

Wood poles for overhead power and telecommunication lines —

Part 1: Specification for softwood poles

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Timber Standards Committee (TIB/-) to Technical Committee TIB/20 upon which the following bodies were represented:

- Association of Consulting Engineers
- British Tar Industry Association
- British Telecommunications
- British Timber Merchants' Association
- British Wood Preserving Association
- Department of Energy (Electricity Division)
- Department of the Environment (Building Research Establishment, Princes Risborough Laboratory)
- Electricity Supply Industry
- Forestry Commission
- Home Timber Merchants' Association of Scotland
- Timber Growers UK Ltd.
- Timber Research and Development Association
- Timber Trade Federation

This British Standard, having been prepared under the direction of the Timber Standards Committee, was published under the authority of the Board of BSI and comes into effect on 28 September 1984

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Foreword

This British Standard, having been prepared under the direction of the Timber Standards Committee, supersedes BS 1990:1971 which is withdrawn. The revision is being undertaken in two Parts; Part 1 covering softwood poles and Part 2¹⁾ which will cover hardwoods. The first standard for wood poles for overhead lines was published in 1953. A metric version of the 1953 edition was prepared and published in 1971 superseding the imperial version in 1974.

The difference between this edition and the 1971 edition is that this standard extends the range of timber species for which data are available, specifies water-borne preservative treatments in addition to pressure creosoting and gives a typical layout of markings. This standard is based primarily upon the predominant species in use, namely redwood or Scots pine (*Pinus sylvestris*) from Northern Europe including the United Kingdom.

The growth characteristics of timbers and their freedom from decay and other defects are of importance in the determination of the mechanical strength of poles for assessing the safe loads in service. The calculated average breaking loads of redwood or Scots pine poles both unstayed and stayed are included in Appendix A.

Appendix B describes a method of determining the moisture content of poles and Appendix C describes a method for determining the extent of preservative penetration.

Appendix D describes a method for establishing the strength characteristics for the species listed in this standard.

The attention of pole users is drawn to the difficulty of defining and working to precise requirements on all aspects of a natural product such as timber. Some properties have of necessity been specified in general terms only. It is therefore recommended that the acceptance of poles, and the supervision of seasoning tests and of preservation processes should be assigned only to qualified and experienced inspectors.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ In course of preparation.

1 Scope

This British Standard specifies requirements for solid softwood poles for power and telecommunication lines (see clause 3).

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the definitions given in BS 565, BS 4261 and BS 6100-4.1 apply.

3 Timbers

Poles shall be made from the following species.

- a) Redwood or Scots pine^a (*Pinus sylvestris*)
- b) Corsican pine (*Pinus nigra*)
- Douglas fir (*Pseudotsuga menziesii*)
- Dunkeld (hybrid) larch (*Larix eurolepis*)
- European larch (*Larix decidua*)
- European (Norway) spruce (*Picea abies*)
- Japanese larch (*Larix kaempferi*)
- Lodgepole pine (*Pinus contorta*)
- Sitka spruce (*Picea sitchensis*)
- Western red cedar (*Thuja plicata*)

^a Hereinafter referred to as redwood.

NOTE The preferred dressed sizes of poles should be as given in Table 1.

Poles of redwood should support the loads given in Table 2 and Table 3 derived from the calculations in accordance with Appendix A. Poles of the species listed under item b) should support the loads given in Table 2 and Table 3 modified by the appropriate factors given in Table 4.

4 Felling

Trees other than spruce, grown in Northern Europe, shall be felled between 1 November and the following 31 March. They shall be sawn off as close to the ground as possible and no timber shall be removed, trimmed or cut from the butt end so as to reduce its natural size. The ends shall be sawn to give a flat section and branches shall be dressed down flush with the trunk. Bark shall be removed as soon as practicable after felling and the poles shall then either be stacked in open formation clear of the ground, or stored in water that is free from marine borer activity.

5 Sizes and permitted tolerances

NOTE This standard is applicable to all sizes of pole, however, it will generally be more economic to specify the preferred dressed sizes given in Table 1.

5.1 Measurement

Many nominally round poles have a natural elliptical cross section; the cross section measurements of such poles shall be of the minor axes.

5.2 Tolerance on length

The tolerance on length shall be $\pm 1\%$ of the specified length.

6 Limiting characteristics

NOTE Some limiting characteristics may be eliminated by cross cutting and/or dressing to produce an acceptable pole.

6.1 Straightness

Sweep or crook shall be permitted to the extent that a straight line from the centre of the top to the centre of the pole 1.5 m from the butt remains within the pole.

6.2 Knots

At any cross section along the length of a pole no knot with a diameter, measured at right angles to the length of the pole, greater than one-fifth of the circumference shall be permitted, and the sum of knot diameters at the cross section shall not exceed one-quarter of the circumference²⁾.

6.3 Fissures

Cracks across poles shall not be permitted.

NOTE Seasoning checks and shakes along the grain are expected and are not recognized as defects.

6.4 Ring and star shakes

The tip shall be free from ring or star shakes but one complete ring or one star shake is acceptable at the butt provided that no part extends to within 50 mm from the periphery.

6.5 Slope of grain

Spiral grain shall not exceed a slope of 1 in 6.

6.6 Inbarks

Inbarks shall be permitted with limitations on their length, width and depth. Maxima are given for each dimension, but when assessing inbarks, the maxima shall only be permitted for one measurement, with half the value given for the other two.

²⁾ The limitations on knots are based on past practice and satisfactory performance. Suitable test results relating knot size to performance are not available.

The maximum dimensions of inbarks shall be as follows.

Length: $4 \times$ diameter of pole

Width: $0.5 \times$ diameter of pole

Depth: 12 mm

6.7 Insect holes

Pinholes and boreholes shall be permitted, provided there is no active infestation and the strength of the pole is not affected by the degree of damage.

6.8 Decay

Rot or punks shall not be permitted.

6.9 Abnormal defects

Other defects, such as mechanical damage, shall be permitted provided that their effect on the structural strength of the pole is likely to be no greater than the effect of any other limiting characteristic.

6.10 Sapstain

Blue stain in the sapwood of softwoods shall not be considered a defect.

7 Stacking and preparation of poles at depots

All poles other than spruce shall be stacked in open formation, before and after dressing, on suitable skids so that the lowest timber of each stack is at least 250 mm above the ground. Sufficient dunnage or cross timbers shall be used to distribute the total mass without imposing undue strain on the poles at the lower layers. The surface of the seasoning ground under and around the stacks shall be well drained and kept free from bark, shavings, grass and weeds. All poles shall be machine dressed to remove the cambium layer before preservation. All drilling, notching and cutting of poles shall be completed before preservation.

8 Moisture content

Preservation of species other than spruce shall not take place until the average moisture content of each batch of poles is reduced to not more than 28 %. No individual pole in the batch shall have a moisture content greater than 30 %.

The moisture content of the poles shall be determined prior to treatment by the oven test method described in Appendix B or by the use of moisture meters. When using the latter, any measurements over 25 % shall be confirmed by the oven test method.

Poles for preservation shall be protected against heavy and continuous rain.

NOTE Seasoning is deemed to commence at the time of felling, and under average weather conditions light, medium and stout poles should be seasoned for at least 6, 9 and 12 months respectively, before preservation.

9 Preservation

NOTE Long life is a prerequisite for poles and preservative treatment is essential. It is recommended that poles complying with this standard have an average service life of 40 years.

9.1 General

The following species shall be pressure impregnated with creosote in accordance with BS 913 or with a copper/chrome/arsenic mixture in accordance with BS 4072.

Redwood
Corsican pine
Douglas fir
Dunkeld larch
European larch
Japanese larch
Lodgepole pine
Western red cedar

When pressure impregnating in accordance with BS 913, the coal tar creosote used shall comply with type 2 of BS 144 and the average net retention of preservative in a charge shall be not less than 115 kg/m^3 .

When pressure impregnating in accordance with BS 4072, the copper/chromate/arsenic (CCA) mixture shall have a solution strength not less than 3 % *m/V*.

NOTE 1 When creosoting is carried out using the Rueping (empty cell) process the gross absorption, to obtain full sapwood penetration, is likely to be double the net retention. However, as the depth of sapwood varies from pole to pole and between species, this level of gross absorption is included for guidance only.

NOTE 2 The average net retention figures given in BS 913 and BS 4072 are average values for a whole charge and do not apply to individual poles. Owing to natural variations in the permeability of wood it has to be accepted that the net retention of individual poles may cover a considerable range on either side of any average value specified for the charge. Initial, gross and net absorptions may also vary from that specified due to the variation in the depth of sapwood present and the species being treated.

As the following species cannot be treated with preservative in the normal way by the procedures described in BS 913 and BS 4072, they shall be preserved using a suitable modification of one of the procedures described in those standards, to meet the requirements for full sapwood penetration and net retention.

European (Norway) spruce
Sitka spruce