Modern enameling technology for hot water tanks.

by Ronald Ditmer

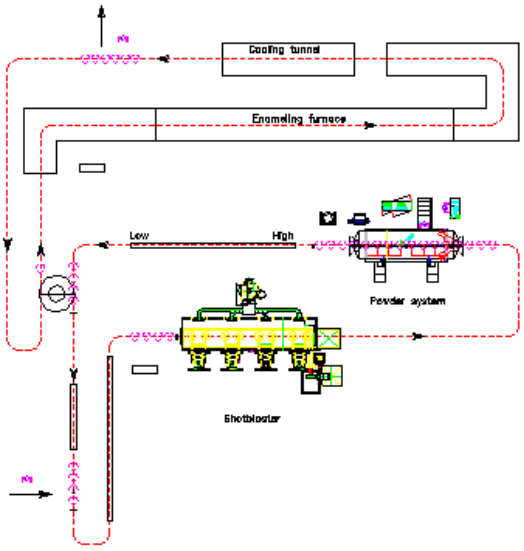
Till recently, the traditional way of enameling hot water tanks (like electrical heaters or solar boilers) included a full pickling process as metal pretreatment and wet enamel preparation plus ditto application method followed by convection drying.

However, technological developments in both powder enamels and powder application equipment makes it today possible to simplify and automate boiler enameling operations.

Several projects, which incorporated this new boiler enameling technology, have already been implemented in Europe and show considerable cost savings while obtaining a better and more constant coating quality.

This paper is intended to provide a general overview of this new boiler enameling technology, highlight its benefits and describe the features of the utilized equipment.

The simplified drawing hereunder (figure 1) shows the layout of a modern enameling plant as recently built at Kwikot, South Africa's largest heater manufacturer.



The typical process flow in such plant is as follows :

The boilers are loaded onto a so-called Power + Free conveyor, which is located near the welding department and transported to a holding position near the shotblaster.

When this machine is ready for operation, sliding doors open automatically and the boilers move to the blasting station, where they are clamped into a centering device.

The boilers are being rotated, while a rigid multi nozzle lance enters the flange opening to blast the interior surface, especially at the welding seams.

By the end of the process cycle, the boilers are move to the next station to wash away any remaining shot by means of compressed air.

The boilers are then transferred to a holding position close to the powder coating system, which consists of two successive application stations with independent gun movers to obtain a consistent film build in compliance with the international standards, like German DIN 4753 T3.

The boilers are being transported respectively the first and second spraying station, where they are clamped to secure proper entering of the application lances.

By the end of the second application cycle, the free car moves from the powder enamel system to the automatic transfer station and boilers are lifted one-by-one from the pretreatment/application conveyor and suspended to the furnace conveyor.

After firing the boilers will be inspected and unloaded from the furnace conveyor.

Above description demonstrates that a modern boiler enameling plant requires an absolute minimum of direct labor since all major process steps are automated & integrated.

E.G.: The products are automatically recognized at the entrance of the powder booth, so that the PLC, with optional dial-in functionality, can select the appropriate application parameters and settings of the product centering device.

The shown shot blaster and powder system are both equipment with an integrated recovery and sieving system, which guarantee an almost perfect material utilization.

In consequence the solid waste emissions of a modern boiler enameling plant are extremely low and incomparable with these at a traditional wet enameling shop.

Furthermore there is no waste water or air emissions, which need special attention and/or treatment.

Another advantage of the shot blasting and electrostatic powder application technology is the use of ready-to-use materials, which require neither in-house preparation nor chemical skills and therefore greatly simply the complexity of the enameling operation.

Last-but-not-least the new boiler enameling plant requires less factory floor space then a traditional enamel shop and significantly reduce the overall process time.

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