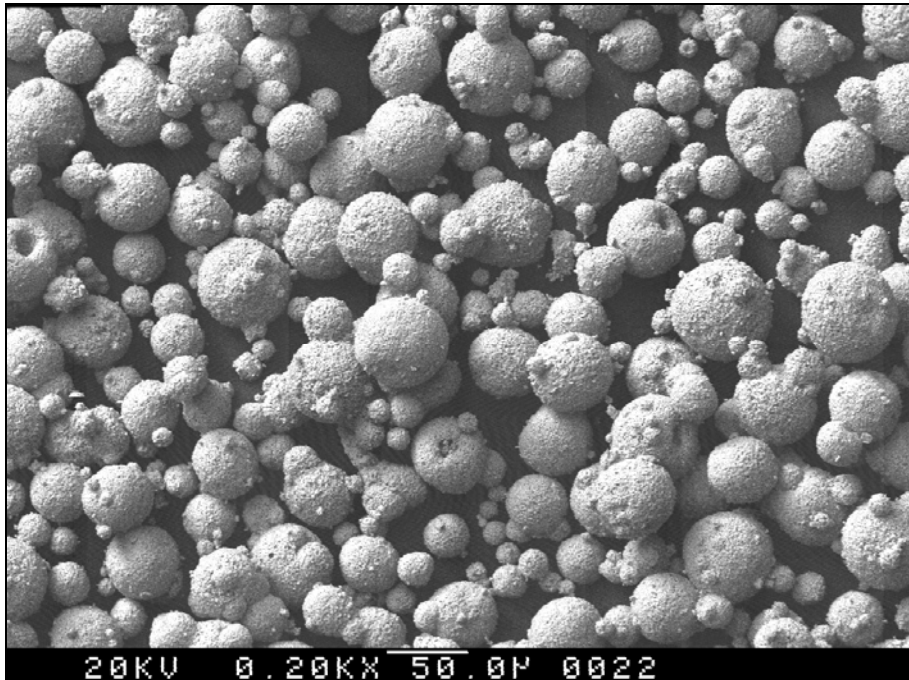


# HA 4002

## Yttrium Oxide

Product Code: 424002  
Technical Data Sheet

Revision: # 003  
Dated: 04/14/09



**Figure 1:** Typical Powder Morphology (SEM 200X)

### 1. PHYSICAL PROPERTIES

HA 4002 is a spherical, easy flow, pure Yttrium Oxide ( $Y_2O_3$ ) powder, designed to meet stringent semiconductor industry requirements

<b>Molecular Formula</b>	$Y_2O_3$
<b>CAS #</b>	1314-36-9
<b>Melting Point [°C]</b>	2,690
<b>Crystal Structure</b>	Cubic
<b>Apparent Density [g/cm<sup>3</sup>] ASTM B212-89</b>	1.2 – 1.4
<b>Hall Flow [sec./50g] ASTM B213-90</b>	105 - 120

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## 2. CHEMICAL PROPERTIES

### 2.1. Typical Chemical Analysis

<u>Element</u>	<u>Weight Percent</u>
Y <sub>2</sub> O <sub>3</sub>	99.7 min.
Al <sub>2</sub> O <sub>3</sub>	<0.002
Na <sub>2</sub> O	0.28
Fe <sub>2</sub> O <sub>3</sub>	<0.002
SiO <sub>2</sub>	<0.002
ZrO <sub>2</sub>	<0.002
HfO <sub>2</sub>	<0.002
All Others	<0.010

## 3. POWDER MORPHOLOGY AND PARTICLE SIZE DISTRIBUTION

### 3.1. Powder Morphology

- 3.1.1. Powder has spherical shape as produced by agglomeration processes.
- 3.1.2. Typical Powder Morphology using SEM is shown in Figure 1.

### 3.2. Particle Size Distribution

- 3.2.1. The typical powder size range measured with Tyler according to ASTM B214 is -230 mesh +5 µm
- 3.2.2. Table 1 shows the required and typical particle size distribution measured with Microtrac according to ASTM B822
- 3.2.3. Figure 2 shows the typical Microtrac particle size distribution graph

# HA 4002

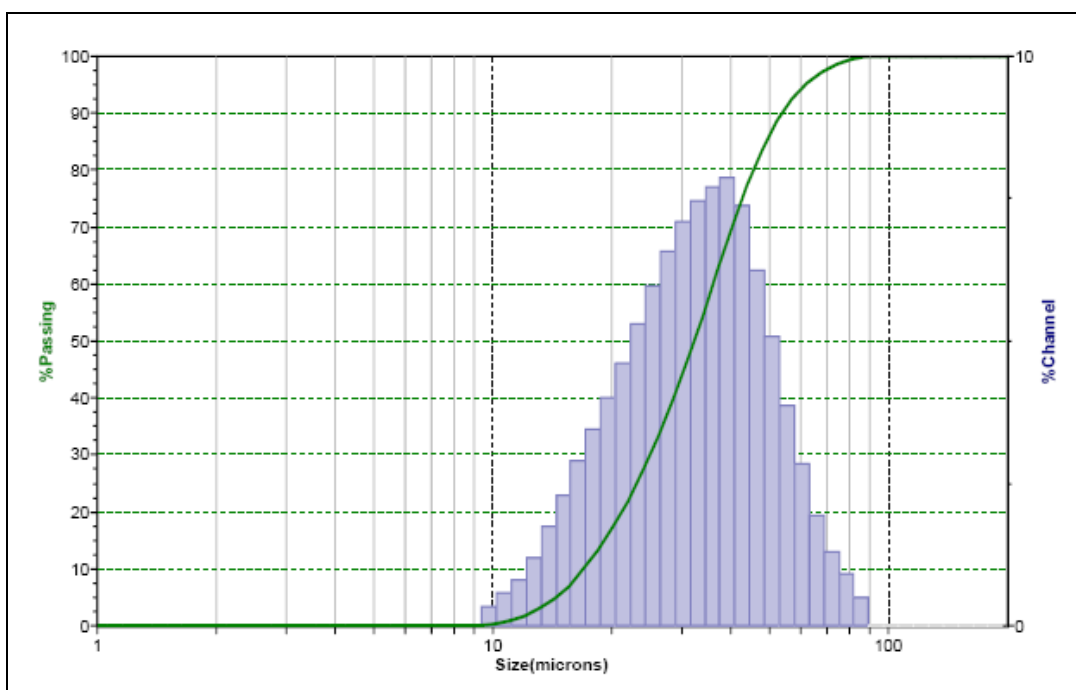
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**Table 1: Typical and Required Microtrac Particle Size Distribution**

<u>Percentile</u>	<u>Typical Particle Size</u>		<u>Mean</u>	<u>Required Particle Size</u>
[%]	[ $\mu\text{m}$ ]			
0.01	9.28		D <sub>10</sub>	10 - 20 $\mu\text{m}$
5.00	14.47			
10.00	17.04			
16.00	19.64		D <sub>50</sub>	25 - 40 $\mu\text{m}$
50.00	32.29			
84.00	48.35			
90.00	53.86		D <sub>90</sub>	45 - 60 $\mu\text{m}$
95.00	61.56			
99.99	87.80			



**Figure 2: Typical Microtrac Particle Size Distribution**