



Ergon Energy Corporation Limited

Technical Specification for Pole Nails

ETS01-10-01

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Technical Specification for Pole Nails

1. Purpose and Scope

This specification sets out the technical requirements for pole nails suitable for use in re-instatement of wood poles. This specification covers design, manufacture and performance requirements.

2. References

2.1 Applicable Standards

The pole nails shall be designed, manufactured and tested in accordance with the relevant parts of the following standards and all amendments issued from time to time except where varied by this specification.

Should inconsistencies be identified between standards and/or this specification, the Supplier shall immediately refer such inconsistencies to the Corporation for resolution.

| STANDARD | TITLE |
|-----------------|--|
| ENA DOC 032 | Groundline pole reinforcement |
| AS/NZS 4680 | Hot-dip galvanised (zinc) coatings on fabricated ferrous articles. |
| AS/NZS 1554 | Structural steel welding set |
| AS 4100 | Steel structures – Limit State Design |
| AS 1627 | Metal finishing – preparation and pre-treatment of surfaces |
| AS/NZS 4360 | Risk Management |
| AS/NZS ISO 9001 | Quality management systems - Requirements |

3. Drawings

3.1 Drawings by the Purchaser

The following drawings are attached and form part of this specification:

| DRAWING NO. | TITLE |
|-------------|-------------------------------------|
| 3064 | VPI Wood Poles Diameters and Masses |

3.2 Drawings by the Tenderer

The Tenderer shall supply all drawings required to adequately evaluate the tender including general arrangement drawings, structural assembly drawings for each nail offered and orientation of pole nail/s with relation to the resultant pole tip loading.

4. Service Conditions

The pole nails shall be suitable for use under the following service conditions:

| | |
|-------------------------|--|
| Ambient Temperatures | 50° summer day time -5° winter night time |
| Maximum Daily Variation | 35°C |

| | |
|-----------------------------|--|
| Solar Radiation Level | 1100 watts per square metre with high ultraviolet content |
| Precipitation | An annual rainfall in excess of 2000 mm (Bureau of Meteorology) |
| Wind Speed | Tropical summer storms with gust wind speeds above 160km/h |
| Humidity | Extended periods of relative humidity in excess of 90% R.H. |
| Atmospheric Classifications | Level IV – very heavy (for installation in polluted ambient air with areas of coastal salt spray and/or industrial pollution refer AS 4436) Equivalent salt deposit densities in the range of 2.0 - 3.0 g/m ² (AS 4436) |

5. Design and Construction

5.1 Design Criteria

Pole nails shall comply with the requirements of “*ENA DOC 032 – Groundline pole reinforcement*” except where varied by this specification.

Pole nails shall be designed and manufactured to restore pole strength rating with an appropriate margin of safety with the assumption that no timber exist at ground line. The details of timber poles used by the Purchaser that may require re-instatement are shown on the attachment 3: Drawing No. 3064.

The design and manufacture shall exhibit a controlled mode of failure (no sudden collapse of nail) to allow sufficient warning and replacement of damaged assets.

Pole nails shall be designed with due consideration to the limited space around the pole, other pole hardware and that in some instances installation shall be carried out on a live pole construction. Pole nails should not assist the climbing of poles by unauthorized person.

The design shall not impose additional obstruction to the public thoroughfares than a typical pole construction. It must be designed with due consideration of public safety. Sharp angular structures are unacceptable.

5.2 Corrosion Protection

All steel items (except for stainless steel) shall be hot-dip galvanised in accordance with AS/NZS 4680.

Hot dip galvanising of ferrous parts, including the threads, bolts, nuts, washers and straps shall be carried out after all machining, bending, cutting, drilling, punching, marking and welding operations have been carried out.

Surface preparation shall be in accordance with AS 1627.

5.3 Surface Finish

Pole nails shall be designed, manufactured and finished with a smooth surface, free of burrs and sharp edges.

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5.4 Welding

All welding shall comply with AS/NZS 1554.

5.5 Profile

Pole nails shall be designed and manufactured with due consideration of its environment.

5.6 Standards

The applicable Australian Standards used in the fabrication of components and fittings in the re-instatement system must be nominated. Where other standards apply in the fabrication of components such as the International Electrotechnical Commission (IEC) and British Standards, these standards or its equivalent Australian Standards shall be nominated for comparison purposes.

5.7 Structural Certification

Structural certification shall comply with clause 6.1 of ENA DOC 032.

The design and manufacture must be certified by a Registered Professional Engineer Queensland to AS 4100. The name and registration details of the engineer are to be supplied.

5.8 Earthing Requirement

Provision for a threaded ferrule to accommodate M12 set screw and lug at the top of the nail are required to allow earthing of pole nails where earth downleads are present. The ferrules shall be 50mm from the edge of the nails and located on each side of the nail.

5.9 Nail Identification

The nail shall be stamped with the ultimate kNm rating of the system and the year of manufacture.

5.10 Nail Software

Where software is required for the selection of the nail, full documentation shall be provided, covering the technical assumptions used for calculation purposes in selecting the correct nail size. Training shall be provided with the use of the software as well as a comprehensive training material and documentation.

6. Machinery / Equipment

The tenderer/supplier shall provide information if applicable on:

- a) The machinery / equipment required for installation, maintenance and disposal
- b) Safe work practice for installation
- c) Cost of acquiring such machinery if purchase or hire
- d) Minimum number of person/s required to carry out safe work practice
- e) Trade / licences / tickets each person/s must acquire

Estimate in hours per nail installation, maintenance and disposal

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7. Performance and Testing

7.1 Testing

The purchaser reserves the right to request that the supplier carry out tests during the tender evaluation period. Seven (7) days notice of such tests shall be given to the purchaser.

The tenderer/supplier when requested shall supply to the purchaser full detailed calculations of bending moments and deflection of the pole, which shall serve as a comparison with the test results. The supplier shall also provide such calculations for each size and type of pole nails offered, in sufficient detail to prove to the purchaser that the test if carried out would be representative of the maximum design load.

Should failure occur during proving tests, further testing of a replacement pole shall take place only after full details of design modifications have been approved in principle.

The design and manufacture must be tested and certified by a Registered Professional Engineer Queensland. The name and registration details of the engineer are to be supplied.

A certificate of conformance shall be submitted with each delivery.

8. Risk Assessment

The Tenderer warrants (without limiting any other warranties or conditions implied by law) that all Goods have been produced, sold and delivered to the Principal in compliance with all applicable laws (including all workplace health and safety and electrical safety legislation, codes of practice and the Principal's Workplace Health & Safety and Electrical Safety Conditions).

Tendered items shall be subjected to a formal risk assessment prior to acceptance. It is preferred that the tenderer performs the risk assessment themselves and provide the resultant documentation with their tender. Where risk assessment documentation is not provided with the tenders, or does not meet the required standard, such tenders shall have their price loaded with the estimated costs associated with the Purchaser conducting the assessments. Any documented risk assessment which accompanies the tender must meet the requirements of AS/NZS 4360 Risk Management as a minimum standard. It is preferred that the risk assessment methodology uses an energy model to identify hazards.

The risk assessment/s must identify hazards to the corporation personnel, public and property associated with:

- a) The handling and installation of the pole nails
- b) The maintenance of the nails during life expectancy
- c) Dismantling / disposal of nails at end of life

9. Quality Assurance

9.1 Purchasers Policy

It is the Purchaser's policy to procure goods, equipment and services from sources that demonstrate the ability to supply quality products.

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9.2 Documentary Evidence

Documentary evidence shall be provided concerning the level of quality system certification associated with the supplier and/or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

Tenderer's attention is drawn to **Schedule MSI** - Management Systems (Form) which forms an integral part of this specification.

9.3 Quality Certification Program

Tenderers shall provide details of their program to upgrade their Quality Certification to meet the requirements of AS/NZS ISO 9001.

10. Samples

10.1 Production Samples

When requested during the tender evaluation period, samples shall be provided and delivered freight free and will include for each size and type of pole nails:-

- a) All components in the re-instatement system; and
- b) Drawings of the construction details.

The Purchasers may at their discretion either purchase the samples at the tendered price or return the samples to the respective tenderer after the contract has been awarded.

Samples shall be supplied within 14 days of official request.

11. Packaging and Marking

Refer **Periodic Supply Without Install: Schedule 10** – PACKAGING AND TRANSPORT REQUIREMENTS in the Periodic Supply of Goods without Installation.

12. Service Performance

The tenderer shall state:

- a) The period of service within Australian conditions, and recommended inspection and maintenance practices to attain the period of service.
- b) Electric utilities who have a service history of the equipment offered and
- c) Contact names and phone numbers of relevant employees of those Electric utilities who can verify the service performance claimed.

13. Reliability

13.1 Service Life

Tenderers are required to comment on the reliability and performance of the items offered for a service life of 20 years under the specified system and environmental conditions.

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13.2 Evidence in Support of Reliability

Such comments shall include evidence in support of the reliability and performance claimed including information of Failure Mode and Critical Effect Analysis (FMCEA).

14. Training

The successful tenderer shall provide any training and training materials necessary to ensure the performance of any equipment supplied under this specification. The material shall include but is not limited to the following topics:

- a) Handling
- b) Storage
- c) Application guide
- d) Installation
- e) Maintenance
- f) Environmental performance
- g) Mechanical performance
- h) Disposal
- i) Software

If the items offered have not been used previously by the purchaser, the tenderer shall provide on-site training for staff in addition to the requirements detailed above.

15. Environmental Considerations

Tenderers are required to comment on the environmental soundness of the design and the materials used in the manufacture of the items offered. In particular, comments should address such issues as recyclability and disposability at the end of service life.

16. Information to be Provided

16.1 Specific Technical Requirements

Attachments 1 and 2 are schedules of the technical details that suppliers are required to complete and return with their offer.

In addition to the completed schedules, Tenderers shall include with their tender documents information on but not limited to the following:

- a) A video that outlines but not limited to the installation, maintenance and testing of the plant to be supplied.
- b) Catalogues, pamphlets, documents, etc. covering topics of mechanical performance, handling, storage, selection, training, pre-installation checks and installation, maintenance, environmental performance and disposal.
- c) If a computer software is provided that determines the pole loading and recommend the type / size of nail to be used, details of the software design principles and assumptions shall be provided.

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16.2 Documentation to be supplied during the Course of the Contract
Certificates as required in **Clause 7**.

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17. Attachment 1 – Technical Details

The supplier shall complete this schedule and shall guarantee the particulars as set out:

| | | | | |
|---|------------------|------------------|------------------|------------------|
| Name of Manufacturer: | | | | |
| Address of Manufacturer: | | | | |
| Place of Manufacturer: | | | | |
| Country of Origin: | | | | |
| Manufacturer's Emblem: | | | | |
| | Item # __ | Item # __ | Item # __ | Item # __ |
| Pole Nail System Offered: | | | | |
| Longitudinal Moment Capacity (kNm) | | | | |
| Transverse Moment Capacity (kNm) | | | | |
| Drawings (Clause 3.2) | | | | |
| Drawings for evaluation (Clause 3.2): (YES/NO) 1. General Arrangement 2. Structural assembly | | | | |

Technical Specification for Pole Nails

Attachment 1 – Technical Details...(Cont'd)

| | Item # __ | Item # __ | Item # __ | Item # __ |
|--|-----------|-----------|-----------|-----------|
| Steel Components – Design & Manufacture Grade of Steel / Class / Australian Standards and / or International Standards / Units per System 1. Pole Nail 2. Bolts 3. Nuts 4. Washers 5. Straps 6. Other (specify) | | | | |
| Corrosion Protection (Clause 5.2) Galvanised to AS 4680 / Other (specify): (YES/NO) 1. Pole Nail 2. Bolts 3. Nuts 4. Washers 5. Straps 6. Other (specify) | | | | |
| Welding (Clause 5.4) Compliance with AS 1554: (YES/NO) At time of manufacture, can a Welders Certificate be provided? (YES/NO) | | | | |

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Attachment 1 – Technical Details...(Cont'd)

| | Item # __ | Item # __ | Item # __ | Item # __ |
|--|-----------|-----------|-----------|-----------|
| Structural Certification (Clause 5.7 and Clause 7) Certified by Registered Professional Engineer Queensland: (YES/NO) Engineer's Name: ? Engineer's Certification Number: ? | | | | |
| Machinery / Equipment (Clause 6) Details supplied: (YES/NO) | | | | |
| Technical Details (Clause 7) Full calculation supplied: (YES/NO) | | | | |
| Risk Assessment (Clause 8) (YES/NO) | | | | |
| Quality Assurance (Clause 9) (YES/NO) | | | | |
| Packaging (Clause 11) Details of packaging provided: (YES/NO) <ul style="list-style-type: none"> • Pack size & mass • Any special lifting or handling requirements | | | | |

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Attachment 1 – Technical Details...(Cont'd)

| | Item # __ | Item # __ | Item # __ | Item # __ |
|--|-----------|-----------|-----------|-----------|
| Service History (Clause 12) Service history information provided: (YES/NO) | | | | |
| Reliability (Clause 13) Reliability evidence provided: (YES/NO) | | | | |
| Training (Clause 14) Training material available: (YES/NO) | | | | |
| Environmental Conditions (Clause 15) Comments provided: (YES/NO) | | | | |

SIGNATURE OF TENDERER: _____

18. Attachment 2 – Suitable Pole Nails

The supplier shall complete this schedule and shall guarantee the particulars as set out:

| Pole Description | | | | Recommended No. of Pole Nails (*Note 5) | | | |
|------------------|--------------------------------------|--|--|---|--------|--------|--------|
| Length (m) | Standard Setting Depth (m) (*Note 1) | Nominal Strength Rating (kN) (*Note 2) | Limit State Strength Rating (kN) (^Note 4) | Item 1 | Item 2 | Item 3 | Item 4 |
| 8.0 | 1.40 | 3 | 5.4 | | | | |
| | | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| 9.5 | 1.55 | 3 | 5.4 | | | | |
| | | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| 11.0 | 1.70 | 3 | 5.4 | | | | |
| | | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| 12.5 | 1.85 | 3 | 5.4 | | | | |
| | | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| 14.0 | 2.00 | 3 | 5.4 | | | | |
| | | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| 15.5 | 2.15 | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| | | 20 | 36 | | | | |

SIGNATURE OF TENDERER: _____

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Attachment 2 – Suitable Pole Nails...(Cont'd)

The supplier shall complete this schedule and shall guarantee the particulars as set out:

| Pole Description | | | | Recommended No. of Pole Nails (`Note 5) | | | |
|------------------|--------------------------------------|--|--|--|--------|--------|--------|
| Length (m) | Standard Setting Depth (m) (*Note 1) | Nominal Strength Rating (kN) (*Note 2) | Limit State Strength Rating (kN) (^Note 4) | Item 1 | Item 2 | Item 3 | Item 4 |
| 17.0 | 2.30 | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| | | 20 | 36 | | | | |
| 18.5 | 2.45 | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| | | 20 | 36 | | | | |
| 20.0 | 2.60 | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| | | 20 | 36 | | | | |
| 21.5 | 2.75 | 5 | 9 | | | | |
| | | 8 | 14.4 | | | | |
| | | 12 | 21.6 | | | | |
| | | 20 | 36 | | | | |

Notes:

* **Notes 1 and 2** as per attached Drawing No. 3064.

^ **Note 4** – Limit state strength rating is 1.8 times nominal strength rating. For wood structures a strength factor of 0.72 is used from Modulus of Rupture (ultimate strength rating). For example a pole with 5kN nominal strength rating has a limit state strength rating of $5 \times 1.8 = 9\text{kN}$ and modulus of rupture of $9 / 0.72 = 12.5\text{kN}$. For steel structures a strength factor of 0.9 shall apply.

` **Note 5** – The Tenderer shall nominate the appropriate number of nails required to restore the pole strength rating based on the items listed in **Attachment 1**.

NAME OF TENDERER:

ADDRESS OF TENDERER: _____

SIGNATURE: _____ FOR AND ON BEHALF OF TENDERER

DATE: _____

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19. Attachment 3 – Drawing 3064

POLES V.P.I. WOOD POLES DIAMETERS AND MAXIMUM MASSES

| Pole Description | | | Minimum Pole Diameters and Maximum Masses | | | | | | | | | | | |
|------------------|-------------------------------------|-------------------------------|---|-----------------------|-------------------|-------------------------|----------------------------|-----------------------|-------------------|-------------------------|----------------------------|-----------------------|-------------------|-------------------------|
| Length (m) | Standard Setting Depth (m) (Note 1) | Strength Rating (kN) (Note 2) | Strength Group S1 (Note 3) | | | | Strength Group S2 (Note 3) | | | | Strength Group S3 (Note 3) | | | |
| | | | Diameter 2m from Butt (mm) | Diameter at Head (mm) | Maximum Mass (kg) | Girth 2m from Butt (mm) | Diameter 2m from Butt (mm) | Diameter at Head (mm) | Maximum Mass (kg) | Girth 2m from Butt (mm) | Diameter 2m from Butt (mm) | Diameter at Head (mm) | Maximum Mass (kg) | Girth 2m from Butt (mm) |
| 8.0 | 1.40 | 3 | 165 | 105 | 290 | 518 | 175 | 115 | 330 | 550 | 185 | 125 | 350 | 581 |
| | | 5 | 195 | 135 | 410 | 613 | 210 | 145 | 450 | 660 | 220 | 155 | 490 | 691 |
| | | 8 | 230 | 165 | 545 | 723 | 245 | 175 | 590 | 770 | 260 | 190 | 630 | 817 |
| | | 12 | 285 | 195 | 700 | 833 | 280 | 210 | 750 | 880 | 295 | 220 | 790 | 927 |
| 9.5 | 1.55 | 3 | 180 | 110 | 380 | 565 | 190 | 120 | 425 | 597 | 200 | 125 | 470 | 628 |
| | | 5 | 210 | 135 | 545 | 680 | 225 | 150 | 595 | 707 | 240 | 160 | 640 | 754 |
| | | 8 | 250 | 170 | 715 | 785 | 265 | 185 | 765 | 833 | 280 | 195 | 845 | 880 |
| | | 12 | 285 | 200 | 905 | 895 | 300 | 215 | 900 | 942 | 320 | 230 | 1070 | 1005 |
| 11.0 | 1.70 | 3 | 190 | 110 | 485 | 597 | 200 | 120 | 535 | 628 | 215 | 130 | 585 | 675 |
| | | 5 | 225 | 135 | 680 | 707 | 240 | 150 | 735 | 754 | 255 | 160 | 790 | 801 |
| | | 8 | 265 | 170 | 875 | 833 | 280 | 175 | 965 | 880 | 295 | 195 | 1025 | 927 |
| | | 12 | 300 | 200 | 1100 | 942 | 320 | 220 | 1230 | 1005 | 335 | 230 | 1290 | 1052 |
| 12.5 | 1.85 | 3 | 200 | 115 | 610 | 628 | 215 | 125 | 650 | 675 | 225 | 130 | 695 | 707 |
| | | 5 | 235 | 140 | 815 | 738 | 250 | 150 | 890 | 785 | 265 | 160 | 950 | 833 |
| | | 8 | 275 | 170 | 1055 | 884 | 295 | 185 | 1155 | 927 | 310 | 195 | 1250 | 974 |
| | | 12 | 315 | 200 | 1350 | 990 | 335 | 215 | 1480 | 1052 | 355 | 235 | 1610 | 1115 |
| 14.0 | 2.00 | 3 | 210 | 120 | 780 | 680 | 220 | 130 | 870 | 691 | 235 | 140 | 875 | 738 |
| | | 5 | 250 | 145 | 1025 | 785 | 265 | 165 | 1075 | 833 | 280 | 165 | 1170 | 880 |
| | | 8 | 290 | 170 | 1305 | 911 | 305 | 185 | 1360 | 958 | 325 | 200 | 1470 | 1021 |
| | | 12 | 330 | 205 | 1615 | 1037 | 350 | 215 | 1750 | 1100 | 370 | 235 | 1870 | 1162 |
| 15.5 | 2.15 | 5 | 260 | 155 | 1275 | 817 | 275 | 165 | 1385 | 864 | 290 | 175 | 1440 | 911 |
| | | 8 | 300 | 180 | 1600 | 942 | 320 | 195 | 1720 | 1005 | 335 | 205 | 1830 | 1052 |
| | | 12 | 345 | 210 | 2160 | 1084 | 365 | 230 | 2285 | 1147 | 385 | 245 | 2410 | 1210 |
| | | 20 | 410 | 255 | 2830 | 1288 | 435 | 285 | 3105 | 1387 | 455 | 300 | 3245 | 1429 |
| 17.0 | 2.30 | 5 | 285 | 160 | 1445 | 833 | 285 | 170 | 1500 | 895 | 300 | 180 | 1625 | 942 |
| | | 8 | 310 | 190 | 1810 | 974 | 330 | 200 | 1835 | 1037 | 350 | 215 | 2060 | 1100 |
| | | 12 | 355 | 220 | 2430 | 1115 | 380 | 235 | 2650 | 1194 | 400 | 250 | 2885 | 1257 |
| | | 20 | 420 | 265 | 3210 | 1319 | 450 | 285 | 3585 | 1414 | 475 | 305 | 3880 | 1492 |
| 18.5 | 2.45 | 5 | 275 | 165 | 1735 | 864 | 290 | 175 | 1870 | 911 | 310 | 185 | 1935 | 974 |
| | | 8 | 320 | 195 | 2150 | 1005 | 340 | 210 | 2290 | 1068 | 360 | 220 | 2425 | 1131 |
| | | 12 | 370 | 225 | 2855 | 1162 | 390 | 240 | 3085 | 1225 | 410 | 255 | 3230 | 1288 |
| | | 20 | 435 | 270 | 3855 | 1367 | 465 | 290 | 4090 | 1461 | 490 | 310 | 4415 | 1539 |
| 20.0 | 2.60 | 5 | 285 | 170 | 2070 | 895 | 300 | 180 | 2220 | 942 | 320 | 190 | 2285 | 1005 |
| | | 8 | 330 | 200 | 2540 | 1037 | 350 | 215 | 2780 | 1100 | 370 | 225 | 2930 | 1162 |
| | | 12 | 380 | 230 | 3225 | 1194 | 400 | 250 | 3590 | 1257 | 425 | 265 | 3845 | 1335 |
| | | 20 | 450 | 280 | 4450 | 1414 | 475 | 295 | 4510 | 1492 | 505 | 315 | 4890 | 1587 |
| 21.5 | 2.75 | 5 | 290 | 175 | 2450 | 911 | 310 | 185 | 2615 | 974 | 325 | 195 | 2775 | 1021 |
| | | 8 | 340 | 205 | 3075 | 1068 | 360 | 220 | 3245 | 1131 | 380 | 235 | 3410 | 1194 |
| | | 12 | 390 | 240 | 3975 | 1225 | 415 | 255 | 4265 | 1304 | 435 | 270 | 4540 | 1367 |
| | | 20 | 460 | 285 | 4995 | 1445 | 490 | 305 | 5420 | 1539 | 515 | 325 | 5835 | 1618 |

NOTES:

- In accordance with the "Uniform Practice Manual for the Mechanical Design of Overhead Electric Lines – Sec(Q) M1-1977", a pole shall be set in the ground to a depth of not less than 0.6m plus one tenth of the pole length. In poor soil, additional stability shall be provided by sinking the pole deeper, or by the use of stabilised fill or stays.
- The Strength Rating (kN) is the allowable pole top load under maximum wind conditions.
- Strength groups are as defined in AS2878 "Timbers – Classification into Strength Groups".

| | | | | | | |
|---|----------------|--|----------|--------------------|---|-------------|
| A | ORIGINAL ISSUE | Ergon Energy Corporation Ltd ABN 50 087 646 062 | APPROVED | <i>[Signature]</i> | DISTRIBUTION DESIGN - OVERHEAD POLES V.P.I. WOOD POLES DIAMETERS AND MASSES | |
| B | 20/02/03 | | DATE | 03/05/01 | | |
| C | 26/07/05 | | PASSED | <i>[Signature]</i> | | |
| | | | DRAWN | C.Jensen | FILE: 5 34 3064 1 | Dwg 3064 Sh |