

Recommendations for the presentation of plastics design data —

Part 4: Environmental and chemical effects —

Section 4.1 Chemical resistance to liquids

IMPORTANT NOTE. Before reading this Recommendation it is **essential** to read the General Introduction to this series of Recommendations, issued separately.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 11 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

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Introduction

Knowledge of the degree of resistance of plastics materials to attack by various liquid chemical substances is of importance to the designer to enable selection to be made of the most suitable material for his purpose. The aim of this Section is to lay down procedures for testing plastics materials without externally applied stresses, accepting as typical the amount of strain normally present in the material as manufactured. The procedures include the reporting of test results so that quantitative comparisons can be made of changes in dimensions and mechanical properties, supplemented by qualitative comparisons of the changes in visual appearance.

With plastics materials, the precise degree of chemical resistance that they show may depend upon the extent to which they are strained when in contact with the chemical substance, the tendency being for strainfree samples to show better resistance to attack than those which have strains induced during manufacture or which become strained in service. It may be noted that plastics are seldom strain-free in the form in which they are normally manufactured. In cases where the effects of strain are likely to be significant, extra tests on strained samples are advisable.

The range of chemical substances chosen for the purpose of this recommendation is based on ISO/R 175¹⁾, and is intended to display most of the chemical resistance properties relevant to applications of plastics.

1 Procedures

1.1 General. Data should be presented on the effect of immersion in the substances listed in Appendix A, Table 1 and Table 2. In addition, data obtained on control specimens exposed in air under the same conditions should be given, in order to distinguish effects unconnected with chemical environment. The list has been chosen to contain examples of the main types of chemical substances commonly encountered in the application of plastics, and thus to give a general indication of chemical resistance. Results with additional chemicals may be given in a supplementary list. The chemical substances are numbered, for easy reference. It should be noted that a material which will resist two or more chemical substances separately may not be suitable for use with a mixture of these substances.

When a material has been selected, as possibly suitable for a particular application, but where the actual chemical or concentration to be used is not included in the basic or supplementary lists, further tests with this chemical should be carried out to confirm the selection.

Exposure to the chemical substances should be carried out in accordance with Appendix B. The temperature and duration of exposure should be given in the data presented.

Where the material is considered by the supplier to be unsuitable for use with a particular chemical substance under particular conditions the words "Not recommended" should be entered on the report.

1.2 Dimensions. The effect of exposure on dimensions should be determined in accordance with Appendix C.

Data should be presented on the percentage changes in length, width and thickness of specimens, both immediately after exposure and after subsequent drying.

1.3 Appearance. The effect of exposure on visual appearance should be determined in accordance with Appendix D.

The particular aspects of appearance which are listed in D.2 should be examined and the extent of changes should be shown by the simple letter code given in D.3.

1.4 Mechanical properties. The effect of exposure on mechanical properties should be determined in accordance with Appendix E.

The mechanical properties to be examined should be selected from the list as appropriate. Data on other properties may be presented additionally.

The data presented are the values of the properties after exposure, expressed as percentages of the values before exposure. The figure 100 therefore, represents no change, lower figures a reduction and higher figures an increase, in the value of the property.

¹⁾ ISO/R 175 "Plastics — Determination of the resistance of plastics to chemical, substances".