

**BIOTRANS 1634:2014**

Revision 1

# **BIOTRANS POLE SLEEVE STANDARD**

## **STANDARD SPECIFICATION FOR BARRIER PROTECTION SYSTEMS FOR TREATED WOODEN POLES - NON TOXIC ENCAPSULATION SYSTEMS**

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## **BIOTRANS 1634:2014**

### **Acknowledgement**

Biotrans Africa CC wishes to acknowledge the valuable assistance of all the members of the SANS: 1634 2014 Working Group.

### **Foreword**

This Standard was approved by Biotrans Africa CC in parallel with procedures of the SABS Standards Division. This Standard includes the use of items covered by patent rights held by Biotrans Africa CC. In terms of Clause 11.1 b of SANS 1-1 2012 the holder of said patent rights is, in terms of Clause 11.2 of SANS 1-1, willing to negotiate national licences with applicants on reasonable and non-discriminatory terms and conditions.

This document was published in 2014 and Biotrans Africa CC reserves the right to amend it at any time.

### **Introduction**

The use of non-toxic barrier protection systems to augment treated poles and posts is practised to improve the performance and service lives of those poles and posts; see Annex A for the degree of augmentation conferred on treated poles by the Biotrans Pole Sleeve. In addition, the barrier protection system described in this Specification has been proven to prevent migration of preservatives to the soil and prevent soil-borne agents of decay from entering the protected zones of wood members.

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## **SPECIFICATION FOR NON-TOXIC BARRIER PROTECTION SYSTEMS FOR TREATED WOODEN POLES**

### **1 SCOPE**

This specification covers the requirements for non-toxic barrier protection systems used to augment treated wooden poles, posts and piling intended for ground contact service conditions by encapsulating their butts. Listed end uses of barrier protection systems in conjunction with treated wood products are defined in SANS 10005.

#### **NOTE:**

- a) The Standards referred to in this specification are listed in the normative references.
- b) The augmentation conferred on poles by Biotrans Pole Sleeves is shown in Annex A.
- c) Schematic illustration of a barrier protection system is shown in Annex B.
- d) Application of barrier protection system is provided in Annex C.
- e) Installation of pole with barrier protection system is described in Annex D.
- f) Inspection of pole with barrier protection system is described in Annex E.
- g) Requirements that must be specified by the purchaser and those that must be agreed upon between the supplier and the purchaser are listed in Annex F.

### **2 NORMATIVE REFERENCES**

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

AWPA E1-97, *American Wood-Preservers' Association. Standard method for laboratory evaluation to determine resistance to subterranean termites.*

ASTM D 3345-74, *American Society for Testing and Materials. Standard method of laboratory evaluation of wood and other cellulosic materials for resistance to termites.*

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ASTM D 5199, *American Society for Testing and Materials. Standard test method for measuring the nominal thickness of geosynthetics.*

ASTM D 1004, *American Society for Testing and Materials. Standard test method for tear resistance of plastic film and sheeting.*

DEF Stan 81-75, *Ministry of Defence. Barrier Material.*

DIN 53122, *Standards Association of German Industry. Testing of plastics and elastomer films, paper, board and other sheet materials – determination of water vapour transmission.*

DIN 53380, *Standards Association of German Industry. Testing of plastics – determination of gas transmission rate.*

EN 252, *Field test method for determining the relative protective effectiveness of a wood preservative in ground contact.*

ISO 536, *International Organisation for Standardisation. Determination of grammage.*

SANS 0324, *South African Bureau of Standards. Code of Practice for Inspection and Supplemental Treatment of Treated Wood Utility Poles.*

SANS 457-2, *South African Bureau of Standards. Wooden poles, droppers, guardrail posts, and spacer blocks Part 2: Softwood species.*

SANS 457-3, *South African Bureau of Standards. Wooden poles, droppers, guardrail posts, and spacer blocks Part 3: Hardwood species.*

SANS 753, *South African Bureau of Standards. Pine poles, cross-arms and spacers for power distribution, telephone systems and street lighting.*

SANS 754, *South African Bureau of Standards. Eucalyptus poles, cross-arms and spacers for power distribution and telephone systems.*

SANS 10005, *South African Bureau of Standards. The preservative treatment of timber.*

### **3 DEFINITIONS**

For the purposes of this document, the following definitions apply.

#### **3.1**

##### **acceptable**

acceptable to the authority administering this standard or to parties concluding the purchase contract, as relevant

#### **3.2**

##### **agricultural pole**

a pole used in orchards

**3.3**

**augment**

increase the durability of a preserved wooden pole

**3.4**

**barrier protection system**

a preformed sleeve of non-biodegradable and preservative-resistant flexible sheeting with one end closed that is securely applied by a strip of adhesive substance positioned on the outer surface of the sleeve which can adhere to an opposing region of the sleeve when it is located on the butt of a treated pole and tightly wrapped around the pole to secure the location of the sleeve on the pole as a primary treatment covering the surface of the pole below its intended ground line to constitute an impermeable barrier between the pole surface and the soil that confines the wood preservative to the pole and protects the pole from soil-borne agents of biodeterioration during the service life of the pole

**3.5**

**butt**

the thick end of a pole or guardrail post

**3.6**

**competent person**

A person with sufficient training, knowledge and experience in the wooden pole preservation and inspection discipline

**3.7**

**contractor**

the relevant body conducting the application of the barrier protection system and installation of the pole or guardrail post, or the inspection and supplemental treatment of utility poles, or both, as agreed between the utility company and contractor.

**3.8**

**distribution pole**

a pole used for support of electricity distribution cables

**3.9**

**eucalyptus**

timber derived from trees of the genus Eucalyptus grown in Southern Africa

**3.10**

**fencing pole**

a pole used as an upright or straining pole, that does not exceed 3,6 m in length

**3.11**

**guardrail post**

a post intended for the erection of steel guardrails at the side of a road

**3.12**

**impermeable barrier**

a barrier as envisaged in this Specification with maximum water vapour transmission rates and oxygen transmission rates specified herein

**3.13**

**non-toxic**

containing no biocidally active ingredients

**3.14**

**pine**

timber derived from trees of the genus *Pinus* grown in Southern Africa

**3.15**

**pole**

a structural, agricultural, fencing, distribution or telephone pole

**3.16**

**primary treatment**

any treatment of a wooden pole applied before it is set in service in the ground, including treatment as defined below and application of nails, staples, wire, a barrier protection system, etc.

**3.17**

**sound pole**

a pole or guardrail post that has no apparent internal or external form of biodeterioration, bearing the certification tags and/or marks specified by the certifying bodies.

**3.18**

**structural pole**

a pole used for structural purposes, for example, buildings, bridges, jetties, etc.

**3.19**

**telephone pole**

a pole used for support of telephone wires

**3.20**

**treated/treatment**

impregnated/impregnation with an acceptable preservative

**3.21**

**utility pole**

a distribution, telephone or street lighting pole

**3.22**

**vineyard pole**

a pole intended to be used within a vineyard as an upright, in contact with the ground, with a minimum top diameter of 60 mm

## 4 REQUIREMENTS

### 4.1 Construction and requirements of sheeting

The barrier protection system shall be constructed as shown in Annex B. The sheeting used to construct the barrier protection system shall be designed to confer the minimum requirements for physical and biological properties on the sheeting as shown in Table 1.

**Table 1 Minimum<sup>a, b</sup> physical and biological requirements of sheeting for barrier protection systems**

property	sheeting			Standard test method
	BPS-A for agricultural, fencing, structural and vineyard poles <5m in length  (SANS 457-2 and 457-3)	BPS-B for guardrail posts and agricultural, fencing, structural and vineyard poles 5m and longer (SANS 457-2 and 457-3)	BPS-C for distribution, telephone and street lighting poles  (SANS 753 and 754)	
weight (g.m <sup>-2</sup> )	140	177	316	ISO 536
thickness (um)	123	170	348	ASTM D 5199
tear strength (N)	23	32	92	ASTM D 1004
tensile strength (N.25mm <sup>-1</sup> )	35	108	200	DEF Stan 81-75
puncture resistance (N)	28	73	300	
WVT <sup>a</sup> (g.m <sup>-2</sup> .24h <sup>-1</sup> )	0.05	0.03	0.03	DIN 53122
OT <sup>b</sup> (cc.m <sup>-2</sup> .24h <sup>-1</sup> )	0.01	0.006	0.006	DIN 53380
fungal resistance	non-biodegradable			EN 252
termite resistance	impenetrable			AWPA E1-97 and ASTM D 3345-74
<sup>a</sup> maximum water vapour transmission rate <sup>b</sup> maximum oxygen transmission rate				

## **4.2 Biological performance of barrier protection system**

The barrier protection system shall have been tested and proven effective by acceptably qualified independent practitioners specialised in both wood biodeterioration and treated pole performance as specified below.

**a)** Agricultural, vineyard, structural, telephone and fencing poles, and guardrail posts. Ten-year field trial conducted by an accredited agricultural research institute on at least 100 poles installed by competent personnel for at least ten years in service in a vineyard in South Africa and subsequent inspection by competent personnel shall yield an overall failure rate of less than 0.5%.

**b)** Distribution poles. Ten-year field trial conducted by an accredited electricity pole research institute with acceptable outcome plus at least 100 poles installed by approved subcontractors for at least ten years in service on the South African electricity distribution grid and subsequent inspection by competent inspectors shall yield an overall failure rate of less than 0.5%.

## **4.3 Application of barrier protection system**

Instructions for application of a barrier protection system to a pole or guardrail post are provided in Annex C and the installation of poles and posts fitted with barrier protection systems is described in Annex D.

## **5 AUGMENTATION OF TREATMENT CONFERRED BY USE OF BARRIER PROTECTION SYSTEMS**

The use of non-toxic barrier protection systems to augment treated poles and posts is practised to improve the performance and service lives of those poles and posts; see Annex A. In addition, barrier protection systems described in this Specification have been proven to prevent migration of preservatives to the soil and prevent soil-borne agents of decay from entering the protected zones of wood members.

## **6 INSPECTION OF POLES FITTED WITH BARRIER PROTECTION SYSTEMS**

Guidance for inspection of poles fitted with barrier protection systems are provided in Annex E.

## **7 PROCUREMENT OF BARRIER PROTECTION SYSTEMS**

Requirements that must be specified by the purchaser and those that must be agreed upon between the supplier and the purchaser are listed in Annex F.

## **8 PRODUCT MARKING**

Barrier protection systems shall be permanently repeat branded on their outer surfaces with the manufacturer's identity and the number of this Specification (and batch number as required).

## **9 PACKAGING AND LABELLING**

Consignments of barrier protection systems transported to purchasers are packaged with the marked inspection certificate also included in the package, which shall be a cardboard box or plastic bag of sufficient strength to withstand the procedures involved in delivery by road, air and/or rail transport. Packages shall not weigh more than 50kg and shall be sealed and labelled to specify their contents and delivery address.

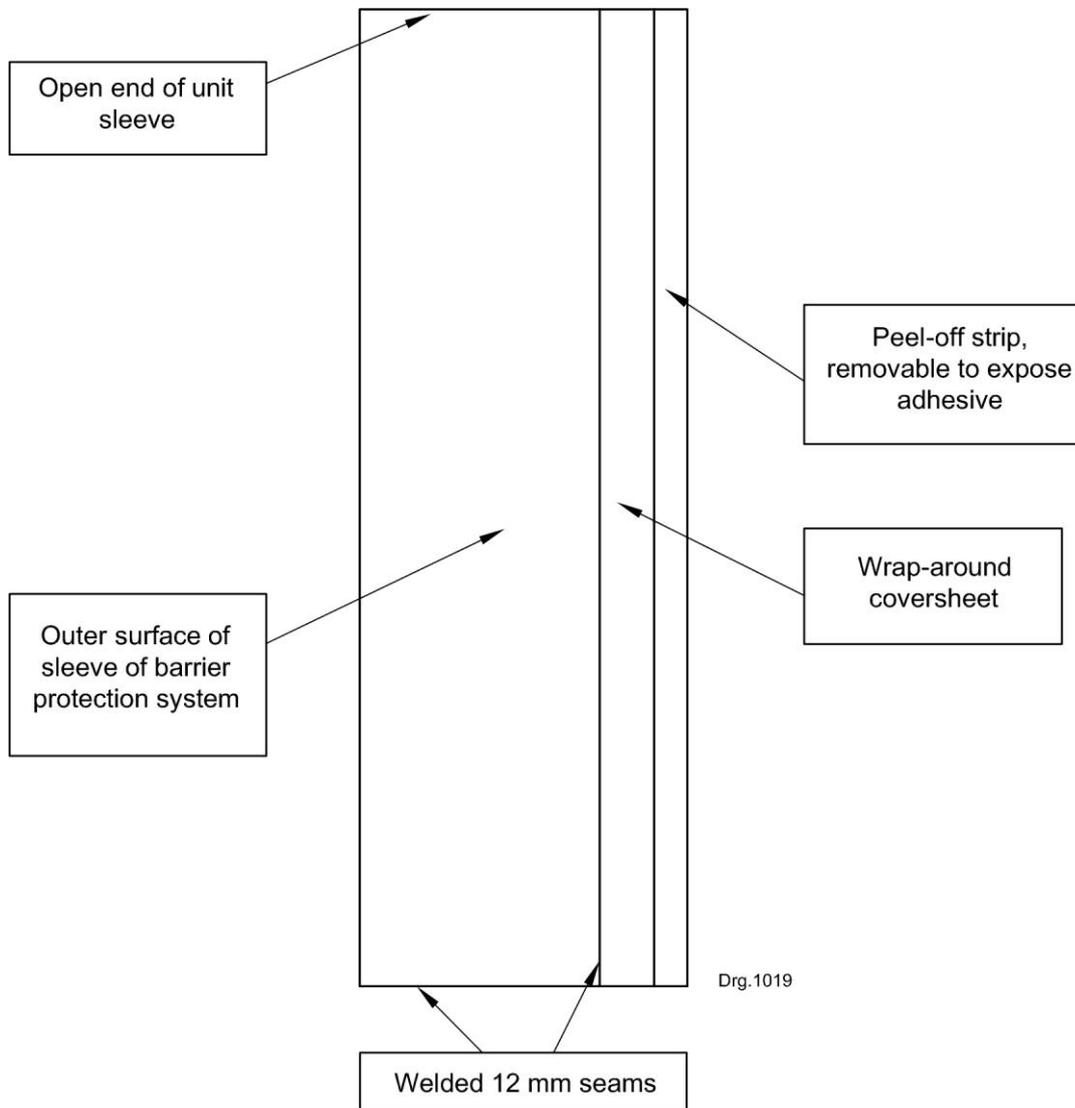
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### Annex A Augmentation of treated poles and posts by barrier protection systems with requirements specified in Section 4

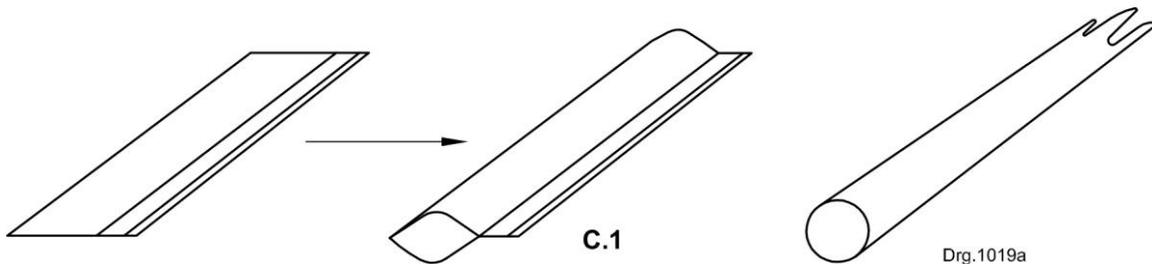
SANS Specification of pole and/or post	preservative	augmentation of hazard class by completion of primary treatment with application of BPS	
		without BPS	with BPS
SANS 457-3: (Table 3, structural, vineyard and agricultural poles)	creosote or WCuAz or CCA	H4 H3	H5 H4
	borate (BAE)	H3	H4
SANS 457-3: (Table 4, fencing poles, guardrail posts)	creosote or WCuAz or CCA	H4 H3	H5 H4
	borate (BAE)	H3	H4
SANS 457-2: Pine - as above for Eucalypt	as above	as above	as above
SANS 754: (Table 3, distribution and telephone poles)	creosote CCA	H3 H3	H4 H4
SANS 753: Pine - as above for Eucalypt	as above	as above	as above

Annex B Schematic representation of a barrier protection system

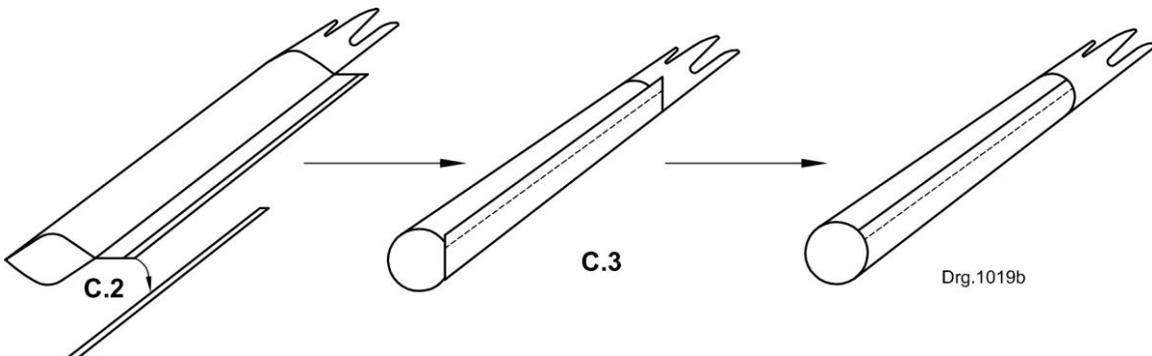


**Annex C Instructions for application of a barrier protection system**

At the side of the hole in which it is to be planted by the purchaser or contractor, the sound treated pole should be supported horizontally such that the portion to be covered by the barrier protection system is at least a few centimetres above the ground. The barrier protection system for that pole is then opened at its top end as shown in Step C.1 below.



Then slide the barrier protection system onto the butt of the pole and remove the peel-off strip from edge of coversheet to expose adhesive as shown in Step C.2 below. Wrap the sleeve tightly around the pole and fold adhesive edge of coversheet over as shown in Step C.3 to seal it tightly onto the already tightened sleeve.



The barrier protection system is now correctly fitted and the pole is ready to be planted in the ground. Crimp the end of the fitted barrier protection system by hand before planting and the weight of the planted pole will flatten the end on the bottom of the hole.

**Annex D Installation of pole fitted with barrier protection system**

**D.1 Pre-Installation visual Inspection**

The purchaser or contractor shall confirm that the barrier protection system is free of tears and punctures, and the pole shall be a sound treated pole free of potentially detrimental protuberances below the intended ground line.

**D.2 Installation**

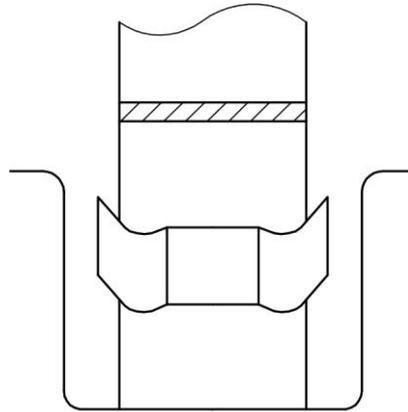
Plant the pole as per manufacturer's recommendation, taking care to avoid possible damage to the barrier protection system by soil compactors during backfilling.

**D.3 Weatherseal**

When backfilling is complete, the top of the barrier protection system should be trimmed to no more than 100mm above the intended groundline. Waterproof tape shall then be tightly wound around this region to bind the top of the barrier protection system snugly to the pole. Two clout nails shall be used to permanently secure the cut end of the tape to the pole.

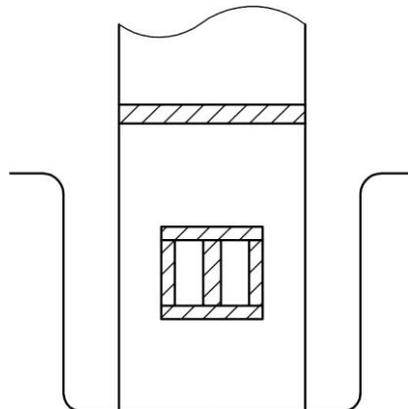
**Annex E Guidance for inspection of poles fitted with a barrier protection system**

**E.1** The contractor should perform the visual inspection specified in the SANS 0324 pole inspection Specification. If necessary, excavate the pole for further inspection according to the Specification. Slit the sleeve of the barrier protection system to make an inspection window. Fold the sheeting away from the pole to expose the surface. Continue the inspection as specified.



Drg.1019c

**E.2** When inspection has been completed fold the sheeting back to its original position and seal the slits with waterproof adhesive tape. Backfill the pole according to the Specification. Take care to avoid damage to the sheeting from soil compactors. Replace the waterproof tape above the groundline (D.3) if necessary.



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**Note:** If inspection holes are drilled into the pole, insert boron rods or preservative as specified in the relevant Specification to kill decay fungi possibly introduced by the increment borer.

**Subsequent inspections in pole management system:** Repeat E.1, removing the waterproof tape from the first inspection. Complete inspection as described in E.2 above.

**Annex F Notes to purchasers**

The following requirements and quantities where relevant shall be specified in tender invitations and in each order or contract to supply barrier protection systems:

- a)** the type of preservative-treated pole or guardrail post (see Table 1);
- b)** the nominal length and the top diameter class (see SANS 457, 753 and 754)
- c)** the treatment process as specified in SANS 10005
- d)** the type of preservative (see SANS 10005)
- e)** the intended planting depth if different from those in Table F.1

Table F.1 Planted depths of poles measured from groundline to base of butt

pole dimensions (m)	
length	depth
5	1.2
7	1.3
9	1.5
10	1.8
11	1.8
12	2.0
13+	2.4