Comparison: Sherardizing and ArmorGalv

The main difference between the two processes is in the way in which each process causes Thermal Diffusion to occur.

SHERARDIZING is based mostly on zinc powder coming in **intimate contact** with the steel part to cause diffusion.

ARMORGALV is the trade name for the Vapor Diffusion process developed by Dr. Shtikan, C.E.O of the Distek Group, in 1993. It is based on an alloyed zinc powder, containing elements (we could call them catalysts or accelerators) which cause **sublimation** of the zinc at low temperatures to create **vapor diffusion**.

The above differences in the principle of the process explain the practical advantages of **ArmorGalv** over the Sherardizing process:

- **Sherardizing** requires the addition of a large amount of sand, to protect the zinc powder from liquefying when coming in contact with super heated the walls of the vessel. As a practical example, in one case a 40 micron coating is required on 30mm bolts. For a load of 1000Kg of bolts, about 250Kg of sand are needed for the Sherardizing process to work, plus about 70Kg of Zinc powder. Between 20%-40% of the zinc mixed in with the sand, is not involved in the process and remains in the sand, but it oxidizes and loses it's activity. This creates a large amount of waste and makes recycling of the sand difficult.
- In the **ArmorGalv** process, practically ALL of the zinc in the container is consumed in the process. The small amount of inert material that is in the ArmorGalv powder is easy to dispose of since it contains just the inert material with practically no zinc.

- In **Sherardizing**, operators want to try and re-use some of the zinc waste. They do this by adding fresh zinc to the sand for re-use. This makes every batch different since it is practically impossible to control the quantity and quality of the zinc powder beyond the first batch with fresh zinc. The process is then **inconsistent** and hard to control.
- The **ArmorGalv** process is very controllable and consistent since every batch consumes all of the zinc in the powder, enabling the operator to have precise coating thickness **control and repeatability**.

- In **Sherardizing**, the large amount of sand requires energy to heat and takes more time to cool than steel.

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- The **ArmorGalv** process does not require the large amount of sand and is therefore more energy efficient and shorter.

- The operators of the **Sherardizing** process are exposed to silica at high temperature, which may cause Silica Disease (Silicosis). Use of sand in this way is actually banned by OSHA.
- The **ArmorGalv** operator is not exposed to hot Silica and if fact, the EPA has tested the process extensively and approved it as having no health issues. The process was also awarded the EPA's MVP^2 (Most Valuable Pollution Prevention) award in 2006.

- For the **Sherardizing** process to work, the operator is required to vary the amount of sand and zinc in the mix, according to the nature of the parts, the size and shape of the vessel, operating temperatures etc. This makes the process more complicated and requires a great deal of experience and knowhow from the operator.
- The **ArmorGalv** saturation powder is universal and can be used with a great variety of parts under most working conditions, without any additions or modifications. This makes the process much simpler and more user-friendly.

- The **Sherardizing** process is limited to a maximum of about 50 microns in coating thickness and cannot be controlled very accurately and uniformly, particularly on complex parts with internal cavities or threads.
- The **ArmorGalv** process can provide very accurate and uniform coating between 10 and 200 microns, regardless of geometry.

- With **Sherardizing** at temperatures of 450^0C or higher, it becomes difficult to prevent some of the zinc from liquefying.
- Since in the **ArmorGalv** process the zinc sublimates at temperatures of around 250^0C, there is no problem to operate at a temperature range of 320^0C to 550^0C (610^0F-1020^0F).

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