

PNGS 1293 - 1989

# PAPUA NEW GUINEA STANDARDS

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## PRESERVATIVE SPECIFICATION FOR SAWN AND ROUND TIMBER

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NATIONAL STANDARDS COUNCIL  
OF PAPUA NEW GUINEA

# Papua New Guinea Standard

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## **PRESERVATIVE SPECIFICATION FOR SAWN AND ROUND TIMBER**



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of Papua New Guinea**

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## PRESERVATIVE SPECIFICATION FOR SAWN AND ROUND TIMBER PNGS 1293 : 1989

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## FOREWORD

This Standard was prepared by the Wood Preservation Standard Committee comprising: Department of Forests, Department of Works, National Standards Council, PNG Forest Industries Council, PNG Electricity Commission, Koppers (PNG) Ltd. and PNG University of Technology.

The role of timber preservation is to increase the service life of timber and to extend the range of its end-uses as a building and structural material beyond that of untreated timber.

In Papua New Guinea, there are a few timbers with significant natural durability which may be used untreated (Appendix 2). However, the destruction of wood by fungi, termites and other wood-destroying insects, or by marine borers can be so rapid that preservative treatment is necessary if any reasonable life is to be expected from timber in most end-uses. For permanent timber structures, treatment is necessary for low cost, temporary or movable structures such as concrete formwork or furniture.

This Standard can be used when preservative treated timber is specified for different end-use situations. The situations in which timber is used are separated into distinct end-use levels according to a particular hazard.

In order to obtain the correct treated timber for a particular end-use, purchasers should inform suppliers of the proposed use of the timber. However, a buyer is at liberty to specify a recognised type of treatment for a specified end-use.

Some timber species have not been listed in this Standard because of lack of retention and treatability data. Addenda to this Standard will be published as data become available.

Further information on this Standard and its Codes of Practice namely:

Code of practice for seasoning timber

Code of practice for vacuum pressure impregnation process for timber preservation and

Code of practice for dip-diffusion process operators

is available from:-

The Director  
National Standards Council of PNG  
P.O. Box 3042, Boroko  
National Capital District

### Caution

1. Preservative chemicals may be highly toxic and should be handled with care.
2. Preservative treated timber should never be used for domestic fires.
3. Dip-diffused timber should not be exposed to the weather.

# PRESERVATIVE SPECIFICATION FOR SAWN AND ROUND TIMBER

## 1. SCOPE

- 1.1 This Standard specifies the requirements for the preservative treatment of timber intended for use in domestic, industrial, agricultural, civil engineering and other structures in Papua New Guinea.
- 1.2 It specifies the requirements for type of preservative, their composition and the minimum levels of preservative distribution and retention in timber treated for various service conditions defined as Hazard Levels 1, 2, 3, 4, 5 and 6.
- 1.3 This Standard does not purport to specify the grades, dimensions or mechanical properties of timber required for any particular application.

## 2. FIELD OF APPLICATION

- 2.1 This Standard is intended to have general application throughout Papua New Guinea.
- 2.2 In order to comply with this Standard, timber intended for sale or use as preservative treated must completely satisfy all the requirements for penetration and retention specified for a particular Hazard Level.
- 2.3 Treated timber must be clearly branded so that users may identify and distinguish it for different Hazard Levels.

## 3. REFERENCES

- AS 1604 Preservative treatment for sawn timber, veneer and plywood.
- AS 1605 Methods for the sampling and analysis of wood preservatives and preservative-treated wood.

## 4. DEFINITION OF TERMS

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

- AIR-DRY** The condition of wood that has been kept in the open and has attained a moisture content below fibre saturation point and not higher than a moisture content of 30%.
- AMENABLE** Easily treated by diffusion or pressure methods with preservative. Syn, permeable, treatable.
- ANALYTICAL ZONE** That part of the sample that is chemically analysed to determine compliance with the standard.

- BORER** Woodboring organisms, chiefly insect but including marine organisms which attack wood, producing holes, tunnels or similar damage.
- BRAND** A permanent, legible mark conveying treatment details.
- DECAY** The decomposition of wood by fungi.
- HAZARD** Level or risk of biological degradation to which timber is exposed in service.
- HEARTWOOD** Wood which in the growing tree has ceased to contain living cells and in which reserve food materials are absent. Usually, but not always, differentiated from the sapwood by its darker colour. Generally, more resistant to wood-destroying organisms than sapwood and less easily penetrated by preservatives under pressure.
- LEACHING** The removal of soluble active wood preservative from timber by the repeated action of water.
- OVEN-DRY** The condition of wood that has been dried to a constant weight in a ventilated oven at a temperature between 101°C and 105°C.
- PARCEL (OF TIMBER)** A quantity of preservative-treated timber purporting to comply with the requirements of the relevant Standard.
- PENETRATION** The depth to which preservative has entered wood after treatment with a prescribed preservative.
- PRESERVATION** The treatment of timber with a chemical or mixture of chemicals to protect it from wood-destroying organisms such as fungi, insect and marine borers.
- PRESERVATIVE** A chemical or a mixture of chemicals in a form suitable for application to wood in order to protect it from wood-destroying organisms.

RETENTION	Amount of chemicals or preservative salts retained in timber and expressed as kilogram per cubic metre or as a percentage of the oven-dried wood weight.		joinery uses, or for reconversion for manufacturing purposes. It can be further classified as "milled", "round", or "treated".
SAPWOOD	The outer layers of growing tree, which contain living cells and food materials. Usually lighter in colour than heartwood and usually more susceptible to wood-destroying organisms.	TIMBER, DRESSED	Finished to a smooth surface.
TERMITE	Insects, belong to the Order. <i>Isoptera</i> incorrectly known as white ants. Termites can be broadly classified as "subterranean termites" and "drywood termites" by their mode of attack on timber and their habitat.	TIMBER, ROUGH SAWN	Surface condition of timber as it leaves the saw.
TIMBER	Wood from a tree which, irrespective of form, shape or size, can be utilised for construction, carpentry or	TIMBER, TREATED	Timber purporting to be preservative-treated so as to fulfill the requirements specified in this Standard.
		TREATER	The individual or company authorized by licence or otherwise to treat timber by an approved process and market such product as treated timber under this Standard.
		TREATMENT PLANT NUMBER	A registration number allocated to identify a particular treatment plant and listed in a register published by the Department of Forests.

## 5. CLASSIFICATION OF HAZARDS

The various conditions of service in which timber can be used have been separated into six Hazard Levels as listed in Table 1.

Table 1: Classification of service condition and hazard levels

SERVICE CONDITION	HAZARD TYPE AND LEVEL	EXAMPLES
Clear of ground, well ventilated, completely protected from weather and wetting	Borer and termite hazard H1	Joinery, furniture framing.
Clear of ground, completely or partially protected from weather and wetting	Borer, termite and/or moderate decay H2	Framing, flooring.
Clear of ground, exposed to weather and/or subject to periodic wetting or condensation	Decay and insect H3	Shingles, weather-boards, external joinery, rails, decking, bathroom steps, verandas
Ground contact, subject to severe wetting and leaching	Severe decay, borers and termites H4	Fencing, landscaping timbers
Ground contact, or continuously damp situation	High decay and/or termites H5	Posts, transmission poles and bridges
Permanently or semi-permanently in contact with sea water	Marine borer H6	Marine piles fenders, wharf members

## 6. APPROVED PRESERVATIVES

6.1 Two types of approved waterborne preservative are recognised in this Standard:—

- (a) Boron-Fluoride-Chrome-Arsenic (BFCA type) preservatives for the Dip-Diffusion process, and
- (b) Copper-Chrome-Arsenic (CCA type) preservatives for the Vacuum-Pressure Impregnation process.

### 6.2 Dip-Diffusion Preservative

An approved water-borne BFCA preservative component for freshly sawn timber is shown in Table 2.

Table 2: Waterborne preservative for dip-diffusion

COMPONENT	CONCENTRATION %wt/wt
Boric oxide (or boric acid or metaboric acid)	30
Borax anhydrous (or borax hydrated)	23
Sodium fluoride	20
Arsenic pentoxide dihydrate (or arsenic acid)	15
Sodium dichromate dihydrate	12
Recommended solution concentration	30%
Specific Gravity of working solution	1.25-1.27

#### 6.2.1 Impurities and Elemental Salt Content

Dip-diffusion multi-salt preservative shall contain no more than 5% impurities and the elemental contents shall be within the limits  $\pm 10\%$  of the percentage specified in Table 2.

#### 6.2.2 Physical Characteristic

Dip-diffusion preservative accepted under this Standard shall consist of an intimately mixed free-flowing powder which will pass a 500 micron mesh sieve, or a paste or slurry.

#### 6.2.3 Approved Additives and Labelling

Approved additives designed to reduce incidence of mould growth and sap-staining fungi during the diffusion stage, and/or to limit frothing during mixing or use, may be packed separately or mixed with the multi-salt dip-diffusion preservative. The chemical composition and concentration of active ingredients must be clearly stated on the preservative container, along with appropriate warnings of toxicity and/or sensitisation.

### 6.3 Vacuum-Pressure Treatment Preservative

An approved water-borne CCA preservative shall have the following components as shown in Table 3.

Table 3: Water-borne (CCA) preservative for vacuum-pressure treatment

COMPONENT	CONCENTRATION %wt/wt
Copper sulphate	31.5-38.5
Potassium dichromate	40.5-49.5
Arsenic pentoxide	18.0-22.0



6.3.1 Impurities

Water-borne preservative shall contain no more than 5% impurities.

7. ALTERNATIVE PRESERVATIVE

Preservative formulations other than those approved in this Standard may be used provided they have been agreed to by the buyer and have been recommended by the Department of Forests.

8. SPECIES AMENABLE TO DIP-DIFFUSION AND VACUUM PRESSURE TREATMENT

8.1 Species Amenable to Dip-Diffusion

All PNG species are amenable to treatment by dip-diffusion process.

8.2 Species Amenable to Vacuum-Pressure Treatment

All PNG species are amenable to vacuum pressure treatment of the sapwood but only some species are amenable to pressure treatment of the heartwood as listed in Appendix 2.

The following general classification of heartwood treatability recognised in this Standard is based on a vacuum of minus 85 kilopascals and a pressure of 1380 kilopascals.

Class 1	<b>TREATABLE</b> Treatable through full section
Class 2	<b>MODERATELY TREATABLE</b> Reasonably uniform treatment in heartwood
Class 3	<b>RESISTANT</b> Erratic non-dependable penetration of heartwood.
Class 4	<b>HIGHLY RESISTANT</b> Untreatable heartwood

9 PRESERVATIVE PENETRATION AND RETENTION REQUIREMENTS

9.1 Penetration Requirements

Each piece of BFCA or CCA-treated timber must be continuously penetrated by the preservative. The required penetration patterns for sawn and round timbers are as follows (see Fig. 1).

Pattern A	(All Sapwood Sawn Timber) Complete sapwood penetration (Fig. 1.1)
Pattern B	(Sawn Timber with Sapwood and Heartwood) Complete sapwood penetration and a minimum of 8mm penetration of the outer heartwood of rough sawn or 5mm of dressed timber (Fig. 1.2).

Pattern C (All Heartwood Sawn Timber)  
A minimum of 8mm continuous penetration of the outer heartwood or 5mm of dressed timber (Fig. 1.3).

Pattern D (Conifers or Hardwood Poles with undifferentiated Sapwood and Heartwood).  
Complete penetration of the outer 50% of the pole radius (Fig. 1.4).

Pattern E (All other Hardwood Poles)  
Complete sapwood penetration and a minimum of 8mm preservative penetration of the outer heartwood (Fig. 1.5).

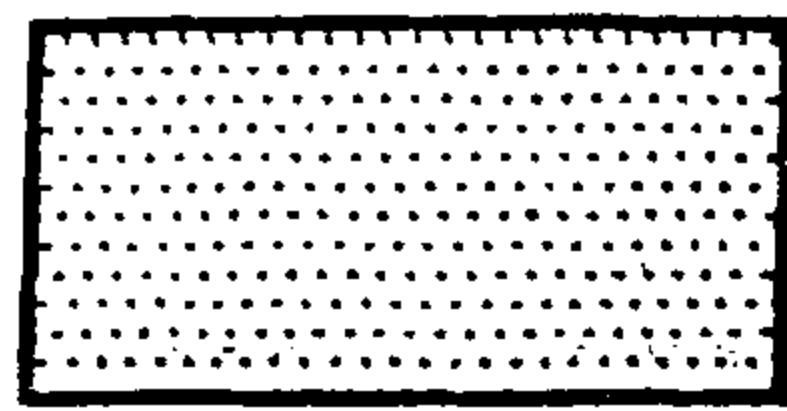
9.2 Analytical Zone

The analytical zone for sawn and round timbers illustrated in Figure 2 is defined as follows:

Zone A	(All Sapwood Sawn Timber) The central one-ninth (1/9) of the cross section of timber (Fig. 2.1).
Zone B	(Sawn Timber with Sapwood and Heartwood) The central one-ninth (1/9) of the sapwood cross section closest to the centre and the inner 4mm of the outer 8mm preservative penetrated heartwood zone (Fig. 2.2).
Zone C	(All Heartwood Sawn Timber) The inner 4mm of the outer 8mm heartwood preservative penetrated zone (Fig. 2.3).
Zone D	(All Conifers and Hardwood Poles with undifferentiated Sapwood and Heartwood) The inner one third (1/3) of the outer 50% of pole radius penetrated with preservative (Fig. 2.4).
Zone E	(All other Hardwood Poles) The inner 4mm of the outer 8mm preservative-penetrated heartwood zone (Fig. 2.5).

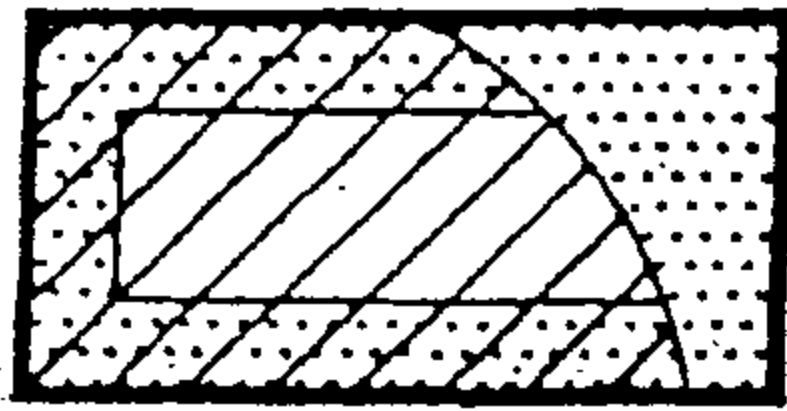
9.3 CCA Retention

Preservative retention levels (kg/m<sup>3</sup> or %wt/wt) set out in Table 4 represent the minimum levels required in the analytical zone of treated timber for defined service conditions. The minimum levels of elemental copper, chromium, arsenic and their salts required to be present in the analytical zone are set out in Table 5



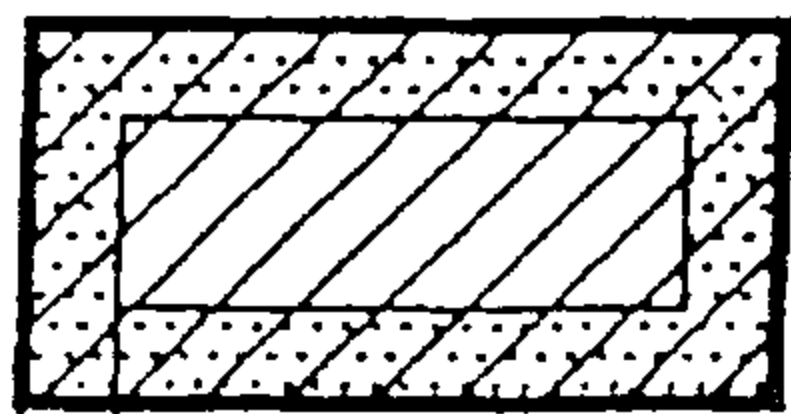
Pattern A  
(All Sapwood Sawn Timber)

Fig. 1.1



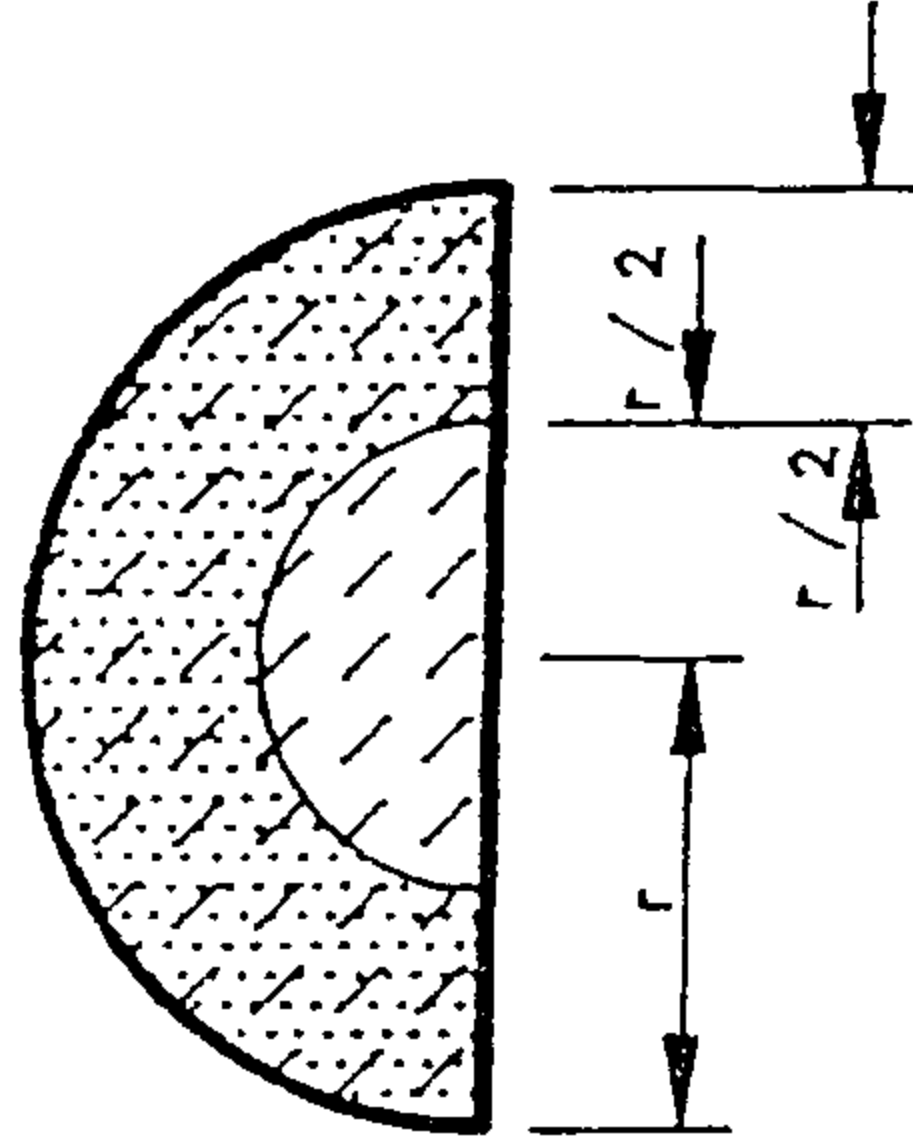
Pattern B  
(Sap plus Heartwood Sawn Timber)

Fig. 1.2



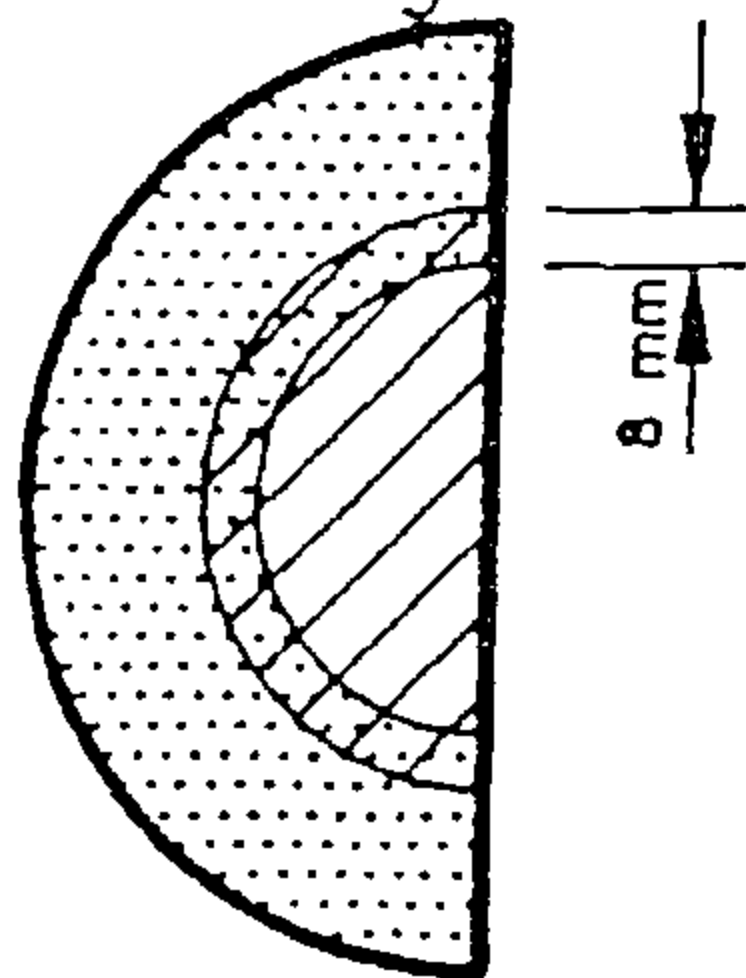
Pattern C  
(All Heartwood Sawn Timber)

Fig. 1.3  
8 mm



Pattern D  
(Conifer Poles or Hardwood Poles with undifferentiated Sap and Heartwood)

Fig. 1.4



Pattern E  
(Hardwood Poles with differentiated Sap and Heartwood)

Fig. 1.5

LEGEND

- |                                      |   |
|--------------------------------------|---|
| Heartwood penetrated by preservative | Undifferentiated Sap & Heartwood penetrated by preservative     |
| Heartwood not penetrated             | Undifferentiated Sap & Heartwood not penetrated by preservative |
| Sapwood penetrated by preservative   |   |

FIGURE 1 - Required penetration patterns for sawn and round timbers

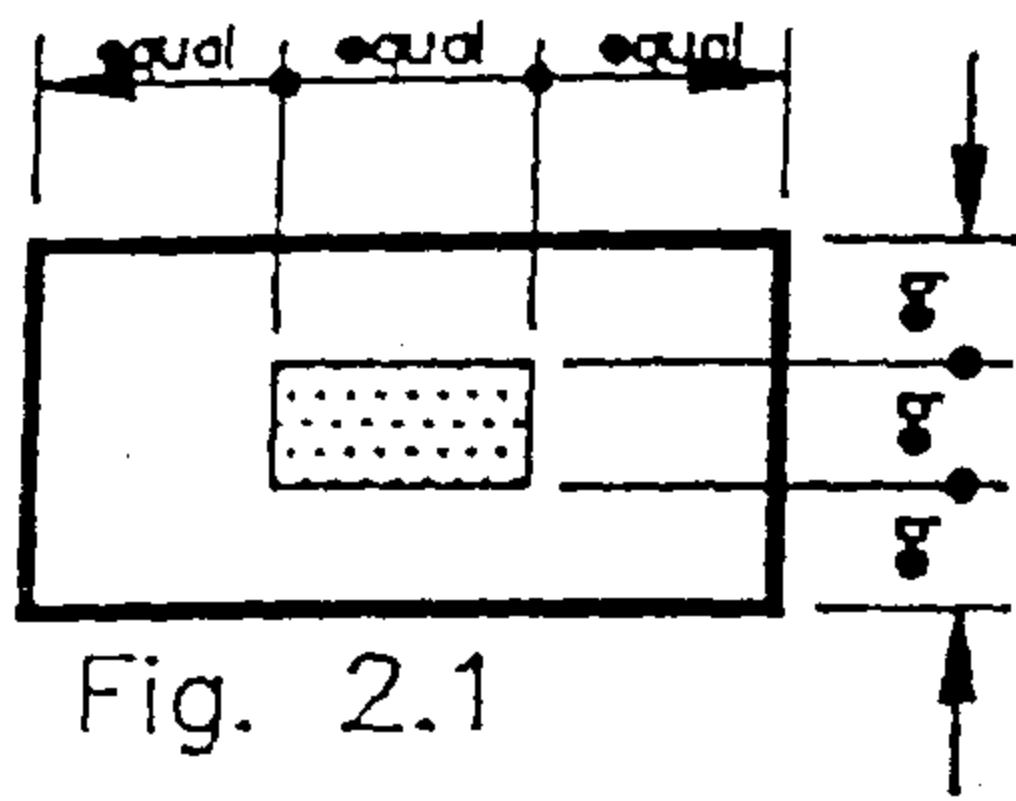


Fig. 2.1

Zone A  
(All Sapwood Sawn Timber)

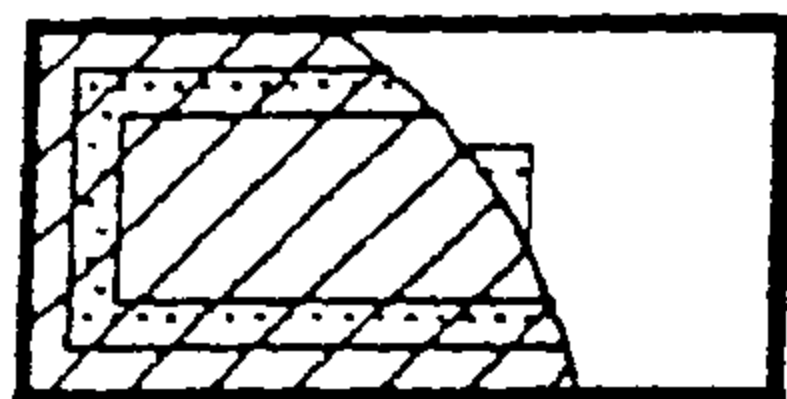


Fig. 2.2

Zone B  
(Sap plus Heartwood Sawn Timber)

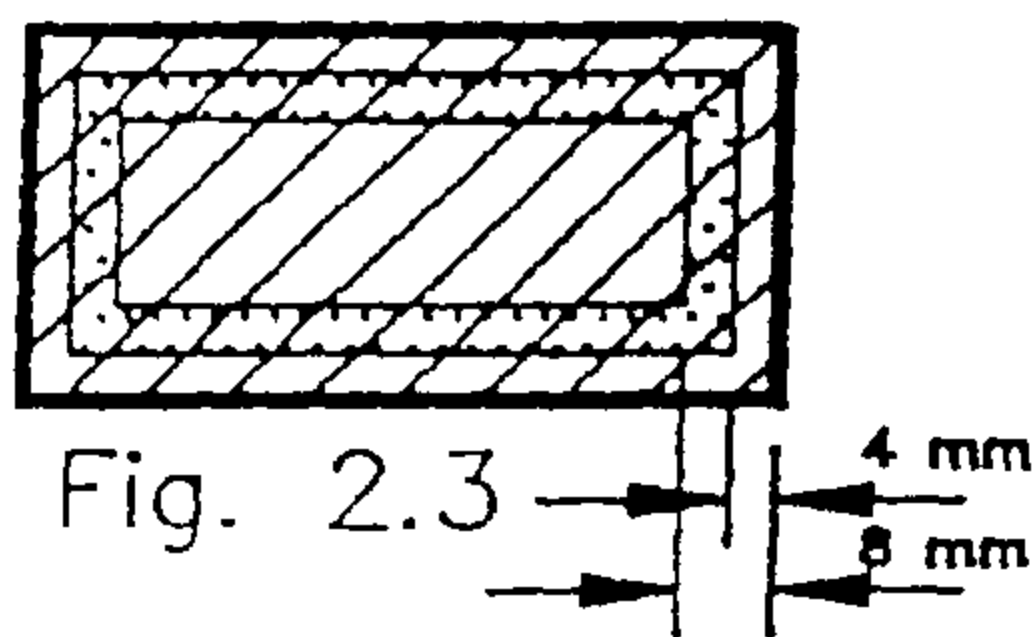


Fig. 2.3

Zone C  
(All Heartwood Sawn Timber)

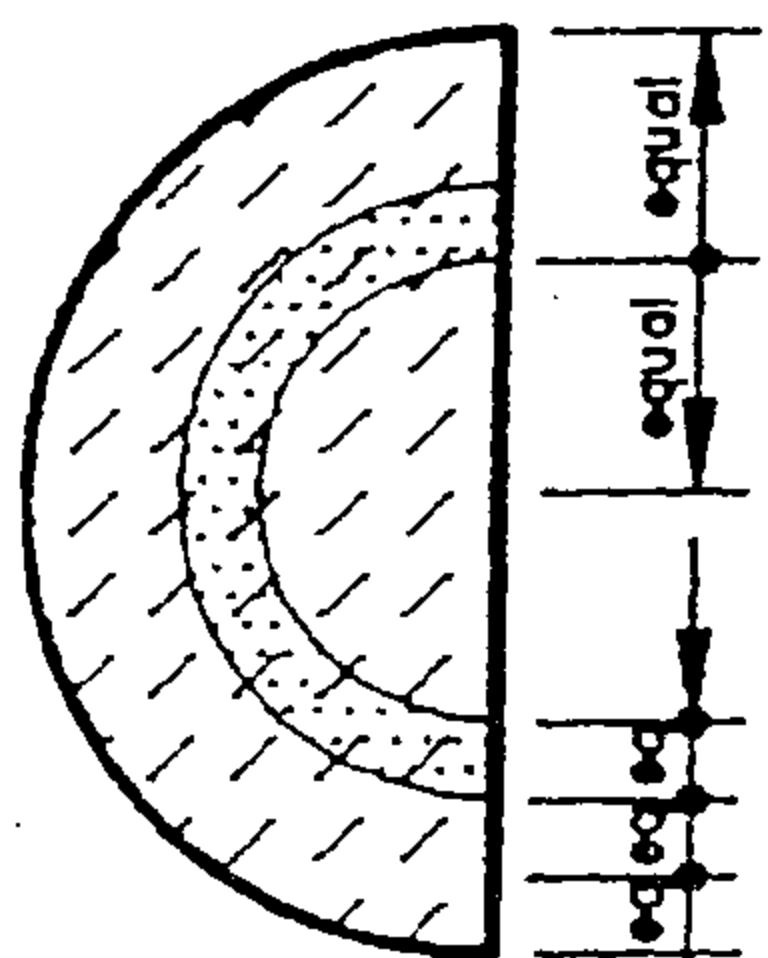


Fig. 2.4

Zone D  
(Conifer Poles or Hardwood Poles with undifferentiated Sap and Heartwood)

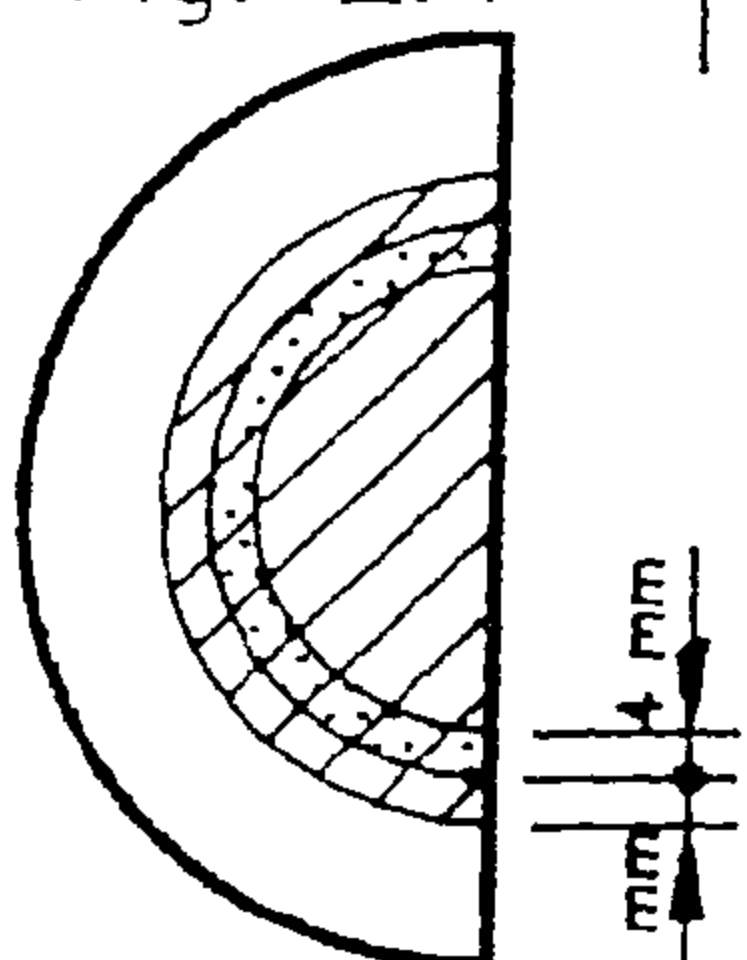


Fig. 2.5

Zone E  
(Hardwood Poles with differentiated Sap and Heartwood)

LEGEND

- |                           |  |
|---------------------------|--|
| Sapwood                   | Analytical Zone (Heartwood)                          |
| Heartwood                 | Undifferentiated Sap and Heartwood                   |
| Analytical Zone (Sapwood) | Analytical Zone (Undifferentiated Sap and Heartwood) |

FIGURE 2 - Analytical zones for sawn and round timbers

Table 4: Service conditions, hazard types and levels and minimum CCA preservative retention in sawn and round timber

HAZARD TYPE AND LEVEL	MINIMUM CCA PRESERVATIVE RETENTION kg/m <sup>3</sup>			RETENTION %wt/wt	
	LIGHT (2)	MEDIUM (2)	HEAVY (2)	SALT	ELEMENTAL
H1	3.74	5.0	6.23	0.83	0.31
H2&H3	6.0	8.0	10.0	1.33	0.50
H4&H5	18.0	24.0	30.0	4.00	1.49
H6	24.0	32.0	40.0	5.33	2.00

Note on Table 4

(1) Treatments approved for higher hazard uses will protect timber in all lower hazard situations.

(2) Retention groups are based on wood density at a moisture content of 12%

"LIGHT" timbers are those with density less than 500 kg/m<sup>3</sup> with an average of 450.

"MEDIUM" timbers are those with density range from 500 to 699 kg/m<sup>3</sup> with an average of 600.

"HEAVY" timbers are those with density of more than 699 kg/m<sup>3</sup> with an average of 750.

Some marine organisms are very resistant to the preservatives currently available. Suppliers must obtain an agreement from the purchaser that the combination of a timber species, preservative and retention is acceptable to the purchaser for a particular marine location.

#### 9.4 Analysis of Penetration and Retention

Refer to PNG Standard No. 1291 "Methods of testing and sampling for preservative and preservative-treated timber"<sup>1)</sup> for detailed method of analysis for penetration and retention requirements.

Table 5: Minimum preservative (salts and elements) retention in the analytical zone for CCA treated timber for various hazard levels based on tanalith CT106

Level	Hazard Minimum Preservative Salt Retention (wt/wt)			Minimum Elemental Retention (wt/wt)				
	Copper Sulphate	Potassium Dichromate	Arsenic Pentoxide	Total	Copper	Chromium	Arsenic	Total
H1	0.29	0.36	0.18	0.83	0.07	0.13	0.11	0.31
H2&H3	0.45	0.58	0.30	1.33	0.12	0.21	0.17	0.50
H4&H5	1.40	1.80	0.80	4.00	0.36	0.63	0.50	1.49
H6	1.88	2.39	1.06	5.33	0.47	0.84	0.69	2.00

1) In preparation

## 10. BRANDING

10.1 All preservative treated timber must be clearly and legibly branded in accordance with relevant Codes of Practice. The brand used shall comply with the following arrangement:—

TREATMENT PLANT NUMBER     HAZARD  
                                    LEVEL  
                                    e.g. 001 — H5

10.2 All pieces of preservative treated timber must be branded except the following:—

- (a) Fence battens (palings) and droppers
- (b) Timber 1100mm<sup>2</sup> and less in cross section
- (c) Timber less than 15mm nominal sawn dimension in thickness.

10.3 At the discretion of the purchaser, the Certificate of Treatment (Appendix 3) may be accepted by the purchaser as sufficient evidence of treatment.

## 11. CERTIFICATE OF TREATMENT

A Certificate of Treatment as shown on Appendix 3, especially in cases where it is not practical to brand every piece of treated timber, may be considered by

the buyer as sufficient evidence of treatment in accordance with requirements of this Standard.

The Certificate of Treatment shall:—

- (a) identify the charge or parcel of timber by the number and date,
- (b) indicate timber species and its density group;
- (c) indicate the preservative used and the process employed;
- (d) state the hazard level number; and
- (e) state the treatment plant number, name and address of the company.

## 12. RECORDS OF TREATMENT

The treater shall on request make available to the buyer copies of records of treatment and shall retain original records of treatment for a minimum of five years. Copies of treatment records shall also be sent to:—

The Director  
PNG Forest Research Institute  
LAE  
Morobe Province

## APPENDIX 1

THE HEARTWOOD NATURAL DURABILITY  
OF TIMBERS**Introduction**

Natural durability may be defined as the inherent resistance of the heartwood of a timber species to decay and insect attack. Insect resistance and termite resistance are not necessarily related. In the context of this Standard, durability refers to the timber's performance in-ground contact when exposed to environmental conditions closely representative of commercial service. The performance of untreated heartwood above ground will generally be better than its performance in the ground, and thus the listed ratings reflect the more severe condition of in-ground contact.

It is recognised that there is a large variation of in-ground durability within most timber species, and that this variation can be apparent both between different trees and within the same trees. Thus the ratings listed in Appendix 2 are intended as a guide for the user and are not necessarily categorical assignments. It is hoped that future research will permit the listing of a species rating plus its known range of variation. In addition, the reader should be aware that currently available data suggested that termite resistance of a timber species can be markedly different to that species' decay resistance. Again, until such data is complete the ratings listed in Appendix 2 should be used as a tentative guide to a timber's natural durability.

For all timbers, the untreated sapwood should be regarded as non-durable in any use where a decay or insect hazard exists. Also the inner heartwood — the first few growth rings around the pith generally has lower decay and insect resistance than the rest of the heartwood.

**Purpose**

The purpose of this Appendix is to assign tentative durability ratings to the heartwood of some timbers likely to be offered in PNG for preservative treatment.

It should be noted that the sapwood of almost all timbers can be penetrated satisfactorily with preservatives by conventional treatments but that the permeability of the heartwood varies greatly between species and to some extent within a species.

Inclusion of a species in this Appendix therefore does not imply that a required penetration pattern is commercially attainable in the heartwood.

**Categories**

The following classifications have been assigned with the foregoing remarks in mind. As further reliable evidence becomes available, the ratings may need to be changed.

Class	Probable life expectancy in ground (years)
1	Greater than 15
2	Greater than 10, up to 15
3	5, up to 10
4	Less than 5

Note that some heartwood of an individual timber species may vary from that species' nominated classification. Treatment is necessary where a performance life in excess of the lower limit of the range of average life expectancy is required.

## APPENDIX 2

## NATURAL DURABILITY, PRESSURE PERMEABILITY AND DENSITY GROUPS OF PNG TIMBER SPECIES

TRADE NAME	BOTANICAL NAME	NATURAL DURABILITY	PRESSURE PERMEABILITY	DENSITY GROUP
adenanthera	<i>Adenanthera spp.</i>	2	3	Heavy
aglaia	<i>Aglaia spp.</i>	3-4	4	Heavy
albizia, brown	<i>Albizia procera</i>	4	3	Medium
albizia, white	<i>A. falcataria</i>			
	<i>A. minahassae</i>	4	2	Light
alstonia, hard	<i>Alstonia spp.</i>	2-3	2	Heavy
amberoi	<i>Pterocymbium beccarii</i>	4	1	Light
amoor	<i>Amoor cucullata</i>	3-4	4	Medium
antiaris	<i>Antiaris toxicaria</i>	4	1	Light
ash, Bulolo	<i>Hibiscus papuaiodendron</i>	4	4	Light
ash, hickory	<i>Flindersia ifflaina</i>	2	(4)	Heavy
ash, papuan silver	<i>Flindersia amboinensis</i>	3-4	4	Medium
ash, scaly	<i>Ganophyllum falcatum</i>	3	4	Heavy
ash, silver	<i>Flindersia schottiana</i>	3	4	Medium
balsa	<i>Ochroma lagopus</i>	4	1	Light
basswood	<i>Endospermum spp.</i>	4	1	Light
beech	<i>Nothofagus spp.</i>	2-3	4	Heavy
beech, Wau (Chempaka)	<i>Elmerrillia papuana</i>	2	4	Light
beech, white	<i>Gmelina moluccana</i>	3-4	4	Light
birch, pink	<i>Schizomeria spp.</i>	4	3	Medium
bombax	<i>Bombax ceiba</i>	4	1-2	Light
box, swamp	<i>Tristania spp.</i>	3	4	Heavy
boxwood	<i>Xanthophyllum papuanum</i>	3-4	4	Heavy
burckella	<i>Burckella spp.</i>	4	4	Med, Heavy
calophyllum	<i>Calophyllum spp.</i>	3	4	Medium
camphorwood	<i>Cinnamomum spp.</i>	3	4	Light
camptosperma	<i>Camptosperma brevipetiolatum</i>	4	2	Light
	<i>C. montanum</i>			
cananga	<i>Cananga odorata</i>	4	1	Light
canarium, grey	<i>Canarium spp.</i>	4	4	Medium
candlenut	<i>Aleurites moluccana</i>	4	1	Medium
cathomion	<i>Cathomion umbellatum</i>	4	4	Heavy
cedar, Java	<i>Bischofia javanica</i>	3	3-4	Medium
cedar, mangrove	<i>Xylocarpus spp.</i>	3	3-4	Medium
cedar, pencil	<i>Palaquium spp.</i>	4	3-4	Medium
cedar, red	<i>Toona sureni</i>	2	4	Light
celtis, hard	<i>Celtis philippinensis</i>	4	1-2	Heavy
	<i>C. latifolia</i>			
celtis, light	<i>Celtis nymanii</i>	4	2	Medium
	<i>C. kajewskii</i>			
cheesewood, white	<i>Alstonia scholaris</i>	4	2	Light
cheesewood, yellow	<i>Sarcocephalus coadunatus</i>	4	2	Medium
chrysophyllum	<i>Chrysophyllum roxburghii</i>	4	2	Light
coachwood	<i>Ceratopetalum succirubrum</i>	4	3	Medium
cordia	<i>Cordia dichotoma</i>	4	3	Light
cryptocarya (Medang)	<i>Cryptocarya spp.</i>	3-4	4	Medium
dacrydium	<i>Dacrydium spp.</i>	2-3	(3)	Medium
dillenia (Simpoh)	<i>Dillenia spp.</i>	4	2-3	Medium
drypetes	<i>Drypetes spp.</i>	4	1	Heavy
duabanga	<i>Duabanga moluccana</i>	4	2	Light

TRADE NAME	BOTANICAL NAME	NATURAL DURABILITY	PRESSURE PERMEABILITY	DENSITY GROUP
dysox	<i>Dysoxylum spp.</i>	2-3	4	Heavy
diospyros	<i>Diospyros papuana</i>	3	3	Medium
ebony, black	<i>Diospyros ferrea</i>	(3)	(3)	Heavy
endiandra (Medang)	<i>Endiandra spp.</i>	3	(2)	Medium
erua	<i>Octomeles sumatrana</i>	4	2	Light
euodia, heavy	<i>Euodia borwickii</i>	4	(2)	Light
euodia, light	<i>Euodia elleryana</i>	4	2	Light
fagraea	<i>Fagraea spp.</i>	2	4	Heavy
fig	<i>Ficus spp.</i>	4	2-3	Light
galip	<i>Canarium indicum</i>	4	4	Medium
garo garo	<i>Mastiziodendron spp.</i>	2	2	Heavy
garuga	<i>Garuga floribunda</i>	4	4	Medium
glochidion	<i>Glochidion philippicum</i>	4	(4)	Medium
gordonia	<i>Gordonia papuana</i>	3-4	(3)	Medium
gum, water	<i>Syzygium spp.</i>	2-3	4	Heavy
hardwood, yellow	<i>Neonauclea spp.</i>	2-3	4	Medium
hekakoro (Rengas)	<i>Gluta spp.</i>	2-3	(3)	Medium
heritiera	<i>Heritiera littoralis</i>	3-4	4	Medium
hernandia	<i>Hernandia papuana</i>	2-3	(3)	Light
hopea, heavy	<i>Hopea iriana,</i> <i>H. glabrifolia</i>	2	4	Heavy
hopea, light	<i>Hopea papuana,</i> <i>H. forbesii,</i> <i>H. similis,</i> <i>H. celtidifolia</i>	2	3-4	Medium
horsfieldia	<i>Horsfieldia irya</i>	4	3	Light
ironbark, scrub	<i>Bridelia spp.</i>	4	4	Medium
kamarere	<i>Eucalyptus deglupta,</i>	3	4	Medium
kandis	<i>Garcinia spp.</i>	3	4	Heavy
kapiak	<i>Artocarpus spp.</i>	4	3	Light
kasi kasi	<i>Xanthostemon spp.</i>	1	4	Heavy
kempas	<i>Koompassia grandiflora</i>	3	2-3	Heavy
kiso	<i>Chisocheton spp.</i>	4	3	Medium
kwila	<i>Intsia bijuga,</i> <i>I. palembanica</i>	1-2	4	Heavy
labula	<i>Anthocephalus chinensis</i>	4	1	Light
lapome	<i>Teysmanniodendron spp.</i>	2	4	Light
libocedrus	<i>Libocedrus papuanus</i>	(2)	(2-3)	Light
litsea (Medang)	<i>Litsea spp.</i>	4	4	Light
macaranga	<i>Macaranga spp.</i>	4	(1)	Light
magnolia	<i>Galbulimima belgraveana</i>	4	2-3	Light
malas	<i>Homalium foetidum</i>	2-3	4	Heavy
mango	<i>Mangifera minor</i>	4	3	Medium
mangrove, black	<i>Bruguiera spp.</i>	3	(2-3)	Heavy
mangrove, milky	<i>Excoecaria agallocha</i>	4	(2)	Light
mangrove, red	<i>Rhizophora spp.</i>	2-3	3	Heavy
mangrove, red-brown	<i>Sonneratia spp.</i>	3	3	Heavy
mangrove, white	<i>Avicennia marina</i>	4	4	Heavy
manilkara	<i>Manilkara kanosiensis</i>	1	4	Heavy
maniltoa	<i>Maniltoa spp.</i>	3	3	Heavy
maple, scented	<i>Flindersia laevicarpa</i>	2-3	4	Medium
maple, silkwood	<i>Flindersia pimenteliana</i>	3	4	Light
mersawa	<i>Anisoptera thurifera</i>	3	4	Medium
milkwood, grey	<i>Cerbera floribunda</i>	4	(3-4)	Light
neoscortechinia	<i>Neoscortechinia forbesii</i>	2-3	2	Medium
neubergia	<i>Neubergia corynocarpa</i>	4	3	Medium
nutmeg	<i>Myristica spp.</i>	4	3	Light
oak, pink silky	<i>Oreocallis wickhamii</i>	3	4	Medium
oak, red	<i>Lithocarpus spp.</i>	(2-3)	4	Medium



TRADE NAME	BOTANICAL NAME	NATURAL DURABILITY	PRESSURE PERMEABILITY	DENSITY GROUP
oak, she oak, silky	<i>Casuarina</i> spp.	(2-3)	4	Heavy
	<i>Grevillea papuana</i> , <i>G. glauca</i>	3	(4)	Medium
oak, white	<i>Castanopsis</i> <i>acuminatissima</i>	3	4	Medium
	<i>Pangium edule</i>	3-4	4	Medium
pangium	<i>Pericopsis mooniana</i>	2	4	Heavy
pericopsis	<i>Pimeleodendron</i>	4	2	Medium
pimeleodendron	<i>amboinicum</i>		(2)	Medium
pine, celery top	<i>Phyllocladus hypophyllus</i>	2-3	2	Light-Heavy
pine, hoop	<i>Araucaria cunninghamii</i>	4	2	Light
pine, kauri	<i>Agathis</i> spp.	4	2-3	-Medium
pine, klinkii	<i>Araucaria hunsteinii</i>	4	2	Light
				-Medium
planchonella, red	<i>Planchonella torricellensis</i>	3-4	3	Medium
	<i>Planchonella</i>	3-4	2	Medium
planchonella, white	<i>kaernbachiana</i>			
planchonia	<i>Planchonia papuana</i>	3-4	2	Medium
				-Heavy
plum, busu	<i>Maranthes corymbosa</i>	2	2	Heavy
plum, tulip	<i>Pleiogynium timorensis</i>	2-3	4	Medium
podocarp, black	<i>Prumnopitys amara</i>	4	2	Light
	<i>Decussocarpus</i>	4	2	Medium
podocarp, brown	<i>wallichianus</i>			
podocarp, high mountain	<i>Dacrycarpus</i> spp.	4	2	Medium
podocarp, low mountain	<i>Podocarpus</i> spp.	4	2	Medium
polyalthia	<i>Polyalthia oblongifolia</i>	4	3	Medium
quandong	<i>Elaeocarpus</i> spp.	4	2	Light
rosewood	<i>Pterocarpus indicus</i>	1	4	Medium
saffronheart	<i>Halfordia papuana</i>	2	4	Heavy
sassafras	<i>Dryadodaphne</i> <i>novoguineensis</i>	4	(2)	Medium
satinheart, green	<i>Geijera salicifolia</i>	2	4	Heavy
	<i>Buchanania</i> spp.	4	2	Light
satinwood, pink	<i>Ailanthus integrifolia</i>	4	1	Light
siris, white	<i>Spondias cytherea</i>	4	2	Light
spondias	<i>Sterculia</i> spp.	4	1	Light
sterculia	<i>Pometia pinnata</i>	3	4	Medium
taun tree	<i>Melaleuca</i> spp.	2	4	Heavy
tea	<i>Tectona grandis</i>	2	4	Medium
teak	<i>Terminalia brassii</i>	4	4	Light
terminalia, brown	<i>Terminalia katikii</i>	3-4	3	Medium
terminalia, pale brown	<i>T. macadamii</i> , <i>T. oreadum</i> , <i>T. solomonensis</i> <i>T. sepicana</i>			
	<i>Terminalia archboldiana</i>	(4)	2-3	Medium
	<i>T. complanta</i> , <i>T. longespicata</i>	3-4	2-3	Light
	<i>Terminalia archipelagi</i>	4	4	Heavy
	<i>T. canaliculata</i> , <i>T. catappa</i> <i>T. eddowesii</i> , <i>T. kaernbachii</i> , <i>T. microcarpa</i> , <i>T. morobensis</i> , <i>T. rubiginosa</i> , <i>T. impediens</i>			

TRADE NAME	BOTANICAL NAME	NATURAL DURABILITY	PRESSURE PERMEABILITY	DENSITY GROUP
terminalia, yellow brown	<i>Terminalia calamansanii</i>	4	2	Medium
	<i>T. meglocarpa</i>	(4)	(2)	Medium
	<i>T. steenisiana</i>	(2-3)	(4)	Heavy
tetrameles	<i>Tetrameles nudiflora</i>	4	1	Light
tristiropsis	<i>Tristiropsis acutangula</i>	4	4	Medium
vatica (Resak)	<i>Vatica rasak</i>	3	(2-3)	Medium
vitex	<i>Vitex cofassus</i>	2	4	Heavy
walnut	<i>Dracontomelon dao</i>	3-4	4	Medium
	<i>D. lenticulatum</i>			
walnut, Island	<i>Cordia subcordata</i>	4	4	Medium
wattle	<i>Acacia spp.</i>	2-3	4	Heavy

Note: Figures in brackets indicate that the natural durability or pressure permeability rating may not be very reliable.

#### Bibliography

The following documents served as references in the preparation of this Standard and will be helpful when using it.

PNGS 1196 Timber poles for overhead lines (in preparation).

Eddows P.J. 1977 Commercial timbers of Papua New Guinea, Office of Forests, Port Moresby.

Timber Preservative Authority 1980. Timber preservation in New Zealand, 4th Edition.

APPENDIX 3

# CERTIFICATE of TREATMENT

This is to certify that

.....(Name of Company)  
of .....(Postal Address)  
has carried out timber treatment  
in accordance with the PNG  
Standard for Preservation of  
Sawn and Round Timber as follows...

## TIMBER TREATED

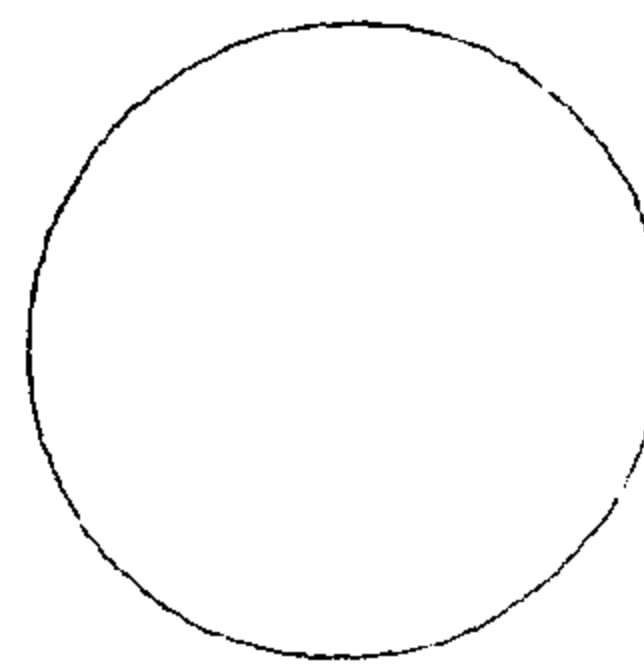
Batch/Order No.....  
Date Treated .....  
Species .....  
Density Group .....  
Hazard Level .....

## THIS CERTIFICATE ISSUED

At .....(place)  
on the ..... day of .....19.....

## AND SIGNED..... (Signature)

Full Name of Signatory .....  
Position within Company .....  
Plant number of Company .....



Seal of the Company

## **PAPUA NEW GUINEA STANDARDS**

To keep abreast of progress in industry, Papua New Guinea Standards are subject to periodic review and are kept up-to-date by the issue of amendments and new editions as necessary. It is important therefore that standards users ensure that their standards are up-to-date.

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Most overseas standards can be purchased through the Sales Office of the National Standards Council.

## **OFFICES OF THE NATIONAL STANDARDS COUNCIL**

The Offices of the National Standards Council are on the ground floor of the Central Government Offices, Waigani, Papua New Guinea.

The postal address is: Executive Director  
National Standards Council  
PO Box 3042  
BOROKO PAPUA NEW GUINEA

## PAPUA NEW GUINEA NATIONAL STANDARDS COUNCIL

The Papua New Guinea National Standards Council was established under the *National Standards Act 1978* and commenced operations in 1979.

The main function of the Council is to advise on all aspects of standardization in Papua New Guinea. In the context of technical standards, the Council publishes PNG Standards and promotes their adoption. Standards are in the form of specifications for materials and products, codes of safe practice, methods of testing etc. They are selected by specialist committees which are staffed by volunteers from Government and private enterprise.

Before a standard is published, the Minister responsible for the adoption of the standard must be satisfied that all interested parties in Government and private enterprise have been consulted and are in agreement with the adoption of the standard.

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The Council is responsible for other aspects of standardization, including:

- (a) recommending PNG legal units of measurement and conversion factors
- (b) advising on the maintenance of standards of measurement
- (c) recommending the approval of measuring instruments
- (d) granting accreditation to testing authorities which have adequate facilities and capacity to carry out certain tests, and
- (e) operating pre-shipment inspection and quality assurance schemes for goods produced in PNG.

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