

# Accepted Manuscript

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PII: S0301-679X(17)30471-1

DOI: [10.1016/j.triboint.2017.10.011](https://doi.org/10.1016/j.triboint.2017.10.011)

Reference: JTRI 4912

To appear in: *Tribology International*

Received Date: 7 July 2017

Revised Date: 15 September 2017

Accepted Date: 9 October 2017

Please cite this article as: Lyu Y, Bergseth E, Tu M, Olofsson U, Effect of humidity on the tribological behaviour and airborne particle emissions of railway brake block materials, *Tribology International* (2017), doi: 10.1016/j.triboint.2017.10.011.

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# Effect of humidity on the tribological behaviour and airborne particle emissions of railway brake block materials

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## Abstract

A pin-on-disc tribometer placed in a one-way ventilated chamber was used to investigate the effect of relative humidity on the tribology and airborne particle emission of three commercial railway brake block materials (grey cast iron, organic composite, and sintered). Cast iron showed the highest friction coefficient, particle emission and wear loss and organic composite exhibited the lowest. The generation of oxide layers on the worn cast iron surface resulted in a decrease in friction, particle emission and wear. Moisture adsorption by the organic composite leads to decreased friction coefficient and particle emission with increasing humidity. Relative humidity does not affect the friction coefficient of the sintered brake block, whose particle emission and wear loss significantly decline with increasing relative humidity.

**Keywords:** Airborne particles; Pin-on-disc; Humidity; Brake block

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