EXCESSIVE PEARLITE LAYER

Ferritic malleable iron.

The fracture after heat treatment shows a clear, shiny edge in contrast to the dark interior.

The edge structure consists of a pearlitic layer which may contain some temper carbon, in addition to which there may also be an outer rim of ferrite. The interior is comprised of temper carbon in a ferrite matrix. A pearlite layer of 0.5 mm (0.02 in.) thickness does not constitute a defect.

Possible Cause

Humidity in the atmosphere of the heat treating furnace, arising either from incomplete drying of the refractory lining or from loads of wet castings placed in the furnace.

The oxygen and hydrogen in the humid atmosphere react at high temperature with the furnace charge. As a result of the decarburizing effect of the oxygen, a thin, ferritic rim is formed on the casting. The hydrogen diffuses toward the interior of the casting, where it stabilizes the pearlite and prevents its decomposition during the second-stage anneal.

Where the pearlite layer arises from the effects of a carburizing atmosphere in the heat treating furnace, the ferrite rim will not be present.

Remedies

— Take precautions to assure that the atmosphere in the annealing furnace is absolutely neutral.
— Be sure that the furnace lining is completely dry.
— Do not load wet or rusty castings into the annealing furnace.