CMMA Solid Surface

www.cmmasolidsurface.com

I would like to introduce the World BMC Company. Our company manufactures solid artificial marble (called a solid surface). It is mostly used for household kitchen countertops.

The solid surface countertop market is divided into the acrylic solid surface countertop market and the polyester solid surface countertop market. Acrylic solid surface products mainly comprise the high-priced market, while polyester solid surface products are a part of the low-priced market.

As an acrylic solid surface is a casting product, it is thicker (12mm) and hard to handle in such operations as cutting, adhesion, and sanding. Although acrylic solid surfaces are elegant, their material and processing costs are also higher.

On the other hand, polyester solid surfaces can be mass-produced and have short hardening time and lower material costs (40 - 50% lower than acrylic products).
However, the material is also hard to cut, adhere, and sand. In addition, some polyester solid surface products cause pollution due to dust and glass fibers, so handlers tend to avoid working with the material.

A new product, CMMA solid surface, minimizes the disadvantages and maximizes the advantage of acrylic and polyester solid surfaces. It is a combination of polyester and acrylic resin, made by using a special technology to create a hybrid product in one shape.

The CMMA solid surface product has new functionality and creates maximum synergies. It's patented ("Acrylic & Polyester Solid Surface" No. 10-0908074) and has a registered trademark, "CMMA," which is the World BMC Company's brand.

Although CMMA has short development history, product has excellent quality and elegance, like acrylic solid surfaces, in addition to a competitive price. Based on these factors, World BMC has tried to create low-priced premium brand and a fresh image on the overseas markets.

CMMA Related Questions and Answers

1. What are the types and comparative characteristics of artificial marble (solid surfaces)?

-CMMA's tensile strength/bending/impact strength and heat resistance is much better than that of acrylic solid surfaces as a result of heating and compression casting. Although the CMMA product is thicker than acrylic solid surfaces, it is extraordinarily strong. CMMA's workability (cutting and sanding) and bond ability is much better than that of polyester solid surfaces.

2. What are the competing products?

-The competing acrylic solid surface products are Dupont's Corian brand product, LG's Hi Macs brand product, Samsung's Staron brand product, KCC, Hanssem, and Lion-Chemtech. The only small business is Lion-Chemtech. The field of polyester solid surface is divided between the "Plate Slab" brand product from a Chinese company and another product from a Korean company. Although the Korean polyester molding product has good

strength and low material costs due to its mounting glass fiber, it has bad dust, bond ability, workability, and weather resistance when requiring special costs.

The Chinese polyester Plate Slab has several weaknesses: brittleness, contortion as time passes, and the unique smell of resin.

3. What is CMMA's competitiveness?

-CMMA has strong competitiveness for several reasons: cost, surface, color, and environmental impact. The cost of CMMA is 40-50% lower than acrylic solid surfaces. CMMA's surface has a natural and luxurious feel as combined polyester color chip. CMMA's color varies, so the range of choices is wide, and it is possible to make it in a short deadline (it can be done in a short time). As CMMA is made with an eco-friendly PVA material, it is made with less toxic material and created 0% of VOC at normal temperatures. CMMA is suitable solution for sick house syndrome.

4. Does the World BMC Company make any products besides countertops using the CMMA material?

- Yes, the World BMC Company also produces wall panels, Sink Bowls (jumbo, mini etc.) and washstands.

5. What is the meaning of "volcanic"?

-Volcanic refers to a solid surface product made of large particles. The price of volcanic products is two times higher than general solid surface's price.

VOLCANIC COLORS

6. Who are World BMC Company's customers?

-The primary target customers are kitchen system manufacturers or furniture suppliers such the Hanssem Company. The second group of target customers includes distribution and sales companies. Finally, the third group of target customers includes fabricator, whose target customers are cabinet manufacturers.

7. See attached price list.

■ **Each type of Solid surface has special features:**

Test item	**CMMA**	Polyester	Acrylic
Material	**Acrylic & Polyester**	Polyester	Acrylic
Molding method	**Compression**	**Compression/ Casting**	**Casting**
Specific gravity	**1.5~1.6**	1.8~1.9	1.7~1.8
Mechanical property	◎	○	△
Adhesive property	○	△	◎
Fabricate property	○	△	○
Weather resistance	○	△	◎
Heat resistance	◎	○	△
Crack resistance	◎	△	△
Flame retardancy	○	○	○
Hardness	○	○	○
Price	○	○	△
Maker	**WBMC**	**China**	**Dupon Corian** **LG Hi-Macs** **SAMSUNG staron**

△ - Good

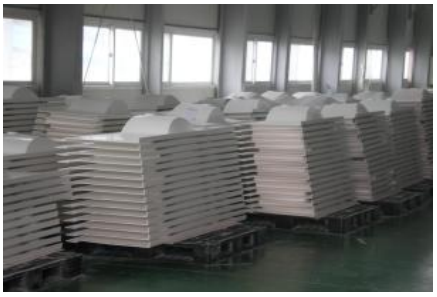
○ - Better

◎ - Best

■ CMMA Artificial Marbles (CMMA SOLID SURFACE)

Sink tops (—)

Sink tops (ㄱ)(ㄴ)



Washstands

■ Characteristics

1) Acrylic & Polyester Solid Surface (patented, trademark)/Own brand
2) Use of eco-friendly reinforcing material and Polyester & Acrylic Hybrid RESIN
3) Good reviews from buyers; its better workability than polyester casting products

■ Major Buyers

1) Korea : Hanssem kitchen furniture
2) Japan : Hanssem Japan / First plus furniture
3) UAE : Dubai-TASHYEED Trading
4) Malaysia: Federal Furniture
5) Philippines: Ohwin Trading

■CMMA Sink Bowl

TYPE	Front	Side	SIZE (WXLXH)	REMARK
Bowl 1			490x870x225	
Bowl 2			410x686x165	
Bowl 3			510x510x220	
Bowl 4			480x550x250	
Bowl 5			440x500x280	
Bowl 6			440x510x194	

■ Certificate of ISO 9001

Registration Certificate

This is to certify that
the Quality Management Systems of

WORLD BMC CO., LTD.

have been assessed by AJA Registrars and registered against the requirements of

BS EN ISO 9001:2008/KS Q ISO 9001:2009

Certificate No. :	**AJA04/7234**	Date of Original Registration :	**19/02/2004**
Date of Expiry :	**17/01/2013**	Date of Re-Registration :	**09/02/2010**

UKAS QUALITY MANAGEMENT
Reg. No. 059

Joint Chief Executives, AJA Registrars

ANGLO JAPANESE AMERICAN AJA REGISTRARS

This Certificate has been issued by AJA Registrars Limited, Court Lodge, 105 High Street, Portishead, Bristol UK BS20 6PT

This certificate is issued in respect of the locations & scope of registration detailed in the Associated Registration Schedule.
This certificate is the property of AJA Registrars and must be returned on request.

■ Certificate of trademark registration

상표등록증

CERTIFICATE OF TRADEMARK REGISTRATION

등 록 제 40-0762855 호
(REGISTRATION NUMBER)

출원번호 (APPLICATION NUMBER) 제 2007-0065333 호
출 원 일 (FILING DATE:YY/MM/DD) 2007년 12월 20일
등 록 일 (REGISTRATION DATE:YY/MM/DD) 2008년 09월 29일

상표권자
(OWNER OF THE TRADEMARK RIGHT)
월드비엠씨(주)(154311-0******)

충북 진천군 이월면 신월리 475

상표를 사용할 상품 및 구분
(LIST OF GOODS)

제 01 류

미가공에폭시수지등 3건

CMMA

위의 표장은「상표법」에 의하여 상표등록원부에 등록되었음을 증명합니다.
(THIS IS TO CERTIFY THAT THE TRADEMARK IS REGISTERED ON THE REGISTER OF THE KOREAN INTELLECTUAL PROPERTY OFFICE.)

2008년 09월 29일

특 허 청 장
COMMISSIONER, THE KOREAN INTELLECTUAL PROPERTY OFFICE

■ Flame retardancy

the way to trust KCL

TEST REPORT

No. : CT10-41399-A1

Customer Name : WORLD BMC Co., Ltd.

Address : 475 Sinwol Ri, Iwol Myeon,Jin Cheon Gun,Chungbuk, Republic of Korea

Test Sample : Solid Surface CMMA

Date of Test : Aug. 26. 2010

Receipt Date : Aug. 16. 2010

Test Results

Items			Units	Results	Materials Classed
Flammability	After flame time for each individual specimen	23 ℃, 50 %R.H, 48 h	sec	Less than 5	V - 0
		70 ℃, 168 h		Less than 5	
	Total after flame time for any condition set for the five specimens	23 ℃, 50 %R.H, 48 h	sec	13	
		70 ℃, 168 h		16	
	After-flame plus after-glow time for each individual specimen after the second flame application	23 ℃, 50 %R.H, 48 h	sec	Less than 20	
		70 ℃, 168 h		Less than 20	
	Cotton indicator ignited by flaming particles of drop	23 ℃, 50 %R.H, 48 h	-	No	
		70 ℃, 168 h		No	
	After-flame or after-glow of any specimen up to the holding clamp	23 ℃, 50 %R.H, 48 h	-	No	
		70 ℃, 168 h		No	
Test Method				UL 94 Flammability:2006 (Vertical Burning Test)	

Sample thickness : 6.8 ㎜

Our report apply only to the standards or procedures identified and to sample(s) tested unless otherwise specified. The test results are not indicative of representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products.

- End of Report -

Tested by Jae Won Eom

Technical Sub Manager YANG KONG PYO S. C. Go

Aug. 26. 2010

Korea Conformity Laboratories

President Tae Shik Oh TaeShik Oh

Address : 305-510 822, Taplib-Dong, Yuseong-Gu, Daejeon, Korea 82-42-360-3007~8

Result Inquiry : Parts and Materials Evaluation dept. 82-2-2102-2666

■ Mechanical properties & Stain Resistance

KOREA TESTING & RESEARCH INSTITUTE

KTR
KOREA TESTING & RESEARCH INSTITUTE
www.ktr.or.kr
88-2, Yeongdeungpo-dong 8-ga, Yeongdeungpo-gu, Seoul, Korea
Tel : +82-2-2164-0011 Fax : +82-2-2634-1008

TEST REPORT

539-8, Gajwa 3-dong, Seo-gu, Incheon, KOREA TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-004141
Receipt Date : Feb.04.2010
Client : CHO KANG YOUNG
Test Completion Date : Feb.16.2010
WORLD BMC CO., LTD.
475, SINWOL RI, IWOL-MYEON, JIN CHEON GUN, CHUNGBUK, #365-824, KOREA

Sample : NBMC(CMMA)

TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Tensile Strength	N/㎟		31.7	KS M 3015 : 2003
Flexural Strength	N/㎟		72.2	KS M 3015 : 2003
Compressive Strength	N/㎟		91.6	KS M 3015 : 2003
Izod Impact Strength	J/m		227	KS M 3015 : 2003
Specific Gravity	-		1.624	KS M 3015 : 2003
Barcol Hardness	-		50	KS M 3015 : 2003
Water Absorption	%		0.025	KS M 3015 : 2003
Contamiation Resistance(Black Tea)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Coffee)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Milk)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(1 % Iodine alcohol)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Vinegar)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(10 % Citric acid)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Gasoline)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Acetone)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Olive Oil)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(10% Ammonia)	-		No Defects	KS M 3332 : 2009

- Next Page -

Hak-Soo Kim
Prepared by Hak-Soo Kim
Tel: +82-32-570-9677
E-mail: nabi@ktr.or.kr

Hyeong-Geun Park
Reviewed by Hyeong-Geun Park
Technical Manager
E-mail: sungjae@ktr.or.kr

Feb.16.2010

Korea Testing & Research Institute

President

■ Stain Resistance

KOREA TESTING & RESEARCH INSTITUTE

KTR
KOREA TESTING & RESEARCH INSTITUTE
www.ktr.or.kr
88-2, Yeongdeungpo-dong 8-ga, Yeongdeungpo-gu, Seoul, Korea
Tel : +82-2-2164-0011 Fax : +82-2-2634-1008

TEST REPORT

539-8, Gajwa 3-dong, Seo-gu, Incheon, KOREA TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-004141
Client : CHO KANG YOUNG
WORLD BMC CO., LTD.
475, SINWOL RI, IWOL-MYEON, JIN CHEON GUN, CHUNGBUK, #365-824, KOREA

Receipt Date : Feb.04.2010
Test Completion Date : Feb.16.2010

Sample : NBMC(CMMA)

TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Contamiation Resistance(Crayon, Black)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Shoe polish, Black)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Dye, Food Red No.102)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Office ink, Black)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(2 % Mercurochrome)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(5 % Phenol)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Sodium sulfite, saturated solution)	-		No Defects	KS M 3332 : 2009
Contamiation Resistance(Resin)	-		No Defects	KS M 3332 : 2009

USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR do not guarantee the quality of all products of the customer.
2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage.

Hak-Soo Kim
Prepared by Hak-Soo Kim
Tel: +82-32-570-9677
E-mail: nabi@ktr.or.kr

Hyeong-Geun Park
Reviewed by Hyeong-Geun Park
Technical Manager
E-mail: sungjae@ktr.or.kr

Feb.16.2010

Korea Testing & Research Institute
President

■TVOC & HCHO

the way to trust KCL

TEST REPORT

1. No : CT11-25183
2. Client
   - ○ Name : WORLD BMC CO., LTD.
   - ○ Address : 475, Sinwol-ri, Iwol-myeon, Jincheon-gun, Chungbuk, Korea.
   - ○ Date of Receipt : May. 27, 2011
   - ○ Date of Issued : Jul. 06, 2011
3. Use of Report :
4. Test Sample : NBMC(CMMA)
5. Test Results

Reissuance (R1)
Date : 2011.7.6

Test Items	Unit	Test Results	Test method used
Total Volatile Organic Compound (TVOC)	$mg/(m^2.h)$	0.012	Ministry of Environment 2010-24 Official test method
Toluene	$mg/(m^2.h)$	0.005	
Formaldehyde	$mg/(m^2.h)$	0.001	

- Refer to the next page -

Affirmation	Tested by In Shik Chae I.S.Chae	Technical Manager Bee Young Lee B.Y.Lee

Our report apply only to the standards or procedures identified and to the sample(s) tested unless otherwise specified.
The test results are not indicative of representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products.

Korea Conformity Laboratories president Tae Shik Oh TaeShik Oh

Address : 306-110 60-4, Jang-Dong,Yuseong-Gu, Daejeon, 305-343, Korea 82-42-360-3007
Result Inquiry : Daejeon & Chungnam Testing lab. 82-42-360-3007

■ Acrylic & CMMA Property Comparison

PHYSICAL PROPERTIES(SAMSUNG STARON)					
PROPERTY	UNIT	TYPICAL VALUES		TEST	CMMA ESTIMATED VALUE
		STARON	CMMA		
SPECIFIC GRAVITY		1.76	1.624	ASTM D-792	
WATER ABSORPTION	%	0.04	0.025	ASTM D-570	
TOTAL LIGHT TRANSMISSION	%	12		ASTM D-1003	10
HARDNESS(Rockwell)		92		ASTM D-785	90
HARDNESS(Bacol)		65	50	JIS K 6911L	
IZOD IMPACT STRENGTH	kgfcm/cm	1.6	20.1	ASTM D-256	
TENSILE STRENGTH	kgf/cm²	420	328	ASTM D-638	
FLEXURAL STRENGTH	kgf/cm²	680	736	ASTM D-790	
FLEXURAL MODULUS	kgf/cm²	$7.0x10^4$		ASTM D-790	$7.8x10^4$
THERMAL EXPANSION COEFF		$6.2x10^{-5}$		ASTM D-696	$6.0x10^{-5}$
HEAT DEFORMATION TEMPERATURE	°C	100~105	180	ASTM D-648	
WEATHERABILITY		NO CHANGE		ASTM D-1499	test required
THERMAL RESISTANCE		NO CHANGE		JIS K6902	NO CHANGE
HOT WATHER RESISTANCE		NO CHANGE		JIS K6902	NO CHANGE
FALLING IMPACT STRENGTH		NO CHANGE		JIS K6718	NO CHANGE
BACTERIAL RESISTANCE		NO GROTH		ASTM G22	NO GROTH

PROPERTIES OF HANEX					
PROPERTY	UNIT	TYPICAL VALUES		TEST	CMMA Estimated Value
		HANEX	CMMA		
Specific Gravity		1,73	1,624	ASTM D-792	
Tensile Strength	psi	5400	4656	ASTM D 638	
Tensile Modulus	psi	$1,4x10^5$		ASTM D638	$1,1x10^5$
Elongation	%min	0,42		ASTM D638	0,2
Flexural Strength	psi	9200	10613,4	ASTM D 790	
Flexural Modulus	psi	$1,38X10^5$		ASTM D 790	$1,4x10^5$
Hardness(Rockwell)	mm/m,C	92		ASTM D 785	90
Thermal Expansion		$3,04X10^{-5}$		ASTM D 696	$3,0x10^{-5}$
Gloss(60 degree gardner)		5~20		ANSI Z 124	5~15
Color Stability		No change		NEMA LD3	No change
Wear & Cleansability		passed		ANSI Z 124	passed
Boiling Water Surface Resistance		No change	—	NEMA LD3	No change
High Temperature Resistance		No change	—	NEMA LD3	No change
Stain Resistance		passed	—	NEMA LD3	passed
Impact Resistance		No fracture	—	NEMA LD3	No fracture
IZOD Impact Resistance	ft,lbs/in	0,28	4,25	ASTM D 256	
Water Absorption Weight	%max	0,03	0,025	ASTM D 570	
Fungi and Bacteria		No attack		ANSI Z 124	No attack
Weatherability		No change		ASTM D 1499	test required
NSF 51	Listed	All Colors		NSF	All Colors