TECHNICAL DATA SHEETS

KOPPERS CERTIFIED PINE BUILDING POLES

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INFORMATION GUIDE FOR PRESERVATIVE TREATED TIMBER POLES FOR POLE HOUSE CONSTRUCTION

This guide is designed to give prospective pole house builders a brief insight into the benefits and features of timber building poles.

WHAT IS A POLE HOUSE?

Basically there are two types of poles houses.

(A) POLE PLATFORM

In which the poles are used to support a level platform, on which a conventional frame is placed and anchored. The typical high-set house on stumps is a prime example of this type of construction.

(B) POLE FRAME

In which the poles are extended throughout the house to roof level and are used to support the entire structure.

Every pole house is an individual and should be designed for its specific site. Whether types (A), (B) or a combination of both are used depends on the steepness of the block and on your own personal taste.

WHY BUILD A POLE HOUSE?

Most people who want to build a pole house do so to improve their view, take in prevailing winds and add to their privacy. It also solves the problems of building on steeply sloping sites. Other reasons are:

(A) ECONOMICS

The steeper the site the more costly the earth works necessary to build a conventional slab-on-ground house. With pole houses, however, all that is necessary is to use longer poles on a very steep site because the embedment of poles into the ground is exactly the same no matter how steep the site. It is probably true to say that the more difficult your block is to build on the more money you can save by building a pole house rather than a conventional dwelling.

(B) FLEXIBILITY

A pole house is extremely flexible in that additions and extensions to the original structure are relatively simple. All that is required is the installation of a few more poles to support extensions to the framework. Only carpentry involving the use of hand and small power tools is needed so there is no need to provide access for major machinery.

WHY USE TIMBER?

(A) AESTHETICS

Timber blends in well with its surroundings and the green colour of treated timber, if anything, enhances this effect. No major earth moving machinery is required to build a pole house so most of the natural vegetation can be left on the block if required, creating an attractive bush land setting.

(B) ECONOMICS

A timber pole house is the best alternative economically for many of the same reasons listed above. It is not necessary to have access to a high voltage electricity supply that would be needed to run welding machines needed to erect steel framing so a timber pole home can be erected more simply and quickly than any alternative.

(C) ENVIRONMENT

Timber provides one of the world's most environmentally sound products because its production needs very little energy and it stores carbon. Steel frames, on the contrary, add carbon to the atmosphere. Pole houses assist in the fight against soil degradation and erosion as the site is generally not fully cleared. The construction also has minimum impact on the local flora and fauna.

WHAT CHOICE OF TIMBER POLES IS AVAILABLE?

There are three types of Timber Poles recommended by Koppers either Durability Class 1 & 2 Hardwood or Softwood Pine SuperPoles, all pressure treated with CCA preservative.

However mostly due to availability, pine poles are now the preferred option.

A comparison of the pole types are summarised below:

	DC 1-Poles	DC 2-Poles	SuperPoles
Wood type (refer AS2209 - Appendix A)	Hardwood	Hardwood	Softwood
Most common species	Ironbark	Spotted Gum/ Blackbutt	Caribaea & Caribaea-Slash Hybrids
Strength Group	S1	S2	S6
Stress Grade	F27	F22	F11*
Lifespan with minimum maintenance	40+years	40+ years	80+years
Size / Length	200 / 250 SED Up to 17.0m	200 / 250 SED Up to 17.0m	180 to 300 DIA Up to 9.0m
Appearance	Green in colour Rustic round	Green in colour Rustic round	Green in colour Machined round
Straightness / Taper	Select grade 8mm / metre	Select grade 8mm / metre	Select grade Nil Taper
Availability	Order / Ex stock Up to 8 weeks	Order / Ex stock Up to 8 weeks	Order / Ex stock Up to 4 weeks
Treatment	Full sapwood penetration 12 to 40mm	Full sapwood penetration 12 to 40mm	Minimum penetration of 35mm
Inherent Benefits	Great strength	Great strength	Ease of working and handling

* Please note: Koppers Softwood Super-Poles are sourced from immature thinnings and this needs to be taken into consideration when designing your pole home. Consult your engineer.

WHAT ABOUT QUALITY?

Timber in pole houses can be expected to give adequate service life provided that good building practice is adhered to and recommended maintenance procedures are regularly carried out.

Recommendations include:

- use the correct timber species
- use timber of suitable quality
- use building practices which will minimise service hazards
- carry out regular maintenance of exposed timber members
- protecting timber internally and externally against weathering caused by effects of water, sunlight, dirt and physical abrasion.
- If termite resistant materials are not used in all the structural components, it will be necessary to comply with AS 3660.1 "Termite Management – New Building Work". See also local State building code, variations or legislation.
- See AS3959 "Construction of Buildings in bushfire-prone areas" and your local State's requirements in planning your pole home.

Koppers provides a Certificate of Compliance with each pole house confirming that the poles have been supplied to our standard specifications.

However it is advisable that expert help be sought to ensure the finished product - your pole house is to be the optimum quality in all aspects.

SPECIFICATION FOR PERFECT ROUND (NON-TAPERED) PINE BUILDING POLES

1.0 SCOPE

This specification establishes the standard for Koppers preservative-treated pine poles used in construction of residential, agricultural and industrial buildings.

2.0 INTERPRETATION

Unless specifically defined herein, the terms and names used in this specification shall be interpreted in accordance with:

AS449.1	Glossary of Terms Used in Timber Related Standards
AS1604.1	Specification for Preservative Treatment – Sawn and Round
AS1720.1	Timber Structures Code - Design Methods
AS1148	Timber – Nomenclature – Australian, New Zealand and Imported Species

- Koppers Manufacturing Specification S15
- Timber Marketing Act (TMA) - New South Wales
- Timber Utilisation and Marketing Act (TUMA) – Queensland

3.0 DEFINITIONS

3.1 BUILDING POLE

A round pole used in construction of residential, agricultural and industrial buildings.

3.2 NON-TAPERED

Machine-peeled to remove the natural taper – producing a parallel-sided pole of uniform diameter along the full length.

3.2 CHECK

Separation of wood fibres along the grain to form a fissure terminating at the pith. Commonly results from stresses set up in a pole during seasoning.

3.3 SPLIT

Separation of wood fibres along the grain to form a fissure extending completely though a pole from one surface to another.

3.4 DIAMETER

A straight-line measured across either end of a non-tapered pole. Used to separate pole size-classes.

4.0 GRADE

The grade requirements set out below apply to poles ready for despatch from the manufacturing plant. Subsequent changes due to variations in moisture content do not invalidate 'fitness-for-purpose' provided that the structural integrity of a pole is not affected by the changes.

4.1 GENERAL

Poles shall be cut from live timber, free from decay, shakes and fractures, visible resin pockets and surface damage.

4.2 SURFACE BARK

Not permitted.

4.3 CHECKS

Maximum width 10mm.

4.4 SPLITS

Not permitted.

4.5 HEARTWOOD

Not to exceed 50% of the diameter at either end of a pole or to be within 35mm of the surface.

5.0 TOLERANCES

5.1 LENGTH

-0, +100mm on specified length.

5.2 DIAMETER

-2, +5mm on specified diameter.

6.0 STRAIGHTNESS

6.1 SWEEP

A string-line from the 'centre-of-each-end' shall fall entirely within the body of a pole in any plane.

6.2 SHORT CROOKS

Not permitted

7.0 SPECIES

The species may be Slash Pine *(Pinus elliottii),* Caribbean Pine *(Pinus caribaea)* and their hybrids or any other softwood species which comply with all elements of this specification. Please note, these species are sourced from immature thinnings.

Note: Refer '*AS1720.1 - Design Methods'* for structural strength criteria.

8.0 SEASONING

Poles may be prepared for preservative-treatment by air-drying, kiln-drying or steam-preconditioning to a moisture content which will enable compliance with the requirements of clause 9.0.

9.0 PRESERVATIVE TREATMENT

9.1 PRESERVATIVE TYPE

Preservative shall be copper-chromium-arsenate (CCA) complying with *AS1604.1.*

9.2 PENETRATION & RETENTION

Preservative penetration and retention shall comply with the levels specified in NSW and Queensland state legislation. In other states *Australian Standard 1604* shall govern.

10.0 ACCEPTANCE CRITERIA

Batch or charge-loads of poles shall be accepted only if all the elements of this specification are met. Non-complying poles may be re-treated and re-tested for compliance.

11.0 IDENTIFICATION

Poles shall be end-marked with Koppers brand and code numbers identifying treatment plant, preservative-type, treatment level and pack number. Only poles which meet all requirements of this specification shall be so marked.

12.0 CERTIFICATION

A Certificate of Compliance will be issued – upon request at time of order - for poles which meet all the elements of this specification. A single certificate may be issued to cover all the poles in one order. The information described in clause 11.0 shall be transcribed on the certificate for each individual pole in the order.

13.0 HANDLING DIRECTIONS

CCA-treated poles shall not be released from the manufacturing plant until the preservative is well-fixed. When working with CCA-treated wood it is recommended that gloves be worn for protection against splinters and skin abrasion. Before eating, drinking, smoking or using toilet facilities exposed areas such as hands and face should be washed. Dust mask and eye protection should be worn when machining timber. Off-cuts should be utilised for landscaping or taken to an approved land-fill site.

POLE INSTALLATION PROCEDURES FOR POLE HOUSE CONSTRUCTION

1.0 EMBEDMENT OF POLES

1.1 DIGGING OF HOLES

The depth of hole will depend on slope, soil and design factors. Tables showing general embedment requirements are available but final depths will be established by the engineer responsible for certification of the design.

Hole diameters should be as in the following table.

Post Diameter (mm)	Hole Size (mm)
100	300
125	300
150	300
175	400
200	400
225	400
250	400
300	500

Where it is necessary to dig unusually large diameter holes a concrete pipe (A) with a diameter 100 mm greater than the pole, can be centered in the hole. The hole is then backfilled (8) and the fill compacted around the concrete pipe which is left free to take the pole (Fig. 1).

Whilst an open hole (non-concrete bottom) is preferred for better drainage, it may be necessary to drill or dig the hole to a specified oversize diameter and pour a concrete plug (C) from 200 to 300 mm deep where additional bearing values are required. The concrete shall not be less than N20 grade (Fig. 2).

1.2 BACKFILLING

The three major types of backfill used are:

1.2.1 Soil taken from the holes mixed with cement in a five to one ratio, dampened and compacted progressively as the hole is filled.

1.2.2 Gravel, crushed rock or road base progressively compacted during backfilling.

1.2.3 Concrete: Where concrete is used as backfill it is important to avoid the situation where a permanently wet interface between pole and concrete is set up. This can be done in one or two ways.

1.2.3.1 The preferred method is to finish the concrete backfill 500mm below ground, taper the top of the concrete (D) and backfill the upper void with coarse, free draining material such as gravel, crushed rock or road base (Fig. 3).

1.2.3.2 Where design considerations require full concrete embedment carry the top of the concrete above the level at which any water is likely to pond or angle away from the pole (Fig. 4). If a gap develops between concrete and the pole at 'E' this gap should be packed with an appropriate Silicon sealer.

NOTE that the Silicon seals should be checked at 6 months and 12 months after installation to ensure seal remains tight. Thereafter poles should be inspected at this point every three years.

Holes should be backfilled with concrete not less than N20 grade. Allow a 150mm gap between bottom of pole and bottom of hole for concrete filling, or 100mm for graded stone backfill.

1.3 SOIL BARRIERS

As an added protection, particularly in high termite hazard areas and to safeguard any untreated timbers in the structure, it is recommended that soil barriers be established during installation. The following recommendations are based on Australian Standard AS3660.1 – 2000 Protection of buildings from subterranean termites, Part 1: New building works, which should be referred to for more detailed information.

1.3.1 Remove old stumps, roots or other debris which might provide a target for termite attack.

1.3.2 Make sure the design provides for access to allow sub-floor inspection.

1.3.3 Make sure that the protective barrier around individual poles or the total barrier, if the whole site is treated, is not breached by service pipes or subsequent landscaping.

1.3.4 It is recommended soil poisoning be carried out by a recognised Pest Control firm, willing to certify that the treatment of the ground and holes has been carried out in accordance with Australian Standard AS3660.1 – 2000 Protection of buildings from subterranean termites, Part 1: New building works and to issue a certificate to this effect.

1.3.5 Ventilation shall be provided to all suspended sub floor areas. The minimum requirement is 7,300mm^2 net ventilation area per linear meter on both external and internal walls, placed below the damp course, but above the level of possible entry of surface water.

1.3.6 The sub floor area below a suspended floor shall be graded and drained to prevent the ponding of water under buildings.

2.0 SUPPLEMENTARY TREATMENT AND INSTALLATION PRACTICES

2.1 Trimming to length must be done at the top or small end of the pole. This will ensure that the end of the pole which is to be embedded in the ground retains the full preservative protection. Any cutting or drilling of the pole in the area which will be below the ground line is to be avoided if possible. When cutting or drilling below groundline is essential to the use of the pole, a 6 mm layer of Koppers CN Emulsion should be applied as detailed in its technical data sheet.

2.2 Pole tops which are exposed to the weather should be capped by copper or other suitable sheathing or protected by galvanised steel pole caps.

2.3 The timber exposed by the length trimming operation should be coated with a 6 mm layer of Koppers CN Emulsion.

2.4 All scarfing and fabrication work carried out on the poles should be followed by the application of a 3 mm layer of Koppers CN Emulsion to the area affected.

2.5 All bolt holes should be filled from both ends with Koppers CN Emulsion.

2.6 All nut and bolt connections used in construction should be checked and tightened 6 months after completion of construction and again after the first summer.

2.7 When untreated bearers and joists are used it is recommended that such sub-floor timbers be flood coated with a suitable surface treatment preservative, such as Koppers CN Timber Oil.

2.8 Top soil containing grass root must be removed from the area on which the footing will rest.

2.9 For pad footing, concrete shall be not less than N20 grade, with 20mm nominal maximum aggregate size.

2.10 Reinforcement in pad footing shall comply with the following

- Design cover to the reinforcement shall be 40mm
- The lap length of bar splices shall not be less than 500mm.

3.0 INSPECTION AND MAINTENANCE PROCEDURES

3.1 Inspection to ensure that pests are not gaining access to any untreated timbers in the structure by bridging the chemical barriers, is recommended as a standard annual maintenance procedure.

3.2 The design should allow crawl space between the ground and bearers and joists to allow inspection of poles to prevent the development of termite runs of the pole surfaces.

3.3 Ensure that the area where the pole enters the ground is kept free from vegetation, household or garden equipment or other materials which would prevent inspection or hide the development of termite runs.

3.4 During the annual inspection carefully check the poles at the ground line to ensure that they are sound, that the area is free draining and that there is no possibility of permanent water or long term wet conditions applying in the ground line area.

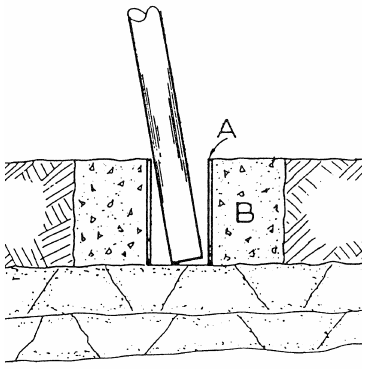

FIG. 1

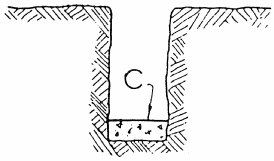

FIG. 2

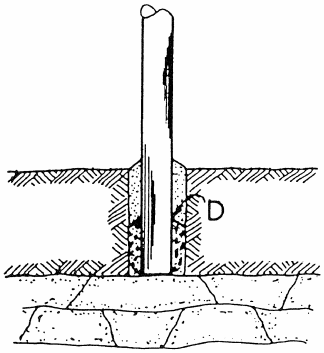

FIG. 3

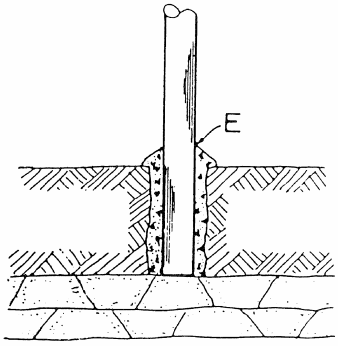

FIG. 4

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