

KENYA STANDARD

DKS 2949:2021

ICS ###.###

First Edition

**Specification for aquatic spine boards for
recovering casualties in controlled
aquatic conditions**



**Kenya Bureau of
Standards**

Standards for Quality life

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Institution of Engineers of Kenya
Green Drive EA Ltd
Kenya Lifesaving Federation
Gertrude's Children's Hospital
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REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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Specification for aquatic spine boards for recovering casualties in controlled aquatic conditions

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Foreword

This Kenya Standard was prepared by the Facilities Management Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This standard specifies the requirements for an aquatic spine board, which is a rigid stretcher like board intended for use in the recovery and transport of a casualty suspected of having sustained an injury to the spine whilst in controlled aquatic conditions. This the First Edition of the standard.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

BS 8403:2003 Specification for aquatic spine boards for recovering casualties in controlled aquatic conditions

Acknowledgement is hereby made for the assistance derived from this source.

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Introduction

The increase in the incidence of injury to the spine whilst in the aquatic environment, particularly in swimming pools, has necessitated the development of a means of immobilizing the casualty on a board in a manner appropriate to that particular environment.

The atmosphere inside a swimming pool is relatively hostile and it is necessary to ensure that the materials used in the aquatic spine board are resistant to that environment.

It has also been recognized that correct use, servicing, cleaning, care and storage are necessary for aquatic spine boards to retain their performance characteristics and appropriate requirements for marking of the board and provision of an instruction manual are included.

The standard provides the technical specifications for an aquatic spine board. The standard does not address the manner in which the board should be integrated into an aquatic rescue.

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Specification for aquatic spine boards for recovering casualties in controlled aquatic

1 Scope

This draft Kenya Standard specifies the construction and performance of aquatic spine boards for use in the rescue, from water, of casualties with suspected spinal injuries. It is applicable only to aquatic spine boards for use in controlled aquatic conditions.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

3.1

aquatic spine board

rigid stretcher to immobilize and lift a casualty with a suspected spinal injury, which provides support to the whole body and has positive buoyancy

3.2

body restraints

straps for securing the casualty's arms, torso and legs to the board

3.3

head restraint

device which is permanently attached to the head end of the board to effectively restrain movement of the casualty's head

3.4

lying part

part of the aquatic spine board on which the casualty is placed prior to immobilization and recovery from the water

3.5

controlled aquatic conditions

static water, either indoors or outdoors, where standing depth is available and that is supervised by trained staff

4 Requirements

4.1 General

The aquatic spine board shall comprise a rigid board and a casualty restraint system. The casualty restraint system shall comprise body restraints and a head restraint, fitted with buckles or other fixings to attach the straps to each other and to the board.

4.2 Dimensions

The dimensions of the aquatic spine board shall conform to the following specifications:

- a) Constructed of 1/2" marine grade polymer;

- b) Be 45cm (16") to 60cm (24") wide;
- c) Have hand holds distributed to accommodate two to four rescuers; one or two on either side of the long side of the board
- d) Have a length not exceeding 2 metres

4.3 Mass

The weight of the board shall be between 3.5 kg and 10 kg.

The board shall indicate maximum load it can carry.

4.4 Loading capacity, dimensional stability and buoyancy characteristics

4.4.1 After conditioning in accordance with Annex A, the board shall be tested in accordance with Annex B. With the load in place, the deflection of each side of the board shall not exceed 25 mm. After unloading, the board shall show no visible signs of permanent deformation, cracking or fractures.

4.4.2 After conditioning in accordance with Annex A, when the board is tested in accordance with Annex B, the deflection of the centre of the board shall be not greater than 50 mm.

After unloading, the board shall show no signs of residual deformation or visible damage e.g. cracking.

4.4.3 After conditioning in accordance with Annex A, when the board is placed in the container of chlorinated salt water specified in Annex A and loaded in accordance with Annex B, it shall remain afloat.

4.5 Construction of the board

4.5.1 The board shall be equipped with a minimum of three handholds on each longitudinal side and with a minimum of two handholds at each of the foot and the head ends of the board. Handholds shall be a minimum of 120 mm in length and shall have a grip diameter not greater than 40 mm.

4.5.2 The board shall be constructed in such a way that, when it is placed on a flat, level floor, the base of the handholds along both sides, and at the head end and the foot end is not less than 25 mm from the ground, to allow for easy gripping when lifting from the ground.

4.5.3 The board shall be equipped with fixing points for the casualty restraint system which allow the restraints to be moved to accommodate casualties of up to 2 m in height. The fixing points shall be positioned such that they do not interfere with the handling of the board when it is being lifted, or transported in an ambulance.

4.5.4 The lying part of the board shall be self-draining to prevent pooling of water.

NOTE The surface of the lying part of the board should be of a material that minimizes the potential for the casualty to develop pressure sores.

4.6 Construction of the casualty restraint system

4.6.1 Body restraints (straps)

The body restraints shall comprise a minimum of five straps or pairs of straps, 50 mm wide, of non-stretch construction. The body restraints shall be adjustable and shall be fitted with quick release buckles or fixings. Where the straps, or buckles or fixings are colour coded for specific restraining parts, the colour codes shall be as specified by the manufacturer.

4.6.2 Head restraint (Support)

The head restraint shall be adjustable and shall be permanently secured to the board to prevent it floating away during application.

4.7 Materials

The aquatic spine board, including the casualty restraint system, shall be made from materials which have been shown to have the following characteristics:

- a) resistance to bacterial and fungal growth;
- b) resistance to the absorption of fluids;
- c) resistance to disinfectants;
- d) resistance to petrol and oil;
- e) radiotranslucence;

NOTE It is essential that attenuation of all diagnostic radiation beams be kept to an absolute minimum.

- f) does not affect, and is not affected by, the magnetic field of magnetic resonance (MR) scanners.

Where screws and staples are used, they should be non-corrosive and stainless and be capped with material that cannot cause scrapping or any bruising.

The manufacturer of the aquatic spine board shall obtain documentation from the manufacturers of the materials demonstrating conformity to these requirements. This documentation shall be included with the test report.

NOTE The materials used should also be easy to clean.

4.8 Resistance to chlorinated salt water

After conditioning of the aquatic spine board in accordance with Annex A, the body restraints and the head restraint shall show no visible signs of failure of the material or stitching, and the board shall show no visible signs of surface damage e.g. cracking, pitting, softening or delamination.

4.9 Flammability

When the board, and one sample each of the body restraint straps and the head restraint, which have been conditioned in accordance with Annex A, are tested; There shall be no progressive smouldering or flaming ignition.

4.10 Stability of markings

4.10.1 Resistance to chlorinated salt water

After the board has been conditioned in accordance with Annex A, all markings shall remain legible. The change in colour of the markings shall be assessed.

4.10.2 Adhesion of the markings

After the test in 4.10.1 the markings shall be tested. The board contact adhesive should be stronger than the skin contact adhesive, such that the strap stays adhered under various environmental conditions, and the skin of the casualty's forehead is not injured by the skin contact adhesive.

The markings shall remain legible. The change in colour of the markings shall be assessed.

5 Marking and information

5.1 The lying part of the board shall have printed on it, the following information:

- a) number and date of this Kenya Standard, i.e., DKS 2949:2021
- b) name, trademark or other means of identification of the manufacturer of the board and the casualty restraint system;
- c) casualty head position;
- d) product name of the aquatic spine board;
- e) pictorial guide to using the casualty restraint system;
- f) order in which the body and head restraints should be applied;
- g) the words "TO BE USED ONLY BY TRAINED PERSONNEL";
- h) the words "ROUTINE CARE, MAINTENANCE AND SERVICING TO BE CARRIED OUT IN ACCORDANCE WITH INSTRUCTION MANUAL".

5.2 The aquatic spine board shall be supplied with an illustrated instruction manual giving the following information:

- a) method of assembly of the board and casualty restraint system;
- b) method for positioning the board under the casualty;
- c) application of the casualty restraint system to the casualty;
- d) routine care, maintenance and servicing instructions;
- e) frequency with which any components should be routinely replaced.

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Annex A (normative)

Procedures for conditioning of the board and casualty restraint system prior to testing

A.1 Principal

The aquatic spine board including the casualty restraint system are stored in cold and then hot conditions and then immersed in chlorinated salt water (to imitate swimming pool water).

A.2 Materials

A.2.1 *Sodium hypochlorite solution*, containing 50 mg/l of active chlorine at a pH of 7.5 ± 0.05 . The solution shall be prepared immediately prior to use, in water.

A.2.2 *Chlorinated salt water*, prepared by dissolving 30 g/l of sodium chloride (NaCl) in sodium hypochlorite solution. The solution shall be prepared immediately prior to use.

A.3 Apparatus

A.3.1 *Container*, made of glass or stainless steel, with a sufficient volume that the item under test can be immersed in the chlorinated salt water at a ratio of 100:1 chlorinated salt water volume to test item volume. The container shall be fitted with a motor driven stirrer rotating at a rate of 40 revolutions/min.

The container shall be maintained in a temperature controlled room at (20 ± 2) °C in darkness.

A.4 Procedure

A.4.1 Place the aquatic spine board in a freezer at (-10 ± 1) °C for 24 h then place it in an oven at (60 ± 2) °C for a further 24 h and then place it in a temperature controlled room at (20 ± 2) °C for 24 h.

A.4.2 After conditioning in accordance with **A.4.1** submerge the aquatic spine board in the container (**A.3.1**) filled with chlorinated salt water (**A.2.2**) at a ratio of 100:1 chlorinated salt water volume to aquatic spine board volume. Ensure that the aquatic spine board is thoroughly wetted. Start the stirrer and leave the aquatic spine board in the container for 12 h. At the end of this time, remove the aquatic spine board, rinse it in distilled water and dry by hanging it up in air at (20 ± 2) °C.

Annex B (normative)

Test for loading capacity and dimensional stability

B.1 Attach the ends of the board to rigid supports so that the board is held horizontally above a firm horizontal surface. Ensure that all four corners of the board are the same distance above the surface.

B.2 Measure the vertical distance between the centre of each side edge of the board and the horizontal surface. Record these distances as L_1 and L_2 (where L refers to Length)

B.3 Distribute a load of 150 kg over the full width of the board as follows:

- a) Distribute 75 kg evenly over the centre 450 mm length.
- b) Distribute 22.5 kg evenly over each of the two adjacent 380 mm lengths.
- c) Distribute 15 kg evenly over each of the two adjacent 300 mm lengths.

NOTE Sandbags may be used to achieve the loading.

B.4 Remeasure the vertical distance between the centre of each side edge of the board and the horizontal surface. Record these distances as L_3 and L_4 where L_3 is the measurement on the same side as L_1 is the measurement on the same side as L_2

B.5 Calculate the deflection of each side of the board as $L_1 - L_3$ and $L_2 - L_4$ respectively.

B.6 Unload the board and examine it for visible signs of damage.

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Annex C (normative)

C1 Dimensions for aquatic spine boards

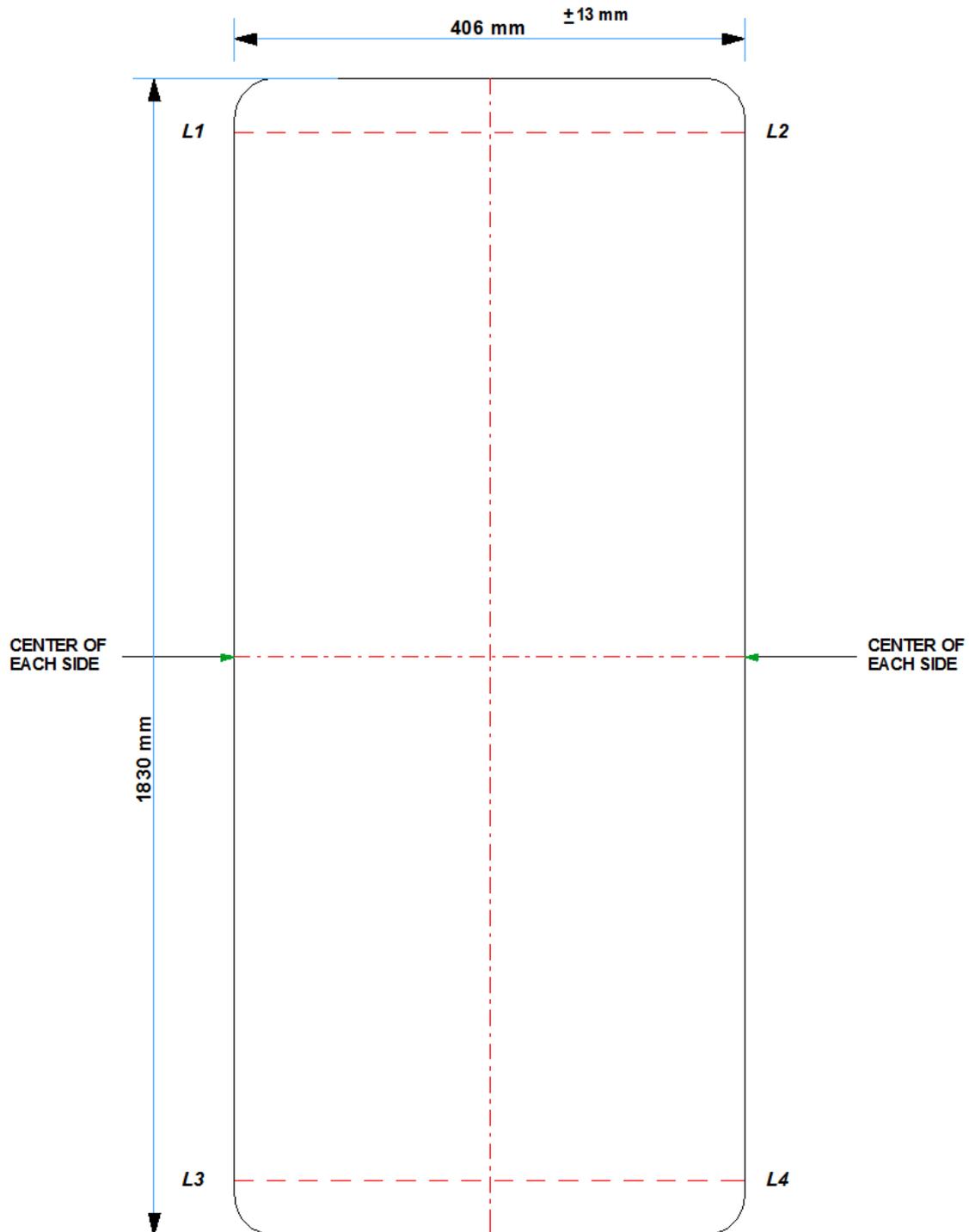
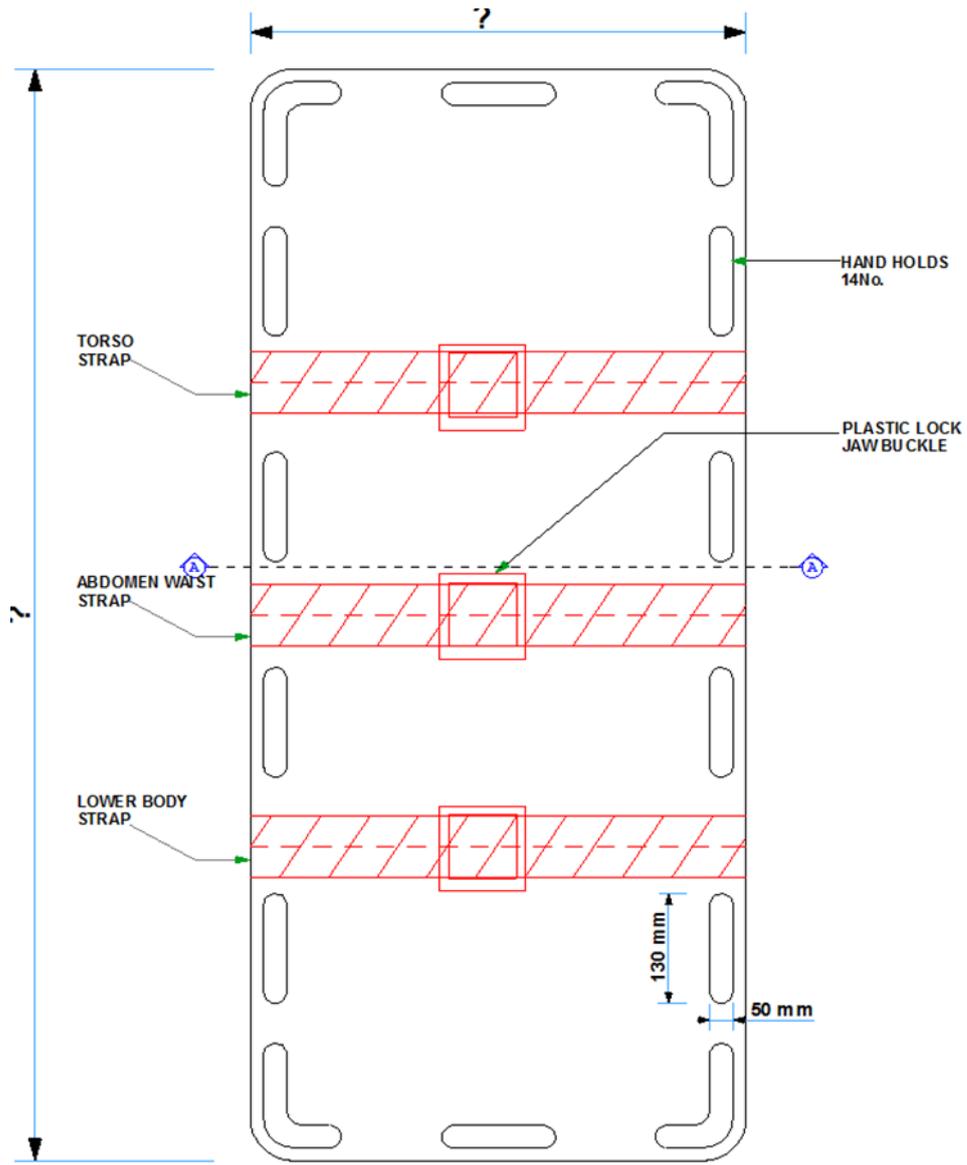


Figure 1 – Dimensions for aquatic spine boards – Width and Height



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Figure 2 – Dimensions for aquatic spine boards – Board thickness