INTERNATIONAL STANDARD

ISO 10365

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Adhesives — Designation of main failure patterns

Adhésifs — Désignation des principaux faciès de rupture

Reference number
ISO 10365:1992(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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Adhesives — Designation of main failure patterns

1 Scope

This International Standard specifies the designations for the main types of failure pattern of bonded assemblies and illustrates, through diagrams, their respective appearances.

It applies to all mechanical tests performed on a bonded assembly, regardless of the nature of the adherends and adhesive which make up the assembly.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 472:1988, *Plastics — Vocabulary*.

3 Definitions

For the purposes of this International Standard, the following definitions, taken from ISO 472:1988, apply.

3.1 assembly (for adhesives): A group of materials or parts, including adhesive, which have been placed together for bonding or which have been bonded together.

3.2 adhesion failure; adhesive failure: Rupture of an adhesive bond in which the separation appears visually to be at the adhesive/adherend interface.

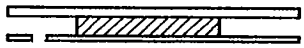
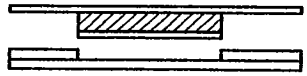
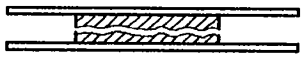
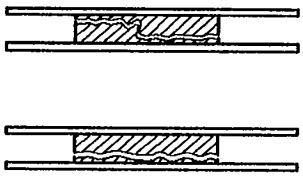
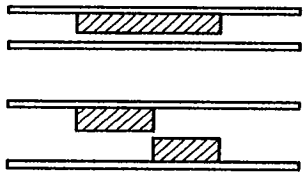
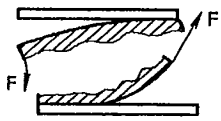
3.3 cohesion failure; cohesive failure: Rupture of a bonded assembly in which the separation appears visually to be in the adhesive or the adherend.

4 Application

The designation of the failure patterns is provided to classify failures in order to understand better the result of any mechanical test of adhesion on a bonded assembly, which is usually expressed by quantitative measured values.

The failure patterns are designated in accordance with the illustrations in table 1.

Table 1 — Designation of failure patterns

	Failure patterns	Designation
Substrate	 Failure of one or both adherends (Substrate failure)	SF
	 Failure of an adherend (Cohesive substrate failure)	CSF
	 Failure through delamination (Delamination failure)	DF
Adhesive	Types of cohesion failure  Cohesion failure  Special cohesion failure	CF SCF
	 Adhesion failure	AF
	 Adhesion and cohesion failure with peel	ACFP

If more than one type of failure occurs, an approximate percentage for each type of failure pattern shall be given after each designation (see figure 1).

If a delamination failure occurs (i.e. the coating tears off the adherend), the designation (DF) shall be followed by the nature of the coating.

NOTE 1 Types of coating include primer, varnish, paint, phosphatization, etc.

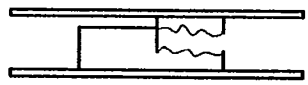
When an oscillating failure of two patterns occurs, it is indicated by adding "OSC" after the description of the failure patterns:

AF (50 %) + CF (50 %), OSC

NOTE 2 The slip-stick mode of oscillating failure is typical of a system constituted by an elastic adherend and an adhesive which may undergo a transition between different failure mechanisms (cohesion and adhesion failure or ductile and brittle-cohesion failure), elastic energy being periodically stored and released by the adherend.

Figure 2 illustrates a typical pattern of oscillating cohesion and adhesion failure.

Examination of the surface using a suitable instrument may enable the different types of failure pattern to be better distinguished.



AF (50 %) + CF (50 %)

Figure 1 — Example of a "mixed failure"

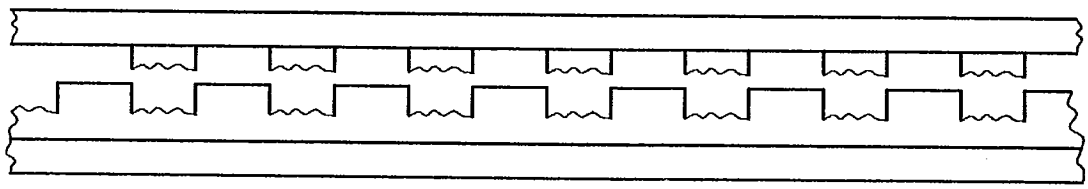


Figure 2 — Example of "oscillating rupture"

UDC 665.93:621.792.053:003.62

Descriptors: plastics, adhesives, adhesive bonded joints, failure, designation, test results.

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