WITHFUR

VINCERO WALL INORGANIC BOARD

Vincero Wall

Semi-noncombustible Finish Panel

Eco-friendly

Fire Resistance

Water Resistance

Functionality

Economic Efficiency

Design Diversity

Company Status

Company Status	Company Name	WITHFUR Co.,Ltd.	Business Registration Number	137-81-51834
		WITHFUR Co.,Ltd.	Industry/Business	Manufacturing/Furniture, etc.
	Location	Headquarters Factory	278-3, Geumgok-dong, Seo-gu, Incheon	
		Second Factory	183-1, Daemyeong-ri, Gimpo-si, Gyeonggi-do	
	Year Established	2001	Representative Director	Han Sang-dam
Number of Employees	Headquarters Factory	50	Second Factory	3
Business Areas	Eco-friendly Hybrid UV Coating / Semi-noncombustible Interior Wall Finish Panel			

Vincero Wall INORGANIC Board

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Company History

2000

2001 WITHFUR founded
2007 Expanded and relocated Geomdan Factory
Selected as Promising SMEs (Woori Bank)
2009 Received Incheon Mayor's Award

2010

2010 Commendation from Korea Federation of SMEs
2013 Commendation from the NTS Jungbu Regional Office Chief
2014 Commendation from Small and Medium Business Administration Chief
Acquired 5 patents
2015 Environmental Label Certification
2017 Received IR52 Jang Young-shil Award
2019 Established a dedicated R&D department

2020

2021 Green Technology Certification
2022 INNOBIZ Certification
MAINBIZ Certification
2023 Patent for flame retardant wood board
2024 Established Gimpo Branch_ Second Factory

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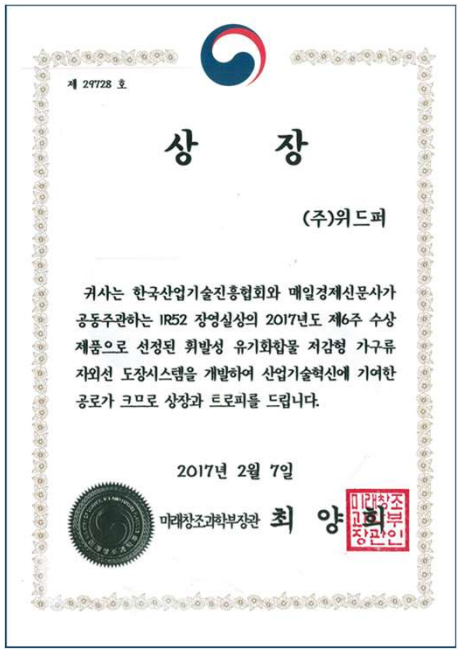
Certifications and Awards

IR52 Jang Young-shil Award

(Ministry of Science, ICT and Future Planning)



제 29728 호

상 장

(주)위드퍼

귀사는 한국산업기술진흥협회와 매일경제신문사가 공동주관하는 IR52 장영실상의 2017년도 제6주 수상 제품으로 선정된 휘발성 유기화합물 저감형 가구류 자외선 도장시스템을 개발하여 산업기술혁신에 기여한 공로가 크므로 상장과 트로피를 드립니다.

2017년 2월 7일

미래창조과학부장관 최 양 희

2020 Selected for Innovative Technology

(Korea International Trade Association, Korea Commission for Corporate Partnership, Hoban Group)

무협, '2020 혁신기술 공모전' 수상기업 10곳 선정

류정현 기자 | 승인 2020.11.06 11:13

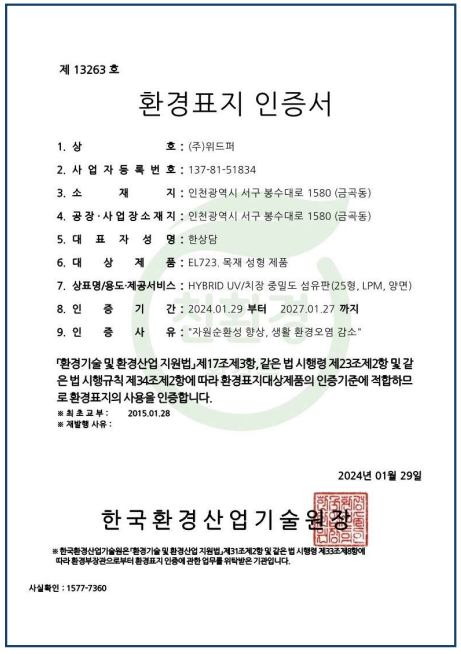
플럭시티, 모콘에스티, 텐일레븐 등 10개 기업이 '2020 혁신기술 공모전'에 선정됐다.

동반성장위원회, 호반그룹, 한국무역협회는 6일 혁신기술 발굴을 위해 개최한 '2020 혁신기술 공모전' 최종 심사를 마무리하고 이같이 밝혔다.

대상에는 디지털트윈 기반 공사현장 안전관리 플랫폼 솔루션 개발을 제안한 '플럭시티'가 영예를 안았다. 최우수상에는 △모콘에스티 △텐일레븐, 우수상에는 △소프트런치 △제니레잇 △라운지랩, 장려상에는 △인포씨드 △위드퍼 △바로건설기술 △우공티엔씨 등이 선정됐다.

Environmental Label Certificate

(Ministry of Environment)



제 13263 호

환경표지 인증서

1. 상 호 : (주)위드퍼
2. 사 업 자 등 록 번 호 : 137-81-51834
3. 소 재 지 : 인천광역시 서구 봉수대로 1580 (금곡동)
4. 공장·사업장소재지 : 인천광역시 서구 봉수대로 1580 (금곡동)
5. 대 표 자 성 명 : 한상담
6. 대 상 제 품 : EL723. 목재 성형 제품
7. 상표명/용도·제공서비스 : HYBRID UV/치장 중밀도 섬유판(25형, LPM, 양면)
8. 인 증 기 간 : 2024.01.29 부터 2027.01.27 까지
9. 인 증 사 유 : "자원순환성 향상, 생활 환경오염 감소"

「환경기술 및 환경산업 지원법」 제17조제3항, 같은 법 시행령 제23조제2항 및 같은 법 시행규칙 제34조제2항에 따라 환경표지대상제품의 인증기준에 적합하므로 환경표지의 사용을 인증합니다.

※ 최초고시일 : 2015.01.28
※ 제발행 사유 :

2024년 01월 29일

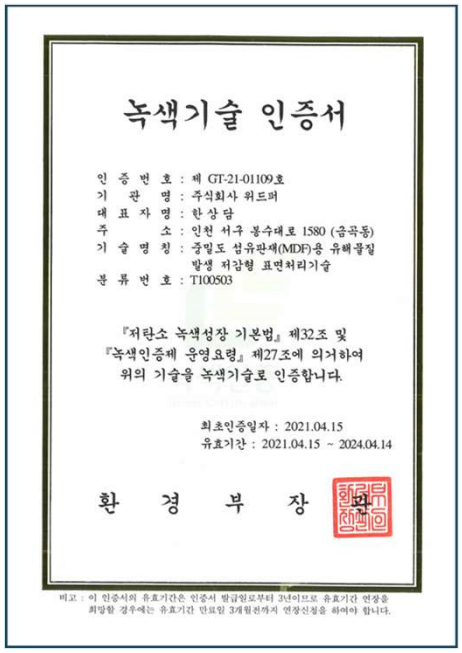
한국환경산업기술원장

※ 한국환경산업기술원은 「환경기술 및 환경산업 지원법」 제31조제2항 및 같은 법 시행령 제33조제2항에 따라 환경부장관으로부터 환경표지 인증에 관한 업무를 위탁받은 기관입니다.

사실확인 : 1577-7360

Green Technology Certificate

(Ministry of Environment)



녹색기술 인증서

인 증 번 호 : 제 GT-21-01109호
기 관 명 : 주식회사 위드퍼
대 표 자 명 : 한 상 담
주 소 : 인천 서구 봉수대로 1580 (금곡동)
기 술 명 칭 : 중밀도 섬유판(MDF)용 유해물질 발생 저감형 표면처리기술
분 류 번 호 : T100503

『저탄소 녹색성장 기본법』 제32조 및 『녹색인증제 운영요령』 제27조에 의거하여 위의 기술을 녹색기술로 인증합니다.

최초인증일자 : 2021.04.15
유효기간 : 2021.04.15 ~ 2024.04.14

환 경 부 장 관

비고 : 이 인증서의 유효기간은 인증서 발급일로부터 3년이므로 유효기간 연장을 희망할 경우에는 유효기간 만료일 3개월전까지 연장신청을 하여야 합니다.

Patent Status

Number	Issue Date	Number	Patent Title	Note
1	2014-02-26	10-13700541	Pre-treatment and Film Adhesion Method using UV Curable Coating for Boards	
2	2014-07-30	10-1426834	Eco-friendly UV Coating Method for Boards	
3	2014-09-23	10-1446598	UV Coating Method for Forming Various Patterns on Boards	
4	2014-11-06	10-1461074	UV Coating Method for Rapid Curing of Boards	
5	2015-03-06	10-1501952	UV Coating Method and Device Simplifying Curing Process for Boards	
6	2022-01-25	10-2359035	Eco-friendly UV Coating Method with Improved Hiding and Yellowing Resistance for Boards	
7	2022-07-15	10-2423023	Eco-friendly Board Coating Method with Hanji Texture	
8	2023-01-05	10-2486673	Eco-friendly Board Coating Method with Hanji Texture	
9	2023-02-14	10-2501116	Glue Paper, LPM Impregnated Paper, Inorganic Eco-friendly Decorative Board and its Manufacturing Method	
10	2023-03-05	10-2645383	Flame Retardant Wood Board Processing and Manufacturing Method	

Vincero Wall INORGANIC Board

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Introduction to Vincero

Interior Architecture New Material for Wall Finish and Next-Generation Tile Alternative

Retains natural inorganic mineral properties, and highly resistant to water and fire without toxic gas emissions.

Vincero Wall INORGANIC Board

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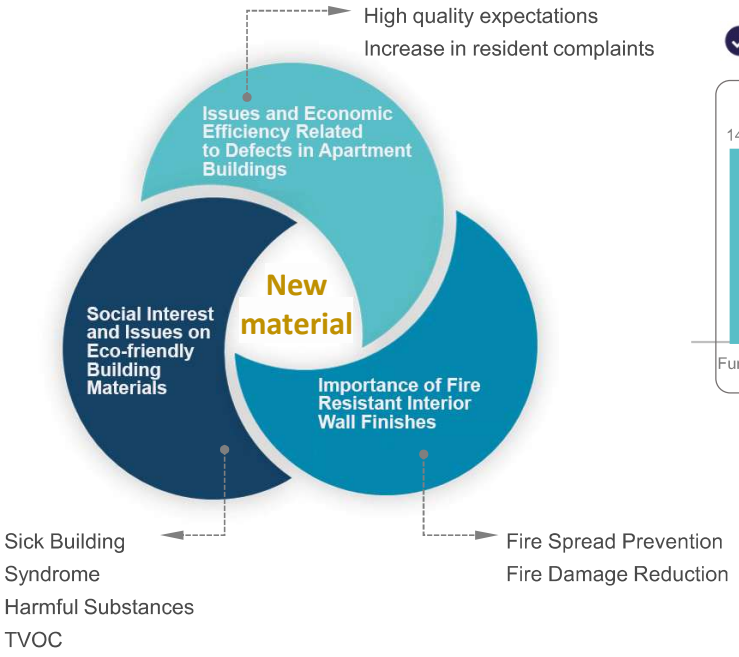
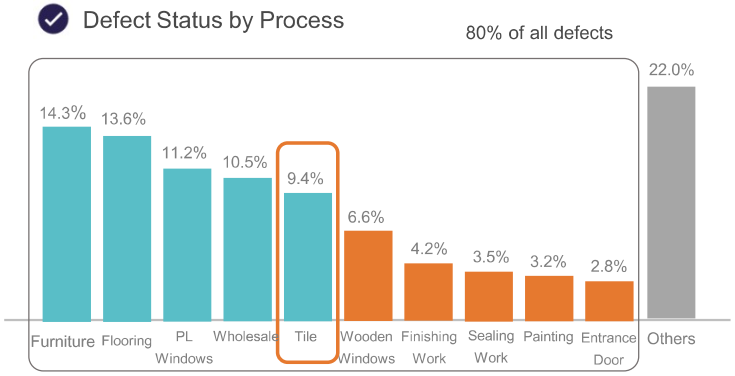
Development Background



Defect Status by Process



LH Corporation Zero Complaint Customer Quality Evaluation System (Proposal) 2020.12

Bathroom Tile Defect Cases

Defect Issues		Factors Related to Defects (Area and Material)						
		Base Frame	Base Mortar	Adhesion Mortar	Tile	Joint	New Construction Joint	Waterproofing for Coping
Peeling		○	◎	◎	◎	○	◎	○
Detached		○	◎					
Crack	Tile Surface			○	◎			
	Tile Surface	◎	○	○	◎	○	◎	
Efflorescence		○	○	○	○	◎		◎
Freeze Damage			○	○	◎	◎		○
Water Leakage		◎				○	○	◎

Vincero Wall INORGANIC Board

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Construction Advantages

Wall Tile Defect Cases

Tile Defect Cases

Vincero Wall Construction Advantages

Vincero Wall Construction Advantages

Maintains physical properties of natural inorganic minerals, and surface **durability is excellent**, not easily damaged **Screws and nails** can be applied **without breaking**

Vincero Wall INORGANIC Board

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Development Purpose

General Use

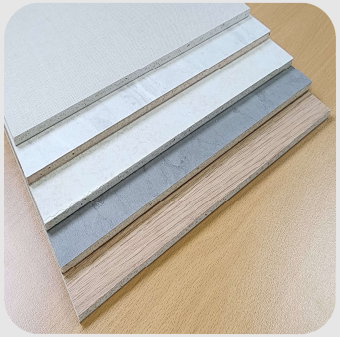
- Material for replacing tiles and marble
- Public halls, Community spaces, Art walls in each unit, Kitchen walls (midway), Hallways and bathroom Wall panel finishing

Core Functions

- Semi-noncombustible inorganic interior wall finish material
- Required for interior spaces with fire resistance needs (Apartment buildings, schools, daycare centers, train stations or waiting areas, hospitals, study rooms, ship interiors, etc.)
- Eco-friendly material without harmful adhesives

Other Functions

- Excellent economic and aesthetic value as an interior construction material
- Easy to install and shortens construction period




Vincero Wall INORGANIC Board

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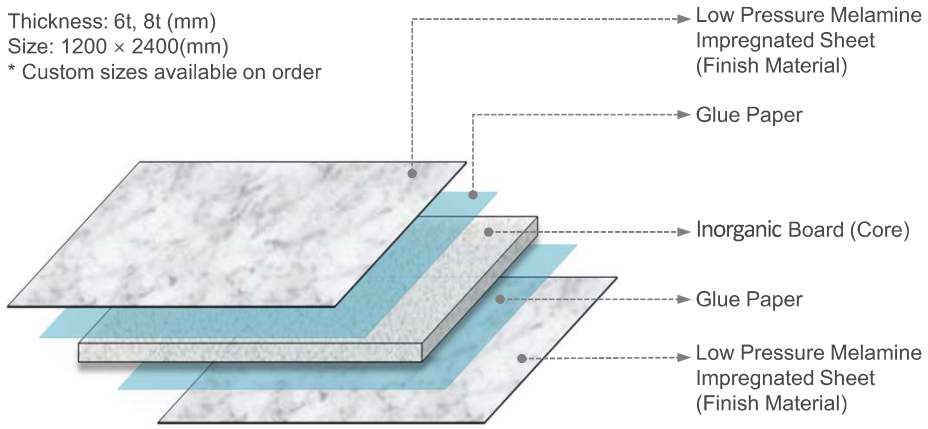
Product Features

Structure of Vincero Wall Board

Thickness: 6t, 8t (mm)
Size: 1200 × 2400(mm)
* Custom sizes available on order



Domestic Patent Status of Vincero Wall Board

Invention's Title	Current Rights Holder	Application Number	Application Date
Glue Paper, LPM Impregnated Paper, Inorganic Eco-friendly Decorative Board and its Manufacturing Method	WITHFUR	10-2022-0083699	2022-07-07

Vincero Wall Board Features

Eco-friendly
Environmentally friendly boards with no detection of formaldehyde, asbestos, or radiation, etc.

Fire Resistance
Non-combustible inorganic board with no toxic gas emissions and flame resistance. Fire Spread Prevention

Water Resistance
No dimensional instability or mold growth at relative humidity levels of 30-90%.

Corrosion Resistance
Corrosion resistant board that does not corrode when in contact with metals such as iron.

Functionality
Sound absorbing board with sound insulation (12mm, 39DB) Insulating board with low thermal conductivity (0.218W/mK)

Economic Efficiency
Cheaper than marble or tiles, with dry installation methods that shorten construction time, reduce material and labor costs

Design Diversity
Variety of patterns such as wood grain and marble stone

Ease of Maintenance
Excellent stain resistance for easy maintenance and replacement.

Vincero Wall INORGANIC Board

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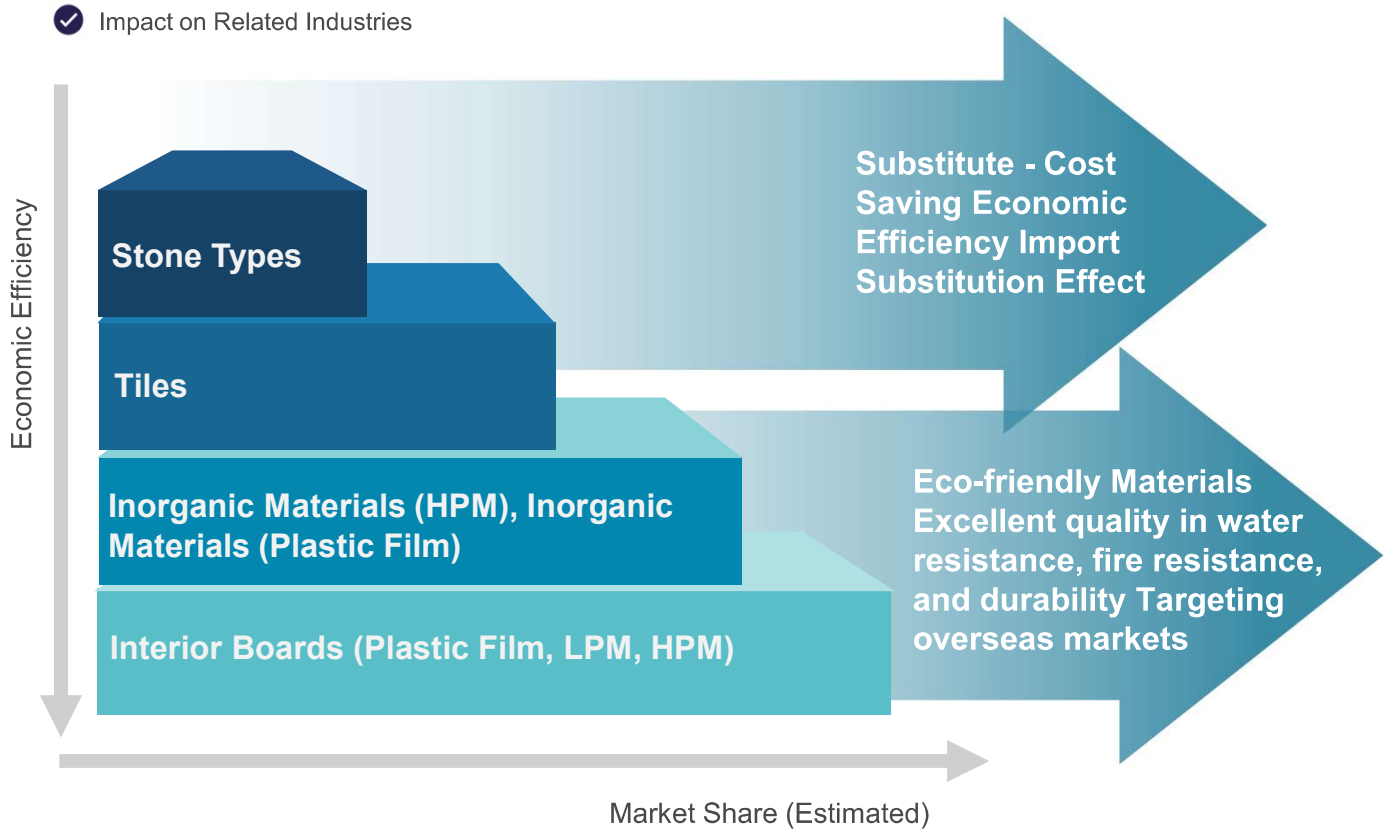
Economic and Technical Impact



1. Industrial advancement through application of inorganic decorative boards in tile industry
2. Protection of public health as eco-friendly interior construction material
3. Possible to work in winter, easy construction, and resolves labor shortage
4. Prevents fire accidents as flame retardant material, increases national fire safety index
5. Eco-friendly product capable of achieving carbon neutrality, aligns with ESG management

Vincero Wall INORGANIC Board

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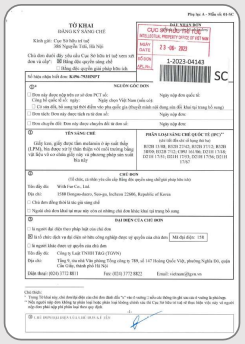
Differentiation

Proposed Technology

Category	Other Products Inorganic board + Plastic Film	Comparison Product Inorganic board + HPM	**Vincero Wall** Inorganic board + LPM
Adhesive Use	Used	Used	**Not used**
Unit Price	Low	High	**Low**
Density (kg/m)	1.06	1.10	**1.05**
Bending	Insufficient	Insufficient	**Good**
Non-combustible Grade	Not enough	Semi-noncombustible	**Semi-noncombustible**
Eco-friendliness	Insufficient	Excellent	**Excellent**

China International Patent Application

Vietnam International Patent Application



Serious issue of emission of combustion hazardous substances during fire

Need for reduction in fire risk and hazardous substances

Need to use inorganic board to reduce hazardous substances (magnesium commonly used)

Two inorganic board with high pressure melamine and low pressure melamine

Issues with High Pressure Melamine

1. Multi-layer adhesion providing combustion risk

2. Adhesive required for inorganic board adhesion

Need for low pressure melamine without adhesive to minimize combustion risk

However, no examples of low pressure melamine **without adhesive in domestic market**

First domestic development of low pressure melamine without adhesive

Vincero Wall INORGANIC Board

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Excellence

Significantly reduced harmful substances

Eco-friendly Performance

Eco-friendliness

Test Items		Test Method	Performance Criteria	Test Results	Comparison
Indoor Air Quality	TVOC	KS M 1988	4mg/(㎡ · h) or less	**0.005mg/(㎡ · h)**	99.8%▼
	Toluene		0.08mg/(㎡ · h) or less	**N.D.**	Not detected
	Formaldehyde		0.02mg/(㎡ · h) or less	**0.004mg/(㎡ · h)**	80%▼
Heavy Metals	Pb (Lead)	Environmental Hazard Factor Test Standard	3mg/kg or less	**N.D.**	Not detected
	Cd (Cadmium)		0.3mg/kg or less	**N.D.**	Not detected
	Hg (Mercury)		0.005mg/kg or less	**N.D.**	Not detected
	Cr^{6+}(Hexavalent Chromium)		1.5mg/kg or less	**N.D.**	Not detected

Test Items		Test Method	Unit	Inorganic board + HPM (NF)	Inorganic board + HPM	Inorganic board + PP	Vincero Wall	Comparison
Indoor Air Quality	TVOC	KS M 1988 (Small Chamber Method)	mg/(㎡·h)	0.026	0.004	0.919	**0.005**	98.4%▼
	Toluene			0.024	N.D.	0.850	**N.D**	Not detected
	Formaldehyde			0.037	0.016	N.D.	**0.004**	98.7%▼

* Significantly reduced harmful substances by 180 - 200 times compared to other products, confirmed as eco-friendly product

Pollutant Emission Test

* No detection of heavy metals
* 0 - 20% of standard level for harmful substances, significantly reduced as eco-friendly product

Pollutant Test Results using Small Chamber Method

Vincero Wall Board is an eco-friendly building material that has received significantly higher ratings than the standard.

Vincero Wall INORGANIC Board

WITHFUR

Excellence

Non-combustible and no toxic gas emissions,

safe semi-noncombustible performance

Semi-noncombustible

Test Items		Test Method	Performance Criteria	Test Results	Comparison
Heat Release Rate	Total Heat Release	KS F 5660-1	8 MJ/㎡ or less	1.80 MJ/㎡	77%▼
	Time Exceeding Limit		10 seconds or less	0 second	None
	Emission of Harmful Factors		Probably none	None	-
Gas Toxicity	Average Time to Immobility	KS F 2271	9 minutes or more	14 minutes 41 seconds	163%▲
45-degree Combustion Test	Flame Duration Time	Flame Retardant Performance Standard Article 7	5 seconds or less	0 second	None
	Smoldering Time		20 seconds or less	0 second	None
	Charred Area		40㎠ or less	5.27㎠	87%▼
	Charred Length		20㎝ or less	3.10㎝	85%▼
Smoke Density			400Dm(corr) or less	67.7Dm(corr)	83%▼

Test Items		Test Method	Unit	Inorganic board + HPM (NF)	Inorganic board + HPM	Inorganic board + PP	Vincero Wall	Comparison
Heat Release Rate		**KS F 5660-1**	MJ/㎡	9.8	13.73	**3.17**	1.80	**80%▼**
Gas Toxicity		**KS F 2271**	min:sec	14:19	12:38	14:58	14:41	**105%▲**
45-degree Combustion Test	Flame Duration Time	Flame Retardant Performance Standard Article 7	sec	0	0	**0**	**0**	-
	Smoldering Time		sec	0	0	**0**	**0**	-
	Charred Area		㎠	12.53	14.03	9.80	**5.27**	**57%▼**
	Charred Length		㎝	4.93	5.27	4.10	3.10	**35%▼**

Flame Retardant & Semi-noncombustible Test

* Flame and smoldering times are “0”, making ignition difficult, and charred area and length confirm 6 - 8 times better fire spread reduction
* Total heat release is 5 times lower than standard, indicating excellent flame retardant performance and fire spread prevention
* Gas toxicity shows 163% higher survival rate compared to standard, allowing for evacuation time during fire

* Compared to other products
  ① 80% reduction in heat release
  ② 40% reduction in charred area and 60% reduction in charred length, confirmed fire spread reduction
* 105% improvement in gas toxicity compared to existing products, allowing for evacuation time

Vincero Wall INORGANIC Board

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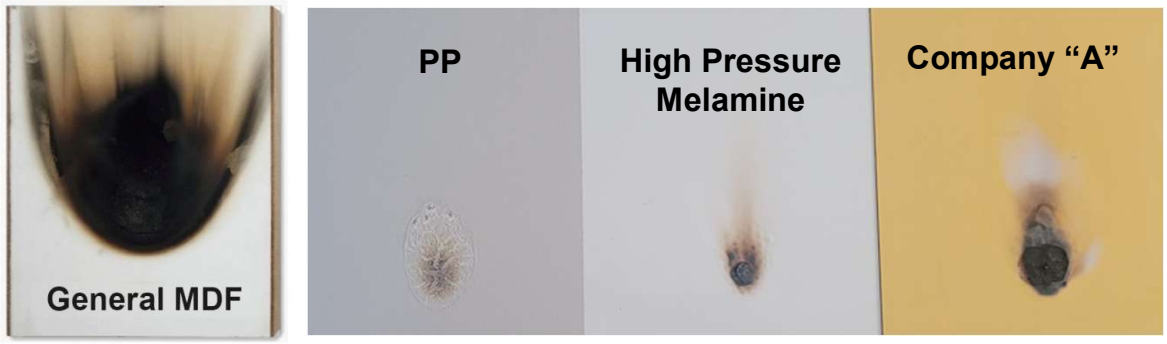
Excellence

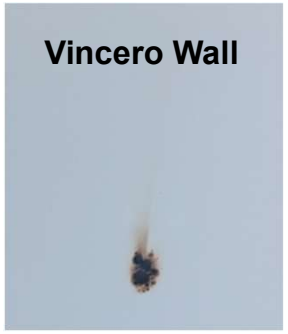
Non-combustible and no toxic gas emissions,

Fire Spread Prevention Safety

Combustion Test Heating Time After 120 Seconds



Combustion Test Heating Time After 120 Seconds



Conforms

After 22 minutes of ignition

INORGANIC Board
Non-combustible Test

Vincero Wall INORGANIC Board

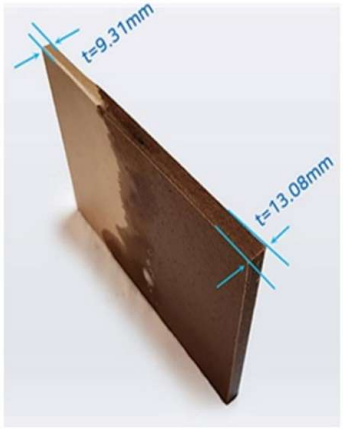
WITHFUR

Excellence

Highly water resistant and dimensionally stable

even with prolonged moisture exposure

After 10 days of water immersion



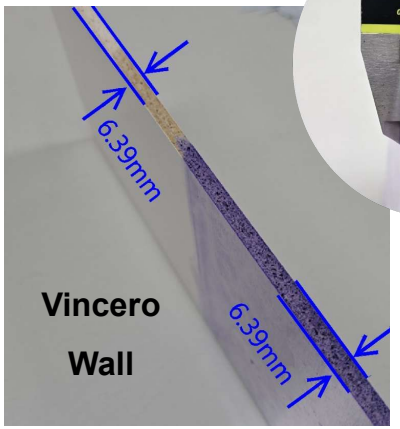
Thickness Change

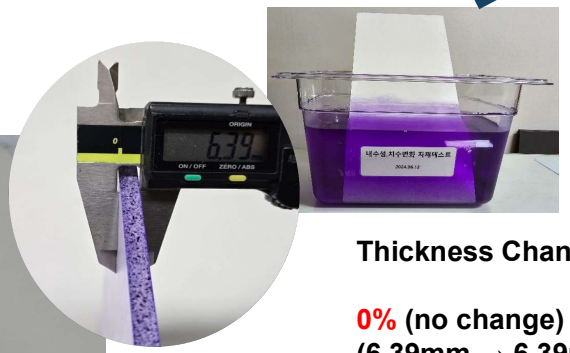
40.4% expansion
(9.31mm → 13.08mm)

Mold growth on 5th day of immersion

After 10 days of water immersion

Conforms





Thickness Change

0% (no change)
(6.39mm → 6.39mm)

No mold growth

Vincero Wall INORGANIC Board

WITHFUR

Excellence

No worries about mold growth

99.9% antibacterial removal rate

Test Items			Test Method	Performance Criteria	Test Results	Comparison
Antibacterial Test	Staphylococcus aureus	Colony Forming Units (CFU/㎡)	KS M ISO 22196	There must be no occurrence	<0.63	-
		Antibacterial Activity (log)			3.7	-
		Bacterial Reduction Rate (%)			99.9	Satisfied
	Escherichia coli	Colony Forming Units (CFU/㎡)			<0.63	-
		Antibacterial Activity (log)			5.3	-
		Bacterial Reduction Rate (%)			99.9	Satisfied

* 99.9% Antibacterial removal rate and low moisture absorption prevent mold growth

Mold spores spread in the air, affecting respiratory system, skin, and food, leading to conditions like atopy, dermatitis, asthma, and bronchitis

Vincero Wall board prevents mold growth

Vincero Wall INORGANIC Board

WITHFUR

Excellence

Highly resistant to damage and defects

Exceeds standard physical properties

Test Items			Test Method	Performance Criteria	Test Results	Comparison
Physical Property Test	Absorption	Total Absorption Rate	KS F 3504	10% or less	**5.33%**	47%▼
		Surface Absorption Rate		2g or less	0.6g	70%▼
	Thickness Expansion Rate under Humidity		KS F 3200	17% or less	0%	None
	Absorption Length Change Rate	Length		0.2% or less	**0.10%**	50%▼
		Width		0.2% or less	**0.10%**	50%▼
	Bending Strength under Humidity	Length		10Mpa or more	23.5Mpa	235%▲
		Width		10Mpa or more	22.5Mpa	225%▲
	Screw Retention	Surface	KS F 3200	350N or more	358N	102%▲
		Edge		175N or more	189N	108%▲
	Bending Failure Load	Length		400N or more	787N	197%▲
		Width		400N or more	788N	197%▲
	Bending Strength	Length		20Mpa or more	31.1Mpa	156%▲
		Width		20Mpa or more	27.6Mpa	138%▲
	Abrasion Resistance	Abrasion Loss	KS M 3332	0.10g/100 revolutions or less	0.01g/100 revolutions	90%▼
		Abrasion Value		200 revolutions or more	400 revolutions	200%▲
	Contamination Resistance	-		There must be no change	No change	-
	Scratch Resistance	g		200g or more	1200g	600%▲

150% higher bending strength compared to the standard
Twice the load support for bending failure, with excellent abrasion and contamination resistance
Conforms to standard physical properties

Vincero Wall board has low rate of damage and defects

Vincero Wall INORGANIC Board

WITHFUR

Excellence

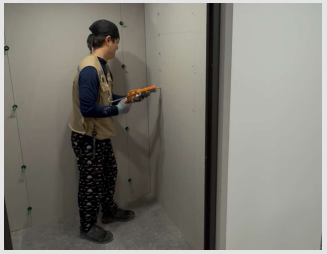
Category	Tile	Vincero Wall
Thickness	6-12t	**6,8t**
Density (Weight)	2.5-3.0 Requires multiple people for transport and installation	**1.1** **Requires small number of people for transport and installation**
Lifting	Requires tools for lifting	**Quick transport without tools** **Easy lifting**
Construct ability	Complex Process Requires skilled workers for each process, increasing labor costs	**Simple Construction** **One process by construction workers, reducing labor costs**

Tile Installation Method

Wet Construction Method

Technical Product Installation Method

Dry Construction Method



Tile Defects

Breakage
Detachment
Crack
Detached

Technical Product Defects

Almost None

Vincero Wall INORGANIC Board

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Excellence

Dry Wall Application

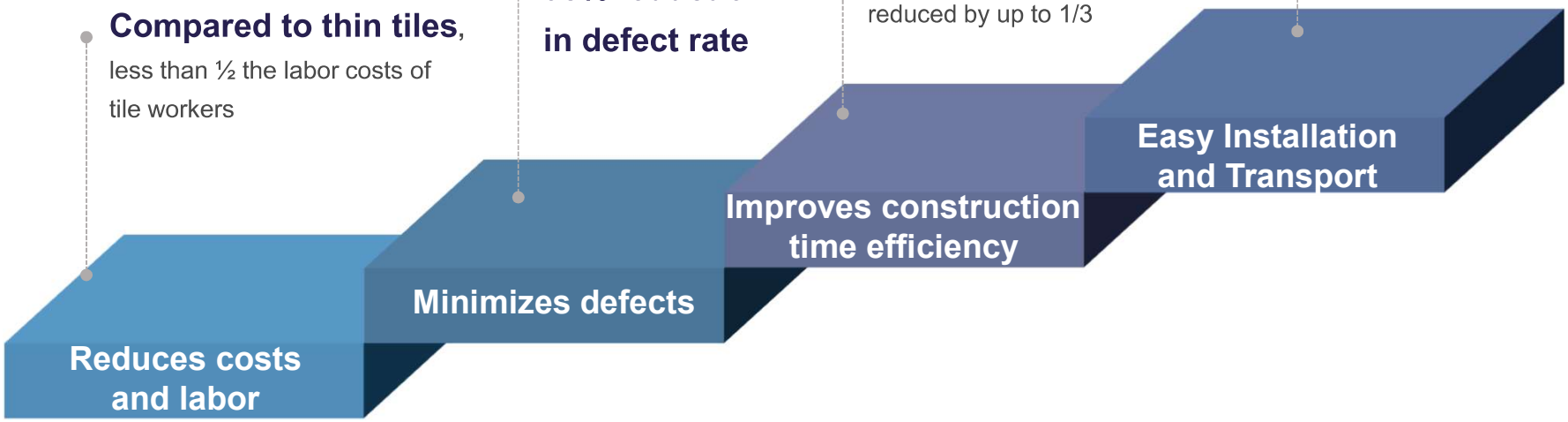
Low defect rate and no need for specialized skills!

Compared to thin tiles,
less than ½ the labor costs of tile workers

Compared to tiles
98% reduction in defect rate

Compared to wet construction, construction period
reduced by up to 1/3

Weight 20-30% less
compared to thin tiles



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Excellence

Application Areas and Economic Efficiency

Substitute for tiles and marble

Apartment art walls,
Kitchen furniture walls [Midway],
Wall panels

For interior design with fire resistance needs

Residential buildings,
Schools,
Daycare centers,
Stations or waiting areas,
Karaoke rooms,
Study rooms,
Ship interiors, etc.

Vincero Wall Sizes

Sizes

Custom sizes available on order

Recommended size

300x300 (mm)
300x600 (mm)
600x600 (mm)
600×800 (mm)
600×1200 (mm)
1200×2400(mm)

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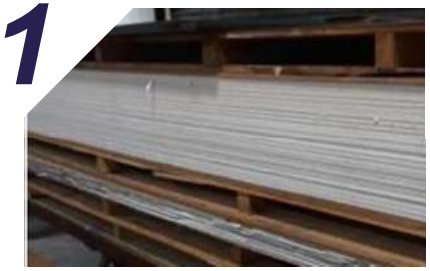
In-house Production and Mass

1



Material Inbound
(Vincero Wall Board)

2

Material Inbound
(Low Pressure Melamine Impregnated Paper)

3

Material Combination

4

Material Adhesion
(Fusion)

5

Edge Processing

6

Cooling

7

Cutting by Specifications

8

Finished Product

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Construction Records

('25. 02.)

Date	Name	Division
'22. 11. 18.	Withfur Training Center	
'23. 06. 07.	IPC Training Center	
'23. 07. 31.	Gumi Geumoh Electronics High School	
'23. 09. 25.	Seoul Guarantee Insurance Headquarters	
'23. 11. 15.	The Sharp Asan Tangjeong	MH
'24. 01. 29.	The Sharp Jeonju Gamnamu Valley	MH
'24. 04. 17.	The Sharp Sokcho Prime View	MH
'24. 06. 01.	Uljin Jukbyeon High School	
'24. 08. 12.	Gyeongju Naenam Elementary School	
'24. 08. 21.	Gyeongsan Jinseong Elementary School	
'24. 09. 09.	Pohang Heunghae Namsan Elementary School	
'24. 10. 18.	Seoul Guarantee Insurance Training Institute	

Date	Name	Division
'24. 11. 09.	IPC Pyeongtaek Shinjang-dong	
'24. 11. 14.	The Sharp Sangbong First World	MH
'24. 11. 14.	Tongyeong Marina Pension	
'24. 12. 03.	Uljin Low Temperature Distribution Center	
'24. 12. 06.	The Sharp Songdo B3	
'24. 12. 23.	Pohang Yi Dong Middle School	
'25. 01. 13.	Daejeon Yongsan High School	
'25. 02. 10.	Uiseong Chunsan Elementary School	
'25. 02. 11.	Yeongcheon Electronic High School	
'25. 02. 17.	Kumoh Technical High School in Gumi	
'25. 02. 17.	Cheongdam K2 Building	
'25. 02. 26.	Pohang Donghae Elementary School	

Vincero Wall INORGANIC Board

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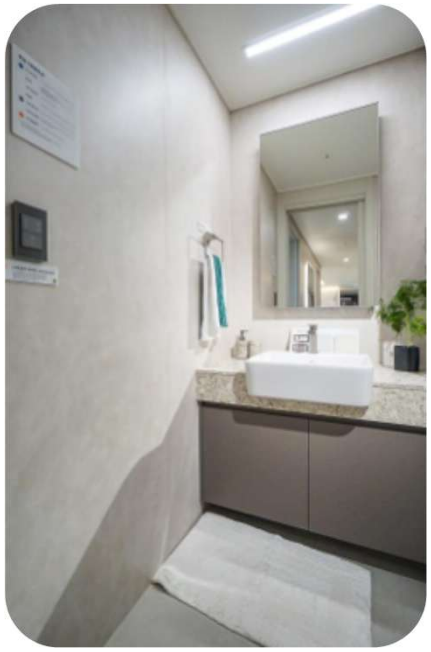
Construction Examples

Asan Tangjeong _ Schattdecor / A37-433

Asan Tangjeong _ Schattdecor / B46-49



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Construction Examples

Jeonju Gamnamugol _ Schattdecor / A3-198

Vincero Wall INORGANIC Board

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Construction Examples

Sokcho Prime View _ Schattdecor / B46 -49, B37-431