Tech Sheet #108
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Magnetic Particle Testing in New Deaerators

In the construction of new deaerators, measures are frequently taken to eliminate cracks and other defects in pressure welds that can lead to failure during operation. Hairline cracks and other surface defects can exist in finished welds, and may not be detectable with the naked eye. As such, it is recommended that all internal nozzle-to-vessel welds be examined using the wet fluorescent magnetic particle (WFMP) method. Such welds normally cannot be radiographed, but WFMP examination will reveal any surface (and some subsurface) defects.

With magnetic particle examination, a magnetic field is generated in the weld by means of an electromagnetic yoke. With WFMP, iron particles, suspended in a fluorescent solution, are applied to the area under examination. If a crack exists, north and south poles will form at the edges of the crack, and the iron particles will be attracted, exposing the crack. An ultraviolet light is used to enhance the effect, making detection of any defects easier.

Note: When the nozzle neck is constructed of austenitic stainless steel material, which is non-magnetic, WFMP examination is ineffective, and dye penetrant examination is recommended instead.

This Tech Sheet was developed by the members of the Heat Exchange Institute's (HEI) Deaerator Section. HEI is a trade association comprising the leading manufacturers of heat exchange and vacuum equipment. HEI Tech Sheets are information tools and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific instructions regarding their equipment.