

## Accepted Manuscript

Temperature dependent cyclic deformation and fatigue life of EN-GJS-600 (ASTM 80-55-06) ductile grey cast iron

Benjamin Jost, Marcus Klein, Tilmann Beck, Dietmar Eifler

PII: S0142-1123(16)30372-3

DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2016.11.010>

Reference: JIJF 4125

To appear in: *International Journal of Fatigue*

Received Date: 28 July 2016

Revised Date: 4 November 2016

Accepted Date: 8 November 2016

Please cite this article as: Jost, B., Klein, M., Beck, T., Eifler, D., Temperature dependent cyclic deformation and fatigue life of EN-GJS-600 (ASTM 80-55-06) ductile grey cast iron, *International Journal of Fatigue* (2016), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2016.11.010>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## Temperature dependent cyclic deformation and fatigue life of EN-GJS-600 (ASTM 80-55-06) ductile grey cast iron

Benjamin Jost, Marcus Klein\* (mailto: klein@mv.uni-kl.de), Telephone: 0049-(0)631-205-5057, Fax: 0049-(0)631-205-2137), Tilmann Beck, Dietmar Eifler

Institute of Materials Science and Engineering (WKK), University of Kaiserslautern,  
P.O. Box 3049; 67653 Kaiserslautern, Germany

Keywords: PhyBaL<sub>SIT</sub>, temperature increase test, strain increase test, ductile cast iron, EN-GJS-600, dynamic strain aging, fatigue properties, lifetime calculation, cyclic deformation behavior

### Abstract

The ductile cast iron EN-GJS-600 (ASTM 80-55-06) provides several beneficial properties for a wide spectrum of applications. Its near-net shaping capabilities combined with beneficial physical and mechanical properties even at elevated temperatures result in a wide use for components of internal combustion engines. Under service conditions, fatigue loading at different temperatures occurs. In this context, the present paper focuses on the isothermal high cycle fatigue behavior of ductile cast iron EN-GJS-600 in the temperature range from ambient temperature up to 400 °C at a frequency of 5 Hz. At elevated temperatures, the consideration of dynamic strain aging effects on cyclic deformation and lifetime behavior is of major importance. It was proved that only one temperature increase test is necessary to determine the temperature range of pronounced dynamic strain aging effects. The physically based fatigue lifetime calculation approach “PhyBaL<sub>SIT</sub>” (SIT = strain increase test) was applied and validated for total strain controlled fatigue tests. To receive maximum information with minimum effort, both test procedures were combined enabling calculation of fatigue life in the temperature range from ambient temperature up to 400 °C based on only thirteen fatigue experiments.

Download English Version:

<https://daneshyari.com/en/article/5015161>

Download Persian Version:

<https://daneshyari.com/article/5015161>

[Daneshyari.com](https://daneshyari.com)