BS ISO 4821:2022

BSI Standards Publication

Plain bearings — Dynamic adhesion test method for DLC coated parts under lubricated condition

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee MCE/12, Plain bearings.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Foreword

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Introduction

Reducing the mechanical loss in engines is one of the effective ways to improve the fuel efficiency of automobiles. To reduce the friction coefficient between engine parts, diamond-like carbon (DLC) coatings can be applied for plain bearings as well as other sliding parts such as valve lifters and piston rings.

Since DLC hard coatings have high internal stress due to its coating process under high temperature and the difference of the coefficient of thermal expansion between DLC and engine parts, the quality control of the adhesion strength between coatings and base materials of specific parts after the coating process is very important. As there is no appropriate official test, automobile manufacturers or part suppliers must validate the adhesion strength by using a specially designed test facility using actual engine parts. In order to further spread the DLC coatings to mechanical parts of engines in the future, a test method can be used to easily evaluate the adhesion strength of the coatings.

The purpose of this document is to provide a test method for evaluating adhesion strength of DLC coatings. The test method specified in this document is a test apparatus equipped with a simple ball-on-disk that has a correlation with conventional engine evaluation results and a relatively inexpensive acoustic emission measurement machine without using actual parts.

The positioning of this test method in the process of parts evaluation performed by automobile manufacturers or part suppliers is shown in Annex A. The correlation between results obtained by the test method specified in this document and results obtained by the test method using conventional engine parts is described in Annex B.

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