SIMPSON®+GEROSA
ELECTRONIC MOLD HARDNESS TESTER

Working at achieving and maintaining zero casting defects requires an in depth knowledge of your casting process. Molding sand control is a key process that has a definite impact on casting quality. The ability to accurately and quickly determine if a key parameter in molding sand has drifted out of control is key to success. With this in mind, Simpson Technologies Corporation has introduced a new measurement device that not only includes the benefits of advanced electronics, but also the ability to quickly disseminate quantifiable data into the hands of operators and supervisors. Allowing corrective actions to be quickly activated to regain control of the process. The instrument has incorporated conventional mold hardness technology into a portable electronic hand held instrument. The research and design efforts were concentrated on improving how we measure, manipulate and utilize mold hardness data.

The benefits of measuring mold hardness on the molding line have been well documented. Using mold hardness information, molding machine operators and QC personal can quickly detect changes in mold quality and reject inferior molds prior to setting cores and pouring. Furthermore, the information can be utilized to alert personal to potential problems with the molding sand. Basically mold hardness, as determined by this instrument, is the resistance offered by the surface of a prepared sand mold to be penetrated by a loaded plunger. The instrument accurately measures the depth of plunger penetration into a mold surface having a load applied at a 90 degree angle to the mold surface.

Some basic applications for this type of instrument would include:

- Ensures proper adjustments to molding machine parameters.
- Helps to ensure proper sand preparation.
- Can indicate whether the proper amount and type of additives are within the sand system.

Maintaining a consistent mold hardness results in improved casting surface finish, more accurate casting dimensions, reduces casting swells, metal penetration, sand inclusions and broken molds. An increase in mold hardness can result in quality problems such as expansion scabs, cracked castings, blow holes, misruns, pinholes, metal penetration and poor shakeout characteristics. A reduction in mold hardness can result in reduced green, dry and hot strengths, mold erosion, sand inclusions, rough surface finish, metal penetration, broken molds, swells

Simpson Technologies Corporation
www.simpsontech.com
751 Shoreline Drive, Aurora, Illinois 60504, Telephone: (630) 978-0044, Fax: (630) 978-0068
Baarerstrasse 77, CH-6300 Zug, Switzerland, Telephone: +41 (41) 711 15 55, Fax: +41 (41) 711 13 87

and inconsistent casting dimensions. Utilizing this on-line data in concert with laboratory sand analysis can yield further insight into the probable causes for variation occurring in molding sand.

The introduction of electronics to this proven control technology allows metal casters the ability to improve test accuracy by eliminating the mechanical scale and locking pin found on dial indicator type instruments. The Electronic Mold Hardness Tester accurately and automatically records the maximum hardness value, thus eliminating the need for a cumbersome mechanical locking system. Furthermore, the electronic liquid crystal display clearly indicates the hardness number, completely eliminating any operator error associated with reading a mechanical scale.

The instrument also has the capability to store up to 900 data points measured throughout a shift. This information can be stored and categorized by up to 32 user defined mold identification names and/or numbers. By including an infrared data port into its design, the Electronic Mold Hardness Tester is capable of wireless data transmission into a computer. This function completely eliminates the time required to write down and key results into a computer, resulting in improved efficiency. Critical control data can be instantaneously available throughout the plant.

The Electronic Mold Hardness Tester also has the ability to function in several unique modes of operation. The instrument can be easily programmed to operate in either point to point, average or scan modes. In point to point mode, the instrument will display mold hardness readings for a set period of time. This information can also be stored in memory for transfer to a computer. When set for averaging mode, a series of data points will automatically be averaged. This mode of operation allows for a rapid indication of the overall hardness a select surface of a mold. Using the scan mode of operation yields a very interesting method of evaluating the quality of a prepared mold. Functioning the Electronic Mold Hardness Tester in scan mode generates a series of data points collected over a vertical or horizontal span on a mold surface. Each individual data point is stored in memory for transfer to a computer. Once in the computer, this series of data points can be displayed by plotting depth versus hardness. Evaluating the resultant curve or line would indicate the hardness gradient of the tested portion of the mold.

Other features incorporated into the design include capability to program and display owners name, time and date display, customized user defined timers, rechargeable internal battery, digital calibration of displacement and the ability to automatically store and display the last date of calibration.

The incorporation of this instrument in a sand control program offers several new modes of evaluating mold quality. By utilizing new modes of operation, the instrument will increase the operators ability to quickly detect changes in mold quality. The instrument is both portable and easy to operate. Molding machine operators and QC personnel can use this instrument to reject poor quality molds prior to setting cores and pouring. The daily hardness data can easily be down loaded for evaluation by other plant personal to evaluate long term data trends. Maintaining a consistent mold hardness will help improve casting quality.