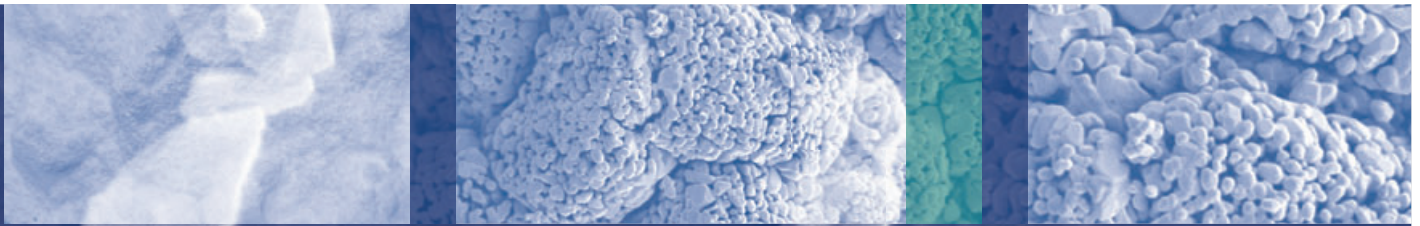


NEW

MARTOXID MRS/MRS-1

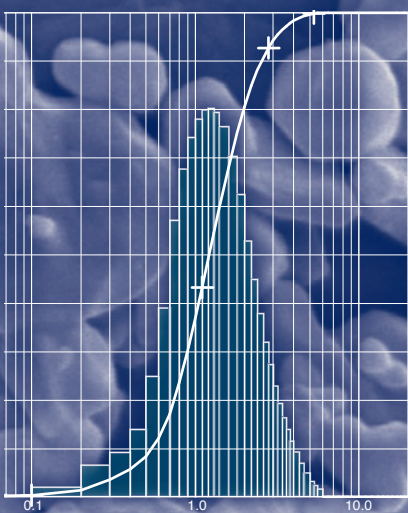
Best in class for ceramic processing

- Easy to grind
 - Easy to sinter
- Alumina grades



3 μm

MRS-1



martinswerk

ALBEMARLE[®]

MARTOXID MRS/MRS-1

The Newest Members of Martinswerk's Very Low Soda Aluminas

MARTOXID MRS (unground) and MRS-1 (super ground) are alumina powders specifically designed to meet our customers' particular requirements in high performance applications in ceramics and refractories. They are well suited for the manufacture of performance ceramics used in sophisticated electronic applications, ballistics, and engineering components.

MARTOXID MRS

Advanced control techniques used in our specialized production process guarantee a reactive powder with a tightly controlled primary crystal size, a super low soda content, and a minimum purity of 99.9% Al_2O_3 . Impurities of foreign oxides such as Fe_2O_3 , SiO_2 , CaO , and MgO are minimized. Its agglomerates, based upon a pattern of spherically shaped primary particles that are less inter-welded, are easy to break and to de-agglomerate into primary crystals, milling readily to a super ground powder. This characteristic

produces a product, which is exceptionally easy to sinter.

MARTOXID MRS-1

The super ground version, MRS-1, meets the acceptance of many high-end ceramic applications. Its outstanding sintering properties result in a homogeneous and micro-crystallized structure free of defects. Furthermore, the well-developed microstructure promotes excellent mechanical and electrical properties. The spherical shape of MRS-1 also makes it an outstanding performer as a sub-micron filler in resins, plastics, and paints. This same morphology provides enhanced characteristics when used in medium-soft polishing applications as well.

The MRS-grades are the powders of choice when producing powders that meet the highest product quality standards.

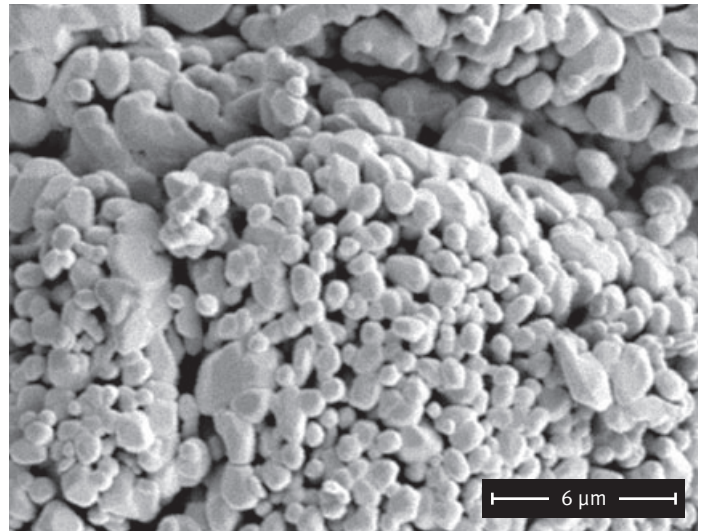
MARTOXID MRS/MRS-1

Alumina	Purity of 99.9% Al_2O_3	Grades	<ul style="list-style-type: none">■ MRS■ MRS-1
Properties	<ul style="list-style-type: none">■ Very Low Soda ($< 0.03\%$)■ Equigranular, Roundish Primary Crystals■ Superior Grindability■ Good Workability■ High Sintering Reactivity■ Microcrystalline Ceramic Structure■ High Mechanical Strength■ Excellent Electrical Properties■ Corrosion Resistance■ Excellent Price Performance Ratio	Applications	<ul style="list-style-type: none">■ Engineering Ceramics■ IC Substrates■ Insulators■ Housings■ Electronics■ Ballistics■ Refractories■ Catalyst Carriers■ Polishing

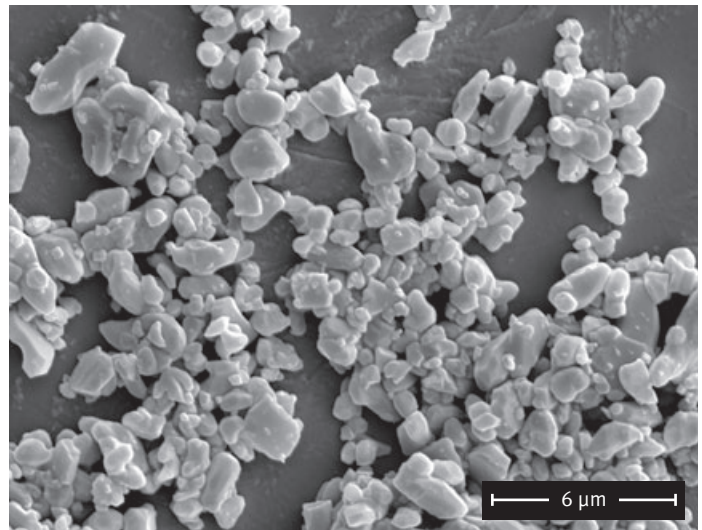
MARTOXID® MRS-Grades: Product Characteristics, Typical Values

MARTOXID	MRS	MRS-1
State of Milling	Unground	Super Ground
Al ₂ O ₃ -content [%]	99.9	99.9
Na ₂ O-content [%]	< 0.03	< 0.03
SiO ₂ -content [%]	0.03	0.05
Fe ₂ O ₃ -content [%]	0.02	0.02
CaO-content [%]	0.015	0.015
Specific Surface Area (BET) [m ² /g]	1.3 - 2.5	2 - 4
Bulk Density [kg/m ³]	800	600
Particle Size Distribution [Cilas 1064]		
d10 [μm]	5	0.5
d50 [μm]	85	1.0 - 1.4
d90 [μm]	130	2 - 4
d100 [μm]	300	< 10
Pressed Density at 100 MPa [g/cm ³]	*	2.3
Sintering Temperature [°C]	*	1600
Sintered Density**, pure [g/cm ³]	*	3.3
Sintering Temperature [°C]	*	1670
Sintered Density**, pure [g/cm ³]	*	3.9
Sintering Temperature [°C]	*	1670
Sintered Density**, MgO-doped [g/cm ³]	*	3.93
Shrinkage [%]	*	16.4
* Not determined ** Retention time at optimum temperature 2 h		

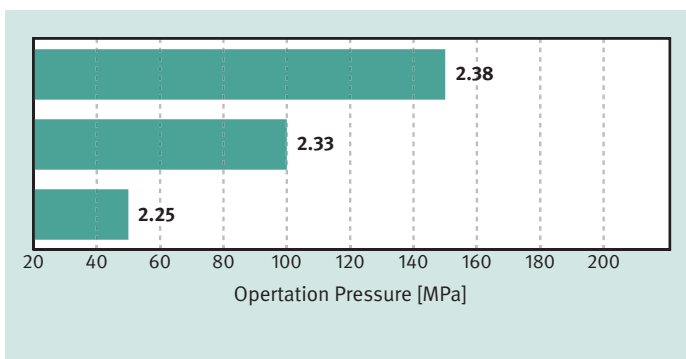
SEM photograph MARTOXID MRS (unground), 1.5 m²/g



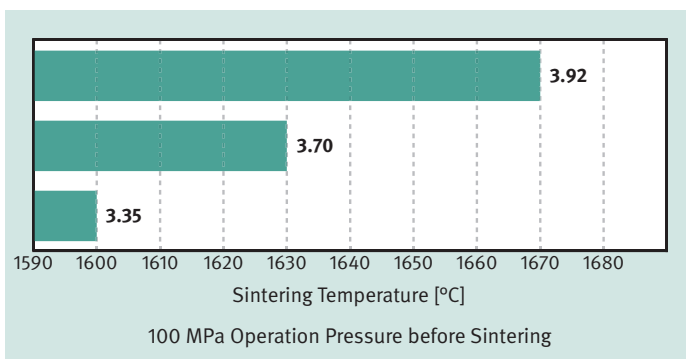
SEM photograph MARTOXID MRS-1 (super ground), 1.5 m²/g



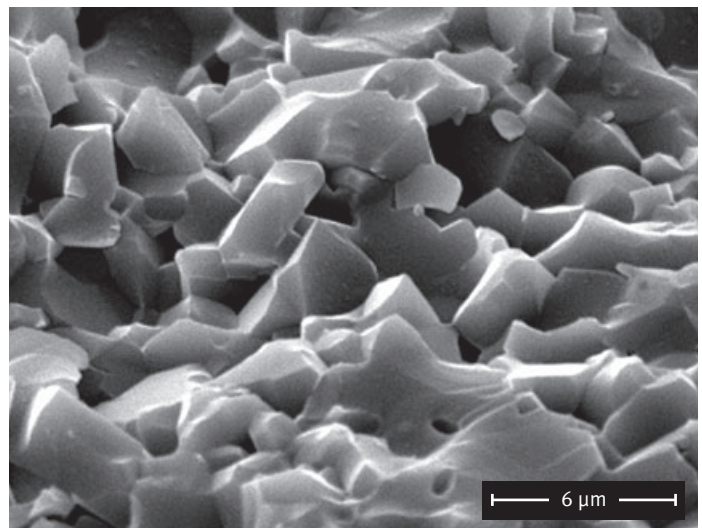
MARTOXID MRS-1, Pressed Density [g/cm³]



MARTOXID MRS-1, Sintered Density [g/cm³]



SEM photograph, sintered MARTOXID MRS-1 (MgO-doped):
Fracture surface of dense and ultra fine ceramic microstructure
Homogeneous grain growth, crystallite size approx. 5 μm



We are confident that we can meet your requirements for high-quality products and services, now and in the future. If you require more information, please contact one of our regional offices.

Europe, Middle East, Africa

Albemarle Europe SPRL
Parc Scientifique de LLN
Rue du Bosquet 9
B-1348 Louvain-la-Neuve Sud, Belgium
Phone: +32-10-48-1711
Fax: +32-10-48-1717

Martinswerk GmbH
Kölner Straße 110
D-50127 Bergheim, Germany
Phone: +49-2271-902-0
Fax: +49-2271-902-557

Americas

Albemarle Corporation
451 Florida Street
Baton Rouge, Louisiana 70801, USA
Phone: +1-225-388-7402
Fax: +1-225-388-7848

Asia Pacific

Albemarle Asia Pacific Company
490 Lorong 6Toa Payoh
#09-10HDB Hub, Biz 3 Singapore
310490 Republic of Singapore
Phone: +65-6424-8400
Fax: +65-6424-8401

Albemarle Overseas Development Corporation
16th Floor, Fukoku Seimei Building
Uchisaiwaicho, 2-2-2
Chiyoda-ku, Tokyo 100-0011, Japan
Phone: +81-3-5251-0791
Fax: +81-3-3500-5623

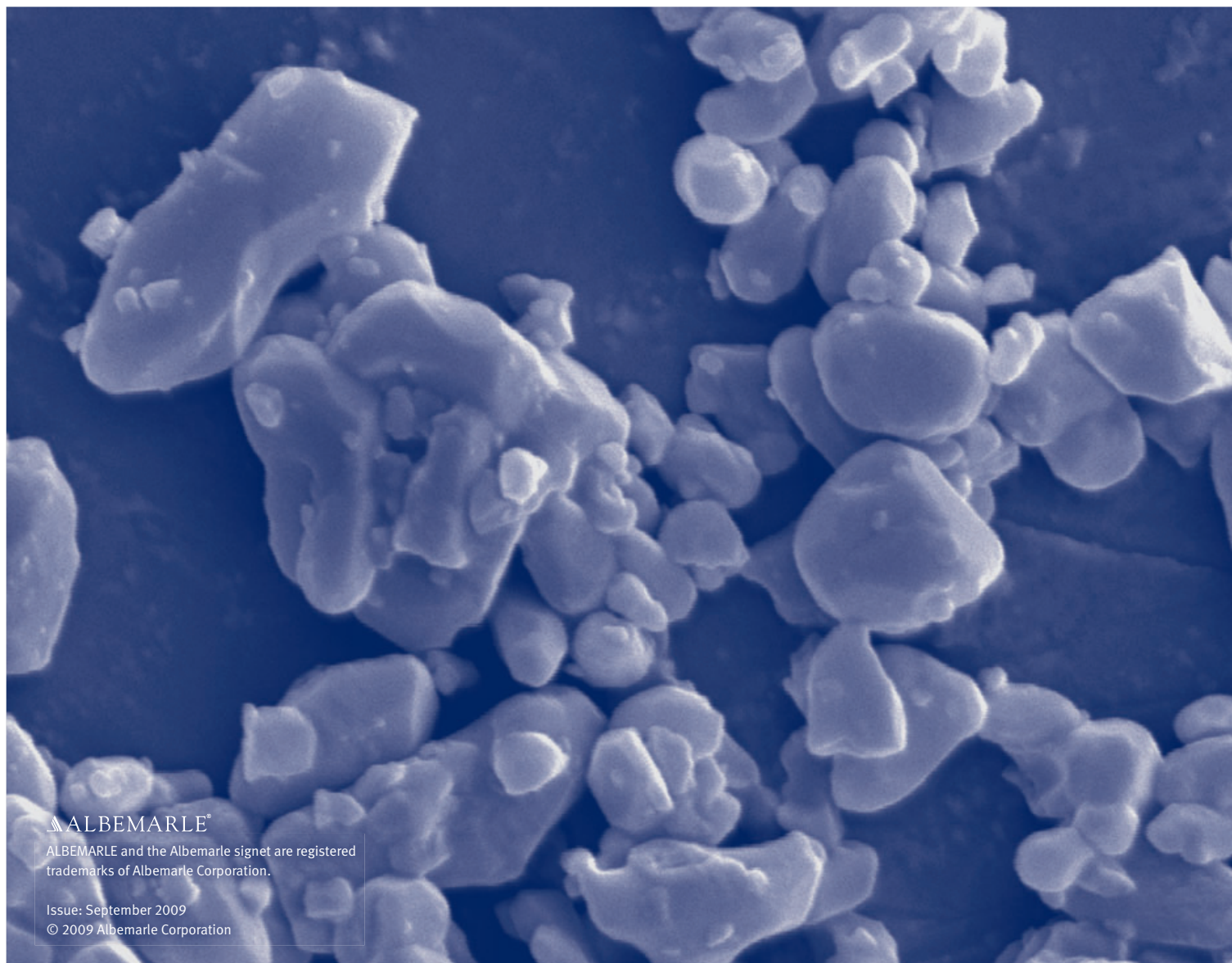
Albemarle Chemicals China Corporation
Room 2208, Shui On Plaza
No. 333 Hua Hai Zhong Road,
Shanghai 200021, China
Phone: +86-21-6103-8666
Fax: +86-21-6103-8777

Albemarle China Corporation
China World Tower, Room 1317
No. 1 Jian Guo Men Wai Avenue
Beijing 100004, China
Phone: +86-10-6505-4153 and -54
Fax: +86-10-6505-4150

Albemarle Korea Corporation
#602 Trade Tower
World Trade Center
159-1 Samsung-dong, Kangnam-gu,
135-729 Seoul, Korea
Phone: +82-2-555-3005
Fax: +82-2-555-3002

www.albemarle.com · www.martinswerk.de

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any information contained herein, including information about any health or safety hazards, only as a guide, and should take those precautions that are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein described materials or processes in violation of existing or future patents.



 ALBEMARLE®

ALBEMARLE and the Albemarle signet are registered trademarks of Albemarle Corporation.

Issue: September 2009
© 2009 Albemarle Corporation