

SOUTH AFRICAN BUREAU OF STANDARDS

Amendment No. 1 : 8 August 2001

to

SABS 05:1999

THE PRESERVATIVE TREATMENT OF TIMBER

Approved in accordance with SABS procedures on 8 August 2001.

Scope of amendment

This standard has been amended in respect of moisture content, to exclude hardwood decking from having to be treated, and to align it with the most recent editions of SABS 1288 (ed. 3), SABS 457-2 (ed. 6), and SABS 457-3 (ed. 6).

Instructions for page replacement

Remove the following pages from your copy of SABS 05:1999 and insert the new pages attached:

Pages 1, 9, 16, 17, 18 and 21.

sabs pta
(pdf)

The preservative treatment of timber

1 Scope

1.1 This standard covers the classification of timber preservatives, hazard conditions for timber, the solvents used for timber preservatives, the preparation of timber for treatment, the various treatment processes and the use of preservative-treated timber in specific areas in South Africa. Recommendations relating to the handling and safety of preservative-treated timber are also given.

1.2 This standard does not cover treatment with fire retardants.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent editions of the standards indicated below. Information on currently valid national and international standards can be obtained from the South African Bureau of Standards.

SABS 457-2, *Wooden poles, droppers, guardrail posts and spacer blocks – Part 2: Softwood species.* |
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SABS 457-3, *Wooden poles, droppers, guardrail posts and spacer blocks – Part 3: Hardwood species.* |
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SABS 538, *High-temperature wood-preserving creosote.*

SABS 539, *Wood-preserving creosote (Lurgi-gasification process).*

SABS 673, *Mixtures of copper-chromium-arsenic compounds for timber preservation.*

SABS 753, *Pine poles, cross-arms and spacers for power distribution, telephone systems and street lighting.*

SABS 754, *Eucalyptus poles, cross-arms and spacers for power distribution and telephone systems.*

SABS 871, *Boron timber preservatives.*

SABS 1288, *Preservative-treated timber.* |
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SABS 1290, *Wood-preserving mixtures of creosote and waxy oil.*

SABS 1388, *Tributyltin oxide-lindane timber preservative.*

SABS 1618, *Timber preservative – Insecticidal deltamethrin for interior use.*

SABS 0183, *The terminology and classification of adhesives for wood.*

SABS 0255, *Safety in the wood preservation industry.*

SABS method 984, *Moisture content of timber and timber products (oven dry method).*

SABS method 985, *Moisture content of timber (extraction method).*

SABS method 986, *Moisture content of timber (electric moisture-meter method).*

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1

acceptable

acceptable to the parties concluding the purchase contract, but in relation to the certification mark and to inspections carried out by the SABS, acceptable to the South African Bureau of Standards

3.2

afterglow

the phenomenon where ignited timber keeps on glowing after having been set alight and after the original source of ignition has been removed. This slow combustion could eventually lead to the total destruction of the timber

3.3

average net retention (of preservative)

the mass of all active components of a preservative compound (where relevant, including water of crystallization) retained in the total volume (not the penetrated volume) of timber treated together in one charge, and expressed in kilograms per cubic metre

3.4

bleeding

the exudation of liquid preservative chemical on the surface of preservative-treated timber

3.5

charge

the quantity of timber treated in one and the same treating cycle (See also note to 6.2.2.)

3.6

inner bark

the physiologically active layer of tissues between the cambium and the phellogen, plus any cells of the phloem that remain alive

6.3.2 Moisture content

6.3.2.1 Timber to be treated by the pressure process

The average moisture content of timber, determined in accordance with the appropriate of SABS methods 984, 985 or 986 immediately before preservative treatment, should be as required in the relevant product specification.

The moisture content of timber products for which no product specification exists, should be as required by the purchaser. However, in the case of timber products where drying defects such as warp and splitting are critical, it is recommended that the average moisture content should not exceed 170 g/kg.
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NOTES

1 Timber at these moisture contents, although satisfactory for treatment, should not necessarily be considered as being properly seasoned timber.

2 The moisture content of timber treated using the gas phase process is dependent upon timber species and dimensions, but will not normally exceed 100 g/kg. Correct moisture content should be as recommended by the preservative manufacturer.

6.3.2.2 Timber to be treated by the diffusion process

Timber to be treated by diffusion should be freshly felled or fresh off saw.

6.3.2.3 Timber to be treated by the pressure-diffusion process

No specific requirement is applicable in terms of moisture content of timber to be treated by pressure-diffusion with diffusible preservatives of type WB, provided that the requirements for penetration and retention are met.

NOTE – Individual pieces of timber to be treated in the same charge should be of similar average moisture content. The average moisture content of individual pieces should not vary by more than 100 g/kg from the average moisture content of the charge.

6.3.3 Prevention of insect attack during seasoning

Because the sapwood of hardwoods is generally susceptible to insect attack, untreated hardwoods should be protected during seasoning and storage by the application of a suitable timber protectant.

6.3.4 Prevention of mould attack

Superficial mould tends to develop during seasoning before preservative treatment, as well as during the closed-stacked phase following preservative treatment of timber with borates by using the diffusion process. A mouldicide should be applied to the timber during seasoning to prevent this, or alternatively a mouldicide can be added to the borate solution.

6.4 Surface preparation

Only treat timber that is free from precipitated water, dirt and other contaminating substances, and free from rot and insect attack. Remove any outer and inner bark that can inhibit penetration. Remove the bark by peeling or, where minor quantities of surface resin are present, by charring, in both cases removing as little of the sapwood as possible. Patches of impenetrable resin/gum scars or pockets may, depending on the type of timber product, be drilled or pierced to improve penetration of the preservative. Use a centre-to-centre spacing of at least 25 mm between holes, which should not exceed 3 mm in diameter and 10 mm in depth.

6.5 Shaping

Whenever practicable, perform all shaping and drilling before preservative treatment.

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6.6 Incising

6.6.1 General

Incising is permissible when this has been agreed upon between the treater and the purchaser of the treated timber. Incising improves penetration in timber that is difficult to treat and reduces the size of surface checks. Do not incise timber of nominal thickness less than 75 mm or faces of softwoods that will be horizontal in use.

6.6.2 Methods

Always make incisions approximately parallel to the general grain direction and to a depth equal to that of the desired penetration (unless this adversely affects the strength of the timber). Space incisions, approximately 25 mm apart, in rows that are at an angle to the general grain direction and that are approximately 60 mm apart and are such that incisions on the grain direction line are spaced as far apart as possible. Achieve spacing such that the number of incisions is approximately 650 per square metre.

6.7 Stacking

So stack timber in the treatment tank or cylinder that the preservative liquid has free access to all faces of each piece. Do not treat a unit or an assembly of units in its wrapping/packing. Where relevant, ensure correct positioning of the samples for average net retention determination.

NOTE – When planed timber is treated with a class O preservative, sticks or laths should be used to separate each layer from the other or, alternatively, boards should be stacked on edge.

7 Preparation and control of preservative mixtures

7.1 General

Ensure that a preservative complies with the requirements of the relevant SABS standard given in table 1.

7.2 Mass concentration

In the case of class W and class O preservatives, use a preservative solution that has a mass concentration such as to ensure that the appropriate requirements for average net retention and minimum preservative penetration given in table 2 are met. However, in no case may the mass concentration of type WCCA solutions be less than 20 g/R and, where an average net retention for type WCCA solutions of at least 16,0 kg/m³ is required, use a solution that has a mass concentration of at least 40 g/R except in the case of hazard class H6, where a mass concentration of at least 60 g/R may have to be used.

NOTES

1 At low levels of mass concentration, high retentions can be difficult to achieve.

2 At no time should the temperature of a type WCCA solution or the temperature of timber immediately before treatment with such a solution exceed 40 °C.

Restrict machining of treated timber to a minimum, since machining removes some of the protected layer. However, if it is necessary to machine or to sand timber that has been treated, use an efficient dust extraction system.

9.3 Disposal

Do not burn timber treated with type WCCA preservative because the fumes emitted by burning timber treated with this preservative and the ash are potentially toxic.

9.4 Flammability

After the solvent has evaporated, timber treated with a class O preservative is no more flammable than untreated timber. Provided that the surface of timber has no free creosote (as after a few months' drying or weathering), creosoted timber presents no greater fire hazard than ordinary timber. Timber treated with a type WCCA preservative is subject to afterglow.

10 Penetration and net retention

The appropriate minimum penetrations and net retentions that have to be obtained to ensure satisfactory service of timber exposed to specific conditions (see clause 5) are given in table 2.

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Table 2 — Requirements for preservative-treated timber

1 Hazard class	2 Exposure class	3 Timber application	4 End use		5 Preservative type	6 Average net retention kg/m ³	7 Minimum preservative penetration mm		
							Soft-wood	Hard-wood	
H6	Marine	Timber constantly or periodically in contact with estuarine or sea water, and subject to marine borer attack	Poles: piling ¹⁾ ; retaining walls; slipways; groynes; jetties; walkways		WCCA plus Creosote	24 plus 200	50	50	
			Sawn timber ²⁾ : piling ³⁾ ; retaining walls; slipways; groynes; jetties; walkways		WCCA plus Creosote	24 plus 200	Complete sapwood ⁴⁾	Complete sapwood	
H5	Fresh water	Timber constantly or periodically in contact with fresh water or heavy wet soils	Poles: agricultural poles; poles under flood irrigation; bridges; piling ¹⁾ ; groynes; walkways; slipways; jetties; agricultural poles for livestock pens/retaining walls ¹⁾		WCCA or Creosote	16 or 130	25	20	
			Sawn timber ²⁾	Piling ³⁾ ; slipways; groynes; jetties; walkways; retaining walls; culverts; flood gates; drains		WCCA or Creosote	16 or 130	Complete sapwood ⁴⁾	Complete sapwood
				Industrial cooling towers ⁵⁾		WCCA	30	Complete sapwood	Complete sapwood
H4	Ground contact	Timber in direct contact with the ground	Poles	Distribution	WCCA or Creosote	16 or 115	30	15	
				Telephone and street light	WCCA or Creosote	16 or 115	25	15	
				Agricultural poles; landscaping structures; playground structures; building; fencing; pergolas; carports; flower boxes; stakes; vine and orchard trellises	WCCA or Creosote	12 or 100	20	13	
				Posts (guard-rail)			Complete sapwood	Complete sapwood	
				Piling; agricultural poles for livestock pens	See hazard class H5				

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Table 2 (continued)

1	2	3	4		5	6	7				
Hazard class	Exposure class	Timber application	End use		Preservative type	Average net retention kg/m ³	Minimum preservative penetration mm				
							Soft-wood	Hard-wood			
			Sawn timber²⁾ (and specified round wood products)	Sawn rectangular posts; landscaping structures; playground structures; building; fencing; pergolas; carports; flower boxes; decking; bridges; stakes	WCCA or Creosote	12 or 100	Complete sapwood ⁴⁾	Complete sapwood			
				Rail bearers					Complete sapwood ⁴⁾ or 20	Complete sapwood or 13	
				General purpose poles					20	13	
				Stakes; garden edging	Sawn Round	CCA or creosote	6 or 80	Complete sapwood	5	5	
				Piling ³⁾	See hazard class H5						
				H3 ¹¹⁾	Exterior above ground	Timber not in contact with the ground but exposed to leaching and weathering	Poles	Cross-arms and spacers	WCCA or Creosote	12 or 100	20
Landscaping structures; playground structures; building; fencing rails; pergolas; carports, vine and orchard trellisses	WCCA or Creosote	8 or 80	20					13			
Spacer blocks ⁶⁾									Complete sapwood	Complete sapwood	
Round droppers	10	10									
Sawn timber⁷⁾ (and specified round wood products)	Balustrades; fencing bearers and slats; outdoor decking and beams; garden furniture; laminated beams; weather board; steps; cladding; stairs; gates; fascia boards; plywood; sawn drop-pers ⁸⁾ ; slabbed poles; cylindrical rails; half-rounds ⁹⁾	WCCA or Creosote	8 or 80				Complete sapwood	20	13		
	General purpose poles; machined poles ¹⁰⁾ for log homes									5	5
	Laths									5	5
										5	5

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Table 2 (concluded)

1	2	3	4	5	6	7	
Hazard class	Exposure class	Timber application	End use	Preservative type	Average net retention kg/m ³	Minimum preservative penetration mm	
						Soft-wood	Hard-wood
H2	Internal	Timber used under a roof, not in contact with the ground, and that will not be exposed to leaching and weathering	Poles: Building structures Roof trusses	WCCA or Creosote or TBTOL ¹¹⁾ or Borate ¹¹⁾	8 or 80 or 1 or 5	20	13
			Sawn timber⁷⁾: Laminated beams; roof trusses; structural timber; ceiling boards; flooring; panelling; doors; cupboards; skirting; window frames; plywood	WCCA or Creosote or TBTOL ¹¹⁾ or Borate ¹¹⁾ (boric acid equivalent)	6 or 80 or 1 or 5	Complete sapwood	Complete sapwood
			General purpose poles; machined poles ¹⁰⁾ for log homes			20	13
HO-i ¹²⁾	Dry interior	Timber used under a roof, not in contact with the ground, exposed to insects other than termites, and not exposed to fungal attack or leaching and weathering	Sawn timber⁷⁾: Mouldings; ceilings; floorboards; joinery	Deltamethrin	0,003	Complete sapwood	Complete sapwood
HO-it ¹²⁾	Dry interior	Timber used under a roof, not in contact with the ground, exposed to insects including termites, and not exposed to fungal attack or leaching and weathering	Sawn timber⁷⁾: Mouldings; ceilings; floorboards; joinery	Deltamethrin	0,01	Complete sapwood	Complete sapwood

- 1) Due to preservative treatment requirements, all piling and agricultural poles for use in livestock pens/retaining walls, that are to be used in direct contact with the ground or that will be constantly or periodically in contact with fresh water or heavy wet soils (or both), shall be treated and marked in accordance with hazard class H5. All piling that will be in contact with estuarine or sea water shall be treated and marked in accordance with hazard class H6.
- 2) The only hardwood recommended is species with a permeable heartwood. Sawn eucalyptus species are not suitable for hazard classes H6, H5 and H4.
- 3) Preferably in roundwood form with complete envelope of sapwood, but if sawn timber is used, a large amount of sapwood shall be present.
- 4) If the required retention is to be achieved, a large amount of sapwood shall be present.
- 5) Timber selected for 100 % sapwood.
- 6) Spacer blocks: Full penetration even with lower retention.
- 7) In the case of hardwood species, some sawn timber products (see 12.2) need not be preservative treated due to their low penetrability
- 8) Type WCCA preservatives shall not be used for the treatment of hardwood sawn droppers
- 9) The treatment of half-rounds manufactured from hardwood species with a class W preservative is not recommended.
- 10) Machined poles for log homes manufactured from hardwood shall be machined in such a way that the sapwood required for penetration is not disturbed
- 11) Timber treated with TBTOL or borate could be used for hazard class H3, provided that it is continuously protected by a suitable well-maintained coating.
- 12) The end uses for this hazard class, unlike the other hazard classes, are restricted to those given in column 4 only (see clauses 5(f) and 5(g)). Only products included in column 4 shall be allowed to be treated.

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12 The use of preservative-treated timber in specific areas in South Africa

To qualify as being adequate for its purpose, structural timber of the two main species used in a permanent building in the areas given in 12.1 and 12.2 shall be preservative treated in terms of clause 12.3.

12.1 Gymnospermae (coniferous species)

Sawn timber (including planed and profiled timber) and poles or logs (round or partly round) of the softwood species shall be treated in terms of 12.3 when used in the following magisterial districts or towns in South Africa:

Albany (Grahamstown), Alexandria, Alfred (Harding), Bathurst (Port Alfred), Bellville, Bizana, Bredasdorp, Caledon, Camperdown, Cape Town, Centane (Kantani), Ceres, Clanwilliam, Durban, East London, Eshowe, Gatyana (Willowvale), George, Hankey, Hermanus, Heidelberg – Cape, Hopfield, Humansdorp, Inanda (Verulam), Ixopo, Joubertina, Kirkwood, King William's Town, Komga, Knysna, Lower Tugela (Stanger), Lower Umfolozi (Empangeni), Lions River, Lusikisiki, Malmesbury, Mdantsane, Montagu, Mooi River, Mossel Bay, Mpendle, Mqanduli, Mtonjaneni (Melmoth), Mtunzini, New Hanover, Ngqeleni, Paarl, Peddie, Pietermaritzburg, Piketberg, Pinetown, Port Elizabeth, Port Shepstone, Queensburgh, Richmond – Natal, Riversdale, Robertson, Scuva (Butterworth), Simon's Town, Somerset West, Stellenbosch, Strand, Stutterheim, Swellendam, Tulbagh, Uitenhage, Umlazi, Umtata, Umvoti (Greytown), Umzimvubu (Port St Johns), Umzinto, Vredenburg, Wellington, Worcester, Wynberg, Xhora (Elliotdale), Zwelitsha.

12.2 Angiospermae (broadleaved species)

All sawn timber, planed timber (excluding laminated timber, block and strip flooring, ceilings, panelling, mouldings, joinery and decking) and poles or logs (round or partly round) of the hardwood species shall be treated in terms of 12.3 when used within the borders of South Africa. **Amdt 1, Aug. 2001**

12.3 Preservative treatment

The preservative treatment of timber shall comply with the provisions of SABS 457-2, SABS 457-3, SABS 753, SABS 754 or SABS 1288 as relevant. **Amdt 1, Aug. 2001**

Annex A
(informative)

Permeability of commercial timber species

A.1 Amenable to impregnation

The sapwood of the following timbers can be easily impregnated, the heartwood only sometimes.

SOFTWOODS

Pinus canariensis
P. caribaea
P. elliotii
P. patula
P. pinaster
P. roxburghii
P. taeda

HARDWOODS

Eucalyptus fastigata
E. fraxinoides
E. grandis

A.2 Moderately amenable to impregnation

The sapwood of the following timbers can be fairly easily impregnated, the heartwood rarely.

SOFTWOOD

Pinus radiata

HARDWOODS

Entandrophragma cylindricum (Sapele)
Eucalyptus citriodora
E. cladocalyx
E. cloeziana
E. diversicolor
E. maculata
E. maidenii
E. microcorys
E. paniculata
E. pilularis
E. resinifera
E. saligna
Shorea spp. (Philippine mahogany)