



# Glass Bead Polishes Apple

*and other informational bites  
on this popular media*



*Many Apple store fronts are covered in stainless steel. The satin finish on the metal panels was achieved with glass bead blasting.*

**APPLE'S FIRST FLAGSHIP** store in New York's SOHO district brings to mind an Apple notebook: a spare, elegant metal housing for its ground-breaking technology. It was one of several Apple storefronts covered in the GB-60™ stainless steel surface. "GB" stands for glass bead and "60" is the bead size used to finish the metal panels. The process was developed by Zahner, a manufacturer of high quality metal and glass products used in art and architecture.

If glass bead adds polish to the world's most expensive apples, what else should we know about it?

## **Start with the Finish**

Zahner also calls their GB-60™ panels, "satin stainless steel" panels. Glass bead is well-known for its ability to give a soft sheen to a metal surface without etching surfaces, changing tolerances or imparting ferrous pollutants.

The satin finish has another architectural benefit: it is glare free. The Apple storefronts have a beautiful metallic finish, but they don't blind pedestrians when the sun hits the panels.

Glare can be problematic indoors, too. A manufacturer of stainless steel laparoscopic surgical tools asked Clemco Industries to improve their finishing operation. Part of Clemco's solution was a blasting cabinet that used glass bead. Glass bead blasting quickly and easily removed the burrs and oxidation with an unexpected bonus. "To the manufacturer's delight, their customers raved about the matte-finish—it served to eliminate the reflective glare on the instrument from the operating room's high-intensity lighting, an obstacle they had lived with for years. Removing the shine from the surface of the instruments increased surgical productivity," said Herb Tobben, Clemco's Sample Processing Manager.

## **Glass Bead is Clean**

Glass beads are inert, meaning that they are chemically inactive and will not leave

ferrous or other undesirable residue on the work piece surface. Glass bead's "cleanliness" makes it popular in medical applications where a contaminate-free surface is crucial.

### Glass Bead is Green

Potter's Industries, a leading producer of glass beads for metal finishing, produces their beads from clean recycled glass cullet. Cullet is crushed and decontaminated glass that is ready to be remelted. Glass recycling uses less energy and releases less carbon dioxide than the manufacturing of new glass, it produces local jobs, and it keeps tons of glass waste out of landfills. Potters Industries says that they recycle over one billion pounds of glass each year.

### Safe Glass Bead Manufacturing is Clearly Better

"Not all glass beads are created equal," said Chris Davies with Potters Industries. "Unlike the clean recycled cullet used to make glass bead in North America, some manufacturers in other countries may still use the soda and lime glass manufacturing process that contains hazardous materials like arsenic and lead." That's why in August 2007 and January 2008, the SAE (AMS 2431/6C) and the Air Force (MIL PRF 9954C), added heavy metal limits to their Glass Bead for Cleaning and Peening Specifications—100 ppm for Lead and 75 ppm for Arsenic. These specs also reduce the health risks associated with landfill disposals and breathing in spent glass bead dust.

In addition to using cullet, Potters takes additional steps to exceed spec requirements. "Every truckload of cullet that enters our property is tested for arsenic and lead. If the test results are even marginal, the entire truckload is sent back," said Robert Mulhall, Vice President and General Manager at Potters Industries.

### Glass Bead is Aggressive and Gentle

Glass bead has the ability to clean without damaging the surface. "When used properly, glass bead can remove paint from a light bulb without breaking it," said Mr. Mulhall. These attributes make glass bead one of the most versatile cleaning and deburring air blasting media on the market—glass bead removes burrs from delicate medical needles and cleans swimming pools without harming the glaze on the pools' tiles.

### Glass Bead Is Not a Peening Lightweight

Shot peening layman assume that steel shot peens better than glass bead because shot is more dense. In real practice, however, conventional shot peening machines are capable of delivering glass bead at much higher velocities than steel shot, so there is a trade-off. The fact is, up to the higher velocity levels where glass beads begin to fracture, glass and steel peen with equal results.

### Any Questions?

Would you like to know what size glass bead to use for your peening process? Need to know what size bead to use in a cleaning process? Do you want to achieve a particular finish? Chris Davies, the "Answerman" at Potters Industries, can answer your questions and help resolve metal finishing problems. Call him at Potter's Research and Development Center in Conshohocken, Pennsylvania at (610)651-4660. The following is a typical question for Mr. Davies.

#### Question

My experience is that a few MROs in China use glass beads that are the required size range, but not necessarily from a approved vendor list, for their peening jobs. The problem is that some of these glass beads are very brittle and break down easily. Their machines have built-in classifiers, but I was wondering if there are detrimental effects from using these beads.

**Adam Chai**

Director of Corporate Affairs  
Pakpal Surface Technology

#### Answer

You are right to be concerned. When quality round glass beads bombard the metal's surface to create a layer of compressive strength, the part isn't damaged or chipped as it could be if angular particles were used. Inferior glass beads may look round, but air bubbles or inclusions compromise their compressive strength and ability to maintain a spherical shape. When these beads are used in peening, they break down quickly and the roundness of the particle is compromised. Then the metal surface can be damaged and stress risers created—creating the opposite effect of what you can obtain with proper glass bead peening.

The glass bead you mentioned can't be meeting AMS 2431/6 because the spec covers all quality control parameters for glass bead including chemical stability, hardness, and angular composition, not just size and roundness.

**Chris Davies**

Research and Technical Service Specialist (the Answerman)  
Potters Industries

