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

PART 2 : NOMENCLATURE, IDENTIFICATION, AND GENERAL INFORMATION

SRI LANKA STANDARDS INSTITUTION

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SLS 1170:Part 2 : 1998

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Sri Lanka Standard
CODE OF PRACTICE ON IDENTIFICATION, GRADING AND MARKING OF IMPORTED CONSTRUCTION TIMBER
PART 2 : NOMENCLATURE, IDENTIFICATION, AND GENERAL INFORMATION

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 2) specifies the nomencluture, marking code, identification and general information on imported construction timber. The other parts of this standard are as follows;

Part 1 : Grading, marking, and guidance on usage;
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 nomenclature, marking code identification and general information on imported construction timber for structural use. General information provided consists of density ranges, and general description of timber useful for preliminary identification.

2 REFERENCES

CS 102 - Presentation of numerical values
SLS 1170 - Code of practice on imported construction timber.
Part 1 : Grading, marking, and guidance on usage.

3 DEFINITIONS

For the purpose of this part of the standard, the definitions given in **SLS 1170 : Part 1 : 1998** shall apply.

4 NOMENCLATURE

Standard names, scientific names, and the marking code are given in Appendix **A**.

The purpose of this nomenclature is to provide a list of standard names necessary for the more orderly identification, marking and use of imported construction timber.

In the derivation of the marking code, the following rules were observed:-

a) The marking code shall normally consist of the first three letters of the standard names as given in this standard;

b) Where two or more standard names have the first two or more letters in common, their marking codes shall consist of the first two letters and any subsequent letter such that no two timbers will have the same code;

c) In case two or more timbers will have the same code even after strictly following the rules given above, repetition of the codes shall be avoided by taking the first, third and fourth or any subsequent letter for consitituting the marking code;

d) Where the standard name is in two words, the first letter of the first word and the first two letters of the second word shall be taken to form the marking code;

e) Where repetition of a code cannot be eliminated even after following the rule given in (c) above, the marking code shall be consistituted by transposing the second or third and any subsequent letter; and

f) Marking codes once standardized shall not be changed except where the standard name itself is revised.

5. GENERAL INFORMATION

Appendix **A** provides general information which consists of density ranges and general description of timber useful for preliminary identification.

Density range for each timber in Appendix **A** is at 15 per cent moisture content (m.c.).

Differences of 20 kg/m^3 to 30 kg/m^3 between densities for different timbers have little or no practical significance. Individual pieces of timber can differ appreciably in density from the figures quoted.

The heavy hardwoods listed in **A.1** of Appendix **A** are heavy or very heavy constructional timbers ranging in density from about to 515 to 1250 kg/m^3 of 15 per cent moisture content. They are naturally durable as they contain within their tissues some toxic materials, e.g. alkaloides or other substances repellent to wood destroying agents and can therefore be safely used without preservative treatment even in positions exposed to fungus or termite activities; the sapwood of these timbers however, is not durable.

The medium hardwoods listed in **A.2** of Appendix **A** are moderately heavy to heavy constructional timbers ranging in density from 432 to 1250 kg/cm^3 at 15 per cent moisture content. Some of these timbers are heavy and strong enough to be classified as 'Heavy Hardwoods' but under tropical conditions they lack sufficient natural durability when exposed to the weather or in contact with the ground unless they are properly treated with preservatives before use. Most of them however, are naturally durable in temperate countries where climatic conditions are less conducive to the activity of the wood destroying agents.

The light hardwoods listed in **A.3** of Appendix **A** include all the relatively light weight and soft timbers which range in density from 270 to 1075 kg/m^3 at 15 per cent moisture content. They are the "general utility" timbers of Malaysia comparable with the general utility timbers in temperate climates; the latter however are mainly softwoods (conifers). In addition to general

utility purposes many of these light hardwoods are excellent for high class joinery work, cabinet making, furniture, decorative panelling, etc. Although not naturally durable in tropical climates, some are quite durable in temperate regions. Provided that proper precautions are taken against attack by wood destroying agents, the light hardwoods as a whole make very satisfactory timbers for general construction even when used in tropical climates.

The softwoods listed in **A.4** of Appendix **A** are softwoods of commercial significance available in Malaysia. None is durable in the tropics. The main difference between the timber of Hardwoods and Softwoods (conifers) is the absence of vessels (pores) in Softwoods.

NOTE

Although the grading rules are designed primarily for the grading of Hardwoods, they can be used equally well (and have been so used) for the grading of those Softwoods in which knots are relatively scarce, as in Damar Minyak, Podo and Sempilor.

6 IDENTIFICATION

A preliminary identification of the timber species can be made by the general description of characteristics of the timber species given in Appendix **A.** However, for positive identification of the species, timber should be referred to a specialist on timber identification, recommended by the Sri Lanka Standards Institution, who will conduct a detailed examination of the timber specimens.

NOTE

Identification of timber species is only possible with constant practice and by comparison with end-grain structures of authenticated timber samples. Only perseverance, patience and time will enable a person to master this subject.

APPENDIX A

NOMENCLATURE OF IMPORTED CONSTRUCTION TIMBER

A.1 Heavy Hardwoods

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
1. BALAU (SELANGAN BATU)	Shorea spp., Barbata and Ciliata (section Eushorea brandis) sub groups	850-1155	BAL/1	Sapwood is moderately well-defined and lighter in colour than heartwood.The colour of freshly cut heartwood is yellow-brown, brown or brown with reddish tinge weathering ultimately to a deeper shade of brown or reddish dark brown. Texture is fine and even. The grain is interlocked.
2. BALAU, RED (SELANGAN BATU MERAH)	Shorea guiso and Shorea kunstleri	800-880	BRE/1	Sapwood is pink, purple-brown or grey-brown and is fairly well defined from the heartwood, which is light to deep red-brown. The grain is deeply interlocked. The texture is moderately fine to slightly coarse and even.
3. BELIAN (see Note 7)	Eusideroxylon zwageri	835 - 1185	BEL/1	Sapwood is well-defined by colour. Heartwood is light brown to almost bright yellow when freshly cut, but darkens on exposure to a deep reddish brown, becoming very dark brown or even black with age. Grain is straight. The texture is moderately fine to fine and even.

A.1 (contd.)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
4. BITIS	Madhuca utilis, Palaquium ridleyi and P. stellatum	820 - 1200	BIT/1	Sapwood is well defined. Heartwood is red-brown or chocolate-brown in colour. Texture is moderately fine and even, with straight or shallowly interlocked grains.
5. CHENGAL	Neobalanocarpus heimii	915 - 980	CHE/1	Sapwood is well defined. When freshly sawn, the heartwood is light yellow-brown with a distinct greenish tinge, darkening on exposure to dark purple-brown or rust red. It has very prominent ripple marks. The grain is interlocked and the texture is fine and even.
6. GIAM	Hopea spp.	865 - 1220	GIA/1	Very similar to Chengal except that the green tinge of colour of freshly sawn timber is not so pronounced and that ripple marks are absent. Sapwood is only moderately distinct from heartwood unless blue-stained. The colour of heartwood is yellow-brown, weathering to a dark tan-brown. Texture is very fine to moderately fine and even. The grain is deeply interlocked.
7. KEKATONG (see Note 7)	Cynometra spp.	880 - 1155	KEK/1	Sapwood is not well-defined The heartwood is red-brown or claret-red and is attractively streaked with lighter coloured layers and often has a small brown-black corewood. The grain is fairly straight or only shallowly interlocked and texture is moderately fine and even.
8. KERANJI (see Note 7)	Dialium spp.	755 - 1250	KER/1	Sapwood is well-defined and white to yellowish white in colour. Heartwood is gold-brown or red-brown weathering to dark brown. The grain is deeply interlocked and sometimes wavy giving rise to attractive stripe figure and the texture is fine to moderately coarse and even.
9. MALAGANGAI	Eusideroxylon malagangai	590 - 850	MAL/1	Sapwood is yellowish and sharply defined from the heartwood, which is brown with a distinct reddish tinge. Texture is moderately fine and even with fairly straight grains.

A.1 (Concluded)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
10. MERBAU (see Note 7)	Intsia palembanica, Intsia bijuga	515 - 1040	MER/1	Sapwood is well defined and pale yellow in colour. Heartwood is yellowish to orange-brown when fresh, weathering to brown or dark red-brown. Growth rings are fairly distinct, grain is interlocked. The texture is coarse but even.
11. PENAGA	Mesua ferrea	945 - 1185	PEN/1	Sapwood is grey-brown on exposure and is well-defined from the heartwood, which is red-brown with a purple tinge when fresh, becoming dark red-brown on exposure. Texture is rather fine and even, with interlocked or spiral grains.
12. PENYAU	Upuna borneensis	945 - 1040	PEY/1	Sapwood is well-defined from the heartwood, which is dark brown. Texture is slightly coarse but even, with straight to only shallowly interlocked grains.
13. RESAK	Vatica spp. and Cotylelobium spp.	655 - 1155	RES/1	Light coloured sapwood is sharply defined in Cotylelobium, but not in Vatica. Heartwood is pale yellow when fresh and turning to brown on exposure in Cotylelobium and brown with a green tinge in Vatica. The grain is straight or slightly interlocked and the texture is even. Unseasoned wood is rather resinous but not after seasoning.
14. TEMBUSU (see Note 1 and 5)	Fagraea fragrans, Fagraea gigantea, Fagraea elliptica	640 - 1075	TEM/1	Sapwood is not well-defined from the heartwood, which is light yellow-brown, darkening on exposure to deep golden or orange-brown. Texture is fine and even, with straight to slightly wavy grains.

A.2 Medium Hardwoods

Standard Name (1)	Scientific Name (2)	Density range (kg/m^3) (3)	Marking (4)	General Description of timber (5)
1. ALAN BATU	Shorea albida	800 - 925	ABA/2	Sapwood is light greyish brown, and merges gradually with the heartwood which is deep reddish brown. White coloured streaks of resin canals on the surface are conspicious. The grain is slightly interlocked and the texture is coarse and even.
2. BEKAK	Amoora spp.	705 - 1025	BEK/2	Sapwood is straw coloured and sharply differentiated from the heartwood, which is brick-red or dark red when fresh, darkening to dark red-brown or walnut brown on exposure. Grain is interlocked or irregular. Texture is slightly coarse and even.
3. DERUM	Cratoxylum spp. (Heavy spp.)	705 - 945	DER/2	Sapwood is not well-defined from the heartwood, which is brown to red-brown with a purple tinge. Texture is fine and even, with straight or interlocked grains.
4. ENTAPULOH	Teijsmanniodendron spp.	432 - 896	ENT/2	The sapwood is yellow and fairly distinct from the heartwood, which is pale yellowish brown. Texture is rather fine and even, with straight or shallowly interlocked grains.

A.2 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density range (kg/m^3) (3)	Marking (4)	General Description of timber (5)
5. GERITING (TERUNTUM)	Lumnitzera spp.	755 - 835	GER/2	The sapwood is not well-defined and is lighter in colour than heartwood, which is light grey-brown to light brownish red. Texture is very fine and even, with straight to shallowly interlocked grains
6. KANDIS	Garcinia spp.	690 - 1120	KAN/2	Sapwood is usually lighter in colour and is not sharply defined from the heartwood. . The heartwood is variable in colour, dark red-brown in some species and yellow in others. The texture is moderately fine and even. Grain is straight.
7. KAPUR	Dryobalanops spp.	575 - 815	KAP/2	Sapwood is well -defined and yellowish brown in colour. The heartwood is reddish-brown. The grain is straight or slightly interlocked or sometimes deeply interlocked. Texture is moderately coarse and even.
8. KASAI	Pometia spp.	735 - 915	KAS/2	Sapwood is lighter in colour and not sharply defined from the heartwood, which is pink, red or red-brown. The texture is moderately coarse and even, with straight or shallowly interlocked grains.
9. KAYU MALAM (see Notes 1 and 6)	Diospyros spp.	595 - 1055	KMA/2	The sapwood is not distinct from heartwood, which is generally yellowish white to buff. Some species produce a streaky core while some others produce a jet black core, which is the Ebony of commerce. Texture is fine and even with straight to slightly interlocked grains.
10. KEDANG BELUM (TULANG DAING) (see Note 7)	Milletia spp.	595 - 815	KBE/2	The sapwood is not well-defined from the heartwood, which is pale orange-brown, streaked with lighter coloured zones of parenchyma. Texture is uneven and coarse due to the presence of abundant wood parenchyma. Grain is interlocked.

A.2 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
11. KELAT	Eugenia spp.	495 - 1010	KEL/2	Sapwood is not well-defined from the heartwood, which is light brown, pink brown, red brown or purple brown with grey tinge. The grain is interlocked, irregular or wavy. Texture is moderately even and fine.
12. KELEDANG	Artocarpus spp.	495 - 945	KEE/2	Sapwood is light yellow to yellow brown and well defined. Heartwood is orange-brown or brown weathering to dark brown. The grain is deeply interlocked. The texture is moderately coarse to coarse and even.
13. KEMPAS (see Notes 2, 7 and 8)	Koompassia malaccensis	770 - 1120	KEM/2	Sapwood is well-defined and yellow in colour. Heartwood is pinkish when fresh and darkening to a bright orange-red or deep brown. The grain is interlocked, often very interlocked. The texture is coarse and even.
14. KERUING (see Notes 2 and 9)	Dipterocarpus spp.	690 - 945	KEI/2	Sapwood is well-defined and grey-brown in colour. Heartwood is red-brown or purple-red weathering to a dark red-brown. Grain is straight to deeply interlocked. Texture is moderately coarse to coarse and even.
15. KERUNTUM (see Notes 2 and 7)	Combretocarpus rotundatus	640 - 800	KEU/2	Sapwood is pale-yellow. Heartwood is reddish brown. The grain is straight and the texture is rather coarse and uneven.
16. KULIM	Scorodocarpus borneensis	640 - 975	KUL/2	Sapwood is light yellow in colour and moderately well differentiated from the heartwood, which is dark purple-brown to dark red-brown. Texture is moderately fine and even, with shallowly to deeply interlocked grains.

A.2 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density range (kg/m^3) (3)	Marking (4)	General Description of timber (5)
17. MATA ULAT	Kokoona spp.	895 - 1055	MUL/2	Sapwood is not always well-defined but usually lighter in colour and merges gradually in to the heartwood, which is whitish to yellowish brown. Texture is fine, but uneven due to the thick bands of parenchyma. Grain is interlocked.
18. MEMPENING (see Note 5)	Lithocarpus spp., Quercus spp.	575 - 1010	MEM/2	Sapwood is not always well-defined but is usually lighter in colour than heartwood, which varies between yellow-brown and red-brown, sometimes quite dark red. Texture is rather coarse and uneven due to the irregular distribution of the vessels and to the wide rays. Grain is straight to interlocked and a true oak-like silver figure is prominent on the radial surface.
19. MENGKU-LANG (KEMBANG) (see Notes 2 and 7)	Some Heritiera spp. (Light spp.)	625 - 895	MEN/2	Sapwood is usually lighter in colour and not always well-defined from the heartwood, which is red, red-brown to dark red-brown. The grain is straight or only shallowly interlocked and texture is slightly to moderately coarse, but even.
20. MERANSI (see Notes 2 and 5)	Carallia spp.	670 - 930	MEA/2	Sapwood is lighter in colour and is moderately distinct from the heartwood, which is red-brown with an orange hue. Grain is straight, interlocked or slightly wavy. Texture is coarse and uneven, due to the presence of the extremely large rays.
21. MERAWAN (GAGIL)	Hopea spp. (light spp.)	495 - 980	MEW/2	Sapwood is generally lighter in colour and is poorly defined from the heartwood, which is yellow when fresh, but darkening to light brown or red-brown on exposure. Grain is interlocked. Texture is moderatley fine and even.
22. MERBATU (see Notes 2 and 5)	Parinari spp., Maranthes corymbosa	690 - 975	MEB/2	Sapwood is lighter in colour but not clearly defined from the heartwood, which is red-brown sometimes with a yellow tinge. Grain is straight, spiral or wavy and texture moderately coarse., but even.

A.2 (Contd..)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
23. MERPAUH (see Notes 1, 2 and 5)	Swintonia spp.	640 - 880	MEP 2	Sapwood is light brown with a grey or pink tinge and is not well-defined from the heartwood, which is light grey-brown with a pink tinge. Some trees develop a corewood which is streaked with orange and red lines. The grain is interlocked and texture moderately coarse and even.
24. MERTAS (see Note 1)	Ctenolophon parvifolius	800 - 930	MET 2	Sapwood is not differentiated from the heartwood, which is brown to purple-red-brown. Grain is interlocked and sometimes wavy. Texture is moderately fine and even.
25. NYALIN (see Note 1)	Xanthophyllum spp.	595 - 960	NYA 2	Sapwood is not differentiated from the heartwood, which is white to bright yellow when fresh and darkens on exposure to a strong orange-yellow. The grain is straight and the texture is moderately coarse and uneven.
26. PAUH KIJANG (see Note 2)	Irvingia malayana	930 - 1250	PKI 2	Sapwood is lighter in colour and is only moderately sharply defined from the heartwood, which is yellow-brown with a slight green tinge. A dark grey-brown striped core is found in some logs. Grain is shallowly interlocked and texture is moderately fine and even.
27. PERAH [see Notes 2 (except for corewood), 5 and 7]	Elateriospermum tapos	735 - 1235	PER 2	Sapwood is light yellow-brown and is sharply defined from the heartwood, which is dark-brown with a red tinge and streaked alternately with lighter and darker stripes. The grain is straight or shallowly interlocked. The texture is moderately fine and even.
28. PETALING (see Note 7)	Ochanostachys amentacea	800 - 1105	PET 2	Sapwood is dark yellow-brown or light red-brown and is moderately defined from the heartwood, is red-brown to purple red-brown, darkening on exposure. Grain is interlocked, and texture is fine and even.

A.2 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
29. PUNAH (see Note 5)	Tetramerista glabra	625 - 800	PUN/2	Sapwood is lighter coloured but not always sharply defined. Heartwood is pink-brown weathering to a light brown. The grain is straight, interlocked or sometimes spiral and the texture is moderately coarse and even.
30. RANGGU (see Notes 5 and 7)	Koordersiodendron pinnatum	690 - 915	RAN/2	Sapwood is white to pale pink and clearly defined from the heartwood, which is pink-brown to red-brown and darkening on exposure. The grain is straight to interlocked and the texture is rather fine and even.
31. RENGAS	Gluta spp. and Melanochyla spp.	640 - 960	REN/2	Sapwood is well-defined from the heartwood, which is dark red-brown or deep blood-red with bands of darker, almost black streaks. The grain is interlocked or occasionally straight and texture is modertely coarse to fairly fine and even. Due to the poisonous nature of the sap, the timber is not very often exploited. The seasoned timber, however, is quite safe to handle.
32. SEMAYUR	Shorea inaequilateralis	784 - 960	SEM/2	Sapwood is pale-yellow to yellowish brown and distinct from heartwood which is reddish dark brown. The grain is straight to shallowly interlocked. The texture is rather fine and even.
33. SENUMPUL	Hydnocarpus spp.	690 - 930	SEN/2	Sapwood is not well-defined from the heartwood, which is pale yellow to yellow-brown. The grain is straight or deeply interlocked. The texture is fine and even
34. SIMPOH (see Notes 2 and 7)	Dillenia spp.	675 - 815	SIM/2	Sapwood is lighter in colour and merges gradually into the heartwood, which is red-brown, sometimes with a purplish tinge, and darkening on exposure. The grain is straight to shallowly interlocked and texture is coarse but even.

A.2 (Concluded)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
35. TAMPOI (see Note 1)	Baccaurea spp.	770 - 895	TAM/2	Sapwood is not differentiated by colour from the heartwood, which is light yellow-brown, and darkening to brown with a purple-red or orange-yellow tinge. Grain is straight or shallowly interlocked. Texture is moderately fine but uneven due to the presence of the large rays.
36. TUALANG (see Notes 2 and 7)	Koompassia excelsa	800 - 865	TUA/2	Sapwood is well-defined. The heartwood is reddish-brown to deep brick red-brown when fresh, weathering to a deep chocolate brown. The grain is interlocked, often deeply interlocked. Texture is rather coarse, but even except in areas where included phloem occurs.

A.3 - Light Hardwoods

Standard Name (1)	Scientific Name (2)	Density range (kg/m^3) (3)	Marking (4)	General Description of timber (5)
1. ALAN BUNGA	Shorea albida	575 - 640	ABU/3	Sapwood is light yellowish pink and not clearly defined from the heartwood, which is pink or pinkish red. The grain is straight to shallowly interlocked. The texture is rather coarse and even.
2. ARA (see Notes 1,2 and 5)	Ficus spp.	350 - 640	ARA/3	Sapwood is not differentiated from the heartwood, which is light yellow-brown or in various shades of yellow to pink-grey. Grain is interlocked. Texture is slightly coarse and uneven due to the presence of abundant parenchyma.
3. BABAI	Saraca spp.	515 - 640	BAB/3	Sapwood is yellow-white with a pink tinge and is sharply differentiated from the heartwood, which is dark grey-brown with darker lines. Texture is rather coarse and uneven due to the presence of moderately large vessels and the surrounding aliform parenchyma. Grain is shallowly interlocked.
4. BAYUR (see Notes 5 and 7)	Pterospermum spp.	384 - 705	BAY/3	Sapwood is creamy white to light yellow-brown and merging gradually into the heartwood which is light red-brown and darkening to brown on exposure. Grain is straight or shallowly interlocked. Texture is moderately fine to slightly coarse and even.
5. BERANGAN (see Note 5)	Castanopsis spp.	610 - 975	BER/3	Sapwood is light brown, often with a greenish tinge and is sharply differentiated from the heartwood. Heartwood is brown to dark red-brown. Grain is fairly straight, but sometimes interlocked. Texture is coarse and uneven due to the large pores and bunch arrangement.

A.3 (Contd.....)

Standard Name (1)	Name (2)	Range (kg/m^3) (3)	Code (4)	General Description of Timber (5)
6. BINTANGOR	Calophyllum spp.	465 - 865	BIN/3	Sapwood is well-defined from the heartwood, which deep red, pink-brown,red-brown or orange brown in colour. The grain is interlocked. The texture is moderately coarse to coarse and uneven.
7. BINUANG (see Notes 2, 5 and 7)	Octomeles sumatrana	270 - 465	BIG/3	Sapwood is white with a greyish tinge and moderately well-defined from the heartwood, which is buff to pale brown or sometimes pinkish brown. Texture is moderately coarse to coarse. Grain is interlocked.
8. DEDALI	Strombosia javanica	580 - 720	DED/3	Sapwood is moderately well-defined from the heartwood, which is pale yellow with an olive brown tinge, darkening to light orange-brown. Grain is straight or interlocked. Texture is fine and even.
9. DURIAN (see Notes 2, 5 and 7)	All species of Coelostegia, Durio and Neesia.	420 - 800	DUR 3	Sapwood is only moderately well-defined in Coelostegia but well-defined in Durio and Neesia. The Heartwood is pink-brown, grey-brown, brown with a red tinge or light orange-brown. The grain is straight to slightly interlocked. Texture is moderately coarse to coarse and even in Neesia, but uneven in Durio and Coelostegia.
10. GERONG-GANG (SERUNGAN) (see Note 2)	Cratoxylum spp. (Light spp.)	350 - 610	GEO/3	Sapwood is moderately well-defined. Heartwood is dark pink or light brick-red. The grain is straight or sometimes shallowly interlocked. Texture is moderately coarse and even.
11. GERUTU (see Note 5)	Parashorea spp. (Heavy spp.)	640 - 770	GEU/3	Sapwood is whitish yellow and is moderately distinct from the heartwood, which is light golden brown and darkening to a deep brown on exposure. Texture is moderately coarse, but even. Grain is interlocked.

A.3 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
12. JELUTONG	Dyera Supp.	415-495	JEL/3	Sapwood is not differentiated by colour from the hearwood, which is creamy white to pale straw in colour. The grain is almost streaight and the texture is moderatly fine and even.
13. JONGKONG (see Note 1)	Ductyloclados stenostachys	495-610	JON/3	Sapwood is not differentiated from the hearwood, which is light brown when fresh and darkening to pink-brown or red-brown. Grain is straight or slightly interlocked. Texture is fine and even, except for the radial strands of included phloem which appear as small flecks or holes on the tangential surfaces.
14. KEDONDONG (see Notes 5 and 7)	All species of Burseraceae	495 - 975	KED/3	Sapwood is lighter coloured, but not sharply defined from the heartwood. However, in Sigriffithi and Sirubiginosa the sapwood is well-defined. Heartwood varies in colour from light yellow in C. apertum to yellow-green-brown in S. griffithi and S. rubiginosa to the common light red-brown and deep red-brown of the other species. The grain is interlocked and texture fairly fine and even.
15. KELUMPANG (see Notes 2 and 7)	Sterculia spp.	560 - 640	KEP/3	Sapwood is lighter in colour and is not sharply differentiated from the heartwood, which is straw coloured to light brown. Grain is straight to shallowly interlocked. Texture is rather coarse and uneven due to the presence of large rays.

A.3 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
16. KEMBANG SEMANGKOK (see Notes 2, 5 and 7)	Scaphium spp.	515 - 755	KEB/3	Sapwood is lighter in shade merging gradually into the heartwood, which is yellow-brown, light buff or light brown. Grain is straight or shallowly interlocked. Texture is slightly coarse and uneven due to the broad rays and wide layers of parenchyma.
17. KETAPANG (see Note 7)	Terminalia bellelrica, T. calamansanai T. catappa, T. citrina, T. copelandii, T. foetidissina, T. phellocarpa and T. subspathulata	385 - 850	KET/3	Sapwood is poorly defined from the heartwood, which is light brown in T. citrina and T. copelandii, yellow in T. subspathulata and red-brown in T. catappa. Grain is interlocked, often deeply interlocked and texture is moderately fine and even in T. Citrina and moderately coarse in others.
18. KUNGKUR (see Note 7)	Pithecellobium spp.	465 - 850	KUN/3	Sapwood is well-defined from the heartwood, which is light red-brown when fresh, darkening on exposure to a deep shade of brown. The grain is slightly interlocked and sometimes wavy. Texture is moderately coarse, but even.
19. LARAN (see Notes 1 , 2, 5 and 6)	Anthocephalus chinensis	370 - 465	LAR/3	Sapwood is not differentiated from the heartwood, which is white with a yellow tinge and darkening to creamy yellow on exposure. Grain is straight. Texture is moderately fine and even.
20. .MACHANG	Mangifera spp.	545 - 610	MAC/3	Sapwood is not well-defined. Heartwood is light pink-brown to light brown. In many trees, a streaky corewood is produced, where the wood is dark brown interspersed with black streaks. This figured material is usually with a natural sheen. The grain is straight to interlocked and texture moderately fine and even.

A.3 (Contd.....)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
21. MAHANG	Macaranga spp.	270 - 495	MAH/3	Sapwood is not well-defined. Heartwood is light yellow-brown, occasionally with a pink tinge. The grain is straight or shallowly interlocked and texture is moderately fine and even.
22. MEDANG (see Note 5)	All light weight species of Lauraceae. (Cinnamomum spp., Dehasia spp., Litsea spp., Cryptocarya spp., Phoebe spp., Beilschmiedia spp.)	350 - 880	MED/3	Sapwood is not distinct in some species but moderately well-defined from the heartwood in other species. Heartwood is variable in colour, the majority being light olive brown to dark green-brown, while some Cryptocarya spp. and Phoebe spp. are light red-brown, and some Cinnamomum spp. are pink to light red. Beilschmiedia spp. are yellow-white in colour. Grain is straight or slightly to moderately interlocked. Texture is moderately fine and even.
23. MELANTAI (KAWANG)	Shorea macroptera, S. cristata, S. macrophylla, S. pilosa, S. pinanga, and S. scaberrima	415 - 625	MEL/3	Sapwood is moderately distinct from the heartwood, which is yellow-pink when freshly cut, weathering to a light pink colour with a yellow tinge. Texture is moderately coarse and even. Grain is interlocked.
24. MELUNAK (see Note 5)	Pentace spp.	530 - 755	MEU/3	Sapwood is moderately well-defined. The Heartwood is brown with a red or pink tinge or red-brown. The grain is shallowly to deeply interlocked. Texture is moderately fine and even.
25. MEMPISANG KARAI (see Note 5)	All species of Annonaceae	370 - 960	MEI/3	Sapwood is normally not well-defined. Heartwood is light yellow-white or light yellow-brown, often with a green tinge. The grain is almost straight and texture is rather coarse and uneven due to the presence of the extremely large rays.

A.3 (Contd...)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
26. MERANTI BAKAU (see Note 10)	Shorea uliginosa	595 - 755	MBA/3	Sapwood is distinct from the heartwood, which is light pink to light red-brown. Grain is interlocked. Texture is rather coarse but even.
27. MERANTI DARK RED (OBAR SALUK) (see Notes 4 and 10)	Some Shorea spp. of the sections Brachyptera, Ovalis, Rubella, Pachycarpa, Pinanga and Mutica but excluding S. Uliginosa (Meranti Bokau)	560 - 865	MDA/3	Sapwood is not clearly defined from the heartwood, which is medium red to deep red to deep red-brown. The grain is interlocked. The texture is moderately coarse and even.
28. MERANTI LIGHT RED (RED SERAYA) (see Notes 4 and 10)	Same as Meranti Dark Red	385 - 755	MLI/3	Sapwood is well-defined from the heartwood, which is light pink to light red or light brown. The grain is interlocked and texture is coarse and even.
29. MERANTI WHITE (MELAPI) (see Notes 2, 5 and 10)	Shorea spp. belonging to the Anthoshorea group	495 - 915	MWH/3	Sapwood is white and is moderately well differentiated from the heartwood, which is almost white when fresh and becoming light yellow-brown on exposure. The grain is usually shallowly interlocked or occasionally deeply interlocked. Texture is moderately coarse and even.

A.3 (Contd...)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
30 MERANTI YELLOW (YELLOW SERAYA) (see Notes 7 and 10)	Shorea spp. belonging to the Richetia group	575 - 735	MYE/3	Sapwood is well-defined. The heartwood is light yellow-brown with a green tinge, darkening to deeper shades of yellow-brown or brown. The grain is interlocked and sometimes wavy. The texture is moderately coarse and even.
31. MERBULAN (see Notes 2 and 5)	Blumeodendron spp.	625 - 895	MRB/3	Sapwood is not distinct and is lighter in colour than the heartwood, which is light brown. Occasionally, a corewood of darker brown with black streaks is produced. Grain is straight or shallowly interlocked. Texture is moderately coarse and even.
32. MERSAWA (see Notes 1 and 6)	Anisoptera spp.	515 - 735	MES/3	Sapwood is not well-defined. The heartwood is light to dark yellow and darkens on exposure. The grain is shallow to deeply interlocked and texture moderately coarse and even.
33. NYATOH	Most species of Sapotaceae, principally Palaquium spp. (Light spp.)	400 - 1075	NYT/3	Sapwood is moderately well-defined. Heartwood is deep pink-red or red-brown. The grain is straight to shallowly interlocked and sometimes wavy. Texture is moderately fine to slightly coarse and even.

A.3 (Contd.)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
34. PELAJAU (see Note 5)	Pentaspadon spp.	480 - 835	PEL/3	Sapwood is not clearly defined from the heartwood, which is light yellow-green, sometimes with a pink tinge and darkening to grey-green on exposure. Grain is shallowly interlocked. Texture is rather fine and even.
35. PENARAHAN (see Notes 2 and 7)	All species of Myristicaceae	370 - 770	PEH/3	Sapwood is poorly defined from the heartwood, which is light yellow brown, with occasional pink finge and dark red-purple stripes. A blood red core is found in some species. The grain is straight and texture rather fine to slightly coarse and even.
36. PERUPOK (see Note 1)	Lophopetalum spp.	480 - 640	PEU/3	Sapwood is not clearly differentiated from heartwood which is light yellow or light yellow-brown when dry and pink when freshly cut. Grain is interlocked. Texture is fine to moderately fine and even.
37. PETAI (see Notes 5 and 7)	Parkia spp.	415 - 815	PEA/3	Sapwood is white to yellow-brown and is extremely wide. Heartwood is seldom developed but if found, is dark brown in colour. Grain is straight to shallowly interlocked. Texture is coarse and uneven.
38. PULAI (see Notes 1, 2, 5 and 6)	Alstonia spp.	370 - 495	PUL/3	Sapwood is not differentiated from the heartwood which is cream to light yellow in colour. The grain is straight to shallowly interlocked. Texture is moderately fine to rather coarse and even.
39. RAMIN (see Notes 1, 2, 5 and 6)	Gonystylus spp.	530 - 785	RAM/3	Sapwood is poorly defined from heartwood, which is white to creamy yellow. The grain is shallowly interlocked and texture moderately fine and even.
40. RUBBERWOOD (see Notes 1, 2, 5 and 6)	Hevea brasiliensis	560 - 640	RUB/3	Sapwood is not differentiated from heartwood, which is pale cream in colour, often with a pink tinge. Grain is straight to shallowly interlocked. Texture is moderately coarse but even.

A.3 (Contd.)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
41. SENGKUANG	Dracontomelum dao	500 - 690	SEG/3	Sapwood is clearly defined in trees with coloured heartwood. The heartwood produced by some trees is coloured and is walnut grey-brown, while other trees produce a greyish or greenish yellow heartwood with irregular concentric dark brown to nearly black bands. Grain is straight or interlocked and sometimes wavy. Texture is moderately coarse and even.
42. SENTANG	Azadirachta excelsa	560 - 770	SET/3	Sapwood is moderately well differentiated from heartwood which is reddish brown. Grain is interlocked. Texture is slightly coarse and uneven, due to a tendency towards a ring-porous structure.
43. SEPETIR (see Note 7)	Sindora spp., Copaifera palustris	530 - 785	SEE/3	Sapwood is clearly defined from the heartwood, which is brown with a pink tinge and darkening on exposure. A corewood, which is streaked with layers of darker coloured to almost black wood is often developed. The grain is straight or shallowly interlocked and texture is moderately fine and even.
44. SESENDOK (see Notes 1, 2 and 6)	Endospermum spp.	305 - 655	SES/3	Sapwood is not differentiated from heartwood which is a bright yellow when fresh, often with a green tinge and darkening to light brown on exposure. The grain is spiral, shallowly interlocked or slightly wavy. Texture is rather coarse and even.

A.3 (concluded)

Standard Name (1)	Scientific Name (2)	Density Range (kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
45. TERAP (see Notes 2 and 5)	Artocarpus spp., Parartocarpus spp. and Antiaris toxicaria	400-560	TER/3	Sapwood is not generally differentiated from heartwood which is yellow to light yellow-brown. Occasionally a dark brown heartwood with an orange tinge is developed, in which case, the sapwood is distinct. The grain is interlocked and texture is moderately coarse to coarse and even.
46. TERENTANG (see Notes 1, 2 and 5)	Campnosperma spp.	320 - 560	TEN/3	Sapwood is not clearly differentiated from heartwood which is bright pink when fresh and taking on a grey tinge on exposure. The grain is interlocked and texture is fine and even.
47. WHITE SERAYA (see Notes 5 and 7)	Parashorea spp. (Light spp.)	400 - 655	WSE/3	Sapwood is paler in colour and not clearly defined from heartwood. which is pinkish cream when fresh, turning to straw colour or light brown on exposure. Texture is moderately coarse and even. Grain is interlocked.

A.4- Softwoods

Standard Name (1)	Scientific Name (2)	Density Range (Kg/m^3) (3)	Marking Code (4)	General Description of Timber (5)
1. DAMAR MINYAK (see Notes 1 and 2)	Agathis borneensis	385 - 580	DMI/4	The sapwood is not differentiated from the heartwood which is buff or cream, sometimes with a pink tinge and darkening into a light golden brown. The grain is straight and texture is very fine and even.
2. PADO (see Note 1)	Podocarpus spp.	415 - 735	PAD/4	Sapwood is not differentiated from the heartwood, which is light yellow with a greenish tinge or light golden brown. Grain is straight and texture very fine and even.
3. SEMPILOR (see Note 1)	Dacrydium spp., Phyllocladus spp.	435 - 705	SEP/4	Sapwood is not defined from the heartwood, which is buff with pinkish tinge or golden brown. The grain is straight and texture is very fine and even.

NOTES

1. *The sapwood and heartwood of these timbers are not differentiated by colour, which makes it impossible for Timber Grader to distinguish the sapwood from the heartwood with certainty. For these timbers sapwood cannot be cinsidered a defect (see 5.3) and hence these timbers should be treated with preservatives.*

2. *These timbers absorb preservatives very easily.*

3. *If "Meranti" is specified in a contract without any qualifications, a mixture of any coloured Meranti may be supplied.*

4. *If "Red Meranti" is specified in a contract without any qualifications, a mixture of Dark Red and Light Red Meranti may be supplied.*

5. *These timbers should always be treated with anti-stain chemicals immediately after coming off the saw. However, in these timbers, especially Ramin, of thicknesses 37.5 mm and above, such treatment may not necessarily prevent development of internal blue stains.*

6. *These timbers are susceptible to Powder post beetle attack.*

7. *The sapwood of these timbers are susceptible to Powder post beetle attack.*

8. *Kempas timber produced in Sarawak and Sabah is usually of higher density.*

9. *Keruing timber produced in Sabah is usually of lower density.*

10. *The name "Meranti" in Peninsular Malaysia and Sarawak is a group name covering all the relatively light weight and softer timbers produced by the genus Shorea.*

sc34wg2-/ltf.

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