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Influence of temperature on the high-cycle fatigue properties of compacted graphite iron

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Abstract: High-cycle fatigue tests of compacted graphite iron (CGI) at 25 °C, 400 °C and 500 °C were performed. The corresponding fatigue damage mechanisms were investigated by the observations on fractographies and longitudinal section morphologies of typical samples. The results show that the decreasing rate of fatigue strength from 400 °C to 500 °C is higher than that from 25 °C to 400 °C. The fatigue strength coefficient of *S-N* curve fitted with the Basquin relationship decreases from 25 °C to 400 °C and increases from 400 °C to 500 °C; while the fatigue strength exponent performs in an inverse tendency. These are resulted from plastic deformation mode transition of the ferrite at the tip of the crack induced by the graphite debonding: slip band at 25 °C and 400 °C to grain boundary sliding at 500 °C. Finally, the influences of carbide on fatigue properties were discussed.

***Key words*:** Compacted graphite iron; Fatigue properties; Fatigue strength; Fatigue damage mechanism.

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