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JAPANESE INDUSTRIAL STANDARD

Testing Methods for Chemical Resistance of Plastics under Constant Tensile Deformation

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Testing Methods for Chemical
Resistance of Plastics under
Constant Tensile Deformation

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1. Scope

This Japanese Industrial Standard specified the testing methods to evaluate the resistance of plastics to chemicals, hereinafter referred to as the "test solution", under constant tensile deformation.

- Remarks 1. This testing method is applicable to such plastics, to which tension test is feasible, as thermosetting plastics, thermoplastic plastics, thermoplastic elastomer, their composite material, or the like.
2. This testing method correlates with the testing method for environmental stress cracking and testing method for tensile creep under immersion in test solution (JIS K 7108). For this testing method generally five test pieces for one kind of test solution shall be used, and it is able to evaluate chemical resistance under dynamic condition to the test solution within a considerably short test duration as 200 hours or less for one test piece.
3. By comparing obtained critical stress and the critical stress in air, this method can provide the evaluation on chemical resistance of the test piece to test solution.

Furthermore, it should be advisable to make reference to the test results obtained under static immersion test method such as JIS K 7114 and JIS K 7209.

2. Definitions

The main terms used in this standard shall conform to the following excepting those defined in JIS K 6900.

- (1) stress relaxation After applying a definite initial load on a test piece, the phenomenon that the stress decreases with the lapse of time while keeping the deformation (strain) constant.
- (2) initial stress The stress appeared when a definite deformation is given to a test piece.

Applicable Standards and Reference Standard: See page 9.

- (3) stress ratio The ratio of an initial stress to the stress appeared after certain duration of time.
- (4) stress relaxation curve The curve obtained by plotting the stress ratio on the ordinate and the logarithm of time on the abscissa.
- (5) critical stress The maximum initial stress giving the curve of the least relaxation among stress relaxation curves.

3. Conditioning of Test Piece and Test Temperature

3.1 Conditioning of Test Piece The conditioning of a test piece shall be carried out principally under the standard temperature condition grade 2 and the standard humidity condition grade 2 ($23 \pm 2^\circ\text{C}$ of temperature and $50 \pm 5\%$ of relative humidity) specified in JIS K 7100 for not less than 24 hours.

3.2 Test Temperature The test temperature principally shall be $23 \pm 1^\circ\text{C}$ or $55 \pm 0.5^\circ\text{C}$. In case of testing at other temperature, selecting the one among $40 \pm 0.5^\circ\text{C}$, $70 \pm 0.5^\circ\text{C}$, $85 \pm 0.5^\circ\text{C}$, and $100 \pm 0.5^\circ\text{C}$ is desirable.

4. Testing Apparatus and Devices

4.1 Testing Apparatus Testing apparatus, capable of applying tensile load to a test piece, keeping deformation (strain) at a definite amount while testing, and measuring the tensile load to the accuracy of $\pm 1\%$, shall be equipped with the vessel for immersing the test piece in test solution and with the thermostatic bath maintaining the test solution at a specified temperature. Fig. 1 exemplifies a testing apparatus.

The material of the vessel to keep the test solution, of the clamping jaws for a test piece, a holding frame, and others shall give no influence on the test solution.