

## **Application of thermography in cyclic load and thermal shock testing of steel components with ceramic coatings deposited by cascaded plasma torch**

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### **Abstract:**

Behaviour of ceramic coatings deposited on steel substrate was tested by cyclic loading and thermal shock. Both tests of ceramic coatings were observed with thermographic camera TIM400. Three different ceramics: Al<sub>2</sub>O<sub>3</sub>, Cr<sub>2</sub>O<sub>3</sub> and Cr<sub>2</sub>O<sub>3</sub>-5SiO<sub>2</sub>-3TiO<sub>2</sub> were deposited by plasma cascade torch SinplexPro. Relation between temperature and stress and reactions to thermal shocks were inspected. Frequency of 10 Hz, step of 20 MPa and stress ratio R<sub>0,1</sub> were used for cyclic load testing. Load was increased every 10 minutes until the specimen fractured. The influence of diverse ceramic coatings on fatigue limit is determined. Thermal shock temperatures were selected based on properties of coating material. To reach desired temperature, resistance heating was used and afterwards compressed air cooled the specimens.

### **Key words:**

Thermography, Cyclic load, Thermal shock, Plasmy spraying, Ceramic

