

AMACAST

CAST STAINLESS STEEL SHOT

FROM ERVIN INDUSTRIES

ES Volume No. 2

August 1995

WORK-HARDENING

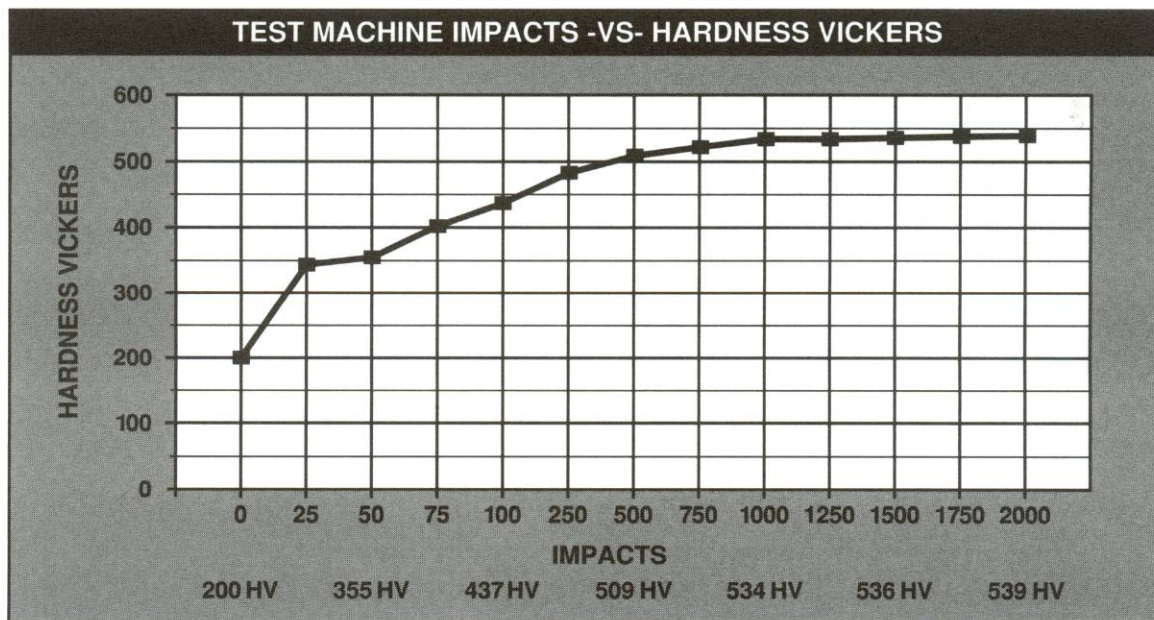
One of the many advantages of using AMACAST stainless steel shot in any operation is its recyclability. AMACAST is capable of imparting its tremendous impact energy to blast-clean or blast-peen a work surface thousands of times, thereby lowering your material costs while providing more consistent, repeatable results.

During the recycling process a transformation takes place. Through repeated impacts the shot is subjected to tremendous forces. With each impact there is a slight deformation and compression of the shot. This causes a gradual changing of its microstructure from austenitic to a harder microstructure, martensite. This process is called work-hardening.

The graph in Fig. 1 illustrates the degree of work-hardening that takes place as the shot is subjected to a specific number of impacts. This hardening curve was created by impacting the shot against hardened tool steel.

When impacting softer non-ferrous metals such as aluminum, brass, zinc, etc. the work-hardening curve decreases while the fatigue life of the shot increases.

Fig. 1



Hardness Testing

The hardness results were obtained by applying a 500-gram load to a Vickers indenter, according to ASTM E 92.

AMACAST, as produced, has a typical hardness of 200 HV (93 Rockwell Hardness B Scale). It work-hardens to about 530 HV (51 Rockwell C scale). These exceptional work-hardening characteristics and the durability to withstand in excess of 5000 impacts make AMACAST an effective, efficient media for blast cleaning or blast peening a wide variety of metals.

Hardness Conversions

Various types of metals have a wide range of mechanical properties and hardness. Therefore, separate testing methods and hardness scales are necessary for different materials. ASTM E 140 provides standard conversion tables that allow comparisons between the hardness scales. Such a conversion table is shown in Fig. 2.

NOTE: ASTM E 140 para. 6.2—"Because of their approximate nature, conversion tables must be regarded as only an estimate of comparative values. It is recommended that hardness conversions be applied primarily to values such as specification limits, which are established by agreement or mandate, and that conversion of test data be avoided whenever possible."

Fig. 2

| Vickers Hardness Number | Rockwell Hardness Number C Scale | Rockwell Hardness Number B Scale |
|-------------------------|----------------------------------|----------------------------------|
| 697 | 60 | — |
| 595 | 55 | — |
| 513 | 50 | — |
| 446 | 45 | — |
| 392 | 40 | — |
| 345 | 35 | — |
| 302 | 30 | — |
| 266 | 25 | — |
| 240 | 20 | 100 |
| 185 | — | 90 |
| 150 | — | 80 |

Approximate hardness conversion numbers taken from ASTM E 140 tables 1 and 2.

ERVIN

Ervin Industries, Inc.

3893 Research Park Drive Ann Arbor, MI 48106
Toll Free: (800) 748-0055 Fax: (313) 663-0136