



**RWANDA
STANDARD**

**DRS
480-2**

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2021-mm-dd

Wood adhesives — Specification —

Part 2:

Urea-Formaldehyde Resin-based glue

ICS 83.180

Reference number

DRS 480-2: 2021

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In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 480-2 was prepared by Technical Committee RSB/TC 056, *Paints, Varnishes, Adhesives and Related Products*.

In the preparation of this standard, reference was made to the following standard:

ASTM D4690: Standards Specification for Urea-Formaldehyde Resin Adhesives

The assistance derived from the above source is hereby acknowledged with thanks.

DRS 480 consists of the following parts, under the general title *Adhesives— Specification*:

- *Part 1: Casein-based glue*
- *Part 2: Urea-Formaldehyde Resin based glue*
- *Part 3: Polyvinyl Acetate (PVA) based glue*

Committee membership

The following organizations were represented on the Technical Committee on *Paints, varnishes, Adhesives and Related Products* (RSB/TC 056) in the preparation of this standard.

Star Construction and Consultancy Ltd

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

Standards for Sustainability

Yong Rui Mei Investments Ltd

AMACO Paints Ltd

AMEKI Colour Ltd

Rwanda Investigation Bureau (RIB)

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Introduction

The use of adhesives offers certain advantages over other binding techniques such as sewing, mechanical fastenings, or welding. These include the ability to bind different materials together, the more efficient distribution of stress across a joint, the cost-effectiveness of an easily mechanized process, and greater flexibility in design.

Adhesives are typically organized by the method of adhesion followed by reactive or non-reactive, a term which refers to whether the adhesive chemically reacts in order to harden. Alternatively, they can be organized either by their starting physical phase or whether their raw stock is of natural or synthetic origin.

Wood glue is an adhesive used to tightly bond pieces of wood together. Many substances have been used as glues. Urea-formaldehyde resin adhesives feature a low effective cost, low cure temperatures, resistance to microorganisms and abrasion, and light colour. It does not creep, and can be repaired with epoxy. It can rapidly deteriorate in hot, moist environments, releasing formaldehyde (a carcinogen).

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Wood adhesives — Specification — Part 2: Urea-Formaldehyde resin-based glue

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for three types of urea-formaldehyde thermosetting resin adhesives suitable for use on wood, wood-based substrates, or plastic laminates.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D907, *Terminology for Adhesives*

ASTM B417, *Test Method for Apparent density of non-free-flowing metal powders using the carney funnel*

ASTM D1875, *Test methods of density of adhesives in fluid form*

ASTM D1490, *Test Method for Non-volatile content of Urea-Formaldehyde Resin Solutions*

ISO 3251, *Paints varnishes and plastics — Determination of non- volatile matter content*

ASTM D905, *Test method for strength properties of adhesive bonds in shear by compression loading*

ASTM D906, *Test method for strength properties of adhesives in plywood type construction in shear by tension loading*

ASTM D1583, *Test methods for hydrogen ion concentration of dry adhesive films*

ASTM D905, *Test method for strength properties of adhesive bonds in shear by compression loading*

ASTM D906, *Test method for strength properties of adhesives in plywood type construction in shear by tension loading*

RS OIML R 87, *Quantity of product in pre-packages*

ISO 15605, *Adhesives — Sampling*

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in ASTM D907 and the following apply.

3.1

urea-formaldehyde resin glue

a thermosetting synthetic resin made by condensing urea with formaldehyde and used especially in wood-bonding adhesives, colored molded articles, and for finishes (as of textiles, paper, and metals)

4 Requirements

4.1 General requirements

4.1.1 The urea-formaldehyde resin adhesive shall be furnished as one of the following types:

Type A — Powder with separate curing agent;

Type B — Powder with incorporated curing agent; and

Type C — Liquid with separate curing agent.

4.1.2 The curing agent for Types A and B shall readily disperse in the adhesive mixture when used in accordance with the manufacturer's recommendation.

4.1.3 The filler shall neither dissolve nor swell excessively in water, and shall not settle from the adhesive mixture during the working life.

4.1.4 **Consistency** — The urea-formaldehyde resin adhesive freshly prepared film shall be homogenous liquid dispersion, free from any coagulated particles of foreign matter.

4.1.5 **Odour** — The urea-formaldehyde resin adhesive freshly prepared film shall not emit any trace of putrefactive odour.

4.1.6 **Colour** — The urea-formaldehyde resin adhesive shall not stain or discolour or in any other way damage the material on which it is applied.

4.1.7 **Build-Up Properties** — The urea-formaldehyde resin adhesive coat shall dry quickly and tacky enough so that the assembly formed shall have sufficient green strength to permit immediate handling.

4.2 Specific requirements

The urea-formaldehyde resin based glue shall comply with the requirements given in table 1 when tested in accordance with the methods prescribed therein.

Table 1 – Specific requirements for urea-formaldehyde resin based glue

S/N	Parameters	Requirements			Test methods
		Type A	Type B	Type C	
	Density, g/cm ³ , max	0.70	0.80	1.282	B417 for types A&B D1875 for type C
	Non-volatile matter, % by mass, min.	40	40	40	ASTM D1490/ ISO 3251
	pH of Cured adhesive film, min.	2.5	2.5	2.5	ASTM D1583
	Insoluble matter in type B		-	-	Annex A
	Working life, h, max.	5			ISO 10364
	Block shear (compression), dry at 24 °C, N/mm ²	20			ASTM D905
	Plywood shear (tension), N/mm ²	Dry at 24 °C			ASTM D906
		48 h soak			
	Storage life	A			

A – A retained sample of the initial lot of the adhesive shall be tested and shall meet the requirements of all tests for the applicable type of adhesive after the storage life time certified by the manufacturer

5 Packaging and labelling

5.1 Packaging

5.1.1 The adhesive, Urea-Formaldehyde Resin shall be packaged in a suitable container that prevents it from deterioration during storage, transportation and normal handling.

5.1.2 The quantity of product packaged in a container shall be in accordance with the requirements of RS OIML R 87.

5.2 Labelling

5.2.1 Each container shall be marked legibly and indelibly with the following information in any of the three languages officially accepted in the Republic of Rwanda namely: Kinyarwanda, French and English:

- a) name of the product;
- b) name and address of the manufacturer and/or registered trader mark;
- c) net content;
- d) batch number
- e) manufacture and expiry dates;
- f) instructions for use and disposal;
- g) special precautions related to toxicity or flammability;

h) storage condition

6 Sampling

Sampling shall be done in accordance with ISO 15605.

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Annex A (normative)

Determination of Insoluble matter in Type B adhesive

A.1 General

Determine the quantity of insoluble matter in Type B adhesives, including filler and any insoluble material, as percentage of non-volatile constituents of the adhesive.

A.2 Procedure

Weigh the nearest milligram approximately 2 g of freshly mixed adhesive in a 100-mL beaker and add 50 mL of cold solution of 20 parts by volume of glacial acetic acid and 80 parts by volume of distilled water. Stir the mixture thoroughly for 1 min and then add 0.500 ± 0.001 g, acid-washed diatomaceous earth. Stir the mixture for 2 min more and then filter through a fritted-glass crucible of medium porosity with the aid of a vacuum. Transfer all residue to the filter with a 20 % acetic acid solution. Wash the residue on the filter with at least 50 mL of 20 % acetic acid and then with cold distilled water to remove the acid. Dry the crucible in an oven at $124 \pm 3^\circ\text{C}$ ($255 \pm 5^\circ\text{C}$) for 1 to 1.5 h, cool in a desiccator, and weigh to the nearest milligram.

A.3 Calculation

The insoluble content, as a percentage of the non-volatile content, is determined as follows:

$$\% \text{ of insoluble matter, by mass} = \frac{(\text{Weigh of residue} - 0.500)}{\text{Weigh of adhesive} \times \% \text{ non-volatile matter}} \times 100$$

Bibliography

[1] ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*, 2016

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