

Q: How long is the average kettle service life and can anything be done to extend it? Are there any potential problem areas on the kettle?

A: A recent survey, completed by Barry P. Dugan of Horsehead Corp., gathered information on the operation of galvanizing kettles to identify trends and predict kettle life. There were 37 responses to the survey and were evaluated with respect to kettle size, service life, burner type, and failure locations. Five of the 37 kettles had leaks or perforation failures (see figure 1). The heating systems, kettle sizes, and burner types are shown below along with the predicted kettle service life.

Kettle Heating System

24 Side Fired Kettles
10 End Fired Kettles
3 Electric Heated

Kettle Length and Predicted Service Life

Less than 35 Ft. Kettle = 6.62 years
Greater than 35 Ft. Kettle = 6.32 years

Burner Type and Predicted Service Life

Side Fired Kettle = 6.38 years
End Fired Kettle = 6.27 years

These predicted service life periods are increasing because of more uniform heating and burner technology, proper kettle sizing, good maintenance and repair, better kettle construction, and overall lower operating temperature. Based on survey information, the service life appears to be independent of the kettle size or burner type.

This survey also identified four kettle maintenance tips that are successful in extending kettle life:

- Keep kettle corners clean
- Review dressing procedures and equipment
- Inspect burners frequently
- Keep the “wash-line” clean



Figure 1: Kettle Perforation Failure

The survey also indicated four potential problem areas on the kettle. The dross line, thermocouple well, and brackets in the furnace cavity are areas that should be monitored closely. The dross line needs to be monitored because dross does not conduct heat as well as molten zinc and therefore is prone to cause overheating. Insulation is often applied to the outside surface of the kettle sidewall to isolate the dross from excessive heat.

The area between the thermocouple well and the kettle sidewall can accumulate dross, which will interfere with the heat transfer. The thermocouple should be located at least 2 inches from the kettle sidewall to insure proper temperature measurement and to minimize the build up of zinc residue.

Finally, if the brackets in the furnace cavity are not properly placed, they can cause hot spots on the kettle wall by interfering with the heat transfer through the wall.

Kettles should be changed on a schedule that prevents the potential of leaks or failures, yet extends the kettle service life as long as possible. Always have a spare kettle ready in case of premature kettle leaks and probe the kettle wall for low spots when the service life approaches 5 to 7 years.