

Optimization of test specimen dimensions for thermal power station exposure device

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Abstract:

Degradation of metallic materials can decrease mechanical properties of metal constructions and components in thermal power plants during their operation and consequently lead to loss of safety and reliability. It is difficult to remove material from the pressure system of the equipment being operated. Therefore, the effort is to design, produce and subsequently install exposure channels, which will allow to remove and evaluate samples of exposed material without intervention into the pressure system. The exposure device for pressures and steam temperature in supercritical blocks, which would contain sufficient test material to produce conventional test specimens, is unrealistic in size, energy and economics. The way is to optimize the dimensions of the exposure device according to the miniaturized test specimens, which, in addition to the tensile test and the structural evaluation, can also carry out other required tests, such as bending impact tests with transition temperature, fracture toughness and fatigue tests. This paper deals with optimization of test specimens for the internal dimensions of the exposure device and shows the applicability of small sample methodologies for selected materials.

Key words:

Exposure device, miniaturized test specimens, material degradation