



# Zeeospheres™

## Ceramic Microspheres

### Gray Grades

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#### Introduction

3M™ Gray Zeeospheres™ Ceramic Microspheres are unique, fine particle size, high-strength microspheres. These products are typically used to reduce VOC levels, increase filler loadings, provide hardness, burnish, scrub and abrasion resistance to a variety of coating formulations.

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#### Typical Physical Properties

(Not for specification purposes)

Shape	Hollow spheres with thick walls	
Composition	Silica-Alumina Ceramic	
Color, Unaided Eye	Gray	
Crush Strength	> 4,200 kg/cm <sup>2</sup> (> 60,000 psi)	
Chemical pH	3.0 minimum	ASTM E 70
Hardness	7	Mohs Scale
Softening Point	1,020°C (1,870°F)	
Refractive Index: Predominant	1.52–1.54	
Dielectric Constant	3.7–4.6	
Thermal Conductivity	2 W/mK	

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## Gray Zeospheres microspheres

G-200 G-400 G-600 G-800 G-850

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<b>True Density (gm/cc)</b>	2.5	2.5	2.5	2.3	2.2
<b>Particle Size (microns)</b>					
<b>95th Percentile</b>	11	19	33	102	120
<b>90th Percentile</b>	9	14	22	80	99
<b>50th Percentile</b>	4	5	6	21	40
<b>10th Percentile</b>	1	1	1	2	10
<b>Mean</b>	5	6	10	32	50
<b>Surface Area (m<sup>2</sup>/cc)</b>	6	5	4	3	2
<b>Oil Absorption*</b>	70	60	60	60	70

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\*gm oil/100cc microspheres

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### Formulating Information

3M™ Zeospheres™ Ceramic Microspheres are best dispersed by using sand, ball and roller mills. For optimal dispersion, Zeospheres microspheres should be added to the grind stage along with pigments and other filler materials. Use of a dispersant will aid in the dispersion of these products.

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### Product Safety and Handling

Please refer to the Material Safety Data Sheet and product label before using this product. Material Safety Data Sheets for this product are available from 3M Customer Service at 800-367-8905 or from your local 3M sales representative.

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### 3M Corporate Headquarters

**3M Specialty Materials**  
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**800-367-8905**  
**800-810-8514 (FAX)**

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**Important Notice to Purchaser:** The information in this publication is based on tests that we believe are reliable. Your results may vary due to differences in test types and conditions. You must evaluate and determine whether the product is suitable for your intended application. Since conditions of product use are outside of our control and vary widely, the following is made in lieu of all express or implied warranties (including the warranties of merchantability or fitness for a particular purpose): 3M's only obligation and your only remedy is replacement of product that is shown to be defective when you receive it. In no case will 3M be liable for any special, incidental, or consequential damages based on breach of warranty or contract, negligence, strict tort, or any other theory.



# Zeeospheres™

## Ceramic Microspheres

### White Grades

#### Introduction

3M™ White Zeeospheres™ Ceramic Microspheres are unique, semi-transparent, white-colored, fine particle size, high-strength microspheres. These products are typically used to reduce VOC levels, increase filler loadings, provide hardness, burnish, scrub and abrasion resistance to a variety of coating formulations. Due to the ceramic chemistry of these products, they are also UV transparent down to 25 nm and have found utility in radiation curable and thin-film powder coatings.

#### Typical Physical Properties

(Not for specification purposes)

Shape	Solid Spheres	
Composition	Alkali Alumino Silicate Ceramic	
Color, Unaided Eye	White	
Whiteness ("L" Value)	95+ (Hunter L,a,b scale)	ASTM D 2244
Crush Strength	> 4,200 kg/cm <sup>2</sup> (> 60,000 psi)	
Chemical pH	9.0–12.0	ASTM E 70
Hardness	6	Mohs Scale
Softening Point	1,020°C (1,870°F)	
Refractive Index: Predominant	1.53	Becke Line
Dielectric Constant	3.19	

UV Light Transmission      UV Transparent down to 25  
nm

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Thermal Conductivity      2.3 W/mK

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**White Zeeospheres microspheres**

	<b>W-210</b>	<b>W-410</b>	<b>W-610</b>
<b>True Density (gm/cc)</b>	2.4	2.5	2.5
<b>Particle Size (microns)</b>			
<b>95th Percentile</b>	10	18	30
<b>90th Percentile</b>	9	14	22
<b>50th Percentile</b>	4	4	8
<b>10th Percentile</b>	1	1	1
<b>Mean</b>	5	6	10
<b>Surface Area (m<sup>2</sup>/cc)</b>	5	3	3
<b>Oil Absorption*</b>	46	44	28

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\*gm oil/100cc microspheres

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**Formulating  
Information**

3M™ Zeeospheres™ Ceramic Microspheres are best dispersed by using sand, ball and roller mills. For optimal dispersion, Zeeospheres microspheres should be added to the grind stage along with pigments and other filler materials. Use of a dispersant will aid in the wet-out and dispersion of these products.

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**Product Safety  
and Handling**

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## 3M Microspheres Comparison Chart

### 3M™ Zeeospheres™ Ceramic Microspheres

	Target Isostatic Strength (90% survival, psi)	True Density (g/cc)	Particle Size (microns, by volume)			Effective top size 95th%	Color (unaided eye)
			10th%	50th%	90th%		
<b>Composition:</b> Silica-alumina ceramic							
<b>G-200</b>	>60,000	2.5	1	4	9	12	Gray
<b>G-400</b>	>60,000	2.4	1	5	14	24	Gray
<b>G-600</b>	>60,000	2.3	1	6	24	40	Gray
<b>G-800</b>	>60,000	2.2	2	18	75	200	Gray
<b>G-850</b>	>60,000	2.1	12	40	100	200	Gray
<b>Composition:</b> Alkali alumino silicate ceramic							
<b>W-210</b>	>60,000	2.4	1	3	9	12	White
<b>W-410</b>	>60,000	2.4	1	4	15	24	White
<b>W-610</b>	>60,000	2.4	1	10	28	40	White

**NOTE:** Technical information and data shown here should be considered representative or typical only and should not be used for specification purposes. Refer to product data pages for additional technical information.