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FE-Analyses as the key to successful high-temperature brazing of complex components

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Alongside welding, high-temperature vacuum brazing is one of the most frequently used joining processes. At the Deutsches Elektronen Synchrotron (DESY) we have a well-equipped workshop area with vacuum brazing furnaces. Several components for beampipe parts, high-frequency components or diagnostic components made from a wide range of materials have been brazed there, sometimes for an ultra-high vacuum application. Unfortunately, it also happens that these components are defective after brazing. And the cause is often very difficult to find. As in this example the component is made of high-alloy stainless steel. A brazed component has already been successfully manufactured in series. For use case a modification has been made. A small series of six pieces was produced and brazed at DESY. This report describes the research into the causes by using FE-Analyses. We present FE-Analyses as a very powerful tool for detecting errors early on in the design process that could potentially lead to the component being rejected. All results will be presented. On top practical tips for vacuum brazing will be given.

Footnotes

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