SRI LANKA STANDARD 1170 : PART 1 : 1998

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CODE OF PRACTICE ON IDENTIFICATION, GRADING AND MARKING OF IMPORTED CONSTRUCTION TIMBER

PART 1 : GRADING, MARKING, AND GUIDANCE ON USAGE

SRI LANKA STANDARDS INSTITUTION

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SLS 1170:Part 1 : 1998

Gr. 15

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Sri Lanka Standard
CODE OF PRACTICE ON IDENTIFICATION, GRADING AND MARKING OF IMPORTED CONSTRUCTION TIMBER
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FOREWORD

This Sri Lanka Standard Code of Practice was approved by the Sectoral Committee on Timber & Timber Based Products and was authorised for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1998-03-19.

Local timber suitable for structural use is in short supply. In addition, government restrictions on felling to protect the environment as well as controls on transport and marketing of timber, have also contributed to the spiralling timber costs. In spite of higher costs, timber is found to be indispensable as a construction material in Sri Lanka. To cater for the demand, the government is now encouraging the import of construction timber by granting import duty reductions, and this trend is expected to continue for some time.

Timber is a perishable material which needs great care in specification, selection and handling of bulk imports. Dealers and users also need to be educated to help them sell/select their requirements. Import inspections should be comprehensive and streamlined. Past experience on import of timber to Sri Lanka, which sometimes discouraged the prospective users, has further underlined the need for establishing some guidelines to help the importers, timber merchants and the users.

For most effective use of construction timber, it must be structurally designed to suit the specific application. To accomplish this goal, timber, over the years, was evolved as an engineering material in spite of its high variability and inherent strength reducing defects by the development of stress-graded timber. As most timber exporters provide stress-graded timber,the required design information as well as the stress-graded timber can be made available to the structural engineers who can pass on the benefits of economy and performance to the user. Availability of stress-graded imported timber will also encourage the stress-grading of local timber in the near future. Hence a need exists for a Sri Lanka Standard on imported construction timber which provides information on selection of species, durability, treatability, timber grades, design stresses as well as guidelines on implementing and checking the grading process.

This part of the standard (Part 1) specifies the grades, grade stresses, marking, requirements for visual stress grading of timber for structural use and guidance on usage of imported construction timber. The other parts of this standard are as follows;

Part 2 : Nomenclature, identification and general information;
Part 3 : Properties; and
Part 4 : Documentation for grading.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or observation, shall be rounded off in accordance with **CS 102**. The number of significant figures to be retained in the rounded off value shall be the same as that of the specified value in this standard.

The Sri Lanka Standards Institution gratefully acknowledges the use of the publications of the Malaysian Timber Industry Board, the British Standards Institution, the Bureau of Indian Standards, the American Society for Testing and Materials and the Standards Australia.

1 SCOPE

This part of Sri Lanka Standard specifies grades, grade stresses, marking, requirements for visual stress grading of timber for structural use, and guidance on usage of imported construction timber. Machine stress grading is not included in this standard.

2 REFERENCES

BS 5268 - Structural use of timber
Part 2 - Code of practice for permissible stress design, materials and workmanship
CS 102 - Presentation of numerical values
SLS 985 - Grading of timber
Part 2 - Terminology
Part 3 - Grading of logs
SLS 1170 - Code of practice on imported construction timber
Part 2 : Nomencluture, identification, and general information
Part 3 : Properties
Part 4 : Documentation for grading

3 DEFINITIONS

For the purpose of this standard the following definitions shall apply:

3.1 bare (dead, exact) - Applied to sawn timber that measures, at the time of inspection, the same as the dimensions specified. Compare with full and scant.

3.2 bark - Outer covering of the trunk and is composed of a dead outer phloem and dry starch materials and thin inner phloem of living cells. Its primary functions are protection and nutrient conduction.

3.3 bark pocket - Patch of bark partially or wholly enclosed within the wood, sometimes known as inbark; resin or gum may sometimes be present in the pocket. Compare with resin pocket.

3.4 blocked heart shake - Larger separation of the wood fibres near the heart in a longitudinal and radial directions, which is blocked by resin. Compare with shake.

3.5 borer hole - Hole in timber caused by boring insects (or their larvae), either in the living tree (e.g. some Ambrosia beetles), or after felling or sawing (e.g. Powder-post beetles), or by marine borers. In this standard three sizes are recognized, namely pin (and needle) holes, shot holes and larger borer holes (grub holes).

3.6 bow (bowing) - The curvature of a piece of sawn timber in the direction of its length. Compare with spring and curvature. (see **Figure 1**).

3.7 boxed heart - A term used when the heart is enclosed within the four surfaces of a piece of sawn or hewn timber. Well boxed heart means that the heart is enclosed within the four surfaces of a piece of sawn or hewn timber throughout its entire length,and is reasonably well centered at both ends (see Figure **2**).

3.8 brittle heart - The defective core of a log, caused by compression failures in its fibres arising during growth, characterised by abnormal brittleness shown by abrupt failure under load at comparatively small deflections with little or no splintering, which occurs in certain kinds of tropical hardwoods. There is no difference in colour from unaffected wood and a sawn cross section shows a pitted condition, but the limits of the defect are never sharply defined. Also known as spongy heart, punky heart or soft heart, Compare with heart.

3.9 cambium - Actively dividing layer of cells between wood and bark. Usually only apparent in freshly felled timber as a thin moist layer under the bark.

3.10 check - Small separation of the wood fibres in a longitudinal direction,not penetrating as far as the opposite or adjoining side of a piece of sawn timber (compare with shake and split); it usually results from strains developing during seasoning; surface (or seasoning) check, and end (or heart) check are distinguished (see **Figure 2**).

3.11 coarse texture - Texture with relatively large cells or usually wide growth rings for the species.

3.12 compression failure - Fracture across the grain in which the fibres are broken transversely or are crushed by compression. Various causes are suggested, such as felling across obstructions, and failure inside the growing tree caused by high winds, growth stresses, etc. Also known as felling shake, thunder, rupture, lightning, transverse shake, upset, cross break, or cross fracture. Very often they are difficult to detect until the timber is dressed (see **Figure 2**).

3.13 corewood - Central part of a log.

3.14 cup (cupping) - The curvature of a piece of sawn timber across its width in mm. Compare with bow and spring. (see **Figure 1**).

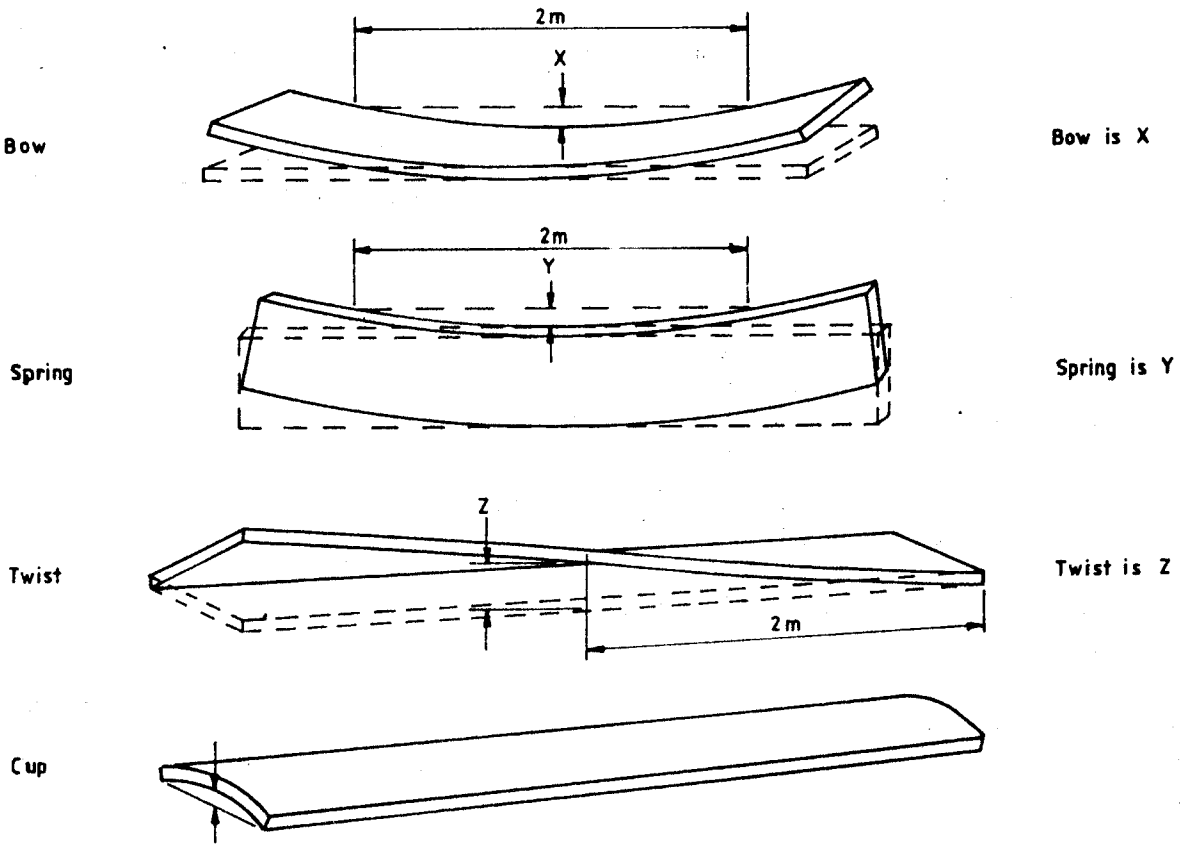


FIGURE 1 – Measurement of bow, spring, twist and cup

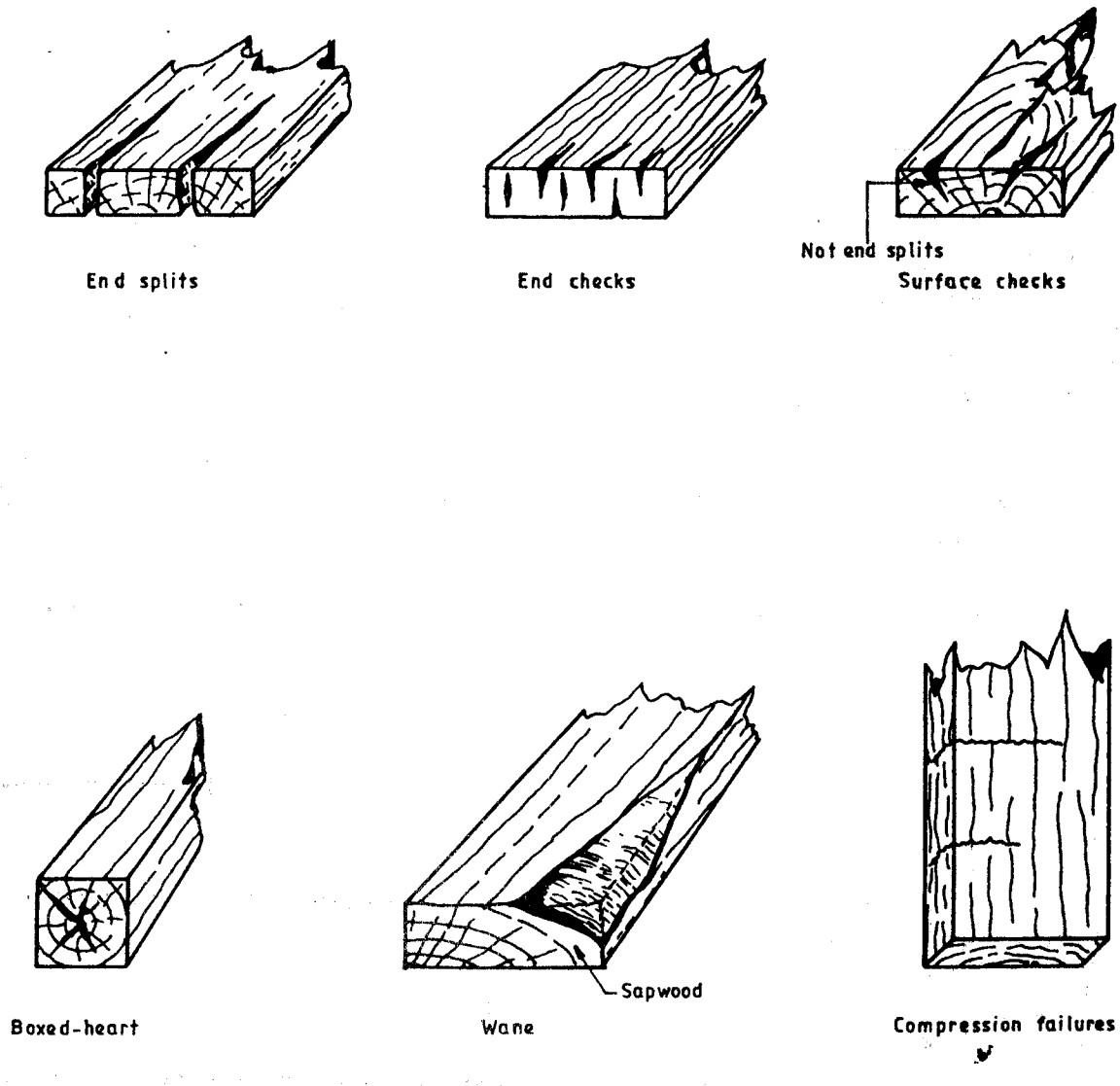


FIGURE 2 – Split, End check, Surface check, Boxed-heart, Sapwood and compression failure

3.15 curvature - Includes either bow, or spring or both. Compare with warp.

3.16 decay - Includes wet rot and dry rot; it is the disintegration of wood resulting from the action of wood-destroying fungi. It is usually accompanied by discolouration even in the early stages of attack. Compare with dote.

NOTE

Infection by sap-stain fungi is not classed as decay or dote (see stain).

3.17 degrade - Applied to timber that through any cause has developed more defects than were permitteed in the original grade of that timber.

3.18 deterioration (or degrade in transit) - The development in timber of defects during transit that are due to the condition of the timber at the time of shipment [and not to external circumstances such as faulty storage prior to shipment (e.g. stacking in the open, exposed to sun and rain)], or to faulty stowage in a ship, or to stowage on deck. Such defects include stain, dote, and warp. Compare with degrade.

3.19 dote (doat). It is incipient decay, or decay in an initial stage, characterized by bleached or discoloured streaks or patches in the timber, where the general texture and strength remain essentially the same.

3.20 early wood - Less dense wood formed during the earlier stages of the growth of each growth ring.

3.21 edge - Either of the narrower longitudinal opposite faces of timber.

3.22 even texture - Texture with little variation in size of cells and little contrast between early wood and late wood.

3.23 face - Either of the wider longitudinal opposite surfaces of timber or any longitudinal surface if the timber is of square cross-section.

3.24 fine texture - Texture with relatively small cells.

3.25 full (sawn) - Applied to timber that has been sawn oversize to allow for shrinkage and which should therefore measure more than the specified dimensions until that timber has been fully seasoned. Also known as oversize. Compare with bare and scant.

3.26 grain - General direction or arrangement of fibres.

3.27 heart - A term applied to the central portion of a log including the pith and the adjacent wood which may be defective. Compare with boxed heart, brittle heart, heartwood.

3.28 heartwood - Inner zone of wood that, in a growing tree, has ceased to contain living cells and reserve materials (e.g. starch). Not to be confused with heart.

NOTE

In commercial practice it is usual to restrict the term to the darker coloured wood that is visually distinct from sapwood.

3.29 hewn timber - The timber that has been chopped or cut with an axe or adze. The ends are sometimes sawn.

3.30 hollow knot - A knot which has fallen out leaving a hole whose sides are free from decay. Compare with unsound knot.

3.31 included phloem - Strands or zones of abnormal and often very hard tissue occurring in some timbers, caused by abnormal development of the cambium. In Kempas, Keranji and Tualang, they occur in long or short concentric arcs while in Jongkong, they occur as radial strands which appear as small flecks or holes on the tangential surface.

3.32 interlocked grain - Grain arrangement in timber where grain runs in different directions in alternate layers of the timber, a common feature in tropical timbers, which was found to have a negligible effect on strength except in sizes less than 100 mm x 50 mm. This is formed when cells in succeeding growth periods incline alternately in opposite directions that are different from that of the axis of the tree.

3.33 irregular grain - Grain that is not straight because of abnormal structure of the wood.

3.34 knot - A portion of a branch which has become embedded in the wood by the natural growth of the tree. The cross section of a knot is usually circular or oval in shape, and is measured by taking the mean of the largest and smallest diameter. In this standard, knots are classified as sound, unsound and hollow knots.

3.35 large borer hole (grub hole) - Over 3.0 mm in diameter, caused by Longhorn beetles, usually averaging about 6.0 mm in diameter.

3.36 late wood - Denser wood formed during the later stages of growth of each growth ring.

3.37 pin (and needle) hole - Not over 1.5 mm in diameter, usually about 0.75 mm or less, sometimes stained round the edges.

3.38 pith - Central core of the stem of a tree or shrub that consists chiefly of parenchyma or soft tissue.

3.39 resin pocket - Cavity in wood which has become wholly or partially filled with solid or semi solid or gummy substance. Also known as dammar pockets, or pitch pockets. Bark may also sometimes be present in the pocket (see bark pocket).

3.40 sapwood - Outer zone of wood that, in a growing tree, contains living cells and reserve materials (e.g. starch), generally lighter in colour than heartwood though not always clearly differentiated.

3.41 sawn timber - The timber that has been converted with a saw.

3.42 scant (sawn) - Applied to sawn timber that measures, at the time of inspection, less than the dimensions specified. Also known as undersize.

3.43 scantling - A piece of sawn timber of rectangular section whose thickness usually equals or exceeds half its width (e.g. 75 mm x 50 mm, 100 mm x 50 mm, 100 mm x 75 mm, 150 mm x 100 mm etc. which are known as small scantlings, and 250 mm x 150 mm, 300 mm x 200 mm, 300 mm x 300 mm etc. which are known as large scantlings or baulks).

3.44 shake - Separation of fibres along the grain, irrespective of the extent of penetration. If it completely encircles the pith (heart) it is called round shake. If it does not encircle the pith it is called cup shake. If it is an irregular zig-zag separation on the log end it is known as shatter or shatter shake. If the separation is radial and originates at the heart, it is a heart shake. Heart shakes grouped more or less in the form of a star is a star shake.

3.45 ship - Deliver (goods) to forwarding agent for conveyance by land or water or air.

3.46 shipping dry - The condition of timber after a period of seasoning designed to prevent deterioration in transit. It is often synonymous with surface dry.

3.47 shot hole - Over 1.5 mm in diameter but not exceeding 3.0 mm in diameter; if the edge of the hole is not stained it is known as unstained shot hole.

3.48 short - Short length of sawn timber usually less than 1800 mm in long.

3.49 sloping grain - A deviation of the grain (fibres) from the longitudinal axis of the timber, when the deviation is in the same direction throughout the depth of the piece.

3.50 sound knot - A knot, solid across its face and, except for its own pith, is as hard as or harder than the surrounding wood to which it is firmly joined. It shows no indication of decay and is usually darker in colour than the surrounding wood.

3.51 spiral grain - Grain that follows a spiral course in one direction around a log.

3.52 split- A longitudinal separation of the fibres which extends to the opposite face or adjoining edge of a piece of sawn timber. Compare with check.

3.53 spring - The curvature of a piece of sawn timber in the plane of its wide face (see **Figure 1**). Compare with bow and cup.

3.54 stain (or discolouration). - Stain is a discolouration, or variation from the natural colour of the wood, generally caused by sap-stain fungi (blue stain). Stain is not a defect if it will dress out in surfacing to standard thickness for dressed timber.

3.55 straight grain - Grain that is straight and parallel or nearly parallel to the longitudinal axis of the piece.

3.56 strip - A narrow piece of sawn timber less than 150 mm wide and less than 50 mm thick.

3.57 surface dry - The condition of sawn timber which has been partially air seasoned so that the surfaces appear and feel dry; also known as skin dry. Compare with shipping dry.

3.58 texture of wood - Structural character of wood as revealed by touch or reaction to cutting tools, largely determined by distribution and size of the various cells.

3.59 twisting - The spiral distortion of a piece of sawn timber. It may be accompanied by either bow, or spring or both (see **Figure 1).**

3.60 uneven texture - Texture with considerable variation in size of cells or distinct contrast between early wood and late wood.

3.61 unsound knot - A knot which is softer than the surrounding wood because it contains decay. If the decay is advanced there may be a hole in the centre of the knot and the sides of the hole may contain decay. Compare with hollow knot.

3.62 warp - Distortion of a piece of sawn timber usually occurring during seasoning. It includes bow, cup, spring and twist.

3.63 wavy grain - Grain in fairly uniform waves or ripples.

3.64 wood - Lignoellulosic substance of which trees and shrubs are largely composed, excluding pith and bark.

4 NOMENCLATURE

Standard names, scientific names, density range, and the marking codes are given in **SLS 1170 Part 2 : 1998.**

5 IDENTIFICATION

Identification of the timber species can be made as given in **SLS 1170 Part 2 : 1998.**

6 NATURAL DURABILITY AND TREATABILITY

Information on natural durability, treatability, working qualities and end usage of imported construction timber is given in **SLS 1170 Part 3 : 1998.**

7 GRADES AND GRADE STRESSES

7.1 Grades

There shall be three visual grades of timber, which are named **Select Structural Grade, Standard Structural Grade** and **Common Building Grade**.

These stress grades are so designed that each piece of timber of a given size in a grade will have a certain minimum strength, thus allowing the grade stress appropriate to that grade to be applied confidently to each piece. Design data for stress-graded timber is given in **7.2.** The grades are multi-purpose grades (i.e. applicable to all structural timbers whether used as bending members or in end-wise compression. In the case of timber used as beams, the recommended grade stresses shall apply no matter which way up the member is installed). The stress grades will also apply to members intended for re-sawing to shorter lengths (but not into smaller cross-sections), except where re-sawing will cause defects to appear on the ends of the re-sawn pieces beyond the extent permitted in the grade concerned.

For normal purposes, the **Standard structural grade** should be specified. The **Select grade** is intended for special purposes, particularly where the strength/weight ratio of the timber is to be a maximum, for example in towers for transmission lines and trusses of very long span. The **Common grade** is intended for wooden members used in the less important parts of building frames, which are not usually designed by means of engineering calculations; it gives a guide to the quality of timber that will normally be adequate for such work in high quality construction, allowing a rational specification to be applied to the bulk of the timber required at a building site.

Intending purchasers of the Standard grade should note that certain defects are allowed at the ends of the piece. Where bolts or timber connectors are to be used in pieces of this grade, allowance should be made for end-trimming when specifying lengths. A further allowance may have to be made for end-splits that may develop after grading, especially if the contract **(Appendix C of SLS 1170 Part 4 : 1998)** does not call for a period of seasoning of at least thirty days before grading.

This standard calls for dimensions not less than nominal at the time of grading, on the assumption that increase of strength due to any subsequent drying, coupled with other factors, will more than offset the decrease due to shrinkage. However, no provision is made for the weakening effect of certain defects that may be caused by improper seasoning after grading. For example, there is no allowance for the deep surface checks, often caused by exposing unseasoned Keruing to the sun on building sites.

Multi-purpose grades are given mainly for the sake of simplicity, in the hope that this simplicity will rapidly lead to their being put into use. The methods of measuring defects **(see 9)** have also been simplified. The most important simplification occurs in limiting the sizes of knots and specifying the method of measuring them. Knots in tropical timbers are rare compared with those in softwoods grown in temperate climates, so that although the limitations on this defect would be far too severe for such softwoods (conifers), they are expected to cause little rejection in tropical woods.

Severe limitations on curvature are to be expected in a multi-purpose grade because the stress-graded timbers must be suitable for use as compression members even if in a particular case they are intended for use as beams. To avoid uneconomic rejection, the grading rules allow bow to be disregarded in pieces of non-square cross-section. This assumes that compression members will always be made by one of the following methods:

(i) Using a single piece of square cross-section;
(ii) Using a piece of non-square section in which end fixity removes or adequately compensates for excessive bow;
(iii) By fastening together two or more pieces of non-square cross-section in such a way that bow in the individual pieces is removed; or
(iv) By specially selecting only non-square sections where bow is absent or negligible.

7.2 Grade stresses

Basic stresses for some timber species covered in this standard are given in **SLS 1170 Part 3 : 1998.** Basic stress is the stress which can safely be permanently sustained by the timber containing no defects.

To obtain grade stresses, for timbers that are stress-graded to select, standard and common grades as specifed in this standard, the basic stress should be reduced to 80 per cent (e.g. grade stress of select grade = 0.8 x basic stress), 63 per cent and 50 per cent respectively for all

properties except modulus of elasticity which is not reduced. The grade stress should be further modified depending on the particular conditions of service and loading as well as other appropriate condidtions in accordance with **BS 5268.**

8 GRADING REQUIREMENTS

8.1 General

These grading requirements are intended for application to scantlings or boards required for structural members that have been designed by engineering calculations of the kind normally applied to timber construction. Any rectangular section (including squares) of sizes normally used in load-bearing structures (e.g 19 mm x 100 mm, 19 mm x 150 mm, 25 mm x 50 mm, 25 mm x 100 mm, 25 mm x 200 mm, 25 mm x 250 mm, 25 mm x 300 mm, 50 mm x 50 mm, 50 mm x 100 mm, 50 mm x 150 mm, 50 mm x 175 mm, 50 mm x 200 mm, 50 mm x 225 mm, 50 mm x 250 mm, 75 mm x 125 mm, 75 mm x 150 mm, 75 mm x 175 mm, 75 mm x 200 mm, 100 mm x 150 mm, 100 mm x 175 mm, 100 mm x 200 mm, 125 mm x 200 mm, 125 mm x 250 mm, 125 mm x 300 mm, 125 mm x 125 mm, 150 mm x 225 mm, 150 mm x 300 mm etc.) is included.

8.2 Borer holes in timber

Pin or shot holes are a defect in some timbers caused by the activities of Ambrosia boring beetles, which attack the growing tree or the freshly cut log. The beetles, however, cannot live in seasoned timber and the presence of pin or shot holes must not be regarded as indicative of active infestation. When such timber is used in work which is out of sight or painted, the holes do not detract from its utility since strength properties are, for all practical purposes, in no way impaired. Borer holes not associated with active infestation of the material may be permitted.

8.3 Sapwood

The question of whether to classify sapwood as a defect depends largely on the species of timber, the use to which it will be put, and whether it is convenient to treat it with preservatives. The difference in colour between the heartwood and sapwood of some timbers may make it desirable to exclude the sapwood, or the sapwood may have to be discarded because some species are susceptible to powder-post beetle attack or to stain during seasoning. In general, however, although sapwood is not as durable as the heartwood, it is, for all practical purposes, as strong mechanically, and as hard as the heartwood, and can be readily impregnated with preservatives, by which means it can be made at least as durable as the heartwood. In timber that is to be impregnated, therefore, sapwood is not a defect, and can normally be allowed without limit.

8.4 Seasoning of timber

Seasoning to 'shipping dry' condition to reduce risk of degrade during transit is essential. To satisfy this condition, timber should be surface dry. Timber must usually have been on stickers, under covers for at least 10 days to reach a surface dry condition. When 'surface dry' timber of small dimension is to be bundled, it is recommended that the minimum seasoning period should be not less than 20 days on stickers unless the timber has been previously dipped in an anti-stain mixture.

8.5 Dipping of timber

The dipping or sprayingpof timber in a suitable anti-stain and/or anti-borer solution immediately after sawing is strongly recommended. Dipping provides protection for timber against stain and/or borer attack during the seasoning period. Timber must however, be properly stacked after dipping (see **8.9**) and failure to do this can nullify the effects of the dip.

8.6 Manufacture

Timber shall be carefully sawn and trimmed to produce the best possible appearance. It shall, unless otherwise specified in this standard or in the contract **(Appendix C of SLS 1170 : Part 4 : 1998),** be sawn full to allow for the natural shrinkage of the timber. A table of recommended sawing sizes is given in **Appendix A.**

8.7 Miscut timber

8.7.1 All timber which, due to faulty sawing, is tapered (wedge-shaped) in cross section and has a greater variation in thickness (except as to wane where this is allowed by this standard) between the thinnest and the thickest points of the wedge than shown below, shall be deemed to be miscut and shall be rejected:

3 mm variation in pieces below 25 mm thick;
6 mm variation in pieces from 25 mm to below 62.5 mm thick;
9 mm variation in pieces from 62.5 mm to below 100 mm thick; and
12.5 mm variation in pieces from 100 mm and above in thickness.

8.7.2 Where the width of a piece of timber varies by more than 12.5 mm (in pieces below 150 mm width) or by more than 25 mm (in pieces 150 mm and above in width) at any point in its length, the piece shall be deemed to be miscut and shall be rejected.

8.8 End trimming and coating

All ends shall be sawn square. The ends of all pieces of sawn timber shall be coated with a properly applied thick end-coating of a type approved by the Sri Lanka Standards Institution to reduce likelihood of end-splitting during seasoning or shipment.

8.9 Stacking and seasoning

Unless otherwise specified (see **8.4**) all timber shall, as soon as possible after sawing, be properly open-stacked on stickers under cover of a type approved by the Sri Lanka Standards Institution. It shall remain on stickers for the period specified in the contract (**Appendix C of SLS 1170 Part 4 : 1998**) before being graded. All stacks of timber shall be properly dated so that the Timber Grader can satisfy himself that the specified seasoning period has expired. Timber not so stacked and dated will not be graded. The Timber Grader should show the seasoning period in the Grading Summary **(Appendix F of SLS1170 Part 4 : 1998),** in the space provided.

NOTE

Great care should be taken to ensure that graded timber does not get wet after leaving the sawmill as this may nullify the effects of seasoning and dipping (see 8.5) and lead to the development of stain or dote. Similarly graded timber should not be left uncovered to the sun as this may lead to serious checking, splitting or warping. Timber in transit between a sawmill or storage yard and the ship's side should at all times be protected by a good tarpaulin or similar cover.

8.10 Thicknesses

Standard thicknesses normally usuful and desirable are as follows :- 12.5 mm, 19 mm, 25 mm, 31 mm, 37.5 mm, 44 mm, 50 mm, 62.5 mm, 75 mm, 87.5 mm, 100 mm, 125 mm and 150 mm. No piece shall measure less than the specified thickness (measured at the thinnest point in the piece) except that small irregularities in sawing, which do not exceed the variations in **8.7** , shall be disregarded. A piece which measures scant (**see 3.42**) of specified thickness at the time of grading may be tallied down to the next lower specified thickness provided that the maximum oversize limits scheduled in **Appendix A** are not exceeded. If these oversize limits are exceeded the piece shall be rejected.

8.11 Widths

Widths will rise in steps of 25 mm from the minimum of each grade unless 12.5 mm increments are specified. Unless specified to the contrary in this standard or in the contract (see **Appendix C of SLS 1170 Part 4 : 1998),** ninety per cent of any width shall be full (see **3.25)** in width, the remaining ten per cent may be up to 6 mm scant (see **3.42)** for widths 100 mm and above and 3 mm scant for widths below 100 mm. Unless the timber has been seasoned for 90 days or more (see **8.9**) pieces supplied against a full-sawn contract (see **8.6**) that measure bare (see **3.1**) at the time of grading shall be considered to be scant for the purpose of this standard. Widths shall always be measured at the narrowest point in a piece (see **8.7.2**).

8.12 Lengths

8.12.1 Unless specified to the contrary in the contract (see **Appendix C of SLS 1170 Part 4 : 1998),** timber will be supplied in random lengths rising in steps of 300 mm from the minimum of each grade; in any case, the maximum over size in length should not exceed 150 mm.

8.12.2 When fixed lengths are specified in a contract they must be supplied in those full lengths unless multiples are admitted in the contract, e.g. Wagon Planks. When multiple lengths are admitted, each fixed length must be inspected and marked (see **10.1**) as if it had been removed from the piece, and adequate over-measure in length (not less than 12.5 mm per cut) must be allowed for cross-cutting to length on arrival. However, the whole piece containing the multiple lengths needs to be stencilled only once.

8.12.3 When tallying a "multiple fixed lengths" contract, two tallies **(Appendix E of SLS 1170 Part 4 : 1998),** must be maintained, one recording the total number of fixed lengths accepted, the other recording the total number of pieces of sawn timber in the consignment. Columns 2 and 3 of the Grading Summary **(Appendix F of SLS 1170 Part 4 : 1998),** should show the number of fixed lengths that have been graded, immediately underneath should be shown the number of pieces of sawn timber containing those multiple fixed lengths; the latter will, of course , always be smaller than the former.

8.13 Unit of measurement

The unit of measurement of sawn timber in Sri Lanka is the cubic metre (m^3). Volume of timber is obtained by using the formula:

$$\text{Length in metres} \times \frac{\text{width in mm}}{1000} \times \frac{\text{thickness in mm}}{1000} = \text{Volume of timber in cubic metres}$$

8.14 Grading requirements

Grading requirements are given in **Table 1.**

TABLE 1 - Grading Requirements for multi-purpose stress grades - (Continued)
(See Note (a) below)

Kind of Defect (1)	MAXIMUM PERMISSIBLE LIMITS FOR EACH GRADE		
	I. Select Structural Grade (See Note (b) below) (2)	II. Standard Structural Grade (See Note (b) below) (3)	III. Common Building Grade (See Note (b) below) (4)
1. **Sloping grain**	1 in 16 (18 mm per 300 mm)	1 in 10.7 (28 mm per 300 mm)	1 in 8 (62.5 mm per 300 mm)
2. **Curvature**. See Note (c) below	1 mm in 600 mm	1 mm in 300 mm	1 mm in 200 mm
3. **Holes, borer**			
(a) **Pin and Needle Holes** (up to 1.5 mm)	16 in 10,000 mm^2	32 in 10000 mm^2	Unlimited if well scattered and not in groups
(b) **Shot Holes** 1.5 to 3 mm dia. and Resin Pockets of similar size	2 per 90,000 mm^2	4 per 90,000 mm^2	8 per 90,000 mm^2
(c) **Large Borer Holes** 3 mm to 6 mm dia.	None	2 per 90,000 mm^2	4 per 90,000 mm^2
d) **Larger Borer Holes** over 6 mm dia.	Double their diameter and count as hollow knots		
4. **Knots**			
(a) **Sound**	One-eighth dimension of face, to max. of 62.5 mm in dia; 1 per 900 mm in length	One-quarter dimension of face, to max. of 75 mm in dia; 1 per 900 mm in length	One-third dimension of face, to max. of 100 mm in dia;1 per 900 mm in length
(b) **Unsound or hollow** (Knot holes)	None	One-sixth dimension of face, to max. of 50 mm in dia.;1 per 2400 mm in length	One-quarter dimension of face, to max. of 75 mm in dia.;1 per 2400 mm in length
5. **Decay** (Rot)	None	None,except in an Unsound Knot	None, except in an Unsound Knot

Contd.....

TABLE 1 - Grading requirements for multi-purpose stress grades - (continued)

Kind of Defect	MAXIMUM PERMISSIBLE LIMITS FOR EACH GRADE		
	I.Select Structural Grade (See Note (b) below)	II. Standard Structural Grade (See Note (b) below)	III. Common Building Grade (See Note (b) below)
(1)	(2)	(3)	(4)
6. Sound Sapwood, including Wane, See Note (d) below	One-sixth sum of width and thickness	One-quarter sum of width and thickness	One-third sum of width and thickness
7. **End Splits and included Phloem intersecting ends** (see **15** below)	None	Longest split or strand of phloem, 75 mm at each end	Longest split or strand of phloem 150 mm at each end
8. **Stain** free from decay	Unlimited	Unlimited	Unlimited
9. **Twist** (spiral distortion)	None apparent	6 mm in 3600 mm	12.5 mm in 3600 mm
10.**Compression failures**	None	None	None
11.**Brittle heart**	None	None	One-quarter of cross-section at ends
12.**Boxed heart**	Permissible only in large cross sections (exceeding about 225 mm x 225 mm) of certain species. Imaginary box, that includes all the heart checks including the pith, shall not exceed one-third to width by one-third to thickness of the section.		
13. **Blocked heart shakes**	None	Strands 75 mm long, spaced 900 mm	Strands 150 mm long, spaced 900 mm
14. **Open shakes, Surface checks and End checks**	One-sixth thickness	One-third thickness	One-half thickness

TABLE 1 - Grading requirements for multi-purpose stress grades - (Concluded)

Kind of Defect	MAXIMUM PERMISSIBLE LIMITS FOR EACH GRADE		
	I. Select Structural Grade (See Note (b) below)	II.Standard Structural Grade (See Note (b) below)	III.Common Building Grade (See Note (b) below)
(1)	(2)	(3)	(4)
15. **Included phloem not intersecting ends** (see **7** above)			
(a) Within 600 mm of ends	None	Strands 150 mm long, unlimited in number	Strands 300 mm long, unlimited in number
(b) Elsewhere within middle half of depth	Strands 150 mm long, spaced 300 mm	Strands 300 mm long, spaced 300 mm	Strands 600 mm long, spaced 300 mm
(c) Elsewhere outside middle half of depth	Strands 300 mm long , spaced 300 mm	Strands 600 mm long, spaced 300 mm	Unlimited if tight.
16. **Resin pockets** above 3 mm dia. (see (3) (b) above); **and bark pockets**	50 mm x 6 mm, spaced 900 mm	125 mm x 9 mm, spaced 900 mm	200 mm x 12.5 mm, spaced 900 mm
	At the discretion of the Timber Grader, an equivalent area may be allowed		
17. **Wane**	See under Sound Sapwood including Wane, item (6) above		
18. **Undersize in dimensions**	Not allowed in any grade; all timber must be sawn so that it measures not less than "bare' at the time of grading		
19. **Cup**	1 mm per 25 mm of width	1 mm per 25 mm width	1 mm per 25 mm width

NOTES

(a) *The above grades are multi-purpose grades, as explained in* ***7.1.***

(b) *The limitation of defects in the Select, Standard and Common grades is generally such that the strength of graded members will not be less than 80 per cent, 63 per cent and 50 per cent respectively of the strength of similar members in timber that are free of all defects.*

(c) *In pieces of square cross-section, curvature shall be measured in the direction in which it is the worse; in other rectangular pieces, only spring shall be limited. See also* ***Table 2*** *of permitted deviations.*

(d) *Sapwood is allowed without limit in timber which is to be pressure impregnated with a suitable preservative;in such cases, item (6) refers to wane only.*

9 MEASUREMENTS OF DEFECTS

9.1 General

Timber Grader, while at work, shall have the following equipment:

a) **A sharp kinfe and a lens**. For identifying timber, or for cutting the surface to see if rot is present, or whether stain is superficial or not, etc;

b) **A brush**. For brushing each piece to look for borer holes and other small defects;

c) **A 600 mm rule graduated in mm.** For measuring widths and thickness, and also cupping;

d) **A properly graduated length measuring stick.** For measuring lengths. Timber Graders are forbidden to estimate lengths;

e) **A piece of string or fine wire.** For measuring spring, bow or twist;

f) **A slope-of-grain scribe**. For showing up the slope of grain (see **Figure 3**) ;

g) **A 0.125 mm feeler gauge**. For measuring depth of checks, etc;

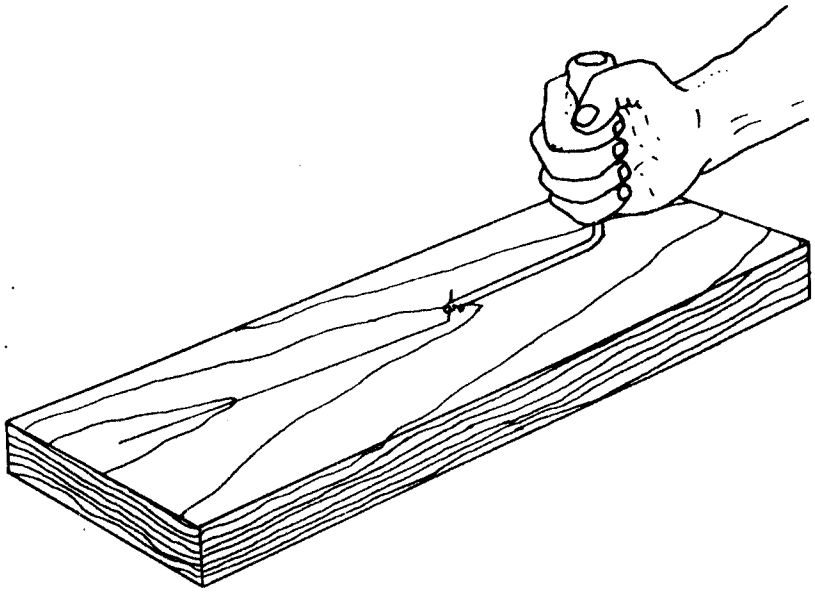
h) **A Tally Book**. For keeping a detailed record of grading carried out (see **Appendix E** of **SLS 1170 Part 4 : 1998),**

j) **Small quantity of paraffin** - For application with a brush on the surface of timber, for cleaning it and for removal of resin or gum before being examined; and

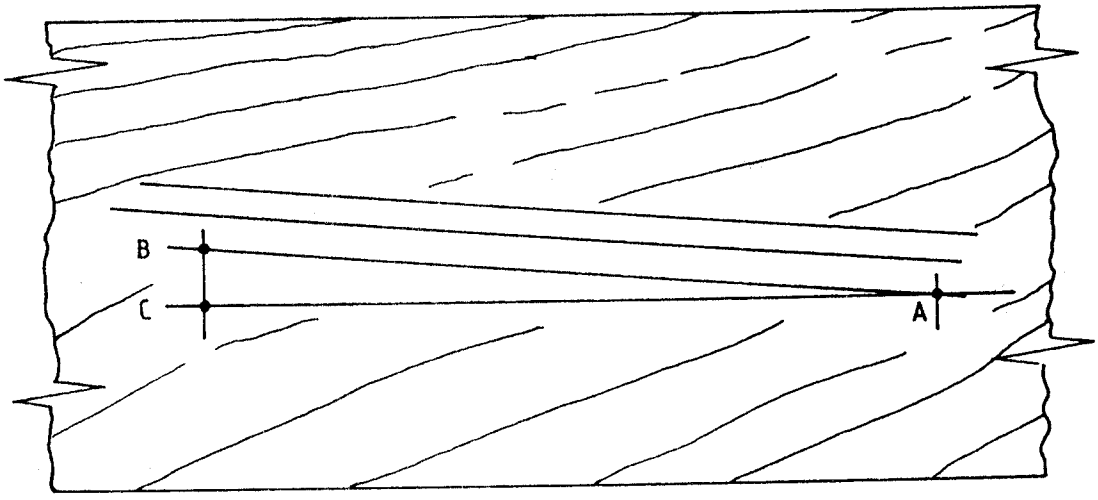
k) **A copy of this standard**. To enable the Timber Grader to make quick reference to grading requirements during the grading process.

9.2 Sloping grain

The slope of grain should be measured over a distance sufficiently long to determine the general slope, disregarding slight local variations (round small knots, etc.). The minimum distance over which the slope of grain is measured should not ordinarily be less than the distance over which a deviation of 25 mm is permitted, e.g. a slope of 1 in 15 should be measured over a distance of not less than 375 mm if possible. A cranked scribe with a freely swivelling handle should be used (see **Figure 3**). The slope of grain shall be measured on the face or the edge, where it is the most severe. No calculation for combining measurements on adjacent faces is required in this standard. Particular care shall be taken to a avoid confusing interlocked grain (see **3.32**) with sloping grain (see **3.49**). In doubtful cases, especially when grading pieces of small cross section, the Timber Grader shall exercise his judgment to reject the doubtful piece.



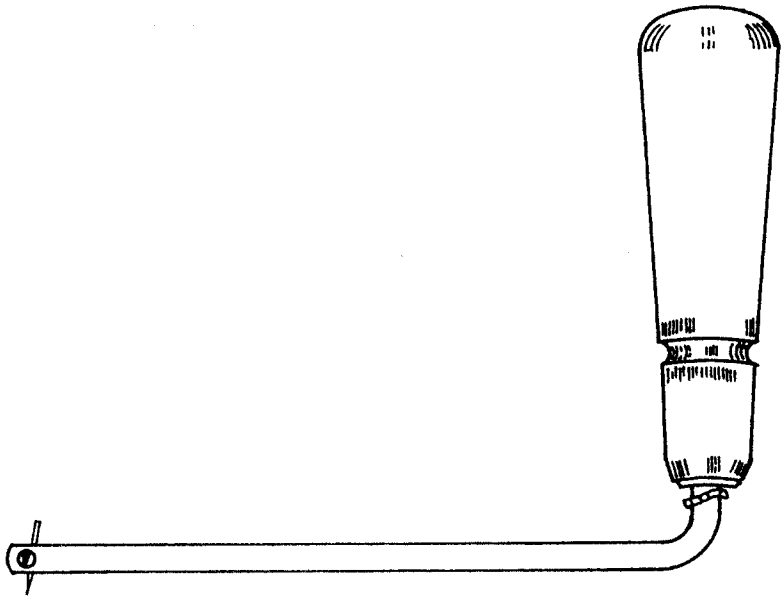
(a)



Slope of grain = 1 in $\frac{AC}{BC}$

(b)

FIGURE 3 – Measurement of slope of grain (continued)



(c)

FIGURE 3 – Measurement of slope of grain

9.3 Curvature (spring and bowing)

Curvature (see **Figure 1**) shall be measured by any convenient means. One method is to measure the maximum deviation from a tightly stretched string or wire. **Table 2** shows permissible deviations for several common lengths of timber.

TABLE 2 - Permissible deviations of curvature

Length of timber mm	Permissible deviation (in mm)		
	Select grade (1 in 600)	Standard grade (1 in 300)	Common grade (1 in 200)
1800	3.0	6.0	9.0
2400	4.0	8.0	12.0
3000	5.0	10.0	15.0
3600	6.0	12.0	18.0
4200	7.0	14.0	21.0
4800	8.0	16.0	24.0
5400	9.0	18.0	27.0
6000	10.0	20.0	30.0
6600	11.0	22.0	33.0
7200	12.0	24.0	36.0

9.4 Borer holes and knots (sound and hollow)

9.4.1 *General.* The size of a borer hole or knot shall be taken as the maximum diameter of its visible cross section, no matter where it occurs. Where only a portion of the cross section is visible, the maximum dimension of that portion shall be measured. Where the knot can be seen in longitudinal section as well as in cross section, the longitudinal section shall be ignored.

9.4.2 *Knot clusters.* Each knot in a cluster shall be measured as just described, and the sum of these measurements shall be taken as the diameter of an equivalent single knot.

9.5 Decay

Decay in an unsound knot is assessed by observation of discolouration or marked softness in comparison to rest of the timber piece. Decay elsewhere is not permitted.

9.6 Sound sapwood including wane

The distance by which the width of a face is reduced owing to wane (see **Figure 4**) is called the width of the wane on that face. The extent of wane as defined in this standard is found by adding together the widths of wane on any two adjacent faces, and expressing their sum as a fraction of the sum of the widths of the two faces concerned. The resulting fraction shall not exceed for any pair of adjacent faces the values given in the **Table 1** for permissible defects. Unless the timber is to be pressure-treated, sapwood shall be included with wane and the combination measured as though the whole consisted of wane. This procedure assumes that since the sapwood is perishable it may eventually be removed completely by decay or insect attack.

9.7 End splits and included phloem intersecting ends

These defects are assessed by measuring the longest split (see **Figure 2**) or longest strain of phloem at either end and adopting the higher value.

9.8 Stain free from decay

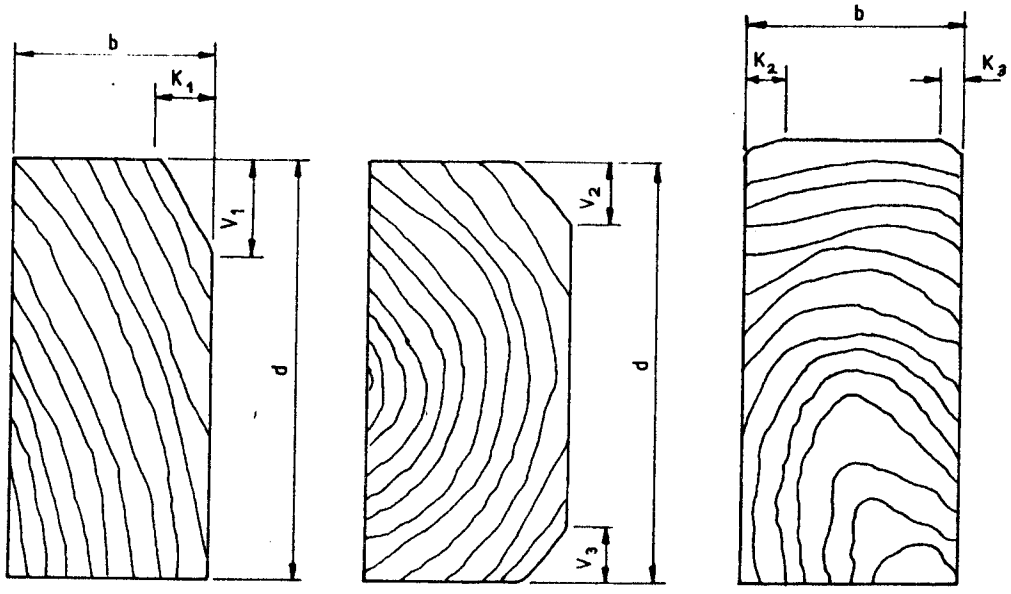
Stain is assessed by observing any discolouration or variation from the natural colour of the wood. When free from decay, it is not a structural defect and is permitted to an unlimited extent.

9.9 Twist (spiral distortion)

This defect (see **Figure 1**) can be assessed roughly by holding down one end of the piece and measuring by how much one corner rises above the other on the lower horizontal face at the far end. The table of defects (see **Table 1**) gives permissible values for a width of 150 mm, and the extent of twist permissible for other widths may be deduced from this value. A more precise specification would be of little value and the figures in **Table 1** should give a sufficient idea of the distortion permissible.

9.10 Compression failures

Even pieces containing only short compression failures shall be rejected for all grades, since the defect indicates that the pieces are taken from too near the heart. It may be possible to relax this requirement in later versions of this standard, on the basis of further experience and experiment.



Amount of wane on the face of the piece is expressed as the ratio

$\frac{V_1}{d}$ or $\frac{V_2 + V_3}{d}$

Amount of wane on the edge of the piece is expressed as the ratio

$\frac{K_1}{b}$ or $\frac{K_2 + K_3}{b}$

FIGURE 4 Measurement of wane

9.11 Brittle heart

All pieces must of course be inspected at their ends as well as on all faces, and the typical pitted appearance of brittle heart on the ends of any piece will automatically exclude it from the Select and Standard grades. Detection of brittle heart on the faces is more difficult; if its presence is definitely suspected from an examination of the faces, the piece should be rejected even if the defect is not evident at its ends.

In the case of the Common grade, the Timber Grader should reject pieces which he suspects are affected by brittle heart over more than one-quarter of their cross-section at points away from their ends.

For any grade, it is likely that occasional pieces will contain more than the permitted amount of brittle heart, in forms which cannot be detected by careful visual examination; the working stresses for the grades are designed to cover this point, since it is not intended that a Timber Grader should test for brittle heart by using a knife except when he definitely suspects its presence and wants to make sure it exists.

9.12 Boxed heart

Boxed heart (see **Figure 2**) is assessed in large sections greater than 225 mm x 225 mm by measuring the sides of the imaginary box parallel to the section edges that can include all the heart checks including the pith.

9.13 Blocked heart shakes

The limitations on blocked heart shakes, such as those occuring in the spacies 'Keruing', are intended to admit tight shakes penetrating the piece for only a short distance, which cannot be measured by means of a feeler gauge. As the shakes are often filled with resin which may show the size of even a tightly closed shake, it is not practicable to specify their maximum depth. Shakes passing through to the opposite face would of course exclude the piece and there will be other cases where a Timber Grader must use his discretion to reject pieces which appear to him likely to be abnormally weak due to sawing near the heart.

9.14 Open shakes, surface checks and end checks.

The size of an open shake (see **Figure 5**) or check (see **Figure 2**) shall be taken as its depth projected onto a surface at right angles to the face on which it occurs. A feeler gauge of 0.125 mm thickness shall be used in estimating the size, and the projected depths of all checks occuring within the middle half of the face being examined shall be added together to assess the magnitude of the total defect. The permissible mangnitude is expressed as a fraction of the width of the face at right angles to the one on which the defects occur. End checks may be measured and limited similarly for the Select grade. For the other two grades, the provision of allowances for end-splits prevents detection of checks which might become visible after ends are trimmed to remove the splits. This is unlikely to be of importance except in the larger cross-

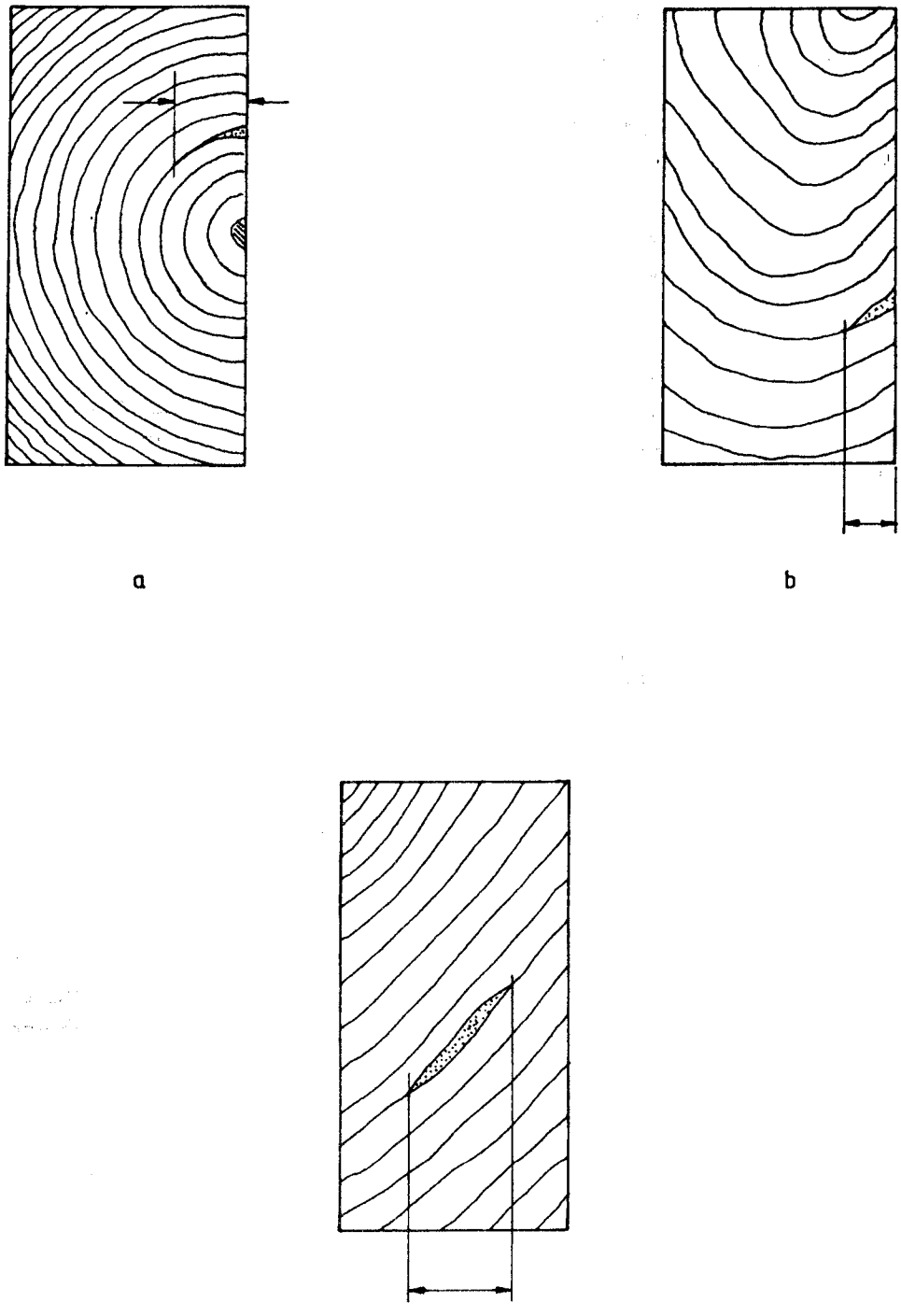


FIGURE 5 – Shakes

sections; for these it is possible that some pieces may have to be down-graded after the ends are trimmed by the user. However, end defects are always likely to develop after stress grading unless the timber is fully seasoned at the time of grading, and the limits placed on them in the table of defects (**Table 1**) allows for this; the complication introduced by the allowance for end-splits is unlikely to make any practical difference.

9.15 Included phloem not intersecting ends.

This defect is assessed by measuring the longest strands of phloem and spacing within 600 mm of ends, elsewhere within middle half of depth of section and elsewhere outside middle half of depth of section. Consider an area 600 mm from an end and measure the length of the longest strand in it which does not intersect ends . Measure the largest spacing (perpendicular to strands) between any two strands. Repeat the procedure for the other end, elsewhere within the middle half of depth and elsewhere outside middle half of depth (also see **9.7**).

9.16 Resin pockets above 3 mm diameter and bark pockets

This defect is assessed by measuring the largest pocket by the sides of an approximate rectangle enclosing it as well as spacing along the member. Resin pockets 1.5 mm to 3 mm in diameter are considered as shot holes (see **9.4**).

9.17 Undersize in dimensions

Dimensions of a timber piece shall be measured and they should not be less than bare (see **3.1**) at the time of grading. However, oversize shall be limited to an extent specified by **8.7, 8.10, 8.11 8.12** and **Appendix A,** irrespective of grade. .

9.18 Cup

Cup (see **Figure 1**) of a section, which is the curvature of a piece of sawn timber across its width, shall be measured and expressed in mm per **25** mm width.

9.19 Combination of defects

Each of the defects listed in **Table 1** will reduce the strength of a piece to the lowest permissible if present to the maximum extent allowed, even if no other type of defect is present. Where two or more defects, each of a size smaller than the maximum permitted, are present at the same place in a piece, the Timber Grader shall use his discretion to reject any piece that he believes will be weakened to a greater extent than would be caused by a single defect of the maximum size.

10 MARKING AND SPECIFICATIONS OF TIMBER TO BE GRADED

10.1 Marking of graded timber

10.1.1 Grade marks specified for different grades are as follows:-

i) Select Structural Grade - F $\hat{\text{I}}$ D (preferred colour code - white)

ii) Standard Structural Grade - F $\hat{\text{II}}$ D (preferred colour code - green)

iii) Common Building Grade - F $\hat{\text{III}}$ D (preferred colour code - red)

10.1.2 Use of any of the above grade marks shall be restricted to timber graded by a Timber Grader accredited by the SLSI (see also **SLS 985 : Part 3**), and covered by a Grading Certificate (see **Appendix A of SLS 1170 Part 4 : 1998**).

10.1.3 Timber graded shall be stencilled with the following marks:- Grade Mark, Standard Name of the timber (see **4**), Mark of Origin, the registered Number of the Timber Grader (which should always be in a circle as shown in **Appendix B** of **SLS 1170 Part 4 : 1998),** Suppliers's Registration Certificate Number with the SLSI, Parcel Number (see **Appendix B of SLS 1170 Part 4 : 1998),** and Buyer's own marks.

10.1.4 All the above marks shall be legibly and indelibly marked on at least one face.

10.1.5 The Timber Grader shall initial in crayon and stencil and/or indicate in crayon the dimensions of the timber on one face.

10.1.6 Timber intended for kiln-drying shall be stencilled "KD" on one face.

10.2 Specifications of timber to be graded

10.2.1 Before any grading can be under taken by a Timber Grader in accordance with this standard, a true copy of, or true extract from, the contract (prices may be omitted) made between the Buyer and the Supplier must be forwarded to the SLSI so that the specifications shall be in no doubt. Specifications must include the details shown below. If they do not, or if they depart or vary in any way from what is published in this standard (other than those concerning dimensions). Timber Graders may not undertake any grading of the timber except with the express permission of the SLSI.

The required details are:

Standard name of Timber (see **4**), quantity, sizes, grades, average widths and lengths, multiple lengths (if acceptable, see **8.12.3**), seasoning period (see **8.9**) and any other special conditions. A sample of the standard form of contract for timber to be imported is given in **Appendix C of SLS 1170 Part 4 : 1998.**

10.2.2 The kinds of timber supplied under any contract shall be as specified in the contract (See **10.2.1**) and the botanical species that may be supplied against any particular kind of timber shall be as listed in **4**. If any kind of timber not specified in the contract is submitted for grading it shall be rejected.

11 GRADING PROCESS

11.1 Timber Grader

11.1.1 Timber grader is a person who holds a valid Certificate of Competency for timber grading issued by the SLSI or an Accredited agency (see **Appendix D of SLS 1170 Part 4 : 1998),**

11.1.2 Certificates of Competency for Timber Graders under this standard, in the form shown in **Appendix D of SLS 1170 Part 4 : 1998,** will be issued by the SLSI or an Accredited agency after it is satisfied by means of examinations, or any other procedure, that the applicant has attained the level of competency required, All Certificates will bear a serial number, which shall be personal to the holder. Should the work or professional conduct of the registered holder of a Certificate be unsatisfactory, the SLSI may suspend the registered certificate holder from performing his function for such time as it sees fit.

11.1.3 Timber graded in accordance with this standard by Timber Graders is subject to check grading of not less than 10 per cent by a Team of Timber Graders nominated by SLSI.

11.1.4 Fees and other charges in respect of timber graded, or check-graded shall be as notified from time to time by the SLSI and shall be payable by the person or firm requesting the grading.

11.2 Preliminary requirements

11.2.1 Suppliers or Buyers (where applicable) are expected to supply the following :-

(i) Labour for handling the timber during grading, and check-grading;

ii) Stencils (other than that of the Timber Grader's personal number) and labour for marking the timber (see **10.1.3**); and

iii) Crayon for marking the dimensions, etc. on the timber.

11.2.2 Good light conditions are essential for implementing applying this standard accurately. Insufficient light is no excuse whatever for mistakes in grading. Unless adequate light can be made available, Timber Graders should either not start grading, or should stop grading if the lack of light is caused by a heavy storm, or the approach of dusk. Night grading is forbidden.

11.2.3 Before any Timber Grader starts grading he should do the following:-

(i) Check that he has all the equipment listed in **9.1;**
(ii) Check that the items listed in **11.2.1** above have been supplied;
(iii) Check that light conditions are adequate (see **11.2.2);**
(iv) Read the contract carefully and note the relevant particulars that affect the Timber Grader (see **10.2.1**);
(v) Check the date on the stack to see whether the seasoning period specified in the contract has expired (see **8.9); and**
(vi) Check whether the measuring stick is calibrated to read to an accuracy of 1 mm (see **9.1).**

11.3 Grading the timber

Visual grading is accomplished from an examination of all four faces and the two ends of sawn timber piece, in which the location as well as the size and nature of specified defects appearing on the surfaces are evaluated over the entire length to ensure that permissible defects specified for each grade (see **Table 1**) are not exceeded. During the grading tally book page (see **Appendix E of SLS 1170 Part 4 : 1998),** should be maintained for each thickness and grade, a final grading summary (see **Appendix F of SLS 1170 Part 4 : 1998),** issued at the end of the grading process.

A grade description describes material on the lower limit of that particular grade; the respective grades shall contain all pieces from that lower limit up to those which just fail to be admitted to the next higher grade. Timber poorer in quality than the lowest grade required shall be rejected.

Timber Grader shall not make any allowance for the purpose of raising the grade, but shall inspect and measure the timber in the condition found. The supplier is at liberty to take back any piece of timber for edging, trimming, or end cutting in order to raise the grade, but this must be done before the piece has been tallied and before any grade marks have been placed on it.

The natural variability of timber precludes the structural grading of the material from being an exact science, but at the present time it is the only means whereby material can be selected which will provide a reasonable assurance that its strength will comply with the design requirements in respect of working stresses. It should be noted that any material which is stress-graded must be graded again if resawn to a different section size.

If a consignment of a timber that has been graded to fall into a particular grade, was found to be 90 per cent or more of said grade or better, the material below grade shall be accepted by the buyer as of the actual grade offered or so certified.

11.4 Check - grading the timber

If any supplier or buyer is dissatisfied with the grading of any piece or pieces in a consignment by the Timber Grader, he may apply in writing to the SLSI within fourteen days for check-grading. The timber in question will be re-examined by a panel of Timber Graders (other than the person making the original grading) within fourteen days, and the normal grading fee will be charged a second time. In the re-examination no account shall be taken of any defects, which in the opinion of the panel of graders were caused by deterioration or were attributable to faulty storage subsequent to the original grading.

A parcel of visually graded timber shall be deemed to satisfy the grade specified, provided that, on reinspection of a representative sample (see **11.1.3**) of the parcel, at least 90 per cent of the sample is within the permissible limits. The defects in any piece in the remaining 10 per cent may not exceed the specified limits by more than 15 per cent. If these conditions are not fulfilled, the parcel does not comply with the requirements of this standard.

11.5 Grading certificates

The grading certificate will be issued by the grader for all graded timber. The following will be the procedure :- At the time of grading all Timber Graders will maintain a Tally Book: when grading is completed the Tally Book will be totalled and a Grading Summary will be prepared and submitted to the Buyer. The Buyer will prepare a Schedule of Timber Shipped and send it with the Grading Summary to the grader who will issue a Grading Certificate. The figures in the Grading Certificate will be taken from the Schedule of Timber Shipped prepared by the Buyer and are not guaranteed by the Grader. Specimens of the types of forms recommended are given in **Appendices E, F** and G **of SLS 1170 Part 4 : 1998**. The standard form of Grading Certificate is given in **Appendix A of SLS 1170 Part 4 : 1998.**

The standard form of Check-grading certificate is given in **Appendix H of SLS 1170 Part 4 : 1998.**

Timber is inspected and measured as the Timber Grader finds it, and certification of grades applies only for the date of inspection of the timber. Buyers are advised to request re-grading of the timber and the issue of a new Grading Certificate should the lapse of time or the method of treatment or storage of the timber between examination and shipment permit of the possibility of degrade. In any case all timber check-graded for longer than 45 days before it is finally shipped must be re-inspected by a Timber Grader who may order the timber to be re-graded if it appears to him that degrade has occured since the orginal grading. It is the responsibility of the Buyer to apply to the SLSI for re-inspection and, if recommended for re-grading, to obtain a new Grading Certificate.

12 SAMPLING AND COMPLIANCE

12.1 When a parcel of timber is forwarded for grading, each timber piece in that timber parcel shall be inspected for the specified defects during the grading process. In the case of check-grading (see **11.1.3**), a sample shall be selected at random from the timber parcel so that not less than 10 per cent of the timber pieces in that timber parcel are included. Each piece in the sample selected for check-grading shall be inspected for specified defects during the grading process. Sampling for re-grading shall be the same as that for grading.

12.2 In order to ensure that a graded timber parcel complies with this standard, the species of timber shall be identified (see **5**), the relevant standard name(s) given (see **4**), graded to comply with specified grading requirements (see **8**) making the necessary measurements and observations (see **9**), and marked with the appropriate grade (see **10**) by a competent Timber Grader following the specified grading process (see **11**) to issue the Grading Certificate (see **Appendix A of SLS 1170 Part 4 : 1998**), after sampling in the specified manner (see **12.1**).

13 GUIDANCE ON SELECTION OF IMPORTED CONSTRUCTION TIMBER FOR SPECIFIC APPLICATIONS

Selection of an imported construction timber for a specific application requires assessment of natural durability and treatability of timber (see **6**), density and general description of timber (see Appendix **A** of **SLS 1170 Part 2 : 1998**), strength properties and working qualities as well as known successful end uses (see Appendix **A** of **SLS 1170 Part 3 : 1998**), section sizes and tolerances (see **8** and **Appendix A**), various structural grades available (see **7**), and extent of permissible defects for each grade (see **8** and **9**).

Guidance shall be obtained from this standard by consulting the various sections listed above in selecting a suitable imported construction timber.

14 GUIDANCE ON STRUCTURAL USE OF IMPORTED CONSTRUCTION TIMBER

In order to specify imported construction timber for structural uses, the Structural Engineer requires information on standard names and marking codes (see **4**), means of identification of timber species (see **5**), natural durability and treatability (see **6**), density and general description of timber (see Appendix **A of SLS 1170 Part 2 : 1998**), working qualities and known successful end uses (see Appendix **A of SLS 1170 Part 3 : 1998**), various grades available and the computation of grade stresses (see **7**), strength properties and modulus of elasticity of each species (see Appendix **A of SLS 1170 Part 3 : 1998**), section sizes and tolerances (see **8** and **Appendix A**), extent of permissible defects for each structural grade (see **8** and **9**), marking of different structural grades (see **10**), and the grading process (see **11** and **12**).

Guidance shall be obtained from this standard by consulting various sections listed above so that structures using imported construction timber can be structurally designed in accordance with **BS 5268 : Part 2.**

APPENDIX A
TABLE OF RECOMMENDED SAWING SIZES AND MAXIMUM OVERSIZE LIMITS

Unless specified to the contrary in this standard, the recommended sawing sizes tabled below are applicable to all timber sawn full in accordance with **8.6 of SLS 1170 : Part 1 : 1998**. Adequate precautions must however be taken when buying timber intended for Kiln Drying. Some timbers, notably Durian, Kapur, Keruing, Mengkulang, Dark Red Meranti, Light Red Meranti and Nyatoh have been found to have higher shrinkage properties, thereby resulting in possible scantness, especially in width, after Kiln Drying. In order to avoid this possible scantness, buyers are therefore advised to place orders for sizes sufficiently larger than the nominal sizes they would order for shipping dry timber.

(i) **Thickness** (see **8.10**)

Ordered Size (i.e nominal size) (mm) (1)	Recommended Sawing Size (off the saw) (mm) (2)	Maximum Oversize (mm) (Fraction above nominal size at time of grading) (3)
under 25.0	plus 1.5	3.0
25.0	28.0	6.0
31.0	34.0	6.0
37.5	41.0	6.0
44.0	47.0	6.0
50.0	55.0	6.0
62.5	67.0	6.0
75.0	80.0	6.0
87.5	94.0	9.0
100.0	106.0	9.0
125.0	131.0	9.0
150.0 and over	159.0	12.5

(ii) **Widths** (see **8.7**)

Recommended sawing sizes are :-

Below 150 mm	.....6 mm oversize (off the saw)
150 mm to below 200 mm	..... 9 mm oversize
200 mm to below 250 mm	..... 12.5 mm oversize
250 mm and over	.....15 mm oversize

(iii) **Length** (see **8.12**)

Example:- A board specified as 225 mm wide x 50 mm thick x 4800 mm long should come off the saw at about 237.5 mm x 55.0 x mm x 4825 mm.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

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