Australian Standard®

Methods of test for sealers and adhesives for automotive purposes

Method 1: Determination of flow properties in absolute units

PREFACE

This Standard was prepared by the Standards Australia Committee on Adhesives, under the direction of the Chemical Standards Board, to supersede AS 1937.1 — 1977.

This edition differs from the 1977 edition in that account is taken of the cone-and-plate method for minute sample quantities of paste adhesives having high viscosity.

METHOD

1 SCOPE This Standard sets out the method for evaluating in terms of absolute units the flow properties of sealers, adhesives, coating materials and similar products used in the automotive industry.

2 DEFINITIONS For the purpose of this Standard, the definitions below apply.

2.1 Newtonian (simple) liquid—an idealized liquid, devoid of shear elasticity, for which the shear stress is proportional to the shear strain rate (see Figure 1).

2.2 Non-Newtonian (complex) liquid—a liquid for which the shear stress is not proportional to the shear strain rate.

2.3 Bingham body—an idealized material in which the strain rate is proportional to the shear stress in excess of a yield stress (see Figure 2).

2.4 Pseudoplastic substance—a material in which the apparent viscosity decreases with increase in shear strain rate (see Figure 3).

2.5 Dilatant substance—a material in which the apparent viscosity increases with increase in shear strain rate (see Figure 4).

2.6. Thixotropic substance—a material in which the apparent viscosity decreases under shear stress, followed by a gradual recovery when the stress is removed (see Figure 5).

2.7 Rheopectic substance—a thixotropic material which has the property of recovering its original apparent viscosity faster at low shear strain rates than at rest.

2.8 Viscosity—the property by which a material increasingly resists deformation with increasing rate of deformation.

2.9 Absolute viscosity—the constant ratio of the shear stress to the shear strain rate of a Newtonian liquid.

2.10 Plastic viscosity—the (constant) ratio of the shear stress above a critical stress (yield stress) to the shear strain rate of a Bingham body (see Figure 2).

2.11 Apparent viscosity—a coefficient of viscosity calculated for a given shear strain rate as the ratio of stress to strain rate, as if the material behaved like a Newtonian liquid (see Figures 3 and 4).

2.12 Differential viscosity—a coefficient of viscosity calculated as the slope of a stress versus strain rate curve for a given shear strain rate.

2.13 Yield stress—the stress of the point on a stress versus strain curve at which a marked reduction in slope occurs.