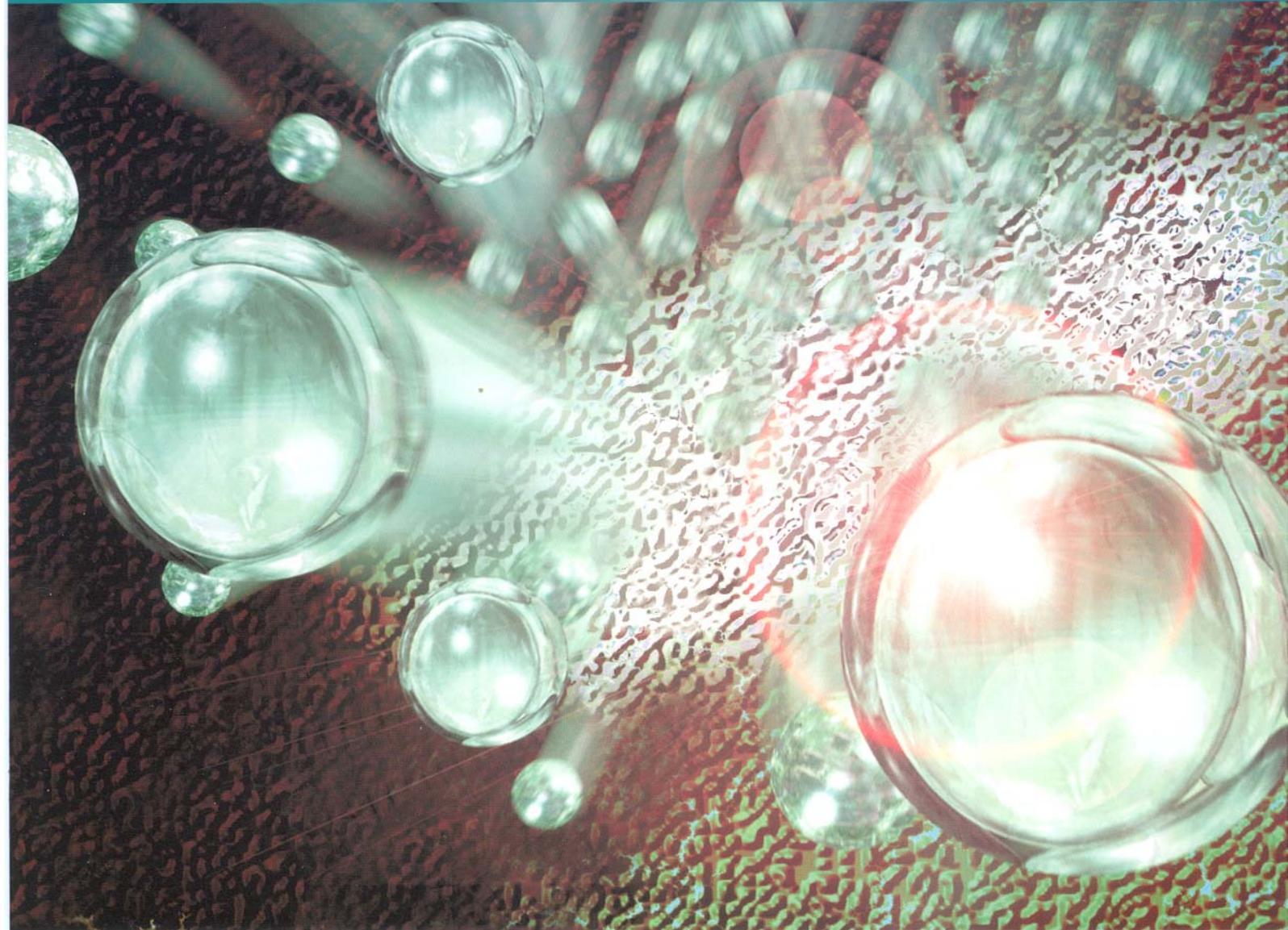




## Potters Glass Beads as Impact or Blasting Media



- Although many different types of impact media are available in the market place in a wide range of different materials, sizes and shapes, Potters Impact Glass Beads exhibit some unique characteristics. Potters beads are spherical, have a smooth surface, and are inert (contain no free silica) and inherently strong.

Beads can be used to treat surfaces by cleaning, deburring, peening and finishing without etching or removal of basic surface material and without leaving undesirable residues

In comparison, impact media that take the form of angular particles can be very aggressive on the surface being treated or, in the case of metallic

media, can leave ferrous residues. In both cases long term problems can ensue.

Glass beads also give the additional benefit of imparting compressive stresses to surfaces. This has the effect of retarding stress corrosion cracking.

### ■ POTTERS IMPACT GLASS BEADS

All Potters Impact Glass Beads are produced in accordance with ISO 9002. They are manufactured to a wide range of specifications covering all European, Middle Eastern and African markets.

# IMPACT



## ■ GENERAL APPLICATION BY SIZE

The following table shows the general suitability of the different grades for the three major application areas of finishing, cleaning and peening:-

| Nominal Size Range (Microns) | Potters Designation | Finishing Grades | Finishing/Cleaning Grades | Finishing/Peening Grades |
|------------------------------|---------------------|------------------|---------------------------|--------------------------|
| 425-850                      | BL                  |                  |                           | ♦                        |
| 300-400                      |                     |                  |                           | ♦                        |
| 250-425                      | C                   |                  | ♦                         | ♦                        |
| 180-300                      | AB                  |                  | ♦                         | ♦                        |
| 150-250                      | AC                  |                  | ♦                         | ♦                        |
| 106-212                      | AD                  | ♦                | ♦                         | ♦                        |
| 75-150                       | AF                  | ♦                | ♦                         |                          |
| 53-106                       | AG                  | ♦                | ♦                         |                          |
| 45-90                        | AH                  | ♦                | ♦                         |                          |
| 0-75                         | AQ                  | ♦                |                           |                          |

## ■ SIZE DISTRIBUTION

Potters Standard Impact Glass Beads are available in a wide range of sizes (see separate data sheet).

The different sizes of beads have different characteristics when used in impact applications as the following table illustrates:-

### Large Beads

Remove larger, heavier contaminants from surfaces.

Give fewer impacts per kilo.

Clean slower.

Peen to more intense levels.

Cannot reach small areas.

Generally produce a brighter finish than smaller beads at the same intensifies.

Consume faster at the same pressure as smaller beads, but in practice may consume slower as less pressure is required to do the same work as smaller boxes

### Small Beads

Remove smaller, lighter contaminants from surfaces.

Give more impacts per kilo.

Clean faster

Peen to less intense levels.

Can reach small areas.

Generally produce a more matt finish than larger beads at the same intensifies.

Consume slower at the same pressure as larger beads, but in practice may consume faster as more pressure is required to do the same work as larger beads.

## ■ GENERAL SPECIFICATIONS

Potters Impact Glass Beads are produced to a number of specifications including BS6088, DIN 8201 and various MIL specs. They also meet the following general specification requirements:-

- **Percentage Rounds** Minimum 70%, 75%, 80% rounds depending on the size and specification, measured in the nominal size range.
- **Size Range** 80% (min) by weight in the nominal size range.
- **Angular particles** 3% (max) by number.
- **Air Inclusions** Not more than 10% of beads with > 25% of projected surface area (tested visually by microscope)
- **Free Icon** 0.1 % max by weight.
- **Specific Gravity** 2.45 to 2.55 g/cm<sup>2</sup>
- **Bulk Density** 1.5 g/cm<sup>3</sup> approx.
- **Hardness** 6 Mohs/Rockwell 47 RC

Potters Impact Glass Beads contain no free silica.

Standard packaging is 25 kg bags. (Other packaging available on request.)

It is recommended that all material is stored in dry conditions under cover.

## ■ POTTERS STANDARD GLASS BEADS FOR CLEANING

The major use of Potters glass beads in impact applications is for the cleaning of surfaces.

The main advantages of glass beads are their ability to remove debris without etching, changing tolerances or imparting ferrous pollutants.

Normally, the rationale in choosing the size of glass bead to use is to select the smallest size possible, which gives the desired result. In this way it is possible to maximise the number of beads, and therefore the number of impacts, per kilo.

Smaller beads are more efficient at removing lighter particles of dirt, and are able to clean in tight corners and constricted areas. However, there may be cases where bigger beads are required in order to remove the larger pieces of dirt or debris, which need more force.

Typical cleaning applications using glass beads include:-

- Cleaning of moulds in the rubber, plastic, glass and metal foundry industries.
- Deburring of castings and preparation for galvanising or other chemical or mechanical coating with metals etc.
- General cleaning of engine, transmission and other parts in the automotive industry.
- Cleaning of pumps, wheels, valves, gauges and armatures in the chemical petrochemical industry.
- Removal of corrosion from weapons, ammunition etc in the defence industry.
- Removal of oxidation, tarnish and scale after treatment of castings, forgings etc.
- Preparation of surfaces for all types of further coating or treatment.
- Cleaning of electrical brushes, connectors and terminals to improve conductivity.

The following picture shows the effectiveness of cleaning using glass beads.

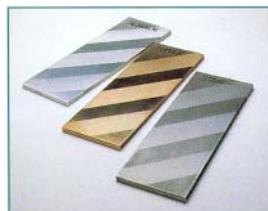


#### ■ POTTERS STANDARD GLASS BEADS FOR FINISHING

Potters glass beads can be used very effectively to produce a particular surface finish. The precise finish obtained will depend on a number of factors including the type of blasting equipment, nozzle size and angle, distance from surface, air pressure, bead size etc

Once a particular finish has been achieved, it can be duplicated in future processing runs simply by using the same size of beads and the same settings of the equipment.

The following pictures demonstrate the effect of using glass beads for finishing purposes and a variety of surface finishes available.



Potters glass beads can be very effective at providing certain special finishes. Typical applications include:-

- Satin or non-reflective finishes on watches and clocks, cameras and office machinery.
- Non-reflective finishes on automobile parts, particularly in the driver's field of vision.
- Uniform finish on stainless steel and non-ferrous metal pipes, containers, sheets etc.
- Replacing chemical treatment on welded areas.
- Etching of printing plates, dies, presses, and moulds.
- Designs on glasses, windows, metal sheets etc.

#### ■ POTTERS SPECIAL GLASS BEADS FOR PEENING

The raw surfaces of metals contain tensile stresses, which tend to pull surface grains apart and cause, 'stress raisers'. These can be compared to cuts on human skin, which if not effectively healed, will allow disease to enter the body. In the same way, the area around a stress raiser on the surface of metal can become a weak point. Corrosion can enter the metal surface and ultimately cause a failure through, 'stress corrosion cracking'.

Potters glass beads can be used, very effectively, to 'peen' the surface of the metal, exerting compressive stresses that pack the surface grains together, close the stress raisers and minimise the possibility of stress corrosion cracking.

The benefits of peening are clear. Parts such as springs, gears and fasteners are better able to withstand 'cyclical fatigue', and the 'elastic yield', or ability of a surface to stretch before snapping, is greatly improved.

Peening allows engineers to design smaller, lighter components, which perform, as well as heavier, unpeened parts.

The big advantage of using glass beads for peening is that, being inert, they do not leave any residue on the surface of the metal part being peened. In the case of some other peening media, such residues can actually lead to stress corrosion cracking and effectively negate any benefits of the peening process.



## ■ CONTROLLING THE PEENING PROCESS

In practice, it is important to be able to control the peening process, and duplicate the particular 'peening intensity', which achieves the desired result.

There are a number of variables, which determine the peening intensity. These are the diameter and density of the media and the velocity at surface impact.

The peening intensity can be determined using an 'Almen Strip' which is a piece of standard steel attached to a hardened steel block. When glass beads bombard this strip, it will bend measurably. The extent of this bending will represent a certain peening intensity when measured with an 'Almen Gauge'.

The appropriate peening intensity value can then be duplicated for all future treatments and tested by using the Almen Gauge.

## ■ TYPICAL PEENING APPLICATIONS

Potters glass beads are used for peening in many industrial areas and applications including:-

- Various components exposed to stress in the automobile industry.
- Turbine blades and other jet engine parts, landing equipment and wing sections in the aircraft industry.
- Gears, shafts and cutting tools.
- Protection of welded structures pipes and joints from stress corrosion cracking.
- Increasing smoothness of machine parts such as piston heads and camshafts.
- Hardening exterior vehicle panels and marine propellers and hulls to reduce fatigue and stress corrosion cracking.

## ■ SELECTION OF POTTERS GLASS BEADS FOR PEENING

Traditionally, larger glass beads are used for peening applications. They have greater mass and can exert more force than smaller beads.

The specifications are generally very tight in terms of size gradation, and tend to be in the size range between 250 microns and 850 microns except in the case of some MIL Specs.

Information contained in this publication (and otherwise supplied to users) is based on our general experience and is given in good faith, but we are unable to accept responsibility in respect of factors which are outside our knowledge or control.

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Potters can produce peening glass beads to all currently published peening specifications.

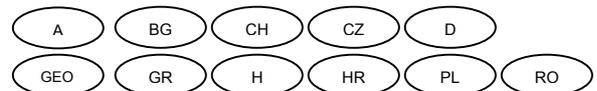
It is also possible to use smaller glass beads in a secondary peening process following the initial peening. Potters can give advice on the appropriate choice of glass bead for this purpose.

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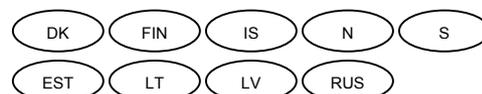
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