

New metal alloys boost high-temperature heat treatment of jet engine components

Measurement scientists at the National Physical Laboratory have reduced the uncertainty of thermocouple temperature sensors at high temperatures to within a degree. This may allow manufacturers to improve efficiency and reduce wastage in the quest for more efficient jet engines and lower aircraft emissions.

Aircraft engines are more efficient at higher temperatures, but this requires thermal treatment of engine components at very specific high temperatures in excess of 1300 °C. If the heat treatment temperature deviates too much from the optimal temperature, the treatment may be inadequate.

Thermocouples are calibrated using materials with known melting points (fixed points), but the available reference materials in the region of the very high temperatures required to treat jet engine components have a large uncertainty compared with the lower temperature fixed points.

Using a new type of metal alloy, NPL scientists have identified a range of reference points for thermocouples beyond 1100 °C. With this added confidence in thermal sensors, component manufacturers are expected to start improving hotter thermal treatments and reducing wastage during production of parts for engines which can run at higher temperatures.

Source: National Physical Laboratory

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