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## DEAERATOR INSPECTION SPECIFICATIONS

All deaerators, including those vessels designed as ASME constructed and those designated as non-ASME constructed, should be periodically inspected. Inspection, or the inspection supervision, should be conducted by a certified ASNT SNT-TC-1A Level II inspector. Circumferential seams are susceptible to cracking more than longitudinal seams, with the highest incidence occurring in the "T" junction of the two (2) seams. Cracks have also appeared randomly at different service nozzle welds affected by thermal expansion and thermal shock. Cracks are thought to be caused by residual stresses imposed during manufacture, along with thermal and dynamic shock and stress loads imposed during uneven deaerator operation. Evidence suggests that some cracks may originate in the area of pits caused by corrosion. Once cracks begin, they are stressed open during periods of operation, allowing iron oxide to collect on newly fractured surfaces, which causes corrosion fatigue. The slightly hardened heat-affected zone of the weld is where most cracks occur.

The inspection of internal tank and weld seams will include circumferential, longitudinal, nozzle, and other welds affected by residual and operating stresses. The actual nondestructive examination will be in accordance with ASME requirements and NACE guidelines and must be conducted from inside the vessels. Each weld will be prepared and treated by taking the following steps.

1. Clean the weld to the base metal (brush, wipe down, etc.).
2. Inspect visually, especially at the intersections of circumferential and longitudinal seams.
3. Test by the wet fluorescent magnetic particle (WFMP) procedure over the entire weld, in "as welded" condition.
4. If cracks are found, grind approximately 20 percent of each weld having cracks flush to the parent metal and retest with WFMP.
5. If cracks are found after retesting with WFMP, they must be ground out. Cracks then should be classified as (a) Class I, in which the depth of the crack does not exceed the corrosion allowance, (b) Class II, in which the depth exceeds the corrosion allowance but not the minimum design thickness, or (c) Class III, in which the depth exceeds the minimum design thickness.
6. It is mandatory to repair Class II cracks. Repairs must conform to the original design, and field repairs must be acceptable to the authorized (insurance company) inspector. The repair paperwork should be filed with the owner's records of the vessel.