



A Checklist of Kenyan Timber, Bio-composites, Poles and Bamboo Standards

**For
Structural Engineers, Architects, Timber and Bamboo Users**



**National Forest Products Research Programme (NFPRP) - Karura
Kenya Forestry Research Institute (KEFRI)**

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Photographs by Nellie Oduor and Benjamin Mukoya

Top left: Solid Timber (Cypress)

Top right: Wooden Poles

Bottom Left: Bamboo Plantation

Bottom Right: A Set of Blockboards

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Abbreviations

KS - Kenya Standards

ISO - International Organization for Standardization

KEBS- Kenya Bureau of Standards

BS - British Standards

Preface

Forests play a key role in Kenya's economy, providing wood and bamboo, for furniture, construction and manufacturing industries. With the growing importance of sustainable practices and quality assurance in various industries, adherence to standardized procedures and specifications is paramount. With this in mind, the Kenya Bureau of Standards (KEBS) continues to develop standards with assistance from inter-ministerial technical committees with membership drawn from various relevant stakeholders.

Kenya Forestry Research Institute, through the National Forest Products Research Programme, has developed this checklist to consolidate and shed light on the Kenyan standards governing various aspects of the timber, bio-composites, poles and bamboo industries. The checklist serves as a comprehensive reference for stakeholders involved in the production, trade, regulation and utilization in the forest products, to promote adherence to quality benchmarks and sustainable practices within the industries.

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1.0 Introduction

The Kenya Bureau of Standards (KEBS) has developed a comprehensive framework of standards for various industries. This checklist provides the Kenyan standards on timber, bio-composites, bamboo and poles industries, each in its own section. Each section provides the relevant standards and a brief description of what they entail. Adherence to the standards will promote quality, safety and sustainability in the industries. These standards serve as pillars of the industries, guiding stakeholders in the production, testing, procurement and utilization of the forest products.

2.0 Kenyan Standards on Solid Timber

This section gives specifications contained in timber on logging industry, sawn timber, timber preservation, wood blocks.

1. KS ISO 8965:2022. Logging industry - Technology - Vocabulary

This standard establishes international terms and their definitions used in contemporary technological processes of the logging industry, to provide terminological unity and comparability of scientific and technical information.

2. KS ISO 13061-1:2014. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 1: Determination of moisture content for physical and mechanical tests

This standard specifies oven-drying methods for determining the moisture content of wood for physical and mechanical tests on small clear wood specimens.

3. KS ISO 13061-2:2014. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 2: Determination of density for physical and mechanical tests

This standard specifies a method for determining the density of wood specimens for physical and mechanical tests on small clear wood specimens.

4. KS ISO 13061-3:2014. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 3: Determination of ultimate strength in static bending

This standard specifies a method for determining the ultimate strength of wood in static bending by measuring the failure load applied in the mid-span of a simply supported beam.

5. ISO 13061-4:2014. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 4: Determination of modulus of elasticity in static bending

This standard specifies a method for determining the modulus of elasticity of wood in static bending by measuring the deflection in the mid-span of a simply supported beam.

6. KS ISO 13061-5:2020. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 5: Determination of strength in compression perpendicular to grain

This standard specifies a method for determining the strength in compression perpendicular to grain of wood.

7. KS ISO 13061-6:2014. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 6: Determination of ultimate tensile stress parallel to grain

This standard specifies a method for determining the ultimate tensile stress of wood parallel to grain on small clear specimens by measuring the breaking load applied statically along the longitudinal axis of a test piece.

8. KS ISO 13061-7:2014. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 7: Determination of ultimate tensile stress perpendicular to grain

This standard specifies a method for the determination of ultimate tensile stress of wood perpendicular to grain of small clear specimens in the radial and tangential directions by measuring the breaking load applied statically perpendicular to the longitudinal axis of a test piece.

9. KS ISO 13061-8:2022. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 8: Determination of ultimate strength in shearing parallel to grain

This standard specifies a method for determining the ultimate strength in shearing parallel to grain of small clear wood specimens by measuring the breaking load applied statically along the radial or the tangential plane of a test piece.

10. KS ISO 13061-10:2017. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 10: Determination of impact bending strength

This standard specifies a method for determining the impact bending strength of wood.

11. KS ISO 13061-11:2017. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 11: Determination of resistance to impact indentation

This standard specifies a method for the determination of the resistance of wood to impact indentation by a steel ball.

12. KS ISO 13061-12:2017. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 12: Determination of static hardness

This standard specifies a method for determining of the static hardness of wood by measuring resistance of a test piece to the penetration of a plunger under gradually increasing load.

13. KS ISO 13061-13:2016. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 13: Determination of radial and tangential shrinkage

This standard specifies a method for the determination of linear shrinkage in the radial and tangential directions of wood.

14. KS ISO 13061-14:2016. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 14: Determination of volumetric shrinkage

This standard specifies methods for the determination of volumetric shrinkage of wood.

15. KS ISO 13061-15:2017. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 15: Determination of radial and tangential swelling

This standard specifies a method for the determination of linear swelling in the radial and tangential directions of wood.

16. KS ISO 13061-16:2017. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 16: Determination of volumetric swelling

This standard specifies methods for the determination of volumetric swelling of wood.

17. KS ISO 13061-17:2017. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 17: Determination of ultimate stress in compression parallel to grain

This standard specifies a method for determining the ultimate stress in compression parallel to grain of wood.

18. KS ISO 13061-18:2022. Physical and mechanical properties of wood. Test methods for small clear wood specimens Part 18: Vocabulary

This standard lists the terms and definitions relating to general concepts, macrostructure, sampling, and methods of physical and mechanical testing of wood.

19. KS 94:2020. Preservation of timber - Specification

This standard specifies requirements for preservative treatment of timbers. The preservatives, safe methods of application and chemical balance average retention levels have all been specified with the objective of achieving long service life.

20. KS ISO 10984-2:2009. Timber structures - Dowel type fasteners Part 2: Determination of embedding strength

This standard specifies laboratory methods for determining the embedding strength of solid timber, glued laminated timber and wood-based sheet products with dowel-type fasteners.

21. KS ISO 17754:2014. Timber structures - Test methods - Torsional resistance of driving in screws

This standard specifies a test method to determine the torsional resistance to driving of screws in solid timber or glued laminated timber or other wood-based materials.

22. KS ISO 24294:2021. Timber - Round and sawn timber vocabulary

This standard defines terms related to round and sawn timber. It applies to identification of a tree and its components, stages of processing in round and sawn forms, and timber grading, dimensions, anatomical structure, features, moisture content and conditions relating to stain, fungal and insect attack. It does not apply to terms related to strength properties of wood, engineered timber products or timber structures.

23. KS 2476:2013. Edge straightness of wooden board products - Test method

This standard covers the determination of the edge straightness of wooden board products.

24. KS 2477:2013. Flatness of Wooden board products - Test method

This standard gives the procedure for the determination of flatness of wooden board products such as plywood and composite board and decorative melamine faced boards.

25. KS 2939:2023. Furniture - Code of practice for joints used in wooden furniture

This standard covers the joints to be used in locations in various types of wooden furniture.

26. KS 2817:2018. Furniture - Wooden office table-Specification

This standard prescribes the requirements and methods of test for wooden tables for office use.

27. KS ISO 17959:2014. General requirements for solid wood flooring

This standard specifies the requirements and test methods of characteristics of solid wood flooring boards for interior use as flooring. It also specifies packaging and marking requirements.

28. KS ISO 13059:2011. Round timber - Requirements for the measurement of dimensions and methods for the determination of volume

This standard establishes the requirements for the measurement of dimensions and methods for the determination of round timber volume.

29. KS ISO 20152-1:2010. Timber structures Bond performance of adhesives Part 1: Basic requirements

This standard specifies the basic performance requirements for adhesives used to bond structural timber components.

30. KS ISO 4211-5:2021. Furniture tests for surface finishes Part 5: Assessment of resistance to abrasion

This standard specifies a method for the assessment of the abrasion resistance of surfaces with foils, laminates, melamine-faced boards, pigmented and transparent lacquers.

31. KS ISO 5323:2019. Wood flooring and parquet - Vocabulary

This standard establishes terms and definitions to express as correctly as possible concepts relating to wood parquet flooring and raw parquet blocks.

32. KS 93:1984. Glossary of terms used in timber

This standard provides a basis for uniformity of terms used in the timber industry. While adopting definition of various terms, priority was given to the already established local usage to the extent that a firmly established meaning has been adopted even when such meaning does exist in other countries' lists. Other definitions have been derived from standards of several commonwealth countries where usage agrees with meaning in the British Commonwealth Forest terminology.

33. KS ISO 8966:1987; Kenya Standard: Logging Industry – Products – Terms and Definitions

This standard was adopted from International Organization for Standardization (ISO) 8966. It defines general terms relating to round logs for various uses, including fuelwood, pulp and paper and board production.

34. KS 19:1976. Nomenclature of commercial Kenyan timbers

This standard is meant to form the basic reference list of the standard (trade), scientific and local names of 164 timber species marketed in Kenya including few wood species used in pole form. Timber imported from either Uganda or Tanzania is also included while timbers from other parts of the world are excluded.

35. KS 17:1976. Specification for sawn timber

This Standard specifies the maximum allowable defects in sawn timber for various end uses. It applies to all hardwoods and softwoods grown in Kenya.

36. KS 771:1991. Specification for softwood timber grades for structural use

This standard gives specifications of grading timber for structural use using visual stress grading method. It gives specifications for two standard grades, namely General Structural grade (GS) and Special Structural grade (SS). The grades are determined by reference to natural features of timber, which are regarded as defects e.g. knots, pith, bark pockets, splits, checks among others. The standard permits small deviation in grading to cater for differences of opinion between experienced graders. In preparation of this standard reference was made on BS 4978 standard.

37. KS 1606:2001. Specifications for wood blocks for floors

The standard specifies the minimum requirement for dimensions, grade descriptions and methods of manufacture for hardwood and softwood blocks excluding end grain blocks for laying on level concrete or other types of rigid level bases.

3.0 Kenyan Standards on Bio-composites

The following are current Kenya standards and specifications on reconstituted timber products.

1. KS 659:1986. Classification and measurement of plywood panels and test pieces

This standard which is a basis for other plywood standards specifies classification of plywood panels and procedures for measuring their thickness, length and width. The classification techniques apply to plywood panels composed of at least three plies based on constitution of panels, type of gluing, surface finish, treatment, species, grade of outer plies and use (general or special). The standard was adopted from ISO 1096:1975, ISO 1097:1975 and ISO 3804: 1977.

2. KS ISO 1096:1999. Plywood – Classification

The standard gives classification of plywood panels according to the procedure used in making them and their principal characteristics, e.g. durability, mechanical properties, surface appearance and condition. The standard was adopted from ISO 1096.

3. KS ISO 1097:1975. Plywood – Measurement of dimensions of panel

The standard specifies the procedure for sampling test specimens for measurement of moisture content, thickness, length and width of plywood panels. This standard was adopted from ISO 1097.

4. KS ISO 1098:1975. Veneer plywood for general use – General requirements

This standard specifies the general requirements for veneer plywood panels for general use. The field of application, procedure on construction of panels,

moisture content, tolerance, workmanship, characteristics of outer and inner plies and gluing procedures are given. The standard was adopted from ISO 1098 standard.

5. KS ISO 2426-1:2000. Plywood – Classification by surface appearance – Part 1: General

The standard establishes general rules for classification of plywood by its surface appearance. It was adopted from ISO 2426-1.

6. KS ISO 2426-2:2000. Plywood – Classification by surface appearance – Part 2: Hardwood

The standard specifies the nature and limits of characteristics inherent in wood and manufacturing defects. It enables visual assessment of plywood for allocation an appearance class. The standard was adopted from ISO 2426-2.

7. KS ISO 2426-3:2000. Plywood – Classification by surface appearance – Part 3: Softwood

This standard specifies the nature and limits of characteristics inherent in wood and defects arising in the process of manufacturing. It enables visual assessment of the plywood for allocation to an appearance class. The standard was adopted from ISO 2426-3.

8. KS ISO 12466-1:1999. Plywood – Bonding Quality – Part 1: Test Methods

This standard specifies sampling methods for test pieces, their space, and size; and equipment used during pre-treatment before determining shear test. The standard also gives procedures for determining behaviour of plywood in bonding by shear test, percentage of apparent cohesive wood failure and formulae for expression of results.

9. KS ISO 12466-2:1999. Plywood – Bonding Quality – Part 2: Requirements

This standard specifies requirements for determination of bonding classes of veneer plywood according to their intended end uses. The standard was adopted from ISO 12466-1.

10. KS 1247:2005. Specification for veneer decorative plywood

This standard provides different grades of veneer and their permissible defects. It also outlines procedures of manufacturing, sampling, testing requirements on moisture content, adhesion, and bond quality of decorative plywood.

11. KS 301-1:2010. Plywood - Specification Part 1: Interior and exterior use (Second Edition)

This standard covers the requirements of different grades and types of plywood with rotary-cut or sliced veneers used for general purposes.

12. KS 301-2:2010. Plywood - Specification Part 2: Marine plywood (Second Edition)

This standard covers the requirements for materials, manufacture and performance of marine plywood suitable for the construction, repair and maintenance of marine and river craft, pontoons and the like.

13. KS 301-3:2010. Plywood - Specification Part 3: Shuttering work plywood (Second Edition)

This standard covers the requirements for plywood for concrete shuttering and formwork.

14. KS 2226:2010. Plywood - Test method

This standard covers all the methods of test applied in all plywood.

15. KS ISO 1954:2013. Plywood - Tolerances on dimensions

This standard specifies dimensional tolerances of plywood panels (length, width, thickness) and tolerances for squareness and edge straightness.

16. KS 2281:2011. Plywood and composite board - Specification

This standard covers requirements for materials, construction, preservative treatment, dimensions and performance of plywood and composite board.

17. KS 2222:2010. Synthetic resin adhesives for plywood - Specification.

This standard prescribes the requirements for phenolic and amino-plastic synthetic resin adhesives used in the plywood industry.

18. KS 2706-1:2017. Fibreboards - Specification Part 1: General requirements

This standard specifies the requirements for some properties, which are common to all uncoated fibreboard types.

19. KS 2706-2:2017. Fibreboards - Specification Part 2: Requirements for dry process boards (MDF)

This standard specifies the requirements for dry process boards (MDF).

20. KS 2475:2013. Fibreboard - Measurement for dimensions of test specimens - Test methods

This standard specifies a method of measuring the length, width and thickness of conditioned test specimens of fibreboard and fibreboard products.

21. KS 1249:1996. Specification for fibreboard and hardboard

The standard gives definitions of several terms including fibrewood, hardboard, types of fibreboards, their shapes and dimensional tolerances, procedures on test requirements and sampling.

22. KS 302:2011. Specification for block boards for general purposes

This standard gives requirements for blockboards for general purposes such as manufacture of doors, furniture and partitions. The standard covers blockboards manufactured from strips of wood as the core. The boards are not suitable for marine and exterior applications. BS 3444:1972 standard was referred to while developing this standard.

23. KS 446:1984. Specification for wood cement slabs

This standard provides the essential requirements of wood wool building slabs for use in construction and provides necessary guidance for their manufacture. The standard specifies requirements for their materials, density, dimensions, strength and other physical characteristics. The slabs are classified into Type A and Type B for light and heavy duty respectively. This standard was adopted from BS 1105: 1994 and IS 3308:1969.

24. KS 2242:2010. Specification for wood chipboards

This standard specifies grades of chipboards for different applications. It also specifies requirements for materials, types, sizes and physical characteristics of both medium and high-density wood chipboards. In preparation of this standard, reference was to BS 5669:1979, ISO 3087:1965 and IS 3478:1966.

25. KS 749:1991. Specification for fibre concrete roofing tiles

This standard specifies requirements of fibre concrete roofing tiles, which include quality of raw materials, dimensions and performance characteristics.

26. KS 448:2010. Wood mosaic parquet specification (2nd Edition)

This standard specifies the requirements for material dimensions and physical characteristics of parquet panels used for flooring. It adopts specifications from ISO 631:1975. Limitations are given for moisture content, permissible defects, dimension and tolerance.

27. KS 1246:1996. Specification for soft boards for general purposes

This standard provides guidance for manufacture of softwoods to ensure optimum performance requirements as insulation boards for general purposes. It specifies the board's shape, dimensional tolerances, test requirements and sampling procedures for purposes of testing compliance.

28. KS ISO 20819-1:2020. Plastics - Wood-Plastic Recycled Composites (WPRC) Part 1: Specification

This standard specifies the types and proportions of raw materials to be used for wood-plastic recycled composites (hereafter referred to as WPRC). It also specifies the health and safety requirements for WPRC and the methods to test these properties.

29. KS ISO 6237:2017 Adhesives wood-to-wood adhesive bonds determination of shear strength by tensile loading

This standard specifies a method for determining the shear strength of wood-to-wood adhesive bonds, with a standard specimen loaded in tension and under specified conditions of preparation, conditioning and testing. This method is intended for testing only those adhesives used in bonding wood to wood in either parallel-laminated or cross-laminated construction.

30. KS ISO 19993:2020. Timber structures - Glued laminated timber - Face and edge joint cleavage test

This standard specifies methods of evaluating the effectiveness of glued laminated timber face and edge bonds within a manufacturing plant by cleaving of the glue line in both dry and wet conditions.

31. KS ISO 8375:2017. Timber structures - Glued laminated timber - Test methods for determination of physical and mechanical properties

This standard specifies test methods suitable for determining the following characteristic values of glued laminated timber: modulus of elasticity in bending; shear modulus; bending strength; modulus of elasticity in tension parallel to the grain; tension strength.

4.0 Kenyan Standards on Poles

1. KS 2776:2018. Inspection and supplemental treatment of treated wooden utility poles

This standard covers the field inspection of in-service wooden utility poles to determine damage done by physical and/or biological factors and the supplemental treatments to be used to prolong the service life of the poles.

2. KS 516:2008. Specification for wood poles for power and telecommunication Lines

This standard specifies requirements for wood poles for power transmission, distribution and telecommunication overhead lines. It provides the requirements for transmission poles giving the loads that can be applied on various categories of poles. The standard provides the basic design input required in the design of transmission systems.

3. KS 1605:2001. Specification for hardwood poles, droppers, laths, guardrail post and spacer blocks

This standard specifies general requirement for preservative-treated wood poles, droppers, laths, guardrail posts and spacer blocks. These are products used in erection of fences and green houses, for agricultural and horticultural purposes, general use in establishment of orchards, general building purposes, uses involving contact with the ground and for marine use.

4. KS 1933:2018. Concrete poles for telephone, power and lighting purposes - Specification

This standard specifies the characteristics of pre-cast reinforced, partially pre-stressed and pre-stressed concrete poles.

5. KS 2513:2014. Composite pole for telephone, power and lighting purposes- Specification

This standard specifies the characteristics of solid composite poles.

6. KS 2789:2018. Composite pultrusion pole for power, lighting and telecom purposes - Specification

This standard specifies the characteristics of pultrusion produced composite poles.

7. KS 1608:2018. Specification for wooden fence posts

This standard gives guidance to erection contractors, purchasers and suppliers on the sizes, workmanship and other requirements and treatment of fencing posts for the more common type of fences.

5.0 Kenyan Standards on Bamboo

1. KS ISO 19624:2018. Bamboo structures - Grading of bamboo culms - Basic principles and procedures

This standard specifies grading procedures for visually and mechanically sorting round or pole bamboo for structural applications using such fundamental elements. Visual sorting is based on observable characteristics of the piece(s). Mechanical sorting is based on non-destructive measurement of properties known to correlate to characteristic values defining a grade.

2. KS 2929:2021. Bamboo flooring - General requirements

This standard specifies the classification, technical requirements, and test methods for indoor bamboo flooring for internal use and outdoor bamboo flooring for external use.

3. KS ISO 22156:2021. Bamboo structures — Bamboo culms — Structural design

This standard applies to the design of bamboo structures whose primary load bearing structure is made of round bamboo or shear panel systems in which the framing members are made from round bamboo.

This standard applies to one- and two-storey residential, small commercial or institutional and light industrial buildings not exceeding 7 m in height.

This document is concerned only with requirements for mechanical resistance, serviceability and durability of bamboo structures.

4. ISO 22157:2019. Bamboo structures — Determination of physical and mechanical properties of bamboo culms — Test methods

This standard specifies test procedures for specimens obtained from round bamboo culms. The data obtained from the test methods can be used to establish characteristic physical or mechanical properties to be

used in structural engineering design or for other scientific purposes. This document provides methods for evaluating the following physical and strength properties: moisture content, density, mass per unit length; strength properties parallel to the fibre direction, compression, tension and bending, and strength properties perpendicular to the fibre direction, tension and bending. It also provides methods to estimate moduli of elasticity in bending, compression and tension parallel to fibres, and bending perpendicular to fibres.

4. KS 2854:2019. Bamboo and bamboo based products- Terminology

This standard defines internationally recognized terms applied to bamboo and bamboo based products through the contribution of bamboo experts, industry consumers and other stakeholders.

5. KS 2930:2021. Bamboo-culm furniture - General technical requirements

This standard specifies terms and definitions, and the general technical requirements which include product classification, test methods, inspection rules, markings, packaging, transport and storage of bamboo furniture.

6. KS 2980:2023. Bamboo toothpicks and skewers - Specification

This standard specifies the product types, technical requirements, inspection methods, inspection rules, identification, packaging, transportation and storage of bamboo toothpicks and skewers.

7. KS 2974:2023. Disposable bamboo tableware - Specification

This standard specifies the methods of testing applied to disposable bamboo tableware such as plates, cups, spoons, forks, cutlery etc.

8. KS 2855:2019. Preservation of bamboo for non-structural purpose - Code of practice

This standard specifies the types of preservatives and methods of treatment interior and exterior bamboo used for non-structural purposes.

9. KS 2856:2019. Preservation of bamboo for structural purpose - Code of practice

This standard specifies the types of preservatives and treatment procedures for bamboos used in structural applications like building.

10. KS 2877:2019. Sustainable management and harvesting of bamboo species - Guidelines

This standard specifies the requirements for the sustainable production, harvesting and processing of bamboo forest products. This standard does not extend to the management of orchards, ornamental bamboo and bamboo nurseries.