

DRAFT TANZANIA STANDARD

**TBS/CDC 7(5420) P3 Adhesives — Ethyl and methyl cyanoacrylate –
Specification**

DRAFT FOR STAKEHOLDER'S COMMENTS ONLY

TANZANIA BUREAU OF STANDARDS

Foreword

This Draft Tanzania Standard is being developed by Industrial and Laboratory Chemicals Technical Committee under supervision of the Chemicals Divisional Standards Committee and it is in accordance with the procedures of the Bureau.

This Draft Tanzania Standard has been prepared with assistance drawn from:

BS 7969: 2004 (Current, confirmed July 2014) Adhesives - Ethyl and methyl cyanoacrylate types 1, 2 and 3, published by British Standards Institution; and

US 1512: 2014 Adhesives — Ethyl and methyl cyanoacrylate types 1, 2 and 3 — Specification, published by Uganda National Bureau of Standards.

In reporting results of a test or analysis made in accordance with this standard, if the final value, calculated or observed is to be rounded off, it shall be done in accordance with TZS 4 *Rounding off numerical values*.

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Adhesives — Ethyl and methyl cyanoacrylate – Specification

1. Scope

This Draft Tanzania Standard specifies requirements, sampling and methods of test for adhesives – ethyl and methyl cyanoacrylate.

2. Normative References

The following referenced documents are indispensable for the application of this document, the latest edition of the referenced documents (including any amendments) applies;

ASTM D1084 *Standard Test Methods for Viscosity of Adhesives*

ISO 15605 *Adhesives – Sampling*

ISO 10365 *Adhesives — Designation of main failure patterns*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions shall apply.

3.1 adhesive

substance capable of holding materials together by surface attachment

3.2 adherend

body that is, or is intended to be, held to another body by an adhesive

3.3 shear

mode of application of a force to a joint that acts in the plane of the bond-line. The force may be applied in longitudinal compression or tension or torsion.

3.4

Viscosity

quantity expressing the magnitude of internal friction in a fluid resisting uniform flow

4. Requirements

4.1 General requirement

4.1.1 The material shall be free from visible impurities and foreign matter as assessed by visual inspection.

4.1.2 The Material shall be of the following types

Type 1 – low viscosity adhesive

Type 2 – medium viscosity adhesive

Type 3 – high viscosity adhesive

4.2 Specific chemical and physical requirements

The material shall comply with the specific requirements in Table 1 when tested in accordance with the methods indicated therein.

Table 1 – Specific chemical and physical requirements for adhesive cyanoacrylate

S/N	Characteristic	Requirement			Method of test	
		Type 1	Type 2	Type 3		
1.	Viscosity at (25 ± 1) °C in MPa.s*	Minimum	20	1000	ASTM D1084	
		Maximum	10	200		4000
2.	Minimum bond strength, MPa*	For ethyl cyanoacrylate	17	17	17	Annex A
		For methyl cyanoacrylate	22	22	22	
3.	Rapid setting property	Satisfactory if three successive joints can be made having bond strengths of not less than 2.4 MPa*			Annex B	

*MPa stand for mega pascal

5. Sampling

The material shall be sampled according to the method specified in ISO 15605.

6. Packaging and labelling

6.1 Packaging

The material shall be packaged in suitable sealed containers.

6.2 Labelling

Each container shall bear the following information in English and/or Swahili written in prominent, legible and durable labelling:

- a) Name and type of the material.
- b) Manufacturer's name and address.
- c) Recognized trade mark, if any.
- d) Net content.
- e) Batch number.
- f) Date of manufacture and expiry
- g) Pictorial symbol to show hazardous nature.
- h) Storage condition

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Annex A
(normative)

Method of test for the determination of bond strength

A.1 General

This method of test is for adhesives using rigid adherends that can be produced to the required dimensional tolerances and that will withstand the forces applied to them. This test method is primarily intended for use in normal ambient conditions.

A.2 Adherend test pieces

Twelve mild steel lap shear test pieces (3 mm x 100 mm x 25 mm) cut from flat sheet, free from burrs and meeting the flatness requirements shall be used with thickness of tolerance (3.0 ± 0.15) mm for non-metal adherends shall be employed.

The adherend shall be rectangular with the following dimensions:

- i. Length: (100 ± 1.5) mm;
- ii. Width: (25 ± 0.25) mm;
- iii. Flatness: within 0.5 mm over the length and width of the area of the specimen to be bonded and within 1.0 mm over the length of the specimen.

The thickness of the adherends shall be such that they are able to withstand the forces that are required for the test, and shall be stated in the report.

NOTE: The choice of the thickness of the adherends depends on the adherend materials, the adhesive and on the particular application and should be agreed between the purchaser and the supplier of the adhesive. For general use the following thicknesses are recommended:

- i. Metal: (1.5 ± 0.15) mm;
- ii. Non- metals (other than wood): (3 ± 0.15) mm; and
- iii. Wood: (5 ± 0.15) mm

If the central adherend in a double overlap joint is of the same material as the two outer adherends, it shall have a thickness of twice that of one of the outer adherends.

A.3 Preparation of adherends

A.3.1 General requirements

The bonding surface shall be plane and free from visible signs of rust.

A.3.2 Surface pre-treatment

Remove loose contamination and oily deposits from the mild steel adherend by wiping with lint-free absorbent cloth, wetted with propan-2-ol. Allow to dry. Blast the bonding surface of the adherends with 80 μ m silicon carbide grit and wipe again with propan-2-ol to remove grit. Allow to dry.

A.4 Preparation of sample

A.4.1 Before bonding, prepare the surfaces of the adherends in accordance with the recommendations in the instructions supplied by the manufacture of the adhesive. In the absence of such recommendations, use ISO 17212.

A.4.2 Apply a small drop of adhesive to the centre of a clean prepared face of the adherend. Immediately spread the adhesive evenly over the bonding area using the clean prepared face of a second adherend and bring the two surfaces into contact by means of the alignment jig. Apply a pressure of 35 kPa, equivalent to a mass of 1.115 kg for this joint configuration, to the bond. It is permissible to remove the mass from the jig after five minutes to make repeat specimens. Once the required number of specimens have been assembled, leave the weight on the bonded area for the duration of cure.

A.4.3 The correct quantity of adhesive is such that a small excess is forced out around the joint. Remove this excess, taking care not to upset the alignment whilst maintaining the pressure exerted by the weight. Prepare six joints using this method.

A.5 Conditioning and testing

A.5.1 Conditioning

Leave the assembled joints under pressure in the alignment jig and maintain the assemblies at 15°C– 25°C for 24 h.

NOTE: Since moisture catalyses the chemical reaction involved in bond formation, the curing time can be affected by the humidity of the air at the time of test.

A.5.2 Testing

Locate the assembly symmetrically in the testing machine with each grip (50 ± 20) mm from the nearest edge of the overlap. Ensure that the longitudinal force applied by the machine acts in the plane of the bond plane by using packing pieces or other methods. When testing a double overlap joint, in order to avoid distorting the adherends, place a packing piece within the grips between the adherends. Set the machine in motion. Operate the machine so that the test joint is subjected to either:

- a) a force that increases at a constant rate; or
- b) a constant rate of separation;

Such that in either case the joint is broken in a period (65 ± 20)s.

NOTE 1: The machine should be operated under substantially constant conditions throughout the test although a load displacement diagram may indicate non-linearity at the commencement and end of the test.

NOTE 2: If no previous experience is available for the type of the joint under test, preliminary tests should be carried out to establish suitable operating conditions.

NOTE 3: Because of the differing moduli of different adhesives, extra specimens might need to be manufactured in order to determine the precise conditions that will give the required time lapse.

Record the highest force during rupture as the breaking force of that specimen. Discard results from test specimens that show starved joints or that rupture in the adherend, unless the test has been conducted to assess compliance with a minimum requirement that has been met or exceeded. Record the mode of failure in accordance with ISO 10365.

A.6 Expression of results

Report results. The mean of six determinations shall be expressed as the breaking shear stress in megapascals (MPa).

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Annex B
(normative)

Method of test for the determination of rapid setting properties

B.1 Principle

The method is designed to determine the rapid setting properties of cyanoacrylates by preparing specimens as described in Annex A and assessing the strength after five minutes.

B.2 Procedure

Follow the procedure of A. 2 through to A. 4. Assemble an individual specimen as described in A.4, apply the weight for five minutes, remove from the jig and immediately test in accordance with A.5.2. Test a maximum of six specimens.

B.3 Acceptance criteria

The rapid setting property is satisfactory if three successive joints tested have a bond strength of not less than 2.4MPa

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