

## Comparison of Steam Oxidation of 18%Cr Steels from Various Power Plants - DTU Orbit (08/11/2017)

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Lean austenitic steels such as the 18%Cr TP347H have been utilized in many power plants in Denmark. Steam oxidation has been investigated for both coarse-grained and fine-grained versions of TP347H. Oxidation for coarsegrained steels follows a parabolic rate however this is not always the case for fine-grained steels. Data has been collected showing a large range of inner oxide thickness for TP347H FG. Thus, this steel can perform well in one plant and will lead to faster oxidation rates in another that can be comparable to the normal "coarse-grained" TP347H. Examples of various oxide morphologies at different exposure conditions highlight the fact that in some cases, the fine-grained steel can have oxidation rates similar to coarse-grained steels. Faster oxidation rates results in an increased total thickness of the oxide, and spallation of the outer oxide. This is especially a problem with pendant superheaters as it can lead to tube blockage at the bends. Reasons for the varying oxidation rates are discussed with respect to chromium content, grain size, temperature, pressure, feedwater composition and surface deformation. Initial plant data with shot-peened tubes gives promising results.

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