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On the running-in of brake pads and discs for dyno bench tests

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Abstract

Running-in process of low metallic brake pads and cast iron discs are investigated using full scale inertia brake dynamometer designed for particle emission studies. The airborne particles are measured using ELPI+ and collected on filters. The pads and disc contact surfaces are studied using microscopy techniques. It is observed that the particle emissions from the new pads and discs are significantly higher compared with the used ones and indicates importance of proper running-in of the pads and disc for wear particle emission tests. The results also indicate that pads and disc pairs which are able to stabilize friction behavior faster will produce less particle emissions which could influence the strategies of brake material formulations or steps during their production.

Keywords: brakes, running-in, particle emissions, testing

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Introduction

The brake systems of passenger cars are designed mainly with the aim of ensuring safe deceleration, controlling speed driving downhill, or retaining the vehicles in a stop position when parked. The design of different braking systems is comprehensively summarized for example, in a book published by Day [1]. Braking is always accompanied by wear of both brake discs and brake pads and along with the intensity of the braking, the formulation of the brake pads significantly influences the wear rate of brake pads as well as brake discs.

A comprehensive review of friction materials designed for brake pads is summarized, for example, in books written by Cox [2] or a paper published by Chan and Stachowiak [3]. There are thousands of raw materials which have been tested as brake pad components including natural or synthetic compounds and it is obvious that only their proper combination