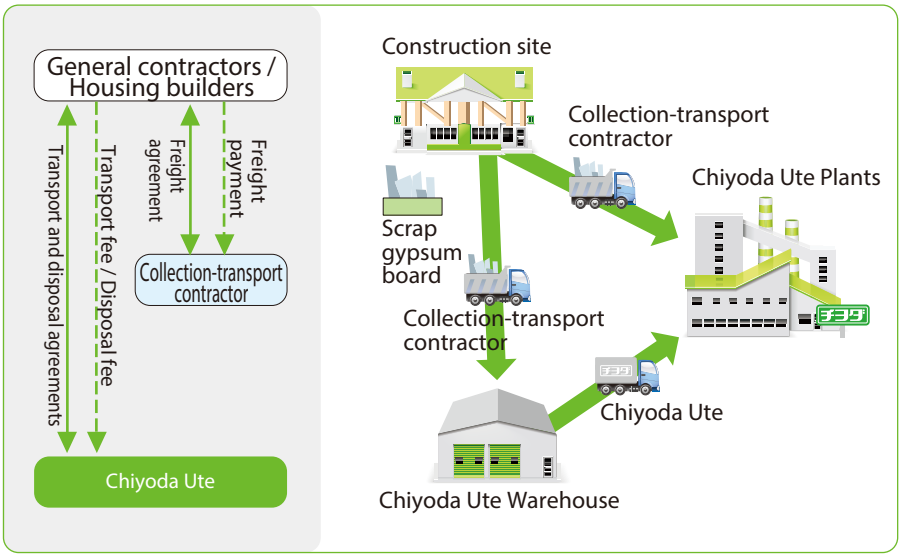
Effective Reutilization of Gypsum Board

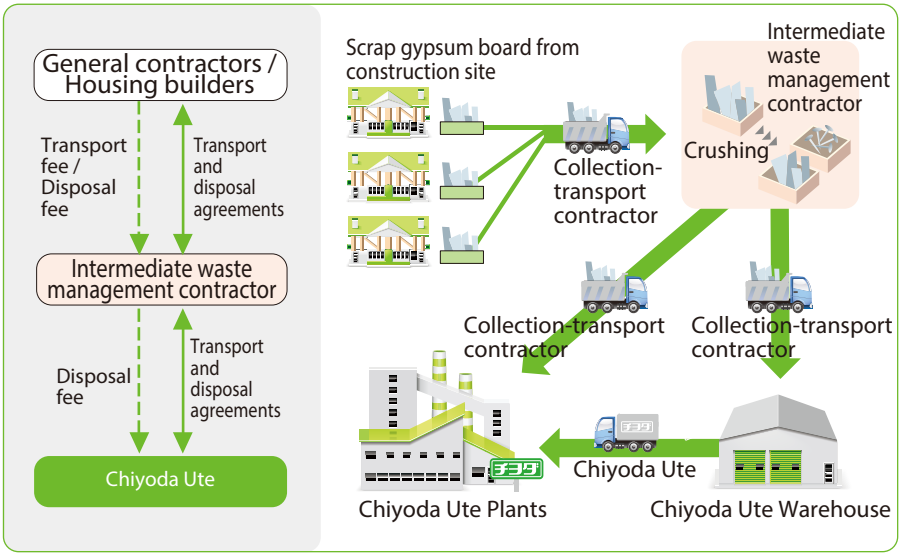
Reutilization Work Items

Work Items	Company in Charge
Exchange of agreements	Construction companies (emitting company) - Chiyoda Ute (recycling firm) Housing production companies (emitting company) - Chiyoda Ute (recycling firm)
Exchange of MOU	Construction companies - Contractors - Chiyoda Ute Housing production companies - Chiyoda Ute (up to 4 companies may be involved, including collection and transport contractors per each construction site)
Gypsum board delivery	Chiyoda Ute
Installation	Construction companies - Contractors Housing production companies - Contractors
Separation and collection of scrap gypsum board	Construction companies - Contractors Housing production companies - Contractors (prevention of extraneous material mixing and water leakage)
Transport of scrap gypsum board	Industrial waste collection and transport contractors Designated carriers (chiyoda Ute) (advance notice/ issuance of manifest)
Receiving scrap gypsum board	Chiyoda Ute (carry-in hours: 9:00~12:00, 13:00~16:00 weekdays)
Reutilization	Chiyoda Ute (reuse of gypsum / paper treatment / request for treatment cost)

Waste Gypsum Board Treatment Flow Chart

There are two ways to treat waste materials.





1. Recycling Plants

Muroran Plant
389-12Sakimori-cyo,Muroran City, Hokkaido
TEL 0143-59-1100

Chiba Plant
12 Kitasode, Sodegaura City, Chiba
Phone +81-438-63-2511

Yokkaichi Plant
928 Takamatsu, Kawagoe-cho, Mie-gun, Mie
Phone +81-59-363-5563

Kaizuka Plant
16-1 Minato, Kaizuka City, Osaka
Phone +81-72-431-5211

Okayama Plant
6-9-1 Tai, Tamano City, Okayama
Phone +81-863-32-3551

Shimonoseki Plant
7-1-1 Hikoshima-sakomachi, Shimonoseki City, Yamaguchi
Phone +81-83-267-6464

2. Recyclable Items

Gypsum board products manufactured by Chiyoda Ute

3. Unrecyclable Items

- Scrap gypsum board containing extraneous matter (Other substrates, metal, cement, rock, sand, soil, wood, paper, cloth, wrapping material, rubber, vinyl, plastic, trash, and other matters with particular caution required for plateshaped construction material.)
- Items containing metal such as screws, staples, and nails
- Items with bonding material attached
- Items with wood, plastic, and vinyl attached
- Composite gypsum boards (damping board, styro, urethane, lead, and etc.)
- Items with water stains and oil spots
- Decorated gypsum boards with cross-pieces (HIT Ceiling, ESTEN)
- Gypsum board products by other manufacturer

4. Items Containing Extraneous Matter

- As a rule, we will not accept such items.
- If we find that items brought to us contain extraneous matter, we will contact you.

CHIYODA GYPSUM BOARD

CONTENTS

Xenna G Board (hard-type)

Gypsum board with higher level of fire resistance and soundproofing. Its strength and high density make suitable walls for schools and hospitals , where higher strength is required. Use of this gypsum board on the floor of residential housing will reduce the noise transmission to the floor below.

High Strength

1.3 times the bending and breaking load compared to conventional products・ Flexural Young's Modulus of 2～4 times

Sound Insulation

High sound insulation by high density

Fire Protection

Non-combustible materials certified for 9.5mm thickness

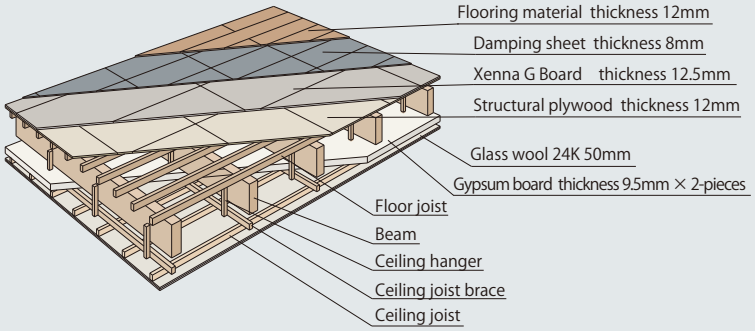
for wooden frame residential housing

Examples for the use of Xenna G Board

Xenna G Board SOUNDPROOFING FLOOR

- Combination of Xenna G Board and damping sheet delivers outstanding soundproof performance.
- Added floor material and the improved ceiling board installation method have improved the sound environment by 2 levels.
- Use of Xenna G Board provides quasi-fireproofing for 1 hour for the floor area (15 minutes longer than the usual 45 minutes). The double application of gypsum board enables meeting the ordinance requiring quasi-fireproofing properties as well as other quasi-fireproofing requirement (15 minutes longer than the usual 45 minutes) for the ceiling.
- With the use of dry method that attaches the material to the underlying plywood, installation and maintenance is very simple.
- The major components of the soundproof floor structure are gypsum board and damping sheet .

♦Type C (Hanging ceiling)



	Performance (improvement)
Heavy weight floor impact sound level	LH-61 (7dB)
Light weight floor impact sound level	LL-62 (7dB)
Floor vibration level	43% reduction

JIS A 6901 Standard

Category		Xenna G Board	
JIS product name		Regular Hard-type Gypsum Board	
Code		GB－R－H	
Thickness	mm	9.5	12.5
Water	%	3 or under	3 or under
Bending Breaking	Length direction	500 or over	700 or over
	Width direction	200 or over	250 or over
Impact resistance		When a 500g steel ball is dropped from a height of 500mm, the board placed on sand shall not form an indentation larger than 20mm and the crack formed shall not pierce through.	When a 500g steel ball is dropped from a height of 650mm, the board placed on sand shall not form an indentation larger than 20mm and the crack formed shall not pierce through.
Heat resistance	$m^2 \cdot K/W$	0.026 or over	0.035 or over

Type, Certification Code, and Bulk Density of Fireproof Material

Type of fireproof material		Non-combustible material	Non-combustible material
Certification code		NM-1139	NM-1139
Bulk density	g/cm^3	1.15±0.15	1.15±0.15

Other Properties (reference value based on our data)

Young's Modulus in bending	N/mm^2	4000～6000	4000～6000
Wood screw retention strength	N	300～400	400～500

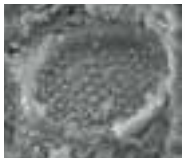
SAWAYAKA Gypsum Board
(humidity control)

Wakkanai diatomite mixed into the base material creates a strong humidity control effect on a semi-permanent basis. The board absorbs and discharges moisture and helps keep the room at a pleasant level of humidity.

Humidity Control Mechanism of Diatom Earth

Diatom earth is a sedimentary rock found in the geological stratum where ocean plankton (diatom) was deposited and has fossilized. Wakkanai diatomaceous earth, in particular, has many fine pores for outstanding humidity control performance. These pores absorb and discharge moisture to help control the humidity level of the house.


Wakkanai Diatomaceous Earth


Microscopic photograph

Excellent Moisture Performance

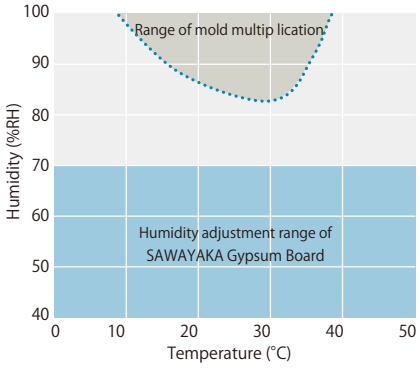
Before humidification

A.SAWAYAKA Gypsum Board B.Standard Gypsum Board

After humidification

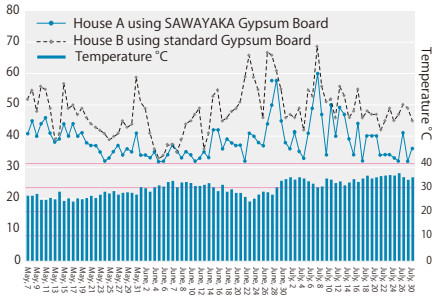
A.SAWAYAKA Gypsum Board B.Standard Gypsum Board

Suppresses Growth of Mold and Mites



Excellent Humidity Control

A study was conducted in House A, in which SAWAYAKA Gypsum Board was used, and House B, where standard gypsum board was used, to examine the changes in moisture levels under normal day to day living conditions. The graph shows that the level of humidity in House A is lower .



SAWAYAKA Closet

Suitable for use in closets and closed off spaces where moisture tends to build up. The board helps control the humidity and prevents the spread of mold and ticks.

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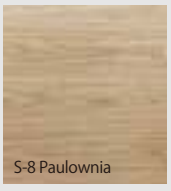
Sawayaka Closet Board has been registered by Japan Building Materials and Housing Equipment Industry Association as a "humidity control building material".


S-8 Paulownia

S-2 Robofuro

S-3 Andora

SAWAYAKA FC Board (damping control + formaldehyde adsorption-decomposition) also available (see next page).

JIS A 6901 Standard

Category		SAWAYAKA Gypsum Board		SAWAYAKA Closet Board	
JIS product name		Humidity controlling Gypsum Board		Humidity controlling Gypsum Board	
Code		GB-R-Hc		GB-D-Hc	
Thickness	mm	9.5	12.5	9.5	12.5
Humidity controlling property	g/m²	150 or over	150 or over	150 or over	150 or over
Other standard values		Pursuant to GB-R (see P9)		Pursuant to GB-D (see P13)	

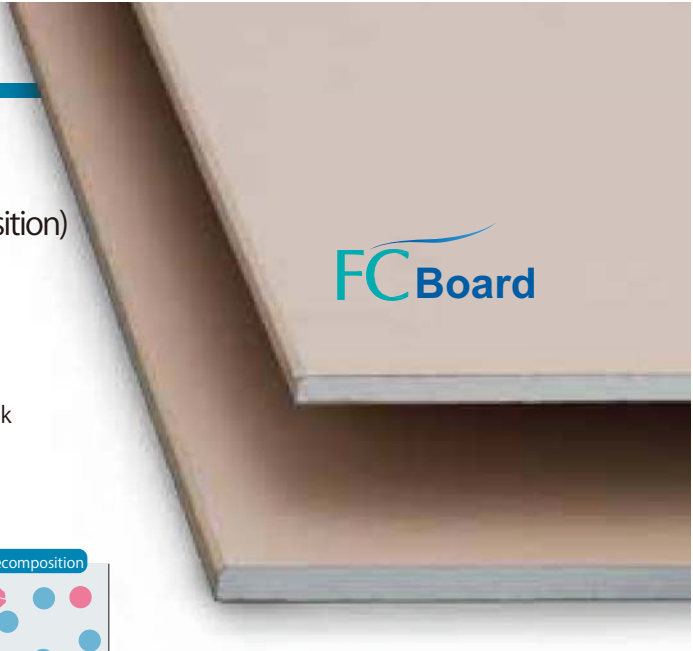
Type, Certification Code, and Bulk Density of Fireproof Material

Type of fireproof material		Quasi-noncombustible material	Non-combustible material	Quasi-noncombustible material	Non-combustible material
Certification code		QM-9071	NM-9417	QM-9086	NM-9455
Bulk density	g/cm³	0.80±0.05	0.80±0.05	0.80±0.05	0.80±0.05

Other Properties (reference value based on our data)

Compressive strength	N/mm²	2~5	2~5	2~5	2~5
Nail holding strength	N	200~500	200~500	200~500	200~500
Humidified deflection %	Length direction	0.02 or under	0.02 or under	0.02 or under	0.02 or under
	Width direction	0.04 or under	0.04 or under	0.04 or under	0.04 or under
Young's Modulus in bending	N/mm²	2000~4000	2000~4000	2000~4000	2000~4000

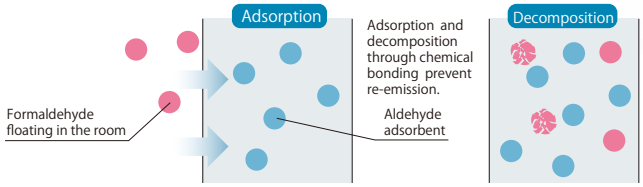
FC Board (formaldehyde adsorption-decomposition)



Adsorbs and decomposes formaldehyde, one of the causes of sick building syndrome.

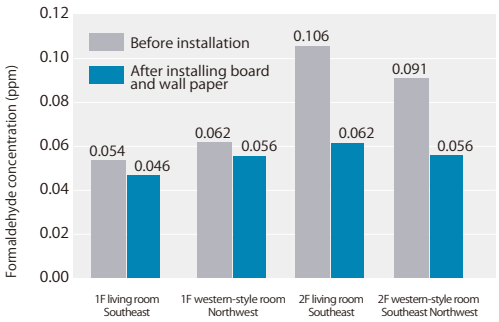
Mechanism of Adsorption and Decomposition of Formaldehyde

An adsorbent traps and decomposes formaldehyde, detoxifies it, and prevents re-emission.



Excellent Formaldehyde Adsorption Effect

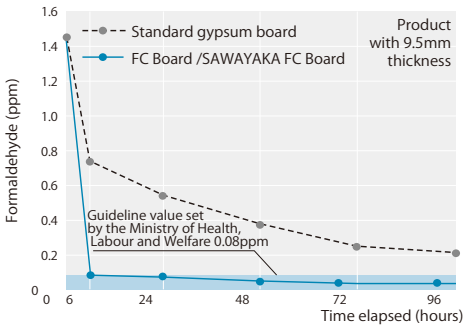
Formaldehyde concentration was measured before FC Board installation (with only framing) and after FC Board and wall paper were placed. The graph shows that concentration was reduced in each room with the installation of FC Board.



Quickly Adsorbs and Decomposes Formaldehyde

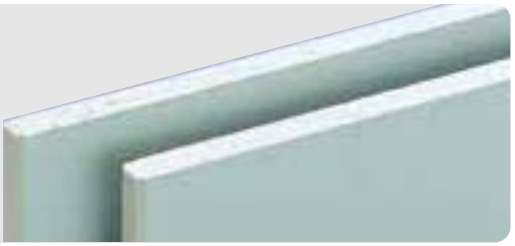
<exceeds the 0.08ppm guideline value set by the Ministry of Health, Labour and Welfare>

The formaldehyde adsorption capacity of FC Board and SAWAYAKA FC Board were measured in simulations using miniature models. The graph shows the attenuation of formaldehyde. Please note, however, that this data was obtained from a miniature model and is not a guaranteed value.



SAWAYAKA FC Board

Gypsum board with both humidity control and formaldehyde adsorption-decomposition functions.



JIS A 6901 Standard

Category		FC Board		SAWAYAKA FC Board	
JIS product name Code		Gypsum Board GB-R		Humidity controlling Gypsum Board GB-R-Hc	
Thickness	mm	9.5	12.5	9.5	12.5
Humidity controlling property	g/m²	—	—	150 or over	150 or over
Other standard values		Pursuant to GB-R (see P9)		Pursuant to GB-R (see P9)	

Type, Certification Code, and Bulk Density of Fireproof Material

Type of fireproof material		Quasi-noncombustible material	Non-combustible material	Quasi-noncombustible material	Non-combustible material
Certification code		QM-9828	NM-8619	QM-9071	NM-9417
Bulk density	g/cm³	0.65 or over	0.65 or over	0.80±0.05	0.80±0.05

Other Properties (reference value based on our data)

Formaldehyde adsorption-decomposition property		○		○	
Compressive strength	N/mm²	2~5	2~5	2~5	2~5
Nail holding strength	N	200~500	200~500	200~500	200~500
Humidified deflection %	Length direction	0.02 or under	0.02 or under	0.02 or under	0.02 or under
	Width direction	0.04 or under	0.04 or under	0.04 or under	0.04 or under
Young's Modulus in bending	N/mm²	2000~4000	2000~4000	2000~4000	2000~4000

Tea Life

Patent No. 4018086

(with green tea leaves: deodorizing-antibacterial)

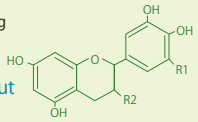
Gypsum board with deodorizing and antibacterial properties.
Containing abundant active ingredients from natural green tea leaves, the board provides a pleasant green tea scent.

■ Suggested for use in residential houses, schools, hospitals, welfare facilities, and shops.

Tea Life was produced with the joint development of Itoen Corporation and Chiyoda Ute.

Qick Information on Green Tea

High expectations for the antibacterial and deodorizing effects of catechin! Green tea expands beyond just being an enjoyable beverage.



History Green tea was introduced to Japan from China about 800 years ago.

Research It has been revealed that other than catechin, green tea has many great components that are good for health, such as vitamins, flavonoids, theanine, and chlorophyll.

About catechin Catechin is one type of polyphenol. It makes up approximately 10% of the weight of tea leaves, and exhibits antibacterial and deodorizing effects, which has attracted attention in the medical field to develop fibers containing green tea leaves for clothes and towels.

Choose from 2 types

Tea Life Regular

Substrate for wall paper and painted finish

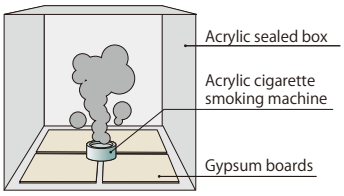
*Please select wall paper and paint with good air permeability.

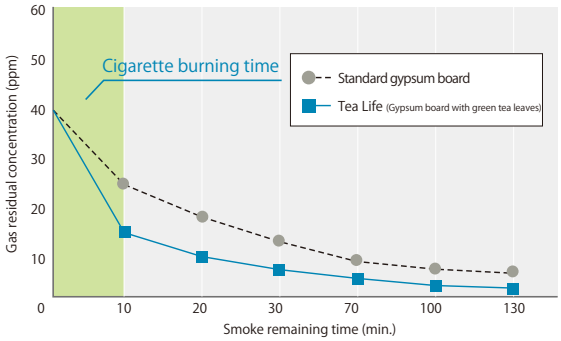
Tea Life Closet(Paulownia T8)

For closet walls and ceilings

Effectively Adsorbs Tobacco Odor

Tea Life and a standard gypsum board were each placed in a sealed box and then exposed to cigarette smoke. The adsorption degree of ammonia, one of the components responsible for cigarette odor, was measured, which revealed that Tea Life adsorbed a larger volume of odor compared to the standard gypsum board.



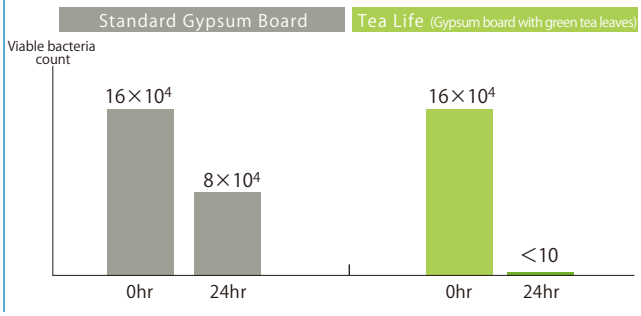


Demonstrated Excellent Antibacterial Effects

A viable bacterial count (CFU/sheet) was made after a 24-hour exposure to a test specimen culture using the film contact method established by the Society of Industrial Technology for Antimicrobial Articles. Test results confirmed that Tea Life (gypsum board with green tea leaves) has an antibacterial effect.

Name of bacteria	Viable bacteria count (CFU/Sheet)	
	0 hour	After 24 hours
MRSA (※)	16×10^4	Standard gypsum board : 8×10^4
		Tea Life (gypsum board with green tea leaves) : <10

(※) MRSA : Methicillin-Resistant Staphylococcus Aureus



JIS A 6901 Standard

Category		Tea Life Regular		Tea Life Closet (Paulownia T8)	
JIS product name		Gypsum Board		Decorated Gypsum Board	
Code		GB-R		GB-D	
Thickness	mm	9.5	12.5	9.5	12.5
Other standard values		Pursuant to GB-R (see P9)		Pursuant to GB-D (see P13)	

Type, Certification Code, and Bulk Density of Fireproof Material

Type of fireproof material		Quasi-noncombustible material	Non-combustible material	Quasi-noncombustible material	Non-combustible material
Certification code		QM-0324	NM-0948	QM-0324	NM-0948
Bulk density	g/cm³	0.75±0.05	0.75±0.05	0.75±0.05	0.75±0.05

Damping φ Board / Damping φ Mat-In Board

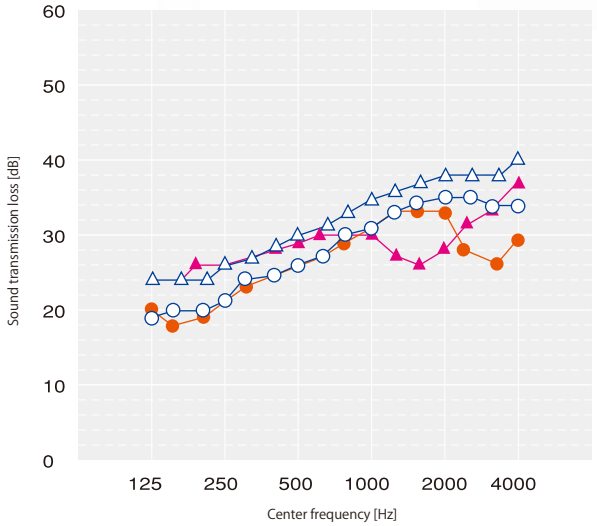
Using the damping mat, with a thickness of 3mm which consist of a paperboard layer and a special viscoelastic resin layer, was attached to a gypsum board.

Excellent Sound Insulation

Featuring a 3mm damping mat made of paper board and a special viscoelastic resin pasted on the back side. Damping φ Board and Damping φ Mat-In Board prevents the coincidence effect seen on walls and ceilings with gypsum board and reduces transmission loss in mid to high registers. Furthermore, Damping φ Mat-In Board will not interfere with transmission quality when directly attached to concrete building frames.

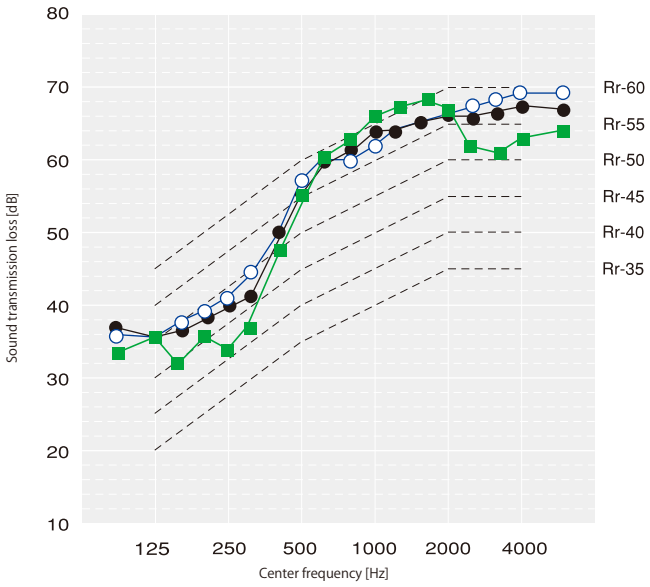
Sound Insulation <comparison with gypsum board>

Center Frequency (Hz)	Sound Transmission Loss (dB)			
	Gypsum Board 12.5mm	Damping φ Board 12.5mm	Gypsum Board 21mm	Damping φ Mat-In Board 22mm
125	20	19	24	24
160	18	20	24	24
200	19	20	26	24
250	21	21	26	26
315	23	24	27	27
400	25	25	28	29
500	26	26	29	30
630	27	27	30	31
800	29	30	30	33
1000	31	31	30	35
1250	33	33	27	36
1600	33	34	26	37
2000	33	35	28	38
2500	28	35	32	38
3150	26	34	34	38
4000	29	34	37	40

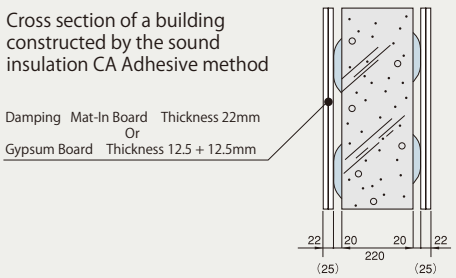


Sound Insulation Performance <sound Insulation CA Bond method>

Center Frequency (Hz)	Sound Transmission Loss (dB)		
	Damping φMat-In Board 22mm	Gypsum Board 12.5mm+12.5mm	Building Frame
100	37	33	36
125	35	35	35
160	36	32	38
200	38	35	39
250	40	34	41
315	42	37	44
400	50	48	50
500	56	55	57
630	59	60	60
800	61	63	60
1000	64	66	62
1250	64	67	64
1600	65	68	65
2000	66	67	66
2500	66	62	67
3150	67	61	68
4000	68	63	69
5000	67	64	69
TLD	47	42	48
平均	55	53	55



Cross section of a building constructed by the sound insulation CA Adhesive method



Performance

Category	Damping φ Board	Damping φ Mat-In Board
Thickness mm	12.5	22.0
Type of fireproof materia	Quasi-noncombustible material	Quasi-noncombustible material
Certification code	QM-0636	QM-0633

＊All products produced after order receipt.

Gypsum Board

Widely used in the construction of residential housing to skyscrapers as fireproof material conforming to the restrictions on interior finish stipulated in the Building Standard Law.

JIS A 6901 Standard

Category		Gypsum Board		
Code			GB-R	
Thickness	mm	9.5	12.5	15.0※
Water	%	3 or under	3 or under	3 or under
Bending Breaking load	Length direction N	360 or over	500 or over	650 or over
	Width direction N	140 or over	180 or over	220 or over
Non-combustibilty		Grade No.2	Grade No.1	Grade No.1
Heat resistance	$m^2 \cdot K/W$	0.043 or over	0.057 or over	0.068 or over

※ Products with a thickness of 15mm are manufactured after receipt of order.

Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	9.5	12.5	15.0※
Type of fireproof material		Quasi-noncombustible material	Non-combustible material	Non-combustible material
Certification code		QM-9828	NM-8619	NM-8619
Bulk density	g/cm^3	0.65 or over	0.65 or over	0.65 or over

※ Products with a thickness of 15mm are manufactured after receipt of order.

This product is certified as a fireproof product when coated with gypsum plaster

Specifications for certification as a fireproof material when coated with gypsum plaster		Gypsum board thickness 9.5mm + Gypsum Plaster coating thickness 3mm or over
Type of fireproof material certification code		Non-combustible material
Certification code		NM-8618
Gypsum board bulk density	g/cm^3	0.65 or over

Other Properties (reference value based on our data)

Thickness	mm	9.5	12.5
Compressive strength	N/mm	2～5	2～5
Nailing strength	N	200～500	200～500
Humidified deflection	Length direction	0.02 or under	0.02 or under
	Width direction	0.04 or under	0.04 or under
Young's Modulus in bending	N/mm^2	1000～3000	1000～3000

Reinforced Gypsum Board

Type X / Type V

Widely used for fireproof and sound structure.
Type X has inorganic fibers, while Type V has inorganic fibers and inorganic minerals. These are added to improve fire resistance.

JIS A 6901 Standard

Category		Reinforced Gypsum Board		
Code		GB-F		
Thickness	mm	12.5	15.0	21.0
Water	%	3 or under	3 or under	3 or under
Bending Breaking load	Length direction N	500 or over	650 or over	850 or over
	Width direction N	180 or over	220 or over	320 or over
Impact resistance		When a 500g steel ball is dropped from a height of 650mm, the board placed on sand shall not from an indentation larger than 25mm in diameter and no crack shall be formed.	When a 500g steel ball is dropped from a height of 800mm, the board placed on sand shall not from an indentation larger than 25mm in diameter and no crack shall be formed.	When a 500g steel ball is dropped from a height of 1000mm, the board placed on sand shall not from an indentation larger than 25mm in diameter and no crack shall be formed.
Frame resistance		A 1000g lead bar is hung from the sample specimen and, when exposed to fire of 1000°C, it shall not break nor drop for 8 minutes.	A 1000g lead bar is hung from the sample specimen and, when exposed to fire of 1000°C, it shall not break nor drop for 10 minutes.	A 1000g lead bar is hung from the sample specimen and when exposed to fire of 1000°C, it shall not break nor drop for 12 minutes.
Non-combustiblity		Grade No.1	Grade No.1	Grade No.1
Heat resistance	$m^2 \cdot K/W$	0.052 or over	0.063 or over	0.088 or over

Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	12.5	15.0	21.0
Type of fireproof material		Non-combustible material	Non-combustible material	Non-combustible material
Certification code		NM-8615	NM-8615	NM-8615
Bulk density	g/cm^3	0.75 or over	0.75 or over	0.75 or over

Other Properties (reference value based on our data)

Thickness	mm	12.5	15.0	21.0
Compressive strength	N/mm^2	2～5	2～5	2～5
Nail holding strength	N	200～500	200～500	200～500
Humidified deflection	Length direction	0.02 or under	0.02 or under	0.02 or under
	Width direction	0.04 or under	0.04 or under	0.04 or under
Young's Modulus in bending	N/mm^2	1000～3000	2000～4000	3000～5000

Water-Resistant Board / Non-combustible Water-Resistant Board

This board has a greater resistance to water compared to regular gypsum board. The board is used around kitchens, washrooms, toilets and other humid places. It is mainly used for the base material for interior.

JIS A 6901 Standard

Category			Gypsum Sheathing	
Code			GB-S	
Thickness		mm	9.5	12.5
Water		%	3 or under	3 or under
Bending Breaking load	N	Length direction	360 or over	500 or over
		Width direction	220 or over	300 or over
Resistance to peeling in water			Gypsum board and facing paper shall not separate.	Gypsum board and facing paper shall not separate.
Water absorption		%	10 or under	10 or under
Surface water adsorprion		g	2 or under	2 or under
Non-combustibility			Grade No.2	Grade No.2
Heat resistance		m^2·K/W	0.040 or over	0.052 or over

Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	9.5、12.5	12.5※
Type of fireproof material		Quasi-noncombustible material	Non-combustible material
Certification code		QM-0493	NM-9346
Bulk density	g/cm^3	0.73±0.07	0.70±0.05

※ Chiyoda Non-combustible Water-Resistant Board

Other Properties (reference value based on our data)

Thickness		mm	9.5	12.5
Compressive strength		N/mm^2	2～5	2～5
Nail holding strength		N	200～500	200～500
Humidified deflection	Length direction		0.02 or under	0.02 or under
	Width direction		0.04 or under	0.04 or under
Young's Modulus in bending		N/mm^2	1000～3000	1000～3000

Remarks ►
- When constructing, please elevate the board 5～10mm from the floor. In addition, attach waterproof tape to the cut surface, make sure that there is no contact with water when constructing.
- You may also directly use the board without other boards beneath.

Structural Gypsum Board Type B

The product is obtained by having a stronger nail later resistance compared to the hard-type gypsum board

JIS A 6901 Standard

Category			Structural Gypsum Board Type B
Code			GB-St-B
Thickness		mm	12.5
Water		%	3or under
Bending Breaking load	N	Length direction	500 or over
		Width direction	180 or over
			500 or over
Impact resistance			When a 500g steel ball is dropped from a height of 650mm, the board placed on sand shall not from an indentation larger than 25mm in diameter and no crack shall be formed.
Fire resistance			A 1000g lead bar is hung from the sample specimen and when exposed to fire of 1000°C, it shall not break nor drop for 8 minutes.
Non-combustibilty			Grade No.1
Heat resistance		m^2·K/W	0.052 or over

Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	12.5
Type of fireproof material		Non-combustible material
Certification code		NM-8615
Bulk density	g/cm^3	0.80 or over

Wall Magnification

Construction method			Magnification	Nail, screws (fastening interval)
Frame fixture method			1.5	GNF40,SFN45,WSN*1、DTSN*2 (outer periphery @ 100mm or below Others @ 200mm or below)
Conventional framing method	Wall with sealed pillars	Standard type	1.2	GNF40、GNC40 (@150mm or under)
		Flooring type	1.0	
	Bearing wall having pillar-exposed	Reinforced support type	1.3	
		Penetrate Type	0.7	

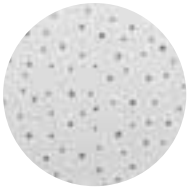
※1…3.8φ×32mm or over
※2…4.2φ×30mm or over

Frame construction: In accordance with the 2001 Ministry of Land, Infrastructure and Transport Notification No. 1541
Conventional shaft assembly method: In accordance with the 1981 Ministry of Construction Notification No.1100

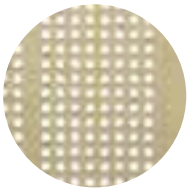
Sound Deadening Board

Features many through-holes for absorbing sound. Based on the principle of resonant absorption, the sound insulation wall on the back side of the board and a layer of air reduces sound energy.

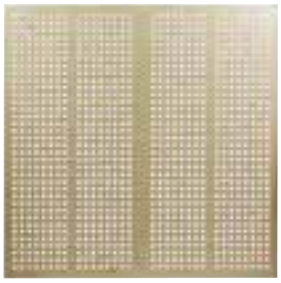
Sound deadening board



Decorated sound deadening board



Special sound deadening board



Category		Sound Deadening Board	Special Sound Deadening Board	Decorated Sound Deadening Board
Code		GB-P		
Thickness	mm	9.5		
Size	mm	455×910 910×910 910×1820	910×910	455×910 910×910
Pore diameter	mm	6	13.4	6・8・10
Pitch		22	24	Random
Number of pores		20×40 40×40 40×80	32×36	306 612
Pore ratio	%	5.8	24.5	3.0
Water	%	3 or under	3 or under	3 or under
Bending Breaking load Length direction	N	110 or over	400 or over	—
Backing material	standard	Recycled hard paper	None	Recycled hard paper
Backing material Quasi-noncombustible specification		Fiber cloth hard paper that possesses equivalent or superior property	Rock wool felt(25mm bulk specific gravity 0.04)Glass wool heat insulating material(40mm bulk specific gravity 0.06)	Non-combustible backing fiber cloth or material that possesses equivalent or superior property
Certification code	g/cm³	QM-9827	QM-9825	QM-9822
Bulk density		0.70 or over	0.70 or over	0.70 or over
Surface		Uncoated	Uncoated	White emulsion coating
Edge configuration		Right angle(cut surface)	Right angle(cut surface)	Narrow chamfering

Ace Board

Non-combustible Gypstar
Non-combustible Cosmo Tone

Only 9.5mm thick but certified as non-combustible material. Non-combustible facing paper is used.

Ace Board

JIS A 6901 Standard

Category		Non-combustible Laminated Gypsum Board	
Code		GB-NC	
Thickness	mm	9.5	
		No decoration	With decoration
Water	%	3 or over	
Bending Breaking load	Length direction N	360 or over	270 or over
	Width direction N	140 or over	105 or over
Discoloration-fade resistance		—	Discoloration at gray scale 3 is considered passing.Furthermore, there should be no cracks, swelling or crinkles on the surface.
Impact resistance		The diameter of the sinkhole is smaller than 25mm and the crack did not pierce to the other side.	—
Non-combustiblity		Grade No.1	Grade No.1
Heat resistance	m²-K/W	0.043 or over	0.043 or over

Type, Certification Code, and Bulk Density of Fireproof Material

Category	Ace Board	Non-combustible Gypstar/Cosmo Tone
Type of fireproof material	Non-combustible material	Non-combustible material
Certification code	NM-2817	NM-2816
Bulk density g/cm³	0.72 ±0.07	0.72 ±0.07

Non-combustible Gypstar

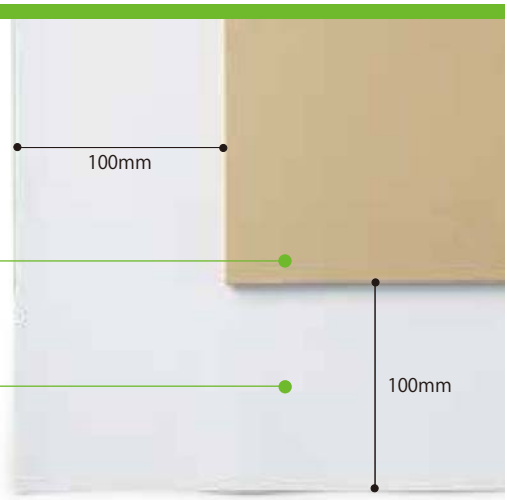
Non-combustible Cosmo Tone

Airtight Board

It is a product to be used for internal condensation prevention.
Construction of moisture-proof film and gypsum board can be done at the same time.

Category		Airtight Board
Thickness	mm	9.5／12.5
Size	mm	910×1820／910×2420/1000×2000
Moisture permeation resistance	㎡·s·Pa/ng	0.180 （measurement）
Other Properties		Same as Gypsum Board

＊Moisture permeation resistance of gypsum board 0.0000307㎡・s・Pa/ng



Gypsum Lath Board

This gypsum board has embossed oblong patterns on the surface.
Used as a substrate for stucco finish.

※When directly painting alkaline finishing material to gypsum board, it may cause the base paper of the board to peel off.

JIS A 6901 Standard

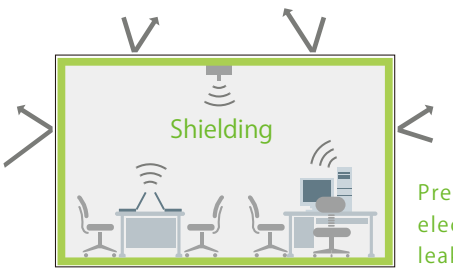
Category			Gypsum Lath Board	
Code			——	GB-L
Thickness	mm		7.0 (does not apply to the standard)	9.5
Moisture content	%		——	3 or under
Bending Breaking load	N(kgf)	Length direction	——	180 or over
		Width direction	——	125 or over

Type, Certification Code, and Bulk Density of Fireproof material

The product is certified as a fireproof material when coated with gypsum plaster	Gypsum Lath Board thickness 7.0mm + Gypsum plaster coating thickness 8mm or over
Type of fireproof material	Non-combustible material
Certification code	NM-8617
Bulk density g/cm³	0.70 or over

Gypsum Lath Board itself is not certified as a fireproof material, but is given certification when the surface is coated with gypsum plaster. The coating shall be applied at the installation site.

Super Board (radio shielding)



Prevents intrusion of external electromagnetic waves and information leakage from inside.

Category		Super Board
Code		12.5
Thickness	mm	910×1820
Absorption performance	dB	30
Other properties		Equivalent to gypsum board

Decorated Gypsum Board Series

The gypsum board is used as a decorative interior material. There are various products for different applications.

Gypstar / Cosmo Tone

Travertine pattern is used for ceilings in stores.

Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	9.5
Type of fireproof material		Quasi-noncombustible
Certification code		QM-9824
Bulk density	g/cm³	0.70 or over

Gypstar

Cosmo Tone

Closet Board

Japanese and Western Style patterns.
Wall material for storage space.

※Products on sale vary by region.

Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	9.5	12.5
Type of fireproof material		Quasi-noncombustible	Non-combustible
Certification code		QM-9824	NM-1734
Bulk density	g/cm³	0.70 or over	0.73±0.07

C-8 Straight grain paulownia

C-12 Linen

Pearl

Western style patter. 2X8 size. Material for office space.

Type, Certification Code, and Bulk Density of Fireproof Material

Category		G-223 Float	G-532 Spool
Thickness	mm	9.5	9.5
Type of fireproof material		Quasi-noncombustible	Quasi-noncombustible
Certification code		QM-9160	M-0441
Bulk density	g/cm³	0.75±0.05	0.75±0.05

G-223 Float

G-532 Spool

HIT Ceiling

Ceiling material for Japanese style room.

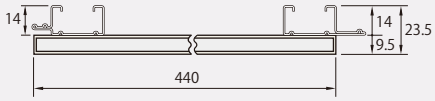
Type, Certification Code, and Bulk Density of Fireproof Material

Thickness	mm	9.5
Type of fireproof material		Quasi-noncombustible
Certification code		QM-9824
Bulk density	g/cm^3	0.70 or over

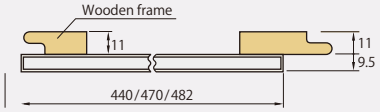
New Yamato

New Natori

ESTEN



HIT Ceiling



JIS A 6901 Standard

Category		Decorated Gypsum Board	
Code		GB-D	
Thickness	mm	9.5	12.5
Water	%	3 or under	3 or under
Bending Breaking load	Length direction N	360 or over	500 or over
	Width direction N	140 or over	180 or over
Discoloration-fade resistance		After irradiation for 48 hours in ultraviolet light carbon fade meter, check the discoloration for gray scale No. 3 to pass test. In addition, no cracks on the surface or blistering, and no wrinkles.	After irradiation for 48 hours in ultraviolet light carbon fade meter, check the discoloration for gray scale No. 3 to pass test. In addition, no cracks on the surface or blistering, and no wrinkles.
Impact resistance		When a 500g steel bull is dropped from a height of 500mm, the board placed on sand shall not form an indentation larger than 25mm in diameter and no crack shall be formed.	When a 500g steel ball is dropped from a height of 600mm the board plaed on sand shall not form an indentation larger than 25mm in diameter and no crack shall not be formed.
Non-combustibility		Grade No.2	Grade No.1
Heat resistance	m^2·K/W	0.043 or over	0.057 or over

Board type with press on surface needs to have a bending breaking load that is 75% above the values presented in the above table.
Board type with press on the surface, does not apply to impact resistance.

Other Physical Properties (reference value based on in house data)

Thickness	mm	9.5	12.5
Compressive strength	N/mm^2	2～5	2～5
Nail effectiveness strength	N	200～500	200～500
Humidification scaling factor	% Length direction	0.02 or over	0.02 or under
	% Width direction	0.04 or under	0.04 or under
Bending Young's Modulus	N/mm^2	1000～3000	1000～3000

Calcium Silicate Board

A non-combustible construction material used as interior material for diverse types of structures, including residential housing and buildings.

Glass Wool

Back

Front

A non-combustible building material, which is used as insulation and sound absorbing material.
JIS A 6301, JIS A 9504, JIS A 9521 standard products.
※Products on sale differ by region.

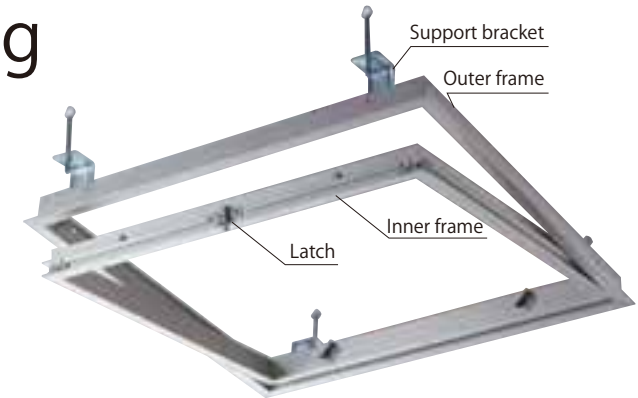
Damping Sheet

This asphalt damping sheet is used with the Xenna G Board Damping System.
The combination with Xenna G Board reduces floor impact sound levels in wooden houses where vibration control is difficult.

Thickness	mm	8
Size	mm	455×910
Surface density	kg/m²	Approx.21

Ceiling Inspection Opening

An aluminum frame opening for ceiling inspections.
Inner frame can be detached freely; it can be set without tools.



The photograph is a support bracket.

Item number	Outer frame ceiling material <W>×<H>	Inner frame ceiling material w×h
CRP-303	303×303	269×269
CRP-454	454×454	420×420
CRP-606	606×606	572×572

Kita-no-Yasuragi Smile

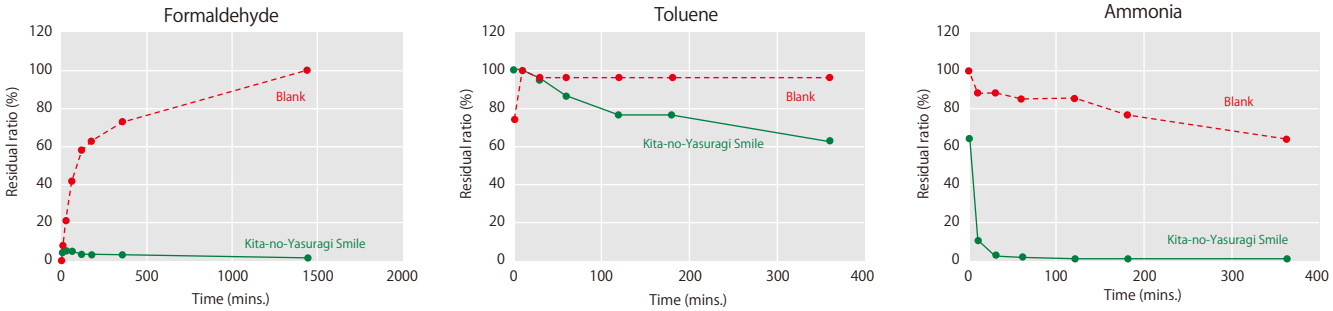
(humidity control stucco)

Moisture performance is improved by painting on surface of a gypsum board.

Substrate	Finishing Material	Moisture Absorption (g/m^2)	Moisture Desorptionn (g/m^2)
Gypsum Board 12.5mm	Vinyl chloride wallpaper	42	34
Gypsum Board 12.5mm	Kita-no-Yasuragi Smile: 3mm coating thickness	123	80
SAWAYAKA Gypsum Board 12.5mm	Kita-no-Yasuragi Smile: 3mm coating thickness	251	206

Moisture absorption: 25° C, 50%RH → 25° C, 90RH Weight change in 24 hours
Moisture desorption: 25° C, 90%RH → 25° C, 20RH Weight change in 24 hours

Excellent Chemical Adsorption Effect



All 18 Color Variations

SBI-03 Blue ash | SBI-02 Pale yellow green | SBI-03 Beige | SWI-04 Ivory | SWI-05 Cream | SWI-06 Cameo beige

SWI-11 White | SWI-12 Flesh | SWI-13 Light cameo beige | SWI-14 Shell pink | SWI-15 Dark yellowish red | SWI-16 Salad green

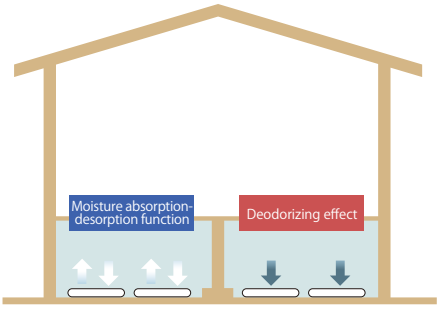
SWI-17 Flaxen | SWI-18 Tobacco brown | SWI-19 Almond green | SWI-20 Amber | SWI-21 Lithograph color | SWI-22 Slate gray

※ The displayed color may be slightly different from the actual product.

SAWAYAKA Health Grain

(underfloor humidity control material)

This underfloor humidity control material is composed of crushed charcoal and Wakkanai diatomaceous earth, possessing outstanding humidity control properties. The product is packaged in a bag. Lining 12 bags per 3.3m² area will complete the procedure.
When disposing this product, only mix into soil.

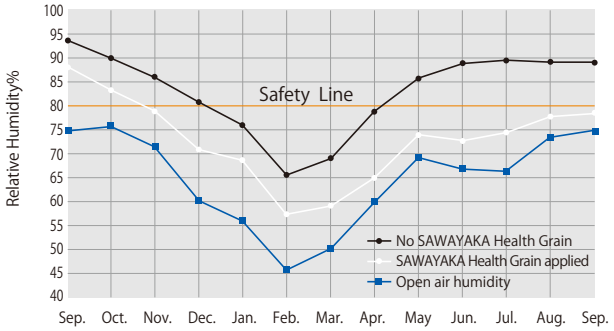


Functional diagram of SAWAYAKA Health Grain

Maintains the humidity under the floor at a comfortable level throughout the year.

SAWAYAKA Health Grain is used under floors where humidity exceeds 90% . SAWAYAKA Health Grain will slowly lower the humidity for 1.5 months, and thereafter maintain the humidity to less than 80% throughout the year.

■ Annnual change in humidity tested at home



Eliminates odors from underfloor.

The raw material for SAWAYAKA Health Grain, diatomaceous earth and crushed charcoal, both provide a powerful deodorizing effect.
This product absorbs odor developing under the floor and improves living conditions.

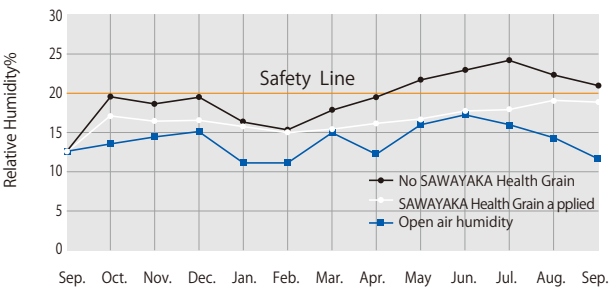
■Deodorizing effect of various materials (24hours) (%)

Odor emitting matters	Crushed charcoal	Diatomaceous Earth	Zeolite	Silica gel
Ammonia	100	100	20	100
Hydrogen sulfide	100	30	20	10
Acetic acid	100	100	–	–
Pyridine	–	100	–	–
Methylmercaptan	–	60	–	–
Trityl amine	–	100	–	–
Formalin	100	100	–	–
Acetic ether	100	–	–	–

Prevents rotting of wooden floor framing and protects against termites.

When the moisture content of the wood exceeds 20% and the temperature rises to about 30°C, wood rotting fungus becomes active and rots wood. Similarly, termites also damage wood under the above conditions. SAWAYAKA Health Grain maintains the moisture content of the wood at below 20% and protects wooden floor framing from rotting, fungus, and termites.

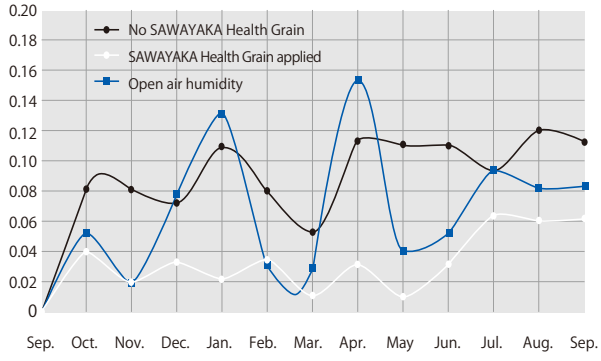
■ Moisture content of wooden floor framing（annual transition）.



Prevents corrosion of pipes and metallic objects mounted underfloor.

Steel corrodes under floors with high humidity. SAWAYAKA Health Grain controls humidity and prevents corrosion of pipes and metallic objects under the floor.

■ Annual transition of under floor metal corrosion (change in weight)



Sukima-Naito

First started as a gap filler for fire insulation walls, but now can be used for a variety of gypsum board walls. This is a dry-curable product. You can use a commercially available cartridge gun.
F☆☆☆☆ product. (Japan Adhesive Industry Association JAIA 010206)

■Note Please keep away from places where there is a risk of freezing.
If there is a gap of more than 8mm, please use the FR felt first.

Capacity	ml	330	900
Packaging	pieces/per box	20	12

FR Felt

Is a material to be filled in between the precursor for fireproof sound insulation walls. Use in conjunction with Sukima-Naito.
It is a non-flammable material made of inorganic fiber . Bulk density 150kg/m^3.

Application (classification with the thickness of underlayment)		12.5/15mm	21mm	
Dimension (thickness X width X length) mm		10×10×1000	10×15×1000	10×20×1000
Packaging	pieces/per box	100 or 200	100	100

Urethane Seal・Acrylic Seal

Is a gap filler to be used for gypsum board wall. There are two types polyurethane and acrylic. Can be used in order to ensure the sound insulation performance.
You can use a commercially available cartridge gun.
F☆☆☆☆ product. (Japan Sealing Association Urethane: JSIA 843002 Acrylic: JSIA 843001)

Application (classification with the thickness of underlayment)		Urethane seal	Acrylic seal	
Dimension (thickness X width X length) mm		320	330	900
Packaging	pieces/per box	10	20	12

G Cork

Used to fill in the gaps between the walls to ensure the fire proof wall.
The reaction curing type used to mix with water. One bag Contains 20kg.

CA Bond

CA bond is an adhesive used when applying gypsum board to a concrete foundation. Adjustment of concrete foundation is not needed. Only water is needed for mixing. One bag contains 20kg.
F☆☆☆☆ product. (Japan Architecture Coverings Industry Association 1001001)

MK－2

Overlaid clad adhesive for gypsum board. Mainly, used in our fireproof “new STW”. It is a type of inorganic dry curing. Please use in conjunction with staples or screws.

■Precautions Please store at above 5℃ and in a location which does not rise above 35℃.
When stored for a long time the viscosity of the adhesive is increased in which you need to stir and add water little by little to adjust the viscosity.

SD Bond

It is an elastic adhesive to be used for the overlapped gypsum board for solid borne sound measures. It will reduce the transmitted waves of sound when objects hit the wall. You can use for our fireproof sound insulation wall “TGW 2H-C・G ”(solid borne sound proof type). Reaction is curing type. Please use in conjunction with staples.
One box contains 20kg.
F☆☆☆☆ product. (Japan Adhesive Industry Association JAIA 008634)

■Precautions
- In order to fully ensure the sound performance, make sure it is entirely bonded. Cannot get the full sound performance if bond is only added by dots.
- Please store at above 5℃ and in a location which does not rise above 35℃.
- Use within 6 months from the date of manufacture.
- Do not mix with other adhesives.

Joint Compounds

■ Please see individual catalogues for details.

Rakutto F

Rakutto B

It is a putty material used for joint processing of gypsum board.
Reaction curing type used to mix with water.
F☆☆☆☆ product. (Japanese Architecture Coverings Industry Association 0508001)

■ Mix the powder with water. Two types available; first coat / second coat.

Category	Rakutto B-60	Rakutto B-90	Rakutto F-90	Rakutto F-120
Application time	60 minutes	90 minutes	90 minutes	120 minutes
Application	Primer		Finish coating	
Dimension kg/per pag	8		8	

Fiber Tape

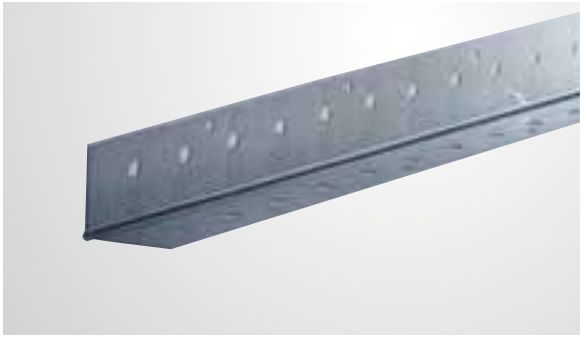
Joint processing material for gypsum board.
A combination of joint compound.

Category		Fiber Tape
Thickness	mm	Width 50mm
Winding length	m/roll	100
Tackiness		Yes
Material		Glass fiber (mesh)

Fiber Tape

Corner Beat

It is used for the external corner portion of the gypsum board walls, and is made of galvanized sheet reinforcement.



H Joiner

It is used for our non-stud fire wall “SP-N1” and “TGSPW”.
It is a galvanized steel sheet joint joiner.
Place both sides of the Reinforced Gypsum Board (21mm thickness) into the joiner.

Curing Sheet / Curing Tape

Use curing sheet for protecting the finished surface and curing tape to hold the sheet.

Curing Sheet

The sheet is light and soft with a embossed surface and can be cut with a cutter.

Curing Tape

This tape is used to stop the curing sheet. It can be cut easily by hand. Width 38mm, winding length 50m. It is a type of tape in which it does not leave adhesive on the surface (Stainless steel adhesive force 700g/25mm).

Curing Sheet

Curing Tape

JIS for Gypsum Board Products

Background on Specification Revisions

1994 The conventional 5 published specifications for gypsum boards are integrated as JIS A 6901 Gypsum Board.
Sound deadening gypsum board with pores (GB-P) was subsumed within the JIS A 6301 Sound Absorbing Materials.

1997 In order to make JIS A 6901 Gypsum Board conform to the global International Quality Standards, aimed to align with ISO 6308:01908 (Gypsum Plaster board-Specification).
The former non-combustible gypsum laminated board is added as a JIS Certified product, non-combustible laminated gypsum board (GB-NC).

2005 Hard gypsum board (GB-*-H), moisture absorption-desorption gypsum board (GB-*-Hc), structural gypsum board (GB-St) were added to the JIS A 6901 Gypsum Board.
Note) The letter R, S, or D is inserted in place of asterisk depending on the type of gypsum board.

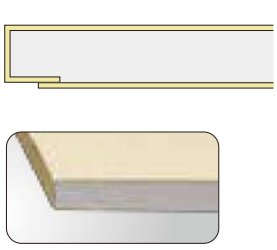
2014 To improve the reliability of fire performance, the lower limit for "thickness" has been raised, also "mass per unit area" and "specific gravity" has been nornalized by the Ministry of Land, Infrastructure and Transport.

Categories and Codes of Gypsum Board Regulated by JIS

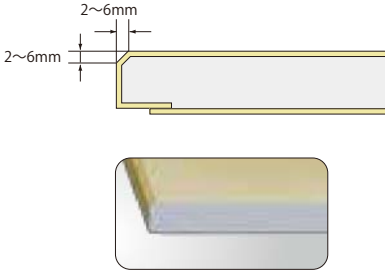
Category		Code	Note
Gypsum Board		GB-R	Standard gypsum board.
Gypsum Board Sheathing		GB-S	Featuring water repellant paper facings and core.
Reinforced Gypsum Board		GB-F	GB-R with inorganic fiber mixed into the core.
Gypsum Lath Board		GB-L	GB-R with oblong pores on the surface.
Decorated Gypsum Board		GB-D	GB-R with decorated surface.
Non-combustible Laminated Gypsum Board		GB-NC	GB with non-combustible face paper or boards with decoration.
Sound Deadening Gypsum Board with Pores		GB-P	A Sound absorbing material specified by JIS A 6301.
Standard Hard Gypsum Board		GB-R-H	Gypsum boards with about 1.2 times or higher impact resistance than GB-F and about 1.3 times or higher flexural fracture load than GB-R.
Moisture Absorption-Desorption Gypsum Board		GB-R-Hc GB-D-Hc	Gypsum boards that have equivalent performance to GB-R and GB-D but have enhanced moisture absorption and desorption performances.
Structural Gypsum Board	A Type	GB-St-A	Gypsum boards that have equivalent performance to GB-F but have enhanced lateral nail resistance, which will be the standard for categorizing Type A and Type B.
	B Type	GB-St-B	

Edge Configurations

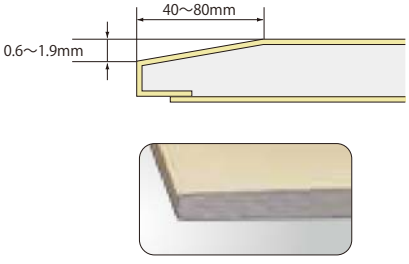
Square



Tapered



Beveled



Dimensional Tolerance

Unit mm

Thickness	Length	Width
+0.5	+3	0
	0	−3

Outline of Testing Methods for Various Properties

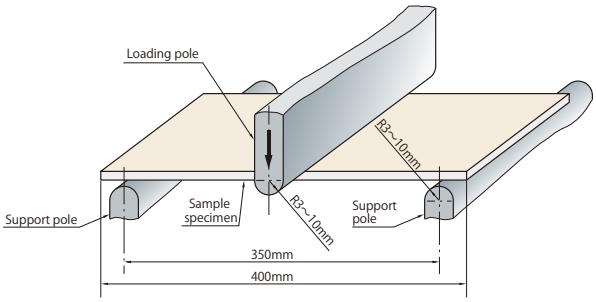
Test specimens used are of a constant mass dried at 40°C.

Moisture Content

The rate of weight change after drying a specimen stored in a normal state at 40°C. Weight after drying is the baseline weight.

Flexural Fracture Load

300mm × 400mm sample specimen set on a support table measuring 350mm. At wet state, the sample specimen is left standing for 96 hours under control conditions of a temperature of 40°C and humidity at 85~90%rh.



Impact Resistance

When a 500g steel ball is dropped onto a 300mm × 400mm sample specimen, placed on sand, it shall not form cracks and an indentation formed shall be smaller than the predetermined diameter. The height from which the steel ball is dropped differs depending on the thickness of sample specimen.

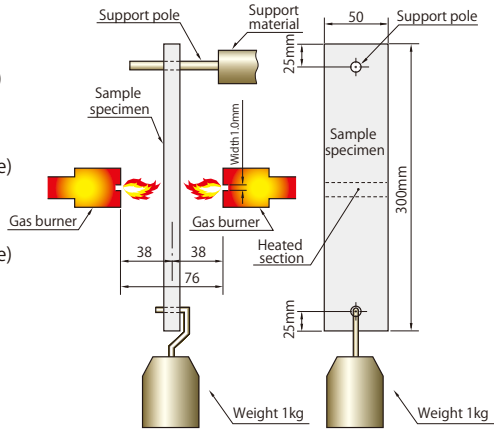
Height of drop

Board thickness / Board type	9.5mm	12.5mm	15mm	21mm
GB-F,GB-H,GB-St	500mm	650mm	800mm	1000mm
GB-D,GB-NC	500mm	600mm	700mm	—

Fire Resistance

When both sides of a 50mm × 300mm sample specimen with a weight of 1000g are exposed to two gas burners at 1000°C for one of the predetermined durations listed below, the sample specimen shall not break nor drop. Exposure time differs depending on the thickness of sample specimen.

· Thickness of 12.5mm (8 minutes exposure)
· Thickness of 15.0mm (10 minutes exposure)
· Thickness of 21.0mm (12 minutes exposure)



Resistance to Peeling in Water

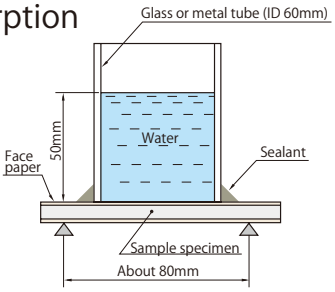
A sample specimen soaked in water for 2 hours is checked to see whether its paper facing peels off from the core. Specimens that have been measured for water absorption content are used.

Water Absorption Content

The rate of weight change when a 300mm × 300mm sample specimen is soaked in water for 2 hours. Weight before soaking in water is the baseline weight.

Surface Water Absorption

The rate of weight change when a glass tube with an inside diameter of 60mm is placed on the board with the tube periphery sealed, in which water is poured to a height of 50mm and left standing for 3 hours. Weight before water absorption is the baseline weight.



Discoloration-Fade Resistance

After 48 hours irradiation with a UV carbon fade meter, the specimen shall not show discoloration that exceeds level 3 of the gray scale for discoloration-fade and there shall be no cracks, swelling, or wrinkles on the surface.

Flame Retardant Property

Specification showing non-flammability. The rise in temperature and the degree of smoke emission are checked during heating. JIS A 1321 testing method.

Heat Resistance

Value indicating how difficult heat transmission is. JIS A1420 testing method.

Types of Fireproof Material

Specification showing non-flammability. Based on the Building Standard Law.

Compressive Strength

Maximum load when a 50mm × 50mm sample specimen is compressed towards the thickness direction.

Nail Holding Strength

Maximum load to sink the head of a nail that is already nailed into the board.

Humidified Deflection

The rate of size change of a 40mm × 100mm sample specimen, which is dried at 40°C, and then left standing in open air for a day at 23°C and 90%rh humidity.

Young's Modulus in Bending

Value showing the flexural rigidity of the board. Calculated from the flexural fracture load measurement data.

Moisture Absorption and Desorption

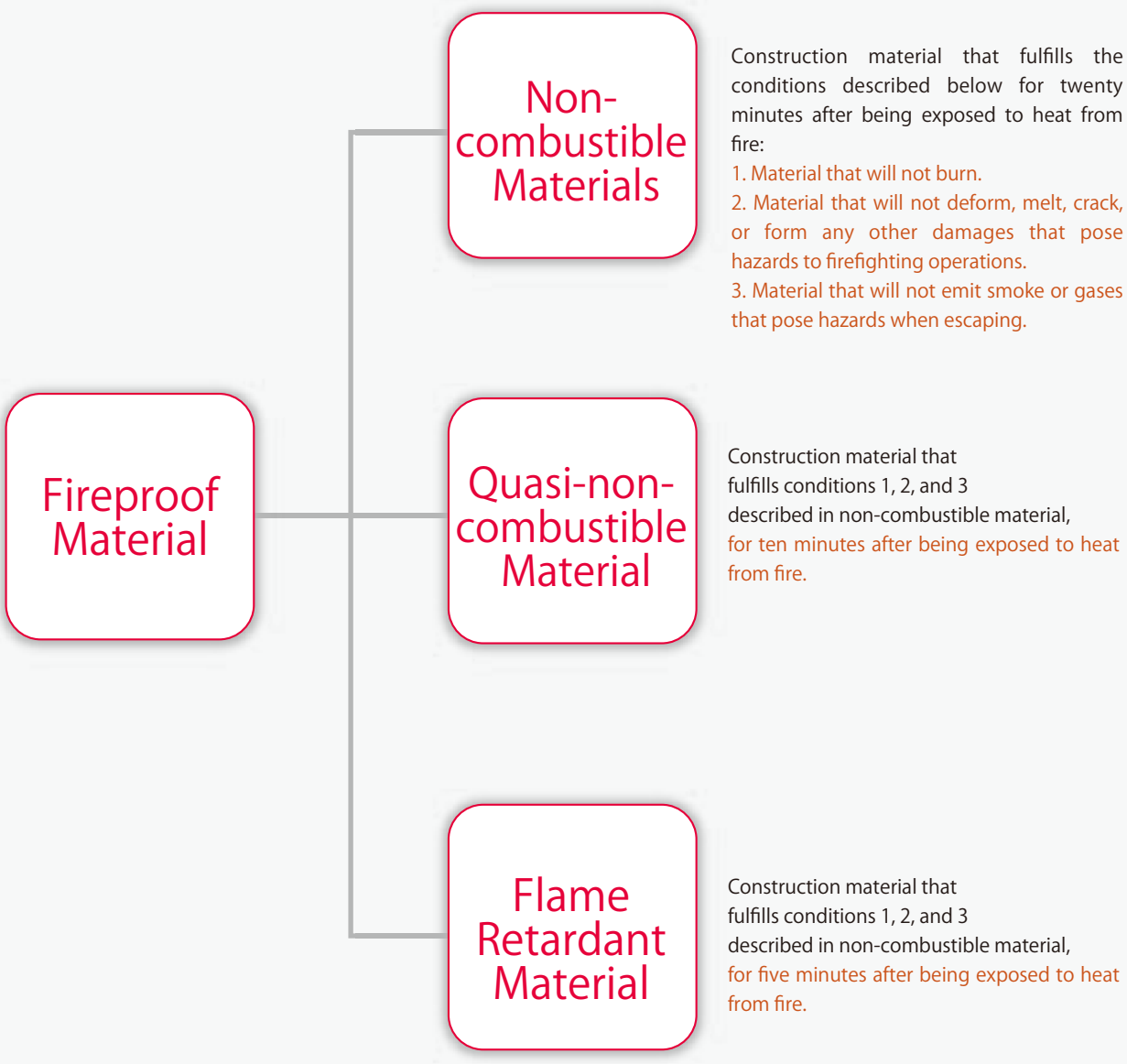
Measurement of the mass of a 100mm × 100mm sample specimen sealed with aluminum tape, except for the face side, which is maintained in a predetermined condition.

Mass 1: 23±0.5°C 53±3%RH constant mass
Mass 2: 23±0.5°C 93±3%RH 24 hours
Mass 3: 23±0.5°C 53±3%RH 24 hours
Moisture absorption (g/m²) = (Mass ② − Mass ①) / Sample specimen one surface area
Moisture desorption (g/m²) = (Mass ② − Mass ③) / Sample specimen one surface area

Lateral Nail Resistance

The strength required to fracture a 150mm × 75mm sample specimen when a round steel bar (φ 2.6mm) is inserted into a point 12mm away from the edge of the specimen, and then tensile load is added.

Types of Fireproof Material



List of Restrictions on Interior Finish

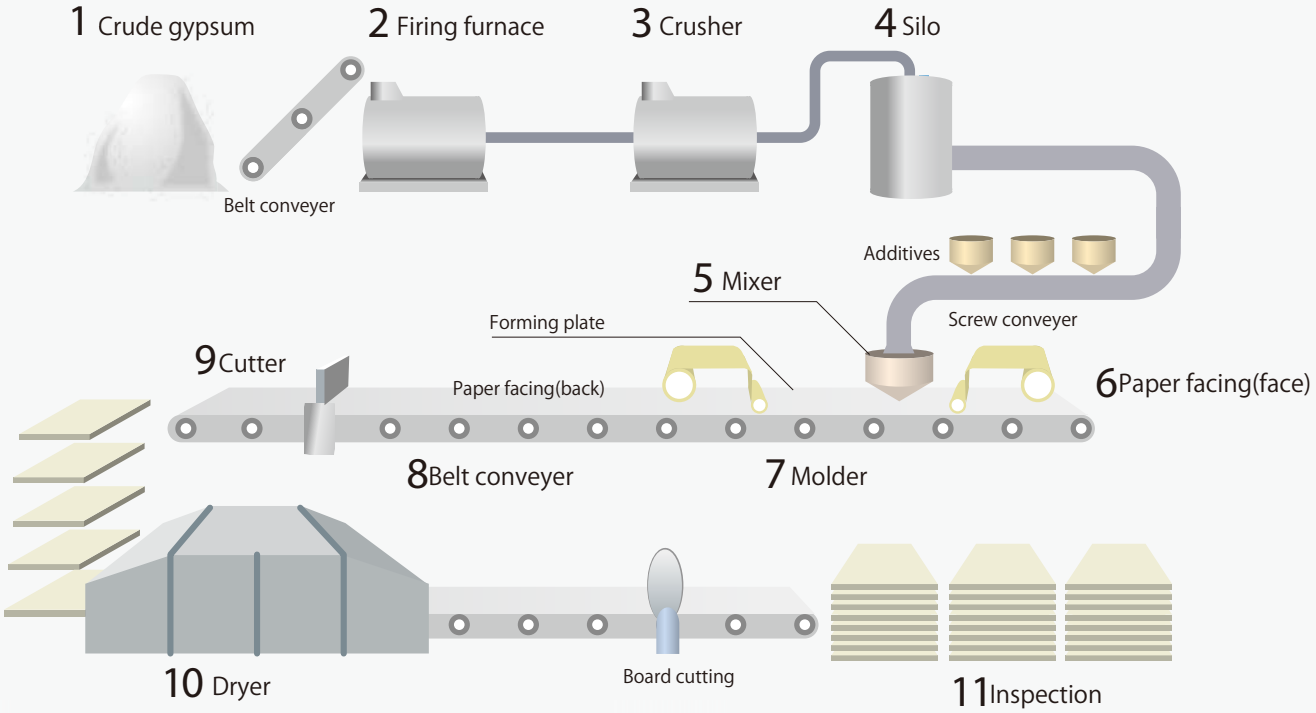
Materials allowed for use in building interiors are specified by the Building Standard Law, which stipulates that only material certified as non-combustible or quasi-noncombustible, depending on the use and scale of the building structure, can be used as interior material.

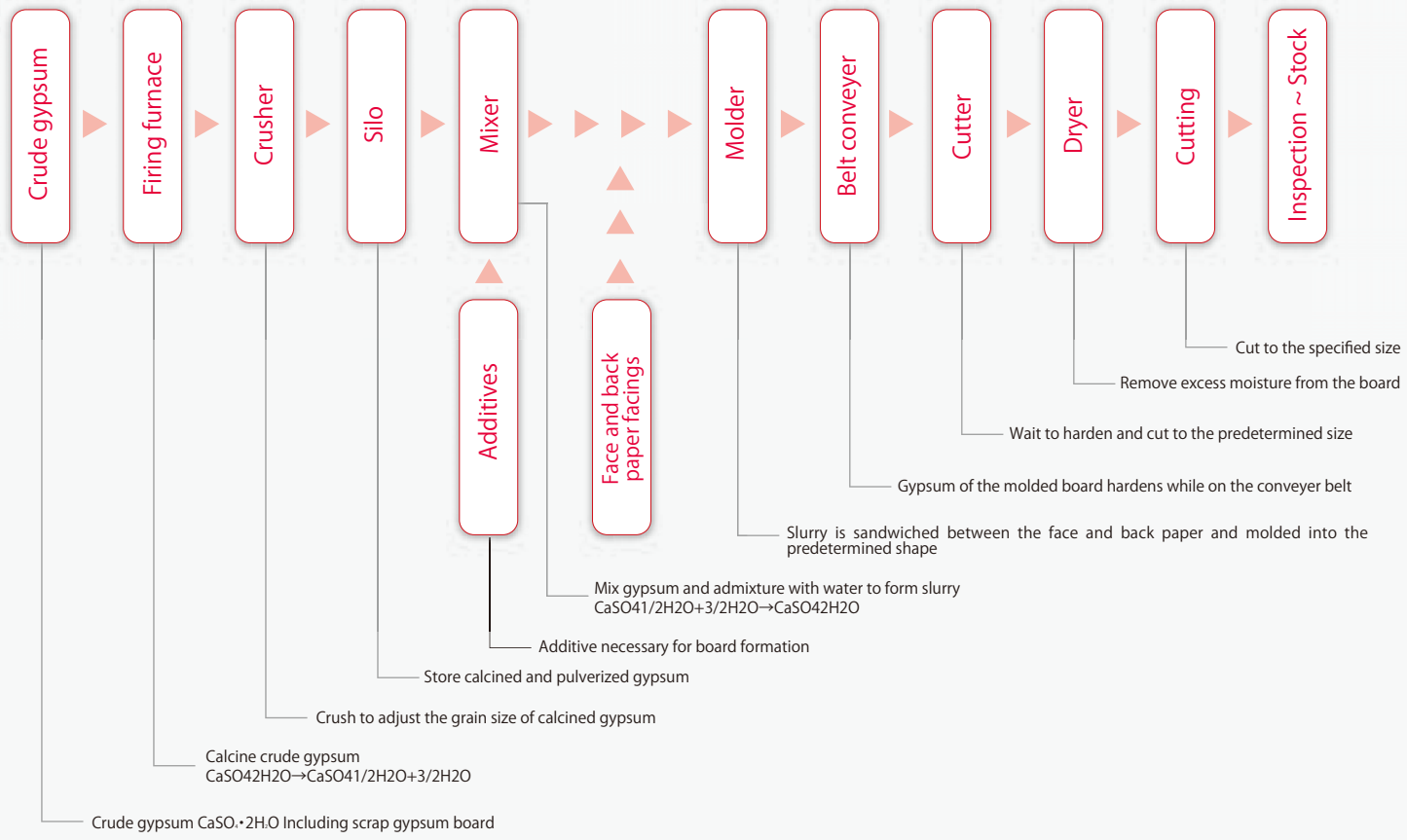
Use / Structure / Scale		Total Floor Area Available for the Relevant Use			Restrictions on Interior Finish		Provisions Enforcement ordinance of the Building Standard Law
		Fireproof structures (Specific evacuation collapse time prevention buildings (h≧1 hour))	Quasi-fireproof structures (Specific evacuation collapse time prevention buildings (45≦h≦1))	Other structures	Living quarters	Primary passage ways, stairways and aisles leading to the aboveground	
①	Theaters, movie theaters, entertainment halls, pavilions, auditoriums assembly halls	(Seating) 400m² or larger	(Seating) 100m² or larger		Non-combustible material Quasi-noncombustible material Fire retardant material*3 (Structures with living quarters on 3rd floor and higher must use non-combustible or quasi-noncombustible material for the ceiling)	Non-combustible materials Quasi-noncombustible material	129・① 128-4・①
②	Hospitals, clinics (with inpatient facilities),hotels,inns, boarding houses, apar tment complex, dormitories, nursing homes, child welfare facilities (En forcement Decree19-①)	(3rd floor and above) 300m² or larger (excluding buildings with fireproof compartments per each or within 100m² (200m² for apar tment complexes). The same applies to the right column).	(2nd floor) 300m² or larger (hospitals and clinics are those with inpatient facilities on the 2nd floor)	200m² or larger			
③	Department stores, supermarkets, shops, night clubs, bars, dance halls, waiting rooms, restaurants, catering establishments and other merchandising establishments (excluding businesses with area of 10m² or smaller)	(3rd floor and above) 1000m² or larger	(2nd floor) 500m² or larger	200m² or larger			
④	Areas or rooms in underground floors used for purposes listed in ①, ②, or ③	All			Non-combustible material		129- ③ 128-4-①-3
⑤	Garage, auto-repair shop	All			Quasi-noncombustible material		129-② 128-4-①2
⑥	Living quarters with no windows (Refer to the Building Standard Law 128-3-2)	All (excluding buildings with ceilings higher than 6m)					129⑤ 128-3-2
⑦	According to number of floors or the scale	· 3rd floor or above with an area exceeding 500m² · 2nd floor with an area exceeding 1000m² · 1st floor with an area exceeding 3000m² However, the followings are exceptions: 1. Schools, etc. (En forcement Decree126-2-①-2) 2. For regular buildings which have a fire compartments every 100m²,which have a section in which the height is lower than 31m. 3. Portions 31m or below in buildings used for purposes described in ②.			Non-combustible material* Quasi-noncombustible material* Fire retardant material*3	Same as above	128-4-②③ 129-④
⑧	Rooms using fire	Residential housing: rooms on the second floor and higher, except for the highest floor, that use fire Other structures: all rooms using fire			Non-combustible material Quasi-noncombustible material	—	129-⑥ 128-4-④
⑨	11th floor and above	Area with a fireproof compartment within 100m²			＊1		112-⑤
		Area with a fireproof compartment within 200m² (excluding fire- proof equipment possessing 20-minute fire blocking capacity)			Non-combustible material / Quasi-noncombustible material (including substrate)*		112条-⑥
		Area with a fireproof compartment within 500m² (excluding fire- proof equipment possessing 20-minute fire blocking capacity)			Non-combustible material (including substrate)*		112-⑥
⑩	Underground mall	Area with a fireproof compartment within 100m²			＊2		128-3-①-3 128-3-⑤
		Area with a fireproof compartment within 200m² (excluding fireproof equipment possessing 20 minute fire blocking capacity)			Non-combustible material / Quasi-noncombustible material (including substrate)*	Non-combustible material (including substrate)	
		Area with a fireproof compartment within 500m² (excluding fireproof equipment possessing 20 minute fire blocking capacity)			Non-combustible material (including substrate)		
⑪	Elevator hall	All			Non-combustible material or quasi-noncombustible material (including substrate) for areas compartment- ed with smokeproof walls		—

*1 The provisions of the ⑨ column, for the fir compartment portion within 100m2,the limit of the materials used is not listed, it is defined by the rank and scale of buildings.
*2 Provisions of ⑩ column, for fire compartment portion within 100 m2, the limit of the materials used is not listed, for the part ①②③ applciations, provision ④ is applied.
*3 When following the rules established by the Minister for ceilings to be quasi-noncombustible materials, you may use wood for the walls.

Note 1. Areas of the building that are subject to interior restrictions are walls and ceilings (if there is no ceiling, then roof) facing the rooms of living quarters and primary passage ways, stairways, and aisles leading from the living quarters to the above ground. However, for columns ①, ②, ③, ⑦, ⑨ and ⑩ with asterisks, the restriction does not apply to walls 1.2m or below from the floor of the relevant living quarters (En forcement Decree 129-①-112-⑥).
2. The most stringent regulation shall apply to the portions of building structures subject to two or more regulations of the restrictions on interior finish.
3. Regulations of the restrictions on interior finish shall not apply to the portions of building structures, which install automatic sprinklers, water spray extinguishing systems, foam extinguishing systems, or any other equivalent automatic equipment, as well as smoke ventilation systems stipulated in the En forcement Decree 126-3 (En forcement Decree 129-⑦).
4. Regarding the regulations on column ⑨⑩, the portions of building structures that install automatic sprinklers, water spray extinguishing systems, foam ex- or any other equivalent automatic equipment are allowed to have twice the floor area for the fireproof compartment. (En forcement Decree112-①)
5. This regulation is set to regard the hoistway door as fireproof door that corresponds to the En forcement Decree 110-④ and 112-⑪ in line with the regulations on the structure of the hoistway door of elevators ⑪.
6. Please refer to the Enforcement Decree, its enforcement ordinance, and other related documents for detail.

Manufacturing Flow Chart for Gypsum Board Products





MEMO

How to Handle Gypsum Boards

1. Use the product for its specified use.
   Avoid use in places where the boards may be continuously or repeatedly exposed to water, high humidity, or condensation (saunas, basements, bathrooms, indoor pools, etc.), because water absorption (moisture absorption) may reduce the strength of the boards or cause them to fall off.
2. A rise in humidity during and after installation may cause mold to develop. Dehumidify and assure proper ventilation to lower the humidity.
3. Place the boards on a pallet, pieces of wood, or underlay board and cover with a water proof sheet at construction sites to protect against rain and water.
4. The weight of each gypsum board varies with thickness, size, and type. However, in general, gypsum boards with a size of 9.5 X 910 X 1,820mm weigh about 11kg, and those with a size of 12.5 X 910 X 1,820mm weigh around 14kg. Considering the weight of gypsum boards, make sure to wear a safety helmet, safety shoes, and slip-resistant gloves when handling and transporting them.
5. Dust may generate when cutting, processing, or installing. Use safety glasses and a dust mask to prevent dust from entering your eyes, nose, and mouth.
6. Store the boards in a well-balanced state, arranged in neat stacks with the front and back, right and left, and top and bottom lined up. If a large number of gypsum boards are stacked in an unbalanced way, they may collapse.
7. Miscellaneous
   1. Currently, asbestos is not used in our products.
   2. Chlorpyrifos is not used in our products.
   3. Chiyoda gypsum boards are not classified as a construction material that releases formaldehyde stipulated on the notification, and thus has no restriction on the area of use.

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