इंटरनेट मानक

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Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
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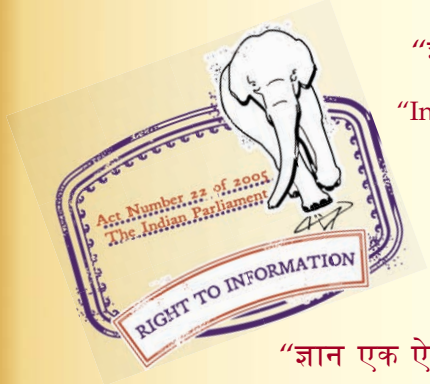
IS 12896 (1990): Indian timbers for door and window shutters and frames- Classification [CED 9: Timber and Timber Stores]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 12896 : 1990
Reaffirmed 2010

Indian Standard

INDIAN TIMBERS FOR DOOR AND WINDOW SHUTTERS AND FRAMES — CLASSIFICATION

भारतीय मानक

दरवाजे और खिड़की के शटरों और फ्रेमों के लिए भारतीय लकड़ी — वर्गीकरण

UDC 674·031·001·3: 691·11

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1990

Price Group 4

AMENDMENT NO. 1 APRIL 2001
TO
IS 12896 : 1990 INDIAN TIMBERS FOR DOOR AND WINDOW SHUTTERS AND FRAMES — CLASSIFICATION

(*Page* 2, *clause* 7.3, *last line*) — Insert the following between 'IS 401 : 1982' and 'except':

'to make them durable as Class 1'.

(*Page* 3, *clause* 7.3.1) — Substitute 'TCP'other organic solvent type wood preservatives' *for* 'PCP/solvent system'.

(*Page* 3, *clause* 7.3.2, *line* 3) — Substitute 'Annex D' *for* 'Annex C'.

(*Page* 3, *clause* 7.3.2, line 6) — Substitute 'TCP/other organic solvent type wood preservatives' *for* 'PCP/solvent' system.

(CED 9)

Reprography Unit, BIS, New Delhi, India

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 17 January 1990, after the draft finalized by the Timber Sectional Committee had been approved by the Civil Engineering Division Council.

The requirement of timber for door and window shutters and frames is increasing day by day as more and more houses are needed to provide shelter to the growing population of the country. Various Indian Standards, namely, IS 1003 (Part 1) 'Specification for timber panelled and glazed shutters: Part 1 Door shutters', IS 1003 (Part 2) 'Specification for timber panelled and glazed shutters: Part 2 Window and ventilator shutters', IS 6198 'Specification for ledged, braced and battened timber door shutters', IS 2202 (Part 1) 'Specification for wooden door shutters (solid core type): Part 1 Plywood face panels', IS 2202 (Part 2) 'Specification for wooden door shutters (solid core type): Part 2 Particle board face panels', and hardboard face panels, IS 4021 'Specification for timber door, window and ventilator frames', have been formulated on different varieties of doors and windows. These standards listed 43 species suitable for the manufacture of shutters and 33 for the frames. The classification of timbers was based upon distinguishing between teak and non-teak broad-leaved species and deodar and non-deodar coniferous species.

Considerable information on properties of Indian timbers which come into play during processing, fabrication and service as doors and windows has now become available as a result of research carried out at F.R.I., Dehra Dun. The data has indicated that many more species can be used for this purpose including a number of lesser known species and certain plantation species now available. It was, therefore, considered necessary to formulate a separate comprehensive standard on classification of Indian timbers for door and window shutters and frames based upon technological data. This standard recommends 109 species for shutters and 69 for frames. Besides giving a wider choice of species for different qualities of doors, it provides guidance to the manufacturers and users in selecting appropriate timber species for the purpose and promote proper and full utilization of dwindling forest resources of the country.

Requirements of timber for different types of doors are different depending on their use. For example, appearance is one of the important requirements when the door is used in a posh building and where door is to be polished while for general construction where the door is painted, it is not so. Similarly durability/treatability is more important for frames than for shutters as frames remain in ground contact. The classification of species in this standard is based on strength coefficient, appearance and texture, durability and treatability, weight, retention of shape, refractoriness to seasoning, ease of working, etc, of timbers and is adopted from the publication 'Classification of Indian timbers for door and window shutters and frames' by V. K. Gupta, S. S. Rajput, Satish Kumar and S. N. Sharma, Division of Forest Products, Forest Research Institute, Dehra Dun in the Journal of Timber Development Association (India), Vol 35, No. 1, 1989.

In the formulation of this standard, due weightage has been given to international coordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

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 analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INDIAN TIMBERS FOR DOOR AND WINDOW SHUTTERS AND FRAMES — CLASSIFICATION

1 SCOPE

1.1 This standard covers the general classification of Indian timber species suitable for door and window shutters and frames. It also lays down the general requirements of quality, seasoning, moisture content and preservative treatment for timber.

1.2 This standard does not, however, cover the species suitable for flush doors.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
287 : 1973	Recommendations for maximum permissible moisture content for timber used for different purposes (*second revision*)
401 : 1982	Code of practice for preservation of timber (*third revision*)
707 : 1976	Glossary of terms applicable to timber terminology and utilization (*second revision*)
1141 : 1973	Code of practice for seasoning of timber (*first revision*)
11215 : 1985	Method of determination of moisture content of timber and timber products

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 707 : 1976 and the following shall apply.

3.2 Strength Coefficient

The numerical value for a timber species evaluated by taking into consideration weight, strength as a beam, suitability as a post, splitting coefficient, nail and screw holding property and retention of shape expressed in terms of teak as 100.

4 TIMBER SPECIES

4.1 Shutters

Timber species for the manufacture of door and window shutters shall have adequate strength, weight, retention of shape, ease of working, ability to season well, finish smooth and shall be sufficiently durable and/or treatable. In addition, for high class polished door shutters, it shall have excellent appearance and figure and shall have good gloss after polishing. The timber species shall be classified into the following four groups based on strength coefficient, weight (expressed as a percentage of teak), durability and treatability, appearance, figure and polish adaptability, keeping also in view their seasoning behaviour, retention of shape and workability.

4.1.1 *Super Group*

The criteria for selection of species in this group shall be as follows:

Strength coefficient	:	More than or equal to 80
Weight	:	Between 75-115
Durability	:	I or II

In addition, these shall be excellent in figure appearance, smooth finishing and polishing. Species of this group are given in Annex A.

4.1.2 *Group I*

The criteria for selection of species in this group shall be as follows:

Strength coefficient	:	More than or equal to 80
Weight	:	Between 75-115
Durability	:	I or II

In addition, these shall be good to very good in figure appearance and finishing. Species of this group are given in Annex B.

4.1.3 *Group II*

The criteria for selection of species in this group shall be as follows:

Strength coefficient	:	More than or equal to 70
Weight	:	70-125
Durability	:	I, II or III [with treatability (a), (b) or (c) (*see* **7.2**)]

Species of this group are given in Annex C.

Species which are comparable to Group II species in respect of strength, weight, seasoning, working and finishing characters but fall short only in treatability, that is, belong to durability III with treatability (d) or (e) or whose durability/treatability data are not available shall be grouped into Group II(A). These species are also given in Annex C. Doors made out of the timbers of Group II(A) will require special preservative treatment after fabrication as in **7.3.2.**

4.1.4 *Group III*

The criteria of selection of species in this group shall be as follows:

Strength coefficient	:	More than or equal to 60
Weight	:	65-125
Durability	:	Any class or not known

Species of this group are given in Annex D. Doors made out of the species in this group that have durability/treatability Class III (d or e) or whose durability/treatability is not known will require special preservative treatment after fabrication as specified in **7.3.2**.

4.2 Frames

Timber species suitable for the manufacture of door and window frames shall be classified into following three groups depending upon strength coefficient, durability and treatability.

4.2.1 *Group I*

The criteria for selection of timber in this group shall be as follows:

Strength coefficient	:	80 or more
Durability	:	I

Species of this group are given in Annex E.

4.2.2 *Group II*

The criteria for selection of timber in this group shall be as follows:

Strength coefficient	:	70 or more
Durability	:	I, II [with treatability (a), (b) or (c) or III with treatability (a) or (b)]

Species of this group are given in Annex F.

4.2.3 *Group III*

The criteria for selection of timber in this group shall be as follows:

Strength coefficient	:	65 or more
Durability	:	I, II (with any treatability class) or III [with treatability (a), (b) or (c)]

Species of this group are given in Annex G.

5 GENERAL REQUIREMENTS

5.1 The timber of all groups shall be free from decay, fungal growth, boxed heart, splits, pitch pockets or streaks on the exposed faces, and dead and loose knots.

5.2 Live knots up to 25 mm diameter, not more than 3 per metre; live knots over 25 mm and up to 40 mm diameter not more than 2 per metre shall be permissible, provided they are evenly distributed and not badly checked.

5.3 Surface cracks not exceeding 2 mm in depth in timber intended for shutters and not exceeding 3 mm in depth in timber intended for frames shall be permitted.

6 SEASONING AND MOISTURE CONTENT

6.1 For the purpose of seasoning, timber species shall be classified into the following three classes depending upon their behaviour with respect to cracking and splitting and drying rate:

a) Class A : Highly refractory,

b) Class B : Moderately refractory, and

c) Class C : Non-refractory.

6.1.1 *Highly Refractory Timber Species* are slow and difficult to season free from surface and end cracking.

6.1.2 *Moderately Refractory Timber Species* may be seasoned free from surface and end cracking within reasonably short periods, given a little protection against rapid drying conditions.

6.1.3 *Non-refractory Timber Species* may be rapidly seasoned free from surface and end cracking even in the open air and sun. If not rapidly dried, they develop blue stain and mould on the surface.

6.2 Timber shall be seasoned to moisture content conforming to **3.1** and **4.1** of IS 287 : 1973 by a suitable process specified in IS 1141 : 1973. Moisture content shall be determined either by the oven dry method or by electrical moisture meters as specified in 3 and 4 of IS 11215 : 1985.

7 DURABILITY AND PRESERVATIVE TREATMENT

7.1 Timbers are classified for durability according to the average life of the test specimens as follows:

Class	*Average Life* (Months)
I	120 and over
II	60 and over but less than 120
III	Less than 60

7.2 The treatability of heartwood of different species shall be classified into 5 grades [(a) to (e)], each grade being defined as indicated below:

a) Heartwood easily treatable;

b) Heartwood treatable but complete penetration not always obtained, in case where the least dimension is more than 6 cm;

c) Heartwood only partially treatable;

d) Heartwood refractory to treatment; and

e) Heartwood very refractory to treatment, penetration of preservative being practically nil even from the ends.

7.3 Sapwood of even durability Class I species and heartwood and sapwood of durability Class II and III species shall be pressure treated with suitable preservatives conforming to IS 401 : 1982 except in the following conditions.

7.3.1 Shutters manufactured from species belonging to Super Group in Annex A, having durability Class II shall be pressure/vacuum treated after complete fabrication only with PCP/solvent system.

7.3.2 Shutters manufactured from species belonging to Group II(A) in Annex C and Group III in Annex C having durability/treatability III (d) or (e) or whose durability/treatability is not mentioned, shall be pressure/vacuum treated with PCP/solvent system only after complete fabrication to ensure minimum penetration of 2 mm in the finished products.

7.3.3 For frames, timber of the species of Group III belonging to durability/treatability Class III (c) in Annex F shall be treated to refusal under pressure when proper retentions as in IS 401 : 1982 for ground contact condition are not achievable.

ANNEX A

(*Clause* 4.1.1)

SUPER GROUP TIMBERS FOR SHUTTERS

Sl No.	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*
	Super Group			
1.	*Albizia lebbeck* (kokko)	I	e	B
2.	*Albizia odoratissima* (kala siris)	I	e	B
3.	*Chukrasia velutina* (chickrassy)	II	c	B
4.	*Dalbergia latifolia* (rosewood)	I	—	B
5.	*Dalbergia sissoo* (sissoo)	I	e	B
6.	*Dysoxylum malabaricum* (white cedar)	I	—	B
7.	*Gluta travencorica* (gluta)	I	—	—
8.	*Michelia* sp. (champ)	II	—	A
9.	*Phoebe hainesiana* (bonsam)	II	c	B
10.	*Pterocarpus dalbergioides* (padauk)	I	c	B
11.	*Tectona grandis* (teak)	I	e	B

ANNEX B

(*Clause* 4.1.2)

GROUP I TIMBERS FOR SHUTTERS

Sl No.	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*
1.	*Albizia procera* (safed siris)	I	c	B
2.	*Amoora* sp. (amari)	II	—	B
3.	*Aphanamixis polystachya* (pitraj)	I	—	B
4.	*Artocarpus chaplasha* (chaplash)	II	d	B
5.	*Artocarpus hetrophyllus* (kathal)	I	d	B
6.	*Artocarpus hirsutus* (aini)	I	—	B
7.	*Artocarpus lakoocha* (lakooch)	I	—	B
8.	*Calophyllum elatum* (poon)	II	—	B
9.	*Cedrus deodara* (deodar)	I	c	C
10.	*Lagerstroemia hypoleuca* (pyinma)	I	—	B
11.	*Lagerstroemia lanceolata* (benteak)	I	e	B
12.	*Lagerstroemia speciosa* (jarul)	II	e	B
13.	*Pterocarpus marsupium* (bijasal)	I	e	B
14.	*Sonneratia apetala* (keora)	II	—	B
15.	*Terminalia manii* (black chuglam)	II	a	B
16.	*Terminalia peniculata* (kindal)	I	c	A
17.	*Zanthoxylum rhetsa* (mullilam)	I	e	B

ANNEX C
(*Clause* 4.1.3)

GROUP II AND GROUP II(A) TIMBERS FOR SHUTTERS

Sl No.	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*
GROUP II				
1.	*Acacia nilotica* (babul)	II	b	B
2.	*Acrocarpus fraxinifolius* (mundani)	III	c	B
3.	*Adina cordifolia* (haldu)	III	a	B
4.	*Anthcephalus chinensis* (kadam)	III	a	C
5.	*Castanopsis hystrix* (Indian chestnut)	II	b	—
6.	*Castanopsis indica* (Indian chestnut)	II	b	B
7.	*Cullenia rosayroana* (karani)	III	b	C
8.	*Cupressus torulosa* (cypress)	I	e	C
9.	*Gmelina arborea* (gamari)	I	e	B
10.	*Grewia tilifolia* (dhaman)	II	d	B
11.	*Hevea brasiliensis* (rubber wood)	III	b	B
12.	*Holoptelea integrifolia* (kanju)	III	b	B
13.	*Lagerstroemia parviflora* (lendi)	II	e	A
14.	*Mangifera indica* (mango)	III	a	B
15.	*Mitragyna parviflora* (kaim)	III	b	B
16.	*Ougeinia oojeinensis* (sandan)	I	—	B
17.	*Palaquium ellipticum* (pali)	II	e	B
18.	*Pinus roxburghii* (chir)	III	b	C
19.	*Podocarpus nerifolia* (thitmin)	II	—	—
20.	*Pterospermus acerifolium* (hathipala)	III	c	B
21.	*Shorea assamica* (makai)	III	c	B
22.	*Syzygium cumini* (jaman)	II	e	A
23.	*Terminalia alata* (laurel)	I	b	A
24.	*Terminalia arjuna* (arjun)	II	b	B
25.	*Terminalia bellirica* (bahera)	III	b	B
26.	*Terminalia myriocarpa* (hollock)	III	a	B
27.	*Terminalia procera* (white bombwe)	III	b	B
28.	*Toona ciliata* (toon)	II	c	B
GROUP II(A)				
29.	*Acer* sp. (maple)	III	—	B
30.	*Azadirachta indica* (neem)	—	—	—
31.	*Betula alnoides* (birch)	—	—	B
32.	*Canarium strictum* (white dhup)	III	—	—
33.	*Cinnamomum camphora* (cinnamon)	III	e	B
34.	*Dillenia pentagyna* (dillenia)	III	d	B
35.	*Duabanga grandiflora* (lampati)	III	e	C
36.	*Eucalyptus tereticornis* (Mysore gum)	III	e	A
37.	*Exbucklandia populnea* (pipli)	—	—	C
38.	*Holarrhena antidysenterica* (kurchi)	—	—	B
39.	*Kingiodendron pinnatum* (piney)	—	—	B
40.	*Mallotus philippensis* (raini)	III	—	—
41.	*Melia azederach* (Persian lilac)	III	—	B
42.	*Milusa velutina* (hoom)	III	—	B
43.	*Milusa velutina* (domsal)	III	—	—
44.	*Morus laevigata* (bola)	—	—	B
45.	*Morus serrata* (mulberry)	III	—	—
46.	*Polyalthia fragrans* (debdaru)	III	—	B
47.	*Pterygota alata* (narikel)	III	—	C
48.	*Taxus baccata* (yew)	—	—	—
49.	*Terminalia bialata* (white chuglam)	III	e	B
50.	*Thespesia populnea* (bhendi)	—	—	B

ANNEX D
(*Clause* 4.1.4)

GROUP III TIMBERS FOR SHUTTERS

Sl No.	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*	*Sl No.*	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*
1.	*Abies pindrow* (fir)	III	d	C	18.	*Lannea coromandelica* (jhingan)	III	e	B
2.	*Abies densa* (red fir)	—	—	—	19.	*Machilus* sp. (machilus)	III	e	B&C
3.	*Acacia leucophloea* (hiwar)	—	—	—	20.	*Milingtonia hortensis* (nimi-chambeli)	—	—	—
4.	*Acacia tortilis*	—	—	—	21.	*Palaquium polyanthum* (tali)	—	—	B
5.	*Adina oligocephala*	—	—	—	22.	*Parishia insignis* (red dhup)	III	—	C
6.	*Aesculus indica* (horse chestnut)	—	—	B	23.	*Picea smithiana* (spruce)	III	d	C
7.	*Albizia lucida*	—	—	—	24.	*Pinus kesiya* (khasi pine)	III	b	B
8.	**Boswellia serrata* (salai)	I	e	C	25.	*Pinus wallichiana* (kail)	II	c	C
9.	*Buchanania lanzen* (charoli)	—	—	—	26.	*Robinia pseudacacia*	—	—	—
10.	*Cupressus lusitanica*	—	—	—	27.	*Schima wallichii* (chilauni)	III	d	—
11.	*Dipterocarpus macrocarpus* (hollong)	III	a	B	28.	*Stereospermum colais* (padri)	III	—	B
12.	*Dipterocarpus* sp. (gurjan)	II	b	B	29.	*Terminalia citriana*	—	—	—
13.	*Elaeocarpus* sp. (rudrak)	—	—	C	30.	*Ulmus wallichiana* (elm)	III	—	—
14.	**Garuga pinnata* (garuga)	I	e	B	31.	*Vateria indica* (vellapine)	III	e	C
15.	*Grevillea robusta* (silver oak)	III	—	B					
16.	*Grewia vestita*	—	—	—					
17.	*Knema attenuata* (jathikai)	III	—	C					

*Contains mostly sapwood. Little heartwood available should also be avoided.

ANNEX E
(*Clause* 4.2.1)

GROUP I TIMBERS FOR FRAMES

Sl No.	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*	*Sl No.*	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*
1.	*Albizia lebbeck* (kokko)	I	e	B	6.	*Artocarpus hirsutus* (aini)	I	—	B
2.	*Albizia odoratissima* (kala siris)	I	e	B	7.	*Artocarpus lakoocha* (lakooch)	I	—	B
3.	*Albizia procera* (safed siris)	I	c	B	8.	*Cedrus deodara* (deodar)	I	c	C
4.	*Aphanamixis polystachya* (pitraj)	I	—	B	9.	*Dalbergia latifolia* (rosewood)	I	—	B
5.	*Artocarpus heterophyllus* (kathal)	I	—	B	10.	*Dalbergia sissoo* (sissoo)	I	e	B

Sl No.	Name of Species	Durability	Treatability	Refractoriness to Seasoning
11.	*Dysoxylum malabaricum* (white cedar)	I	—	B
12.	*Eucalyptus globulus* (blue gum)	I	e	A
13.	*Gluta travancorica* (gluta)	I	—	A
14.	*Hopea parviflora* (hopea)	I	e	A
15.	*Lagerstroemia hypoleuca* (pyinma)	I	—	B
16.	*Lagerstroemia lanceolata* (benteak)	I	e	B
17.	*Ougeinia oojeinensis* (sandan)	I	—	B
18.	*Pterocarpus delbergioides* (padauk)	I	c	B
19.	*Pterocarpus marsupium* (bijasal)	I	e	B
20.	*Shorea robusta* (sal)	I	e	A
21.	*Tectona grandis* (teak)	I	e	B
22.	*Terminalia alata* (laurel)	I	b	A
23.	*Terminalia paniculata* (kindal)	I	c	A
24.	*Xylia xylocarpa* (irul)	I	e	A
25.	*Zanthoxylum rhtesa* (mullilam)	I	e	B

ANNEX F
(*Clause* 4.2.2)

GROUP II TIMBER FOR FRAMES

Sl No.	Name of Species	Durability	Treatability	Refractoriness to Seasoning
1.	*Acacia nilotica* (babul)	II	b	B
2.	*Adina cordifolia* (haldu)	III	a	B
3.	*Anthocephalus chinensis* (kadam)	III	a	C
4.	*Castanopsis* sp. (Indian chestnut)	II	b	B
5.	*Chukrasia velutina* (chickrassy)	II	c	B
6.	*Cullenia rosayroana* (karani)	III	b	C
7.	*Cupressus torulosa* (cypress)	I	e	C
8.	*Dipterocarpus macrocarpus* (hollong)	III	a	B
9.	*Dipterocarpus* sp. (gurjan)	II	b	B
10.	*Gmelina arborea* (gamari)	I	e	B
11.	*Hevea brasiliensis* (rubberwood)	III	b	B
12.	*Holoptelea integrifolia* (kanju)	III	b	B
13.	*Mangifera indica* (mango)	III	a	B
14.	*Mitragyna parviflora* (kaim)	III	b	B
15.	*Phoebe hainesiana* (bonsum)	II	c	B
16.	*Pinus roxburghii* (chir)	III	b	C
17.	*Terminalia arjuna* (arjun)	II	b	B
18.	*Terminalia bellirica* (bahera)	III	b	B
19.	*Terminalia chebula* (myrobalan)	II	c	A
20.	*Terminalia manii* (black chuglam)	II	a	B
21.	*Terminalia myriocarpa* (hollock)	III	a	B
22.	*Terminalia procera* (white bombwe)	III	b	B
23.	*Toona ciliata* (toon)	II	c	B

ANNEX G

(*Clause* 4.2.3)

GROUP III TIMBERS FOR FRAMES

Sl No.	*Name of Species*	*Durability*	*Treatability*	*Refractoriness to Seasoning*
1.	*Acrocarpus fraxinifolius* (mundani)	III	c	B
2.	*Amoora* sp. (amari)	II	—	B
3.	*Artocarpus chaplasha* (chaplash)	II	d	B
4.	**Boswellia serrata* (salai)	I	e	C
5.	*Calophyllum elatum* (poon)	II	—	B
6.	*Diospyros melanoxylon* (ebony)	II	—	A
7.	**Garuga pinnata* (garuga)	I	e	B
8.	*Grewia tilifolia* (dhaman)	II	d	B
9.	*Lagerstroemia parviflora* (lendi)	II	e	A
10.	*Lagerstroemia speciosa* (jarul)	II	e	B
11.	**Lannea coromandelica* (jhingan)	III	e	B
12.	*Michelia* sp. (champ)	II	—	B
13.	*Palaquium ellipticum* (pali)	II	e	B
14.	*Pinus kesiya* (khasi pine)	III	b	B
15.	*Pinus wallichiana* (kail)	II	c	C
16.	*Podocarpus nerifolia* (thitmin)	II	—	–
17.	*Pterospermum acerifolium* (hathipaila)	III	c	B
18.	*Quercus semicarpifolia* (oak)	II	c	A
19.	*Shorea assamica* (makai)	III	c	B
20.	*Sonneratia apetala* (keora)	II	—	B
21.	*Syzygium cumini* (jaman)	II	e	A

*Contains mostly sapwood. Little heartwood available should also be avoided.

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