BS ISO 18535:2016

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Diamond-like carbon films — Determination of friction and wear characteristics of diamond-like carbon films by ball-on-disc method

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National foreword

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Foreword

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The committee responsible for this document is ISO/TC 107, *Metallic and other inorganic coatings*.

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Introduction

This International Standard gives guidance on conducting a sliding friction and wear test in a ball-on-disc configuration to determine the friction generated and wear observed in uniaxial sliding contacts between diamond-like carbon (DLC) films and a counter body.

The tribological properties of DLC films are different from those of metallic and ceramic coatings. DLC films have the tribological characteristics of low friction and low wear against other materials. Since a DLC film is a coating, rather than a bulk material, it has a limited amount of wear and possibility of delamination. Hence, a friction and wear testing method specific to DLC films is used to determine friction and wear resistance independent of delamination. In the ball-on-disk method using a DLC-coated ball on a non-coated disk, a non-coated ball on a DLC-coated disk, or a DLC-coated ball on a DLC-coated disk, the wear of DLC is minimal compared with other materials; for this reason, it is preferable to apply the coating on the ball to measure the wear rate with a reasonable accuracy. Of course, the wear on the ball side induces a decrease in contact pressure that must be taken into account for the friction coefficient interpretation. Because of these aspects, the ball-on-disk method is ideal for conventional testing of DLC coatings.

It should be noted that there are many parameters in the sliding contact that affect the magnitude of friction and wear. The aim of performing any wear test is to simulate, as closely as possible, the conditions that occur in the real application. As the deviation between the test conditions and the application conditions becomes larger, the test results become less relevant. To add credence to the test results, the appearance of the worn surfaces from the test samples are compared with the appearance of the worn surface from the actual worn component in order to ensure that similar wear mechanisms have taken place in each case. It is intended that the recommended test conditions suggested in this International Standard be used when the application conditions are not well defined but general comparison among materials is required.

This International Standard is useful for quality control of DLC films.

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