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Plain bearings — Testing of the tribological behaviour of plastics

Paliers lisses — Essai du comportement tribologique des plastiques

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ISO/TR 7147 was prepared by Technical Committee ISO/TC 123, *Plain bearings*.

The reasons which led to the decision to publish this document in the form of a technical report type 2 are explained in the Introduction.

0 Introduction

As several research institutes are still carrying out tests on the tribological behaviour of plastics for plain bearings and, consequently, results are not yet available, it has been decided, for the time being, to publish work on the test system in the form of a Technical Report.

When the test results from the different institutes are available, the status of this Technical Report will be re-assessed.

1 Scope and field of application

This Technical Report specifies uniform instructions for the testing of tribologically-stressed plain bearing elements manufactured from solid plastics.

The test values will give useful information for practical application only if all parameters of influence are identical.

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The purpose of this Technical Report is to obtain, under specified and exactly defined operating conditions, reproducible measured values for wear and the coefficient of friction as regards plastics/steel or plastics/plastics sliding couples. Consequently, to obtain comparability of these values, exact indications are necessary concerning directly acting influences, such as the form of the specimen, the condition of surface and material or the sliding couple. This Technical Report, therefore, defines the forms that test specimens shall take and specifies uniform manufacturing processes for the test specimens. In order also to eliminate the secondary influences created by the nature of the test system (e.g. conditions of thermal conduction, vibrations, driving vibrations, mounting conditions) the complete test equipment and basic construction and performance requirements have also been standardized.

2 References

ISO 291, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 527, *Plastics — Determination of tensile properties.* [1)]

ISO 4378, *Plain bearings; Terms, definitions and classification —*

Part 1: Design, bearing materials and their properties.

Part 2: Friction and wear.

Part 3: Lubrication.

ISO 6691, *Plain bearings — Thermoplastics — Classification, designation, recommendations.* [2)]

3 Symbols

A_0	nominal contact surface, in square millimetres
f	coefficient of friction
F_n	normal force, in newtons
F_f	friction force, in newtons
k	wear coefficient, in cubic millimetres per newton kilometre
p	nominal specific load, in newtons per square millimetre
r_g	mean radius of sliding way, in millimetres
s	sliding distance, in kilometres
t_d	temperature of the disc, in degrees Celsius
u	sliding velocity, in metres per second
w_l	linear wear of test material, in micrometres
w_v	volumetric wear of test material, in cubic millimetres
$w_{l/s}$	linear wear rate, in micrometres per kilometre
$w_{v/s}$	volumetric wear rate, in cubic millimetres per kilometre

4 Definitions

4.1 dry friction: Condition of friction where two initially degreased and cleaned sliding surfaces are in contact with each other without external lubrication.

4.2 coefficient of friction: Ratio of the friction force between two bodies to the normal force pressing these bodies together, i.e.:

$$f = \frac{F_f}{F_n}$$

4.3 wear rate: The linear or volumetric wear of the test material referred to the sliding distance, i.e.:

$$w_{l/s} = \frac{w_l}{s} \text{ or } w_{v/s} = \frac{w_v}{s}$$

1) At present at the stage of draft. (Revision of ISO/R 527-1966.)

2) At present at the stage of draft.