

## ASBESTOS SOLIDITY STABILIZER

FOR PREVENTING DISPERSION OF ASBESTOS

# GMC-200

## GUN MYUNG TECHWIN CO. LTD.

Patent registration / New technology certification / Eco label certification Affiliated R&D institute / ISO quality management / ISO environmental management Technology-innovative small and medium business (INNOBIZ certification) / Promising small and medium business



## General status

Company name	Gun Myung Techwin Co. Ltd
CEO	Cha, Seong-hak
Date of establishment	July 9, 2008
Addresses	Head office: Rm. 1301, Building A, Heungdeok IT Valley, 13
	Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do
	Manufacturing plant: Rm. 1301, Building A, Heungdeok IT Valley,
	13 Heungdeok 1—ro, Giheung—gu, Yongin—si, Gyeonggi—do
Website	www.gmtwin.com
Major business areas	Asbestos solidity stabilizer, CCTV surveillance & construction services
	for environment and safety
Major certifications	Performance certification, patent, affiliated R&D institute, certification
	of excellent venture company and a promising small and medium
	business in Gyeonggi-do ISO9001, ISO14001,
	ISO9001, ISO14001, environment certification, INNOBIZ, new
	technology certification

## B

#### 2018.1

#### 13. Pilot project



### **Riskiness of asbestos**

Asbestos, which is called the silent killer or quiet time bomb, has a latent period of  $20\sim40$  years. It is a class 1 cancer-causing agent designated by the World Health Organization (WHO), and there is no limitation for safety regarding the exposure to asbestos.



### Diseases related to asbestos

The diseases related to asbestos are Asbestosis, Lung cancer and Mesothelioma, and in most cases, there is no distinct cure for these diseases.







Mesothelioma caused by asbestos



## About GMC-200 Technology

### Core material of asbestos solidity stabilizer and its function



#### Silane grafted Silica & Layer Silicate

Name of technology	Patent No. 10-1673851 - Technology applied with a composition, which includes inorganic acid compounds, preventing the dispersion of asbestos
Applicable use	Preventing the generation of dispersed particles of asbestos by applying penetrative coating to construction materials
Applicable areas	Facilities constructed by using the materials containing asbestos, such as asbestos fiber, slate, cubicle, sheath and insulation material (schools, public organizations, slate, abandoned mine)
Major ingredients	Silicate nano-colloid / saline / water-based acrylic resin





## About GMC-200 Product

It is a product stabilizing asbestos particles, which can be created by physical influences, such as damage and external vibration, by flocculating and solidifying them after being penetrated into the surface or the interior of construction materials containing asbestos.



Asbestos solidity stabilizer GMC-200



## About GMC-200 Product

## Applicable areas of GMC-200



Heat-reserving board & slate



Sound-absorbing materials



Gypsum cement plate



Fire resistive covering material



Plastering work of insulation



Beam light







## Differences between asbestos removal and using solidity stabilizer

#### Removal of asbestos vs. prevention of asbestos dispersion vs. GMC-200

Classification	Removal	Prevention of asbestos dispersion	GMC-200
Content	<ul> <li>Authorized business removes asbestos, and re–constructs</li> <li>Necessary to cooperate with waste disposal contractors</li> <li>Additional constructions may be necessary after removal</li> </ul>	<ul> <li>Product for coating inorganic synthetic resin</li> <li>Using the painting skills (application on front only)</li> <li>Most of the businesses are using imported products</li> </ul>	<ul> <li>Eco-friendly water-based asbestos solidity stabilizer</li> <li>Using the painting skills (application on both sides)</li> <li>Patent for composition (No. 10–1673851)</li> <li>Patent for improved penetration performance (No. 10–1840971)</li> <li>New technology certification (No. 1077)</li> <li>Environmental certification (No. 17094)</li> </ul>
Period	Minimum 1 month	3∼5 days	3∼5 days
Advantages	Possible to remove asbestos completely	<ul> <li>No creation of designated wastes and secondary environmental pollution</li> </ul>	<ul> <li>Approved dispersion preventing performance / penetrative performance /water resistance (Korea Industrial Technology Association)</li> <li>No creation of designated wastes and secondary environmental pollution</li> </ul>
Disadvantages	<ul> <li>High cost (for demolition and using materials to replace asbestos)</li> <li>Construction or expansion is limited</li> <li>Causing secondary environmental pollution</li> <li>Creating costs for waste disposal and taking much time</li> </ul>	<ul> <li>Limited application to actual environments due to lack of water resistance</li> <li>Lack of verification of dispersion prevention performance</li> <li>Not possible to be processed as general wastes for further demolition</li> </ul>	<ul> <li>Not possible to be processed as general wastes for further demolition</li> </ul>

### How to use asbestos solidity stabilizer

Classification	Method of using the product according to the market of asbestos solidity stabilizer
Maintenance of buildings and abandoned mines with asbestos	<ul> <li>Asbestos materials of the domestic schools, public offices and general buildings cannot be removed at the same time, and people have to be under the influence of asbestos while waiting for its removal.</li> <li>In the case of abandoned mines, it is not possible to remove the remaining asbestos, and the nearby residents may be influenced consistently.</li> <li>It is possible to secure safety from the influence of asbestos without removing it by approximate the asbestos additive atabilities.</li> </ul>
Apply when demolishing asbestos- containing structures	<ul> <li>Presently, the removal of asbestos from schools or public offices still creates residual asbestos dusts, and the indoor air quality is still below the standard.</li> <li>Environmental organizations insist that the removal work is diffusing the pollution created by asbestos</li> <li>By using the asbestos solidity stabilizer when removing asbestos, it is possible to solve the problems of the worker's safety, and to prevent the dispersion of asbestos after removal.</li> </ul>

Applicable areas for using the asbestos solidity stabilizer : Maintenance of buildings containing asbestos materials / demolition work of buildings containing asbestos materials

### Reliability of the product

#### Performance of preventing the dispersion of asbestos particles

Evaluation items	Unit	Standard	Result	Evaluation method
1. Test for fiber dispersion caused by air flow	Piece/cc	0.01 piece/cc	0.002	
2. Test for fiber dispersion caused by surface damage	Piece/cc	0.01 piece/cc	0.003	KS M 2757:2014
3. Test for fiber dispersion when it is shredded	Piece/cc	0.01 piece/cc	0.003	



#### Analysis using a scanning electron microscope (SEM)

Asbestos fiber



Fracture surface(x1000)

► After applying GMC-200



Fracture surface(x3000)

Fracture surface(x3000)

Fracture surface(x1000)

#### Surface(x500)

Surface(x500)

## Comparison of each product's performance of preventing the dispersion of asbestos

Evaluation items Unit				Evaluation				
	Unit	Standard	Blank (Asbestos plate)	GMC-200 (New product)	Ref–A (Exx)	Ref-B (xxx-100)	Ref-C (XX-1000)	method
1. Fiber dispersion test (Aerosol)	Piece	0.01 or less	0.023	0.002	0.017	0.007	0.011	KS M
3. Fiber dispersion test (Shredding)	/cc		0.037	0.003	0.027	0.019	0.014	(KTR)



## Basic property of each product & coating characteristics of asbestos board

Evaluation items	GMC-200 (Gun Myung developed product)	Ref–A (xxx–100)	Ref–B (Exx)	Ref-C (xx-1000)	Method
Appearance	Translucent suspension	Translucent suspension	Translucent suspension	Translucent suspension	Visual observation
pH	10±0.2	11±0.2	11±0.2	11±0.2	pH meter @25°C
Viscosity (Viscosity, mPa-s)	1.5±0.2	2.0±0.2	1.7±0.2	1.8±0.2	AND SV-10 @25℃
Solid content (%)	9.4±0.2	20±0.1	18±0.3	21±0.3	@120°C/2hr
Coating characteristics	Good	Powder separation	Powder separation	Powder separation	@120°C/2hr



## Major core technologies

### Result of penetration analysis through EDS (elementary analysis)

- Result analysis: Comparison of internal distribution according to depth realized by comparing the graph of K-edge spectrum's intensity of K element
- **Evaluation sample :** GMC-200 & 3 prototypes (Ref.-A,B,C)
- **Making a specimen :** Coat the back side of asbestos fiber, of which the size is that of a slide glass, with 4 solutions for evaluation. Dry it at 100°C for 1 hour after making them penetrate for 60 minutes. Cut the specimen vertically, and analyze the element distribution of the fracture surface through EDS.

\* Analyze the elements using the potassium (K) as an indicator (In the case of Ref.B, coat by randomly mixing with K2SiO3)

Analysis equipment : HITACHI–S4800 FE–SEM (Common equipment center of Hanyang University)



Ref-A Ref-B Ref-C GMC-200

## Result of comparing with the water resistance of other company's products

#### Result of comparing water resistances

- · In the case of GMC-200, no particular change of the coated layer is observed.
- In the case of Ref. A and Ref.C, deposited area becomes opaque. The surface is changed into granular materials and easily separated.
- · In the case of Ref. B, the coated layer is partially melted and separated.



#### Method of comparing water resistances

- · Coat the slide glass with each coating solution and harden it (120°C/30min.)
- · Fill the beaker with distilled water, and dip half of the coated part into it.
- Dip for 30 min. at the room temperature (25°C)
- · Observe the exterior of specimen after drying it for 10 min. at 120°C

Items	Unit	Analysis result	MDL	Test Methods
Pb	mg/kg	Not detected	5	IEC 62321-5 Ed.1.0:2013(AAS)
Cd	mg/kg	Not detected	0.5	IEC 62321-5 Ed.1.0:2013(AAS)
Hg	mg/kg	Not detected	0.5	IEC 62321-4 Ed.1.0:2013(AAS)
Cr(VI)	mg/kg	Not detected	0.5	IEC 62321 Ed.1.0:2008(UV/Vis)

#### Analysis of heavy metal content of the solidity stabilizer

\*Notes : mg/kg = ppm (parts per million), N.D.=Not detected, MDL = method detection limit



\*Analysis sample: GMC-200, analysis agency: Korea Testing & Research Institute (KTR)/ December 5, 2016

## **Expected effects**

### **Expected effects**

<b>01</b> Technical side	<ul> <li>Establishing application technology of coating stabilizer for preventing the dispersion of asbestos</li> <li>Securing water resistance improvement technology for water-soluble paint</li> <li>Securing technology of protective agent's penetration performance for preventing the water absorption of concrete buildings</li> <li>Possible to replace existing paint ingredients</li> <li>Establishing independent technology based on the standardization of construction process</li> </ul>
<b>D2</b> Economic & industrial side	<ul> <li>Increase the use of dispersion preventing agent by expanding the application to asbestos containing materials</li> <li>Reducing the national budget by replacing the existing method of removing asbestos</li> <li>Economic vitalization by hiring new personals while saving the development cost</li> <li>Preventing the secondary pollution by improving the residential environment without creating wastes</li> </ul>
<b>D3</b> Social side	<ul> <li>Creating jobs through developing independent technology</li> <li>It is possible to convert the dispersion-preventing agent, which is presently used for the removal of asbestos and producing plate-type materials, into a high value-added business</li> <li>Solving the problems of air pollution</li> </ul>

## Surface-hardening agent for preventing dispersion GMC-200

#### · Maintaining the pleasant indoor air

- Preventing the asbestos-related diseases
- · Excellent penetration performance

 Expanding the application area Improving the durability Maintaining the of construction materials pleasant and safe Reducing the indoor air construction period Eco-friendly product, securing Reducing the students' right for national budget health • Reducing cost by 60% comparing to the existing removal method

Excellent ratio of preventing the dispersion of asbestos

- Zero heavy metals
- Zero wastes
- · Zero VACs detection
- · Lower than TVOC standard
- · Lower than VOCs standard

· Improving the durability (water resistance)

of construction materials

Simple application

## Applicability of technology



1. Pre-investigation

4. Preconditioning

area

- Check the application area
- Measure the area, and estimate the amount of materials



 2. Measurement of indoor air quality
 Check the indoor air quality before application



5. Electricity / wiring · Arrange the wires to apply the product on the surface



3. Security zone setup Install a control facility at the construction site



Reinforcement work

 Reinforce materials attached to the ceiling

Reinforce floor and walls

#### Apply asbestos solidity stabilizer

· Remove foreign objects and dusts

· Arrange and repair the application



7. Application on upper areas • Check the application area

Measure the area, and estimate the amount of materials



10. Finishing application of each part
Apply to finish the stained area



8. Application on lower areas Apply by spraying it twice

Apply thoroughly and evenly



 11. Measuring the indoor air quality
 Measure the indoor air quality in the same classroom after application



 9. Reinforcement and arrangement
 Remove the residual materials and check the surface



 12. Cleaning after completion

 Clean the area thoroughly after completing the application

## 인증 및 등록현황

## Certification and registration status



Certificate of Inno-Biz



The company prioritizing the people The company prioritizing the environment **GUN MYUNG TECHWIN CO. LTD.** 

