1. SCOPE

The purpose of this document is to provide practical safety, environmental and quality guidance for handling of wood poles and storage in permanent sites and on-site temporary storage prior to them being erected. This guidance applies to the storage of all wood poles regardless of the number of poles or the duration for which the poles are to be stored.

Implementation of the measures set out in this document shall be the responsibility of the SPEN Logistics Manager, Head of Resources or Head of Delivery, for SPEN controlled storage areas.

SPEN's Service Partners are responsible for ensuring their pole storage areas, processes and accountability are appropriate. This document can be used as guidance for the preparation of the Service Partner's own pole storage processes.

This document supersedes OHL-16-001 "Site Pole Delivery and Handling", which is now withdrawn.

2. ISSUE RECORD

This is a Reference document. The current version is held in the EN Document Library.

It is your responsibility to ensure you work to the current version.

Issue Date	Issue No.	Author	Amendment Details
August 2020	1	Jamie McDonald	This document supersedes OHL-16-001 "Site Pole Delivery and Handling", which is now withdrawn.

3. ISSUE AUTHORITY

Author	Owner	Issue Authority
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4. REVIEW

This is a Reference document which has a 2-year retention period after which a reminder will be issued to review and extend retention or archive.

5. DISTRIBUTION

This document is not part of a Manual maintained by Document Control and does not have a maintained distribution list.

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7. REFERENCES

This document makes reference to the documents listed below, it is important that users are in possession of the latest editions together with any amendments.

ENV-04-012 Waste Management and the Duty of Care.

ENV-12-019 Landowner Agreement Form – Pole Re-Use.

OHL-03-099 Specification for Construction of HV Overhead Lines up to 33kV on Wood Poles.

OHL-03-101 Specification for Low Voltage Overhead Lines incorporating Aerial Bundled Conductor.

OHL-09-001 Temporary Pole Storage Area Assessment Form – 5 Poles or Less Single Layer.

OHL-09-002 Temporary Pole Storage Area Assessment Form – 6 Poles or More Single Layer.

OHL-26-007 Re-Use and Disposal of Used Poles.

SMS-09-002 Activity Risk Control: Distribution Overhead Lines.

BS 8417 Preservation of wood. Code of practice.

HSG 151 Protecting the public – Your next move.

SPEN Glove Guide.

8. POLE TREATMENTS

8.1 Creosote Treated Poles

Creosote is the only wood preservative specified in BS 8417 that offers a desired service life of 60 years. In addition to the health issues associated with creosote (see Section 9), it is extremely toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

Any leachate from creosote impregnated poles or blocks during storage must be treated as a hazardous substance and prevented from entering the environment. Although poles may bleed excess creosote at any time of the year, this risk increases during periods of peak ambient temperatures and direct sunshine.

Irrespective of whether or not the pole is bleeding, skin contact with creosote treated poles can result in chemical burns. Excess creosote can penetrate through coveralls and additional care shall be taken when poles with excess creosote are identified. In high ambient temperatures, new poles can also release creosote vapours that could penetrate coveralls and affect the skin through indirect contact.

Traditional drain interceptors, or separators, are not effective at controlling run-off of creosote into drainage systems. This is due to creosote being heavier than water.

8.2 Copper Salt Treated Poles

Copper salt treated poles can be differentiated from creosote treated poles in that they are green in colour, dry to the touch and there are no health effects that could occur from exposure to, or the handling of, new copper salt treated poles. As they are water based (as opposed to the oil-based creosote) the poles are not lubricated in the same way that occurs with creosote. Similar to the old CCA (Copper, Chrome, Arsenic) poles, they are more difficult to climb with irons and will require additional care. Copper salt treated poles will leach copper from the poles, which is harmful to copper intolerant organisms, and they have no resistance to copper tolerant organisms in the soil and poles erected by some UK utility companies have had a significant percentage of poles with substantial decay in less than 10 years. To prevent this premature decay, all copper salt treated poles installed by SPEN will be fitted with a protective sleeve that has been developed to act as a barrier to prevent the copper salt treated poles from encountering the copper tolerant organisms. This increases the poles' life expectancy to between 20 and 30 years.

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There may still be existing CCA poles on the network. The chrome and arsenic chemicals in the preservative present significant health risks. These poles can be identified by the letters “CCA” carved into the wood below the scarf mark. CCA poles should be treated as creosote treated poles.

8.3 Copper Oil Treated Poles

Copper oil treated poles will give the pole a life expectancy of 50 years. The poles are dry to the touch and there are no significant health effects that could occur from exposure to, or the handling of, new copper oil treated poles. The poles are dark green / brown in colour and the treatment lubricates the poles similarly to creosote, offering water repellence during the life of the pole. These poles are environmentally friendly and the leaching of copper from the pole is minimal. The storage and use of these poles is safe near sources of water and areas with aquatic organisms. Note: it is expected that pole sleeves do not need to be fitted to these poles.

Copper oil treated poles are not currently Approved for use within SPEN at the time of writing this document. Standards are planning to introduce them to replace Copper salt poles within the next 12 months.

8.4 Legislation

A European Union directive states that creosote should not be used on transmission / distribution wooden poles that are in, or in close proximity to schools, playgrounds, parks, gardens, and any outdoor recreational and leisure facilities where there is a risk of frequent skin contact. Copper salt treated poles and copper oil treated poles are suitable to be erected in these locations.

In order to comply with this legislation and to protect members of the public from chemical burns from creosote treated poles, it has been decided that, for both HV and LV lines, creosote treated poles shall not be erected in areas that are frequented by members of the public. This includes: schools; playgrounds; parks; gardens; footpaths; car parks; and outdoor recreational and leisure facilities. Outdoor recreational and leisure facilities shall include: fishing areas; golf courses; public rights of way; fields that host annual events; caravan parks; camp sites; official or unofficial picnic areas; and official or unofficial areas where youths congregate (note: this list is not exclusive). Poles that have been treated with a copper salts preservative and fitted with protective sleeves or poles that have been treated with a copper oil preservative shall be erected instead.

New HV lines shall not be erected in schools or playgrounds. In parks, domestic gardens and outdoor recreational and leisure facilities, an on-site risk assessment shall be carried out to determine the area’s suitability for new HV overhead lines to be built and whether or not it is practical for the line to be located out with these areas. Where poles are to be erected in these areas, they shall be preserved with either a copper salt treatment and fitted with protective barrier sleeves, or a copper oil treatment; creosote treated poles shall not be erected in these areas.

In areas that are not described above, it is expected that either creosote treated poles or copper oil treated poles shall be erected at both HV and LV. If, however, an on-site risk assessment determines that there is a high likelihood of the risk of frequent skin contact to members of the public, then either copper salt treated poles, fitted with protective sleeves, or copper oil treated poles shall be erected.

9. MINIMISING EXPOSURE TO CREOSOTE

9.1 Health Effects

Creosote is a classified Group 2 carcinogen, a substance that has been shown in some instances of causing cancer in humans. It has been linked to both skin and testicular cancers. It is a coal tar derivative, which contains polycyclic aromatic hydrocarbons (PAHs) and cresols, among other hazardous components. In accordance with SMS-09-002, health surveillance and skin checks are provided for “at risk” staff.

Creosote is classified as toxic, harmful and an irritant, primarily to the skin. Prolonged exposure to the vapour can cause irritation of upper respiratory tract. It can also cause an individual to develop photo-sensitivity, which is where the effect of the UV from sunlight on creosote vapour or direct contact with the skin, exacerbates the harmful effects, often resulting in burns.

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9.2 Direct Contact

Exposure to creosote generally occurs through direct contact with a creosote pole. Note: the risk is greater in the first few years of the pole's life. This type of exposure could occur all year round and the pole does not need to be bleeding. Direct contact with creosote through inadvertent wiping of a gloved hand across the face, for example, could cause a reddening of the skin. Depending on the amount of creosote and how quickly it was removed from the skin, this may cause a burn to develop – phototoxic tar dermatitis. If skin contact has occurred, a SPEN Approved hand cleaner wipe (SAP code: 30032479) would be sufficient to remove the creosote from the skin. Moisturise the affected area once clean.

Reference shall be made to the SPEN Glove Guide.

When handling copper salt treated poles, copper oil treated poles or creosote treated poles that are not bleeding, general purpose gloves for industrial work should be worn (SAP code: 30038230 – 8233). Note: if these gloves have a fabric back, this will readily allow the creosote to contact the skin. These shall be changed fortnightly, dependent on use and creosote contamination.

Where thermal protection is required when handling copper salt treated poles, copper oil treated poles and creosote treated poles that are not bleeding, thermal gloves may be worn (SAP code: 30038226 – 8229). Note: these gloves have a reduced cut level when compared to the general-purpose gloves for industrial work and any fabric will readily allow the creosote to contact the skin. These shall be changed fortnightly, dependent on use and creosote contamination.

If directly handling bleeding creosote poles, concerted effort to remove gloves prior to the need to touch skin shall be made. A chemical glove for oil and common chemicals will give sufficient protection against the creosote for up to four hours (SAP code: 30035886 – 30085888). Note: these gloves have a reduced cut level when compared to general purpose gloves for industrial work.

Measures should be sought to reduce the potential for the contamination of coveralls, especially on the arms and lower legs. The use of disposable sleeves would reduce the potential for creosote to contaminate the arms of the coveralls, if practicable for the working environment. All heavily contaminated coveralls shall be changed as soon as reasonably practicable. The potential for contamination should be considered prior to the work commencing, with a change of coveralls available.

All contaminated coveralls should be changed as soon as reasonably practicable and a change of coveralls should be kept available to facilitate this. Lightly contaminated coveralls shall be carefully stored within the van and laundered at the end of the shift. Note this should not be in a bag as the person opening the bag could be exposed to the vapour evolving in the bag. Heavily contaminated coveralls and gloves shall be carefully stored within sealable bags for disposal.

9.3 Creosote Vapour

The other form of exposure is through indirect contact with the vapour. This would tend to occur during the hotter months when the leaching creosote vaporises. This form of exposure has the tendency to cause a photosensitive reaction, which feels similar to sunburn, and can also be painful.

When working in warmer weather, the potential for vapour release is an additional risk. Minimise exposed skin through ensuring coveralls are fully zipped up, the sleeves are rolled down and suitable, approved gloves are worn. The application of Factor 50 sun cream to the face and neck 30 minutes ***before*** work begins, in accordance with SMS-09-002, would prevent any UV light entering the skin, therefore significantly reducing the potential for the photo-sensitive reaction to develop. Prevention of direct skin contamination should be followed as above. It is worth noting that the vapour could also contaminate the coveralls and so, even if it is felt there has been little direct contact with the poles, the coveralls should be changed and laundered.

Any signs of exposure to creosote shall be reported to the Team Leader or Foreman in the first instance who will then contact Occupational Health or the Safety Officer, as appropriate.

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10. DELIVERY AND HANDLING

Although copper salt treated poles and copper oil treated poles shall be stored separately from creosote treated poles and blocks to prevent contamination, they may be delivered together as the level of creosote contamination to the copper salt treated and copper oil treated poles will be minimal during the short duration whilst being transported.

Before unloading poles from any vehicle, a suitable exclusion zone should be established, to control third party access into that work area. Once in place, the poles should be lifted using a grab or endless slings / chains to avoid impact and surface damage to the wood. Care must be taken when handling copper poles fitted with barrier sleeves to prevent damage and to ensure that the jaws or clamps of the machinery do not damage or bite into the pole. Before lifting poles refer to pole weights in Tables 1 and 2 and ensure that the load being lifted does not exceed the safe lifting load of the equipment.

Table 1 – Pole Weights for Creosote Treated Poles

Length of Pole (m)	Weight (kg)			
	Medium	Stout	Extra Stout	Extra-Extra Stout
9.0	217	319	373	414
9.5	246	358	404	443
10.0	254	378	444	473
10.5	261	399	474	490
11.0	293	443	507	525
11.5	319	479	520	540
12.0	345	515	554	581
13.0	376	571	638	674
14.0	432	633	733	754
15.0	532	734	795	840
16.0	591	788	909	987
17.0	676	843	1038	1090
18.0	771	1120	1163	1190

Table 2 – Pole Weights for Copper Salt and Copper Oil Treated Poles

Length of Pole (m)	Weight (kg)			
	Medium	Stout	Extra Stout	Extra-Extra Stout
9.0	286	383	448	497
9.5	295	430	485	532
10.0	305	454	533	568
10.5	313	479	569	588
11.0	352	532	608	630
11.5	383	575	624	648
12.0	414	618	665	697
13.0	451	685	766	809
14.0	518	760	880	905
15.0	634	881	954	1,008
16.0	709	946	1,091	1,184
17.0	809	1,012	1,246	1,308
18.0	925	1,344	1,396	1,428

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Wood poles are natural products; therefore, all pole weights are AVERAGE, and a degree of variation should be allowed for. It should be noted though that copper salt and copper oil treated poles are considerably heavier than creosote treated poles.

11. POLE STORAGE AREAS – 3-LAYER

The pole storage areas described in this section are likely to be SPEN Logistics main pole stores or SPEN District pole storage areas, either in Depots or at other SPEN sites. Each pole storage area shall have a nominated person in charge of the pole storage area.

The nominated person will be responsible for ensuring the storage site is inspected at least once per week to ensure compliance with the safety, environmental and quality requirement detailed in this document. This inspection shall be recorded in Cintellate by the nominated person responsible for the pole storage area.

Copper oil treated poles and copper salt treated poles may be stored together but they shall be stored separately from creosote treated poles and blocks to prevent the copper treated poles from getting contaminated by excess creosote. Note: creosote treated poles and copper oil or copper salt treated poles may be delivered together as the level of creosote contamination to the copper oil or salt treated poles will be minimal during the short duration whilst being transported.

Creosote treated poles and blocks received at SPEN's pole storage areas, or those of its Service Partners, shall be dry as shown in the photographs in Section 17.1. Poles and blocks that are bleeding shall be declared as defective and quarantined. Creosote treated poles and blocks that subsequently start to bleed after delivery shall also be quarantined. The person receiving the delivery shall inform SPEN Logistics that there are quarantined poles. SPEN Logistics will inform the pole supplier to uplift these poles at the earliest opportunity. This ensures that there is a record of the bleeding poles.

These storage sites shall be fenced off to deter unauthorised access by members of the public, with a fence and gate that are not easily climbable. If members of the public are prevented from being on site for other reasons e.g. a secure SPEN depot or yard belonging to a third party, then this is considered a sufficient measure. Where the storage area is in an unsecured area, e.g. in a field to supply poles for a large project, the site shall be fenced off with Heras fencing, or similar, complying with HSG 151.

'Danger of Death Keep Out' signs shall be fixed to the fencing, such that it is prominent when approaching from any direction.

Storage areas shall be located such that creosote treated poles and blocks are not stored in close proximity to water courses (such as rivers or streams) or in proximity to surface water drains or gullies, where the drain-off could enter the water courses or drains.

The storage area for creosote, copper oil or copper salt treated poles shall be constructed on well-drained, firm ground, free from weeds and old or decayed timber.

Timber, metal, or concrete vertical posts shall be securely held in place with structural concrete to create bays for the different sizes of poles. Pole lengths normally range from 9 metres to 16 metres and pole bays should be constructed to accommodate these lengths. Where larger poles are to be kept on site, then the length of the pole bays shall be increased to accommodate this. In addition, it is recommended that pole sizes / grades are not mixed whilst in storage. Maintaining stock rotation is critical to ensure 'last in/first out' principles

Upright retainer posts should be fitted to the boundaries of storage areas. These posts shall have enough strength such that the lateral forces applied by the poles do not cause them to bend or move. A minimum of two upright posts are required at each end of the storage area for poles up to 10 metres in length. Longer poles will need 3 or 4 sets of upright posts to ensure poles are adequately retained.

A timber or concrete lateral shall be bolted between each set of vertical posts to support the poles and keep them a minimum of 250mm above the ground. Note: copper treated poles shall be stored such that the protective sleeve does not rest on the lateral.

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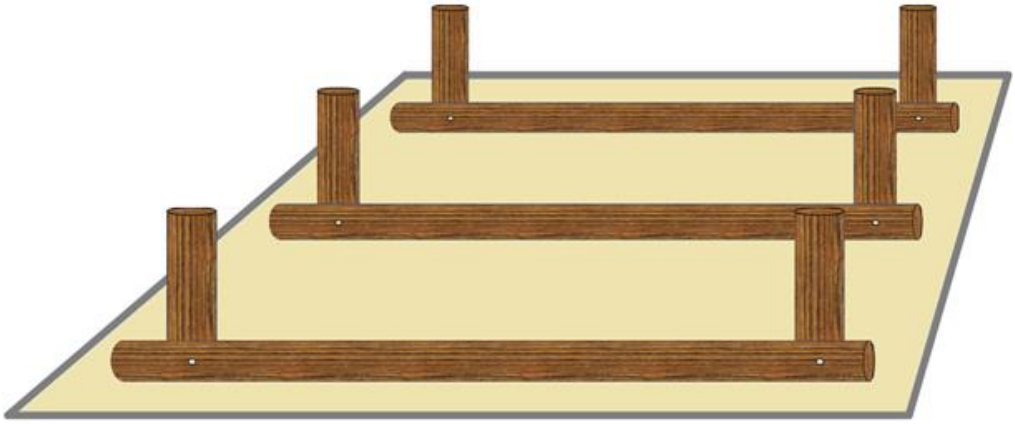
In addition, for creosote treated poles and blocks, the ground shall be excavated to a depth of 120mm for the full length and breadth of the bay and type 1 stone laid to ensure that the ground is level and firm. A non-permeable membrane shall be laid on top of the type 1 to prevent creosote run-off from contaminating the ground. A layer of bark, wood chips or sand, 75mm to 100mm deep, shall be placed on top of the membrane to contain any potential run-off.

The poles shall be stacked no more than a maximum of 3 poles high.

An additional bay shall be erected to contain these bleeding poles and blocks prior to uplift by the pole supplier.

Figure 1 shows a typical structure for stacking poles.

Figure 1: Storage Site for Stacked Poles



The poles shall be rotated at least annually to prevent individual poles from being stored for prolonged periods of time. Individual poles stored for more than 3 years shall be used as soon as is practical.

The bark, wood chips or sand shall be replaced when they become saturated.

A contamination skip, or similar, shall be located on site to hold old creosote poles, blocks, bark, wood chips, sand or other items that have been contaminated with creosote, including the butts of Cobra treated poles. This material shall be treated as hazardous waste and disposed of in accordance with ENV-04-012.

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12. TEMPORARY POLE STORAGE AREAS – 6 POLES OR MORE SINGLE LAYER

Where a minimum of 6 poles (and associated blocks) are required to be kept on site for up to a maximum of 13 weeks, a temporary storage area for both poles and blocks shall be agreed between the landowner and the SPEN Project Manager (or their representative who is competent to survey the site to ensure suitability to store the poles). Each pole storage area shall have a nominated person in charge of the pole storage area.

The nominated person will be responsible for ensuring the storage site is inspected at least once per week to ensure compliance with the safety, environmental and quality requirement detailed in this document. This inspection shall be recorded in Cintellate or kept with the OHL-09-002 form by the nominated person responsible for the pole storage area.

A risk assessment of the proposed pole storage location shall be carried out, taking cognisance of the proximity to built-up areas, schools, children's play areas, recreational areas, public rights of way, water courses (such as rivers or streams), surface water drains, or gullies, where the drain-off could enter the water courses or drains.

The "Temporary Pole Storage Area Assessment Form – 6 Poles or More Single Layer" (OHL-09-002) shall be completed. The agreed location shall be clearly identified and recorded in OHL-09-002. The completed form shall be retained for 3 years in the district office by the District Head of Delivery.

Prior to poles and blocks being delivered, as part of setting to work, the operatives shall be fully briefed on the storage location and its specific requirements. This shall include all preventative measures that have previously been identified.

Unless members of the public are prevented from being on site for other reasons, for example, a secure yard belonging to a third party, then the site shall be fenced off with Heras fencing, or similar.

'Danger of Death Keep Out' signs shall be fixed to the fencing, such that it is prominent when approaching from any direction.

The pole storage area for creosote, copper oil or copper salt treated poles shall be constructed on well-drained, firm ground, free from weeds and old or decayed timber.

Where practicable, the storage shall be on level ground. Where this is not practicable, the poles need to be stored on a slope, to stop the poles from rolling down the slope, they shall be stored perpendicular to the slope (with the butt at the bottom of the slope) and not across the slope.

To prevent creosote run-off from contaminating the ground, for creosote treated poles and blocks, a non-permeable membrane shall be laid on top of the ground and a layer of bark, wood chips or sand shall be placed on top of the membrane to contain the run-off. Alternatively, an absorbent matting may be laid with a minimum of 100mm overlap to ensure no gaps occur to avoid creosote leachate sitting unabsorbed on the membrane beneath, as shown in Figure 2. If the site is not level, the downhill sides shall be lined with absorbent booms, in accordance with Figure 6.

Copper treated poles and creosote treated poles and blocks shall be stored separately in order to prevent the copper treated poles from being contaminated with creosote.

A minimum of two skid boards, or poles laid horizontally, shall be used to support the poles and keep them a minimum of 250mm above the ground, as shown in Figure 3. Note: copper treated poles shall be stored such that the protective sleeve does not rest on the skid board.

The poles shall not be stacked and shall be a maximum of one high. See Figure 4.

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The poles shall be secured to prevent movement by the most appropriate means, depending on the number of poles in the area, options include:

- Foundation or stay blocks or steelwork fitted to poles to prevent movement.
- Enough chocks to ensure that the poles do not move. These can be wood, plastic, metal, or rubber, as long as they are considered suitable. Ideally, they shall be of a highly visible colour. They shall be replaced if they become damaged. See Figure 5.

When poles and blocks are delivered to site, a record shall be kept of both the arrival date and their uplift to site for installation. Irrespective of how long any individual poles are stored in this area, the area shall not be in use for more than 13 weeks.

Prior to leaving site, photographs of the poles, blocks, fencing and signage shall be taken. These photographs shall be kept with the completed OHL-09-002 form.

Where poles or blocks start to bleed after they have been delivered, they shall be returned to the quarantine location in the permanent storage area for uplift by the pole supplier and SPEN Logistics shall be informed.

The contaminated bark, wood chips, sand or absorbent matting shall be replaced, as required, to prevent it from becoming saturated. The contaminated bark, wood chips, sand or absorbent matting is hazardous waste and shall be transported to the contamination skip for disposal as detailed in Section 11.

Figure 2: Absorbent Matting on Membrane

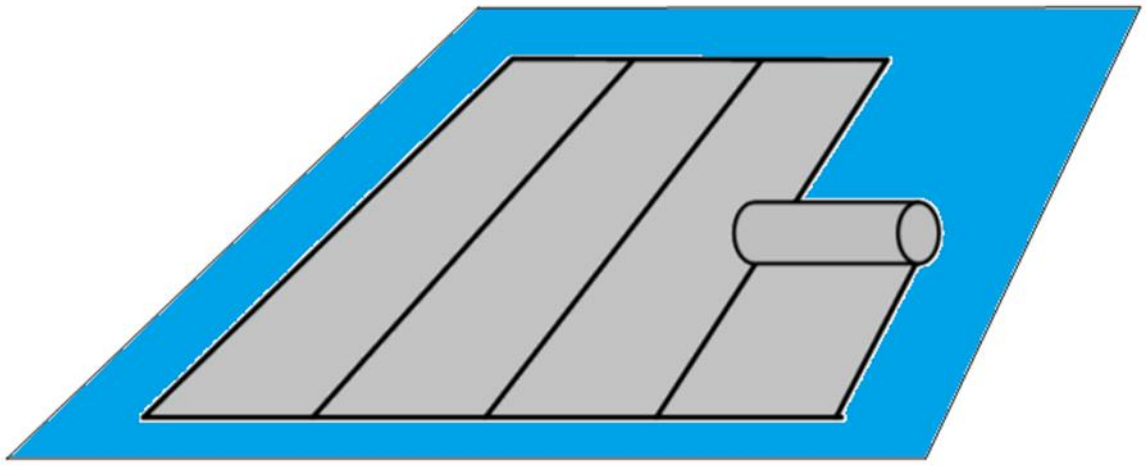


Figure 3: Skid Boards on Matting

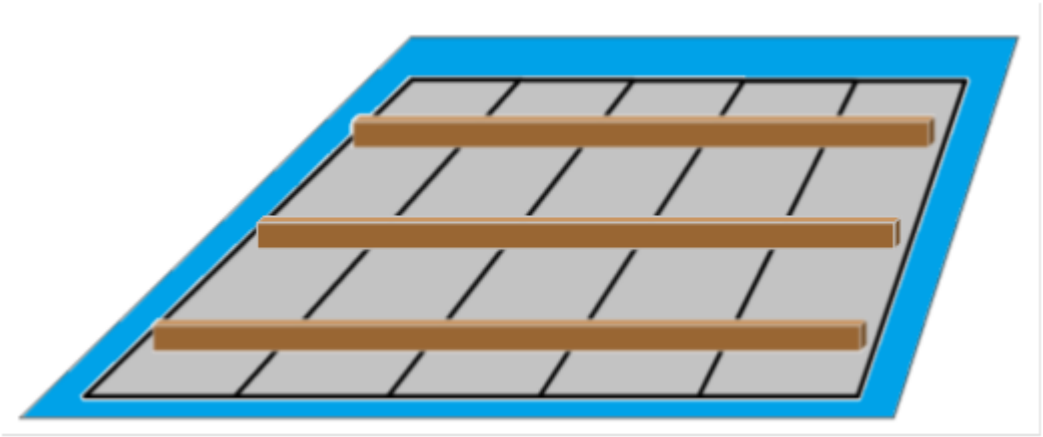


Figure 4: Single Layer Poles

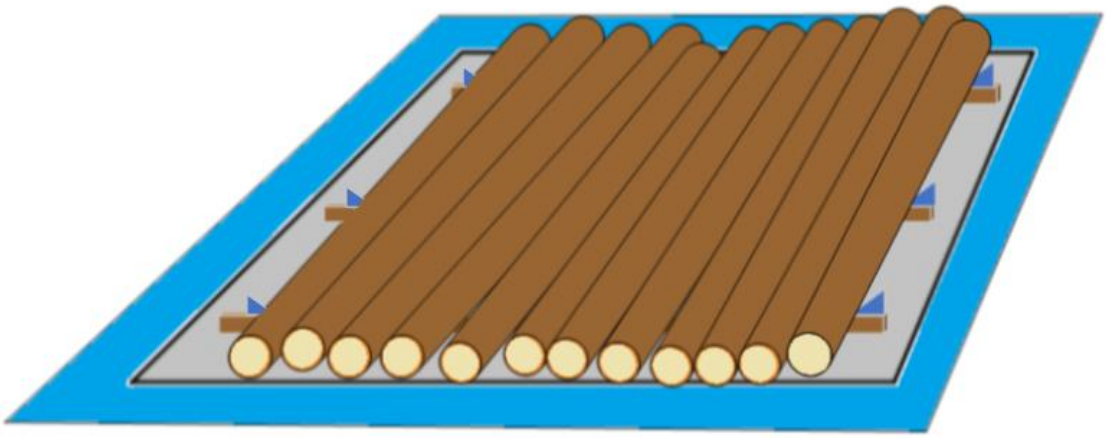


Figure 5: Poles Chocked

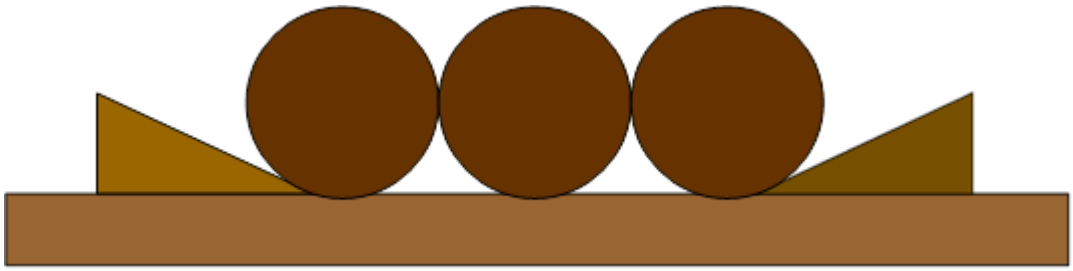
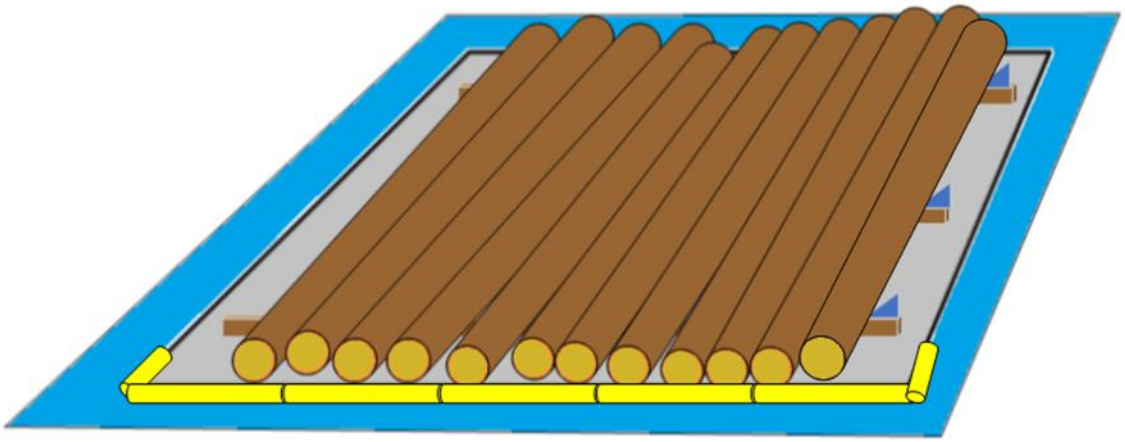


Figure 6: Absorbent Booms



13. TEMPORARY POLE STORAGE AREAS – 5 POLES OR LESS SINGLE LAYER

Where up to a maximum of 5 poles (and associated blocks) are required to be kept on site, a suitable temporary storage area for both poles and blocks shall be agreed between the landowner and the SPEN Project Manager (or their representative who is competent to survey the site to ensure suitability to store the poles). Consideration shall be given to locating the storage area as near as possible to the peg position, and the poles must be handled as little as possible, to prevent damage to the wood.

A risk assessment of the proposed pole storage location shall be carried out, taking cognisance of the proximity to built-up areas, schools, children's play areas, recreational areas, public rights of way, water courses (such as rivers or streams), surface water drains, or gullies, where the drain-off could enter the water courses or drains.

The "Temporary Pole Storage Area Assessment Form – 5 Poles or Less Single Layer" (OHL-09-001) shall be completed. The agreed location shall be clearly identified and recorded in OHL-09-001.

The poles and blocks shall be delivered no more than 4 days before the work is scheduled to start. The arrival date of the poles and the date of their installation shall be recorded on the OHL-09-001 form. The maximum amount of time that the poles and blocks may be on site is 21 days. If the planned work is cancelled or postponed, then the poles and blocks shall be removed from site within the 21-day period. This is to allow sufficient time to arrange an uplift of the poles, it is not intended that the poles are left on site while a new outage is being arranged.

Prior to poles and blocks being delivered, as part of setting to work, the operatives shall be fully briefed on the storage location and its specific requirements. This shall include all preventative measures that have previously been identified.

Poles shall not be stored on verges, roads, or embankments. Poles shall not be placed in areas that are frequently accessed by the public e.g. adjacent to public footpath.

Where the operative believes that the agreed location and/or measures are not the best solution due to the site conditions, then the operative shall implement the best solution and record the changes made.

HPDE Chapter 8 works barriers, with 'Danger of Death Keep Off' signs, shall be erected around this temporary storage area to deter unauthorised access by members of the public.

The poles shall be laid directly on the ground but shall not be stacked and shall be only one layer high. They shall be secured to prevent movement by the most appropriate means, depending on the site conditions, options include:

- Foundation or stay blocks or steelwork fitted to the poles to prevent movement.
- Enough chocks to ensure that the poles do not move (minimum of two pairs). These can be wood, plastic, metal, or rubber, as long as considered suitable. Ideally high visibility in colour, and they shall be replaced if they become damaged.
- The poles are bolted or pinned together.

Prior to leaving site, photographs of the poles, blocks, barriers, and signage shall be taken. These photographs shall be kept with the completed OHL-09-001 form, which shall be retained for 3 years by the District Head of Delivery.

If a pole or block starts to bleed after it has been delivered, it shall not be erected and, that day, it shall be returned to the quarantine location in the main storage area for uplift by the pole supplier and SPEN Logistics shall be informed.

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14. POLES LEFT WITH LANDOWNERS

If poles or blocks are to be re-used by the landowner, two copies of the Landowner Agreement Form (ENV-12-019) shall be completed in accordance with OHL-26-007.

Where recovered or old poles or blocks are to be left on site, they shall be left safely on ground that has been agreed with the landowner. The agreed storage area shall be on level, well-drained, firm ground and a risk assessment of the location carried out, taking cognisance of the proximity to built-up areas, schools, children's play areas or recreational areas, water courses (such as rivers or streams), surface water drains or gullies, where the drain-off could enter the water courses or drains.

Poles shall not be stored on verges, roads, or embankments. Poles shall not be placed in areas that are frequently accessed by the public e.g. adjacent to public footpath.

The poles shall not be stacked and shall be a maximum of one high.

The poles shall be secured to prevent movement by the most appropriate means, depending on the site conditions, options include:

- Foundation or stay blocks fitted to the poles to prevent movement.
- Enough chocks to ensure that the poles do not move (minimum of two pairs). These can be wood, plastic, metal, or rubber, as long as considered suitable.
- The poles are bolted or pinned together.

All metalwork (other than bolts used to prevent movement), wiring and notices shall be removed. Photographs shall be taken prior to leaving site that show how the poles have been left. These photographs shall be kept with the completed Landowner Agreement Form, which shall be retained for 3 years by the District Head of Delivery.

Any poles, blocks or pole butts that are not required by the landowner, or are damaged beyond re-use, shall be transported to the permanent pole storage area and stored in the appropriate hazardous waste skip or container to await disposal.

Note: CCA poles and the butts of creosote poles that have had secondary treatment with Cobra or boron shall not be left with the landowner.

15. SUMMARY OF POLE STORAGE OPTIONS

A summary of the options for the storage of poles is shown below in Table 3.

Table 3 – Pole Storage Options

Storage Site	Maximum Number of Poles	Maximum Number of Layers	Maximum Length of Time That Storage Site Can Be Open	Ground Protection	Signage & Guarding
Permanent Storage	Unlimited	3	Unlimited	Ground sheet Bark, wood chips, sand Storage structure	Secure fence 'Danger Keep Out' signs
Temporary Storage: 6 Poles or More	Unlimited	1	13 weeks	Ground sheet Bark, wood chips, sand or absorbent mats Skid boards Poles chocked/secured	Secure fence or Heras fence 'Danger Keep Out' signs
Temporary Storage: 5 Poles or Less	5	1	4 days before work is scheduled 21 days after delivery if work not carried out within that time-period.	Poles chocked/secured Level ground	Chapter 8 barriers 'Danger Keep Off' signs
Poles left with landowners	Unlimited	1	Unlimited	Poles chocked/secured Level ground	None

16. POLE LIMITING CHARACTERISTICS

16.1 Inspection

Pole storage areas shall be inspected at least once per week in accordance with Sections 11 and 12. Where new poles have been delivered since the previous inspection, the poles shall be inspected for defects.

16.2 Straightness

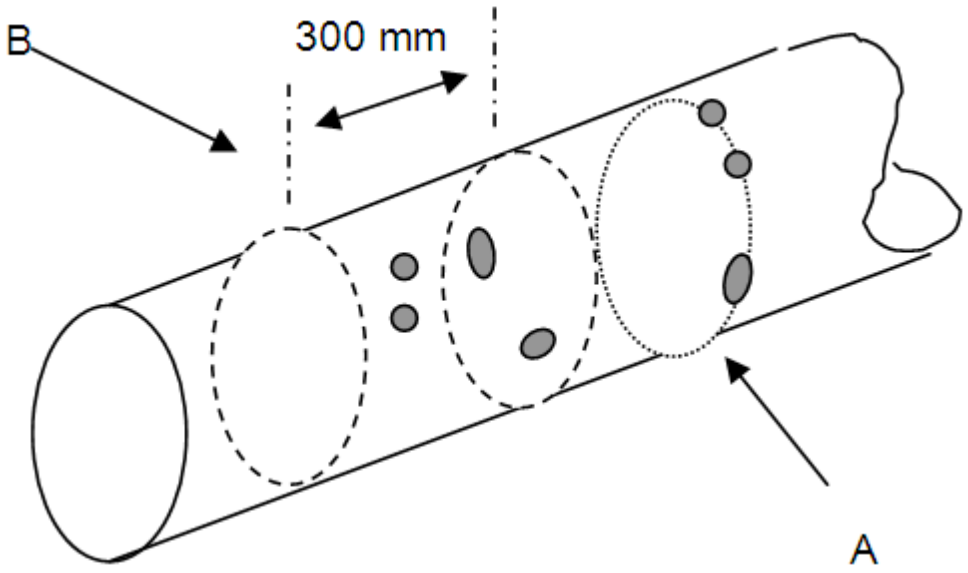
A single or double sweep shall be permitted to the extent that a straight line from the centre of the top to the centre of the pole 1.5m from the butt remains in the pole.

16.3 Knots

The maximum dimension of knots, knotholes and knot clusters shall be measured in the following manner and as highlighted in Figure 7:

- Individual knots or knot clusters – maximum diameter of knots or knot clusters when measured at right angles to the length of the pole, no knot with a diameter greater than one-fifth of the circumference shall be permitted. The dimension of a knot or knot cluster shall be measured as the diameter of a knot measured on the surface of the pole. Knot clusters shall be treated as a single knot.
- Multiple knots – maximum sum of all the knot diameters in any 300mm length of the wood pole, expressed as a factor of the circumference of the wood pole at the mid-point of the 300mm length (e.g. factor = knot diameter in mm/circumference of pole at cross section in millimetres). The sum of knot diameters at the cross section shall not exceed one-quarter of the circumference.

Figure 7: Measurement of Knots



Key

A - Individual knots or knot clusters

B - Multiple knots in any 300mm length of the wood pole

16.4 Fissures

Cracks across poles shall not be permitted.

Seasoning fissures along the grain of the wood pole are expected and are not defects providing they do not have a depth greater than half the diameter at one point along the wood pole or do not exceed 50% of the length of the wood pole.

16.5 Ring and Star Shakes

The tip shall be free from ring shakes or star shakes with five or more points.

At the butt, one complete ring or one star shake shall be acceptable, provided that not more than two points extend to within 5mm from the wood pole circumference. If they extend to the circumference they shall not extend along the wood pole more than 500mm from the butt.

16.6 Slope of the Grain

The slope of grain, relative to the longitudinal axis, shall be measured over a minimum 1m length of the wood pole shall not exceed a slope of 1 in 6, i.e. 166mm deviation over a 1m length along the axis of the pole.

16.7 Insect Holes

Wood poles shall be free from attack by insects. Minor insect holes shall be acceptable provided that there is no active infestation and the holes, evenly distributed in any 100mm length of the wood pole, are either:

- not larger than 1.5mm in diameter and do not exceed 5 in number.
- not larger than 1.0mm in diameter and do not exceed 20 in number.

16.8 Decay

Wood poles shall be sound and free from decay, rot, or punks.

16.9 Bark Pockets and Rind Galls

Bark pockets and rind galls shall be permitted without limitation in the first 1m of length from the butt.

Above the first 1m length from the butt, bark pockets and rind galls shall be measured as the overall length, width at the widest point and depth at the deepest point.

The depth, position and number shall not exceed those given for mechanical damage specified in Section 16.10.

16.10 Mechanical Damage

Mechanical damage shall not extend to a depth of the wood pole that reduces the diameter by more than 5% of the diameter at any cross section. The wood pole diameter on which the measurement of the damage is based shall be calculated on the diameter at the cross section where the damage occurs. This is obtained by measuring the diameter of the sound wood pole immediately above and below the damage and these two measurements are averaged. The minimum diameter of the damaged cross section shall be measured and the reduction in diameter determined.

No more than two occurrences of mechanical damage shall be permitted and no part of these shall be less than 500mm apart.

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17. APPENDIX 1 – CREOSOTE TREATED POLES

17.1 Examples of Dry Poles (No excess creosote)

17.1.1 Photograph 1

Two different colour poles (light and dark) but both are DRY poles. No areas of excessive creosote on the surface of the poles.



17.1.2 Photograph 2

Dark surface colouration but no wet patches of excessive creosote on the surface of the pole.



17.1.3 Photograph 3

Both poles are DRY. The pole to the right has some small darker patches which highlight areas of the grain. There are no areas of excessive surface creosote.



17.2 Examples of Bleeding Poles (excess surface creosote)

17.2.1 Photograph 4

This is a BLEEDING pole. Large areas of the pole have excessive creosote on the surface with a clearly wet and shiny appearance.



17.2.2 Photograph 5

This is a BLEEDING pole. Smaller areas at the butt end of the pole have excessive surface creosote with a wet and shiny appearance.



17.2.3 Photograph 6

This is a BLEEDING pole. The bottom of this pole appears extremely dark and shiny with excessive surface creosote.



17.2.4 Photograph 7

This is a BLEEDING pole. It has a thin layer of excess creosote over the surface of the pole; again, it has a shiny appearance.



17.2.5 Photograph 8

This is a BLEEDING pole. There is a surface layer of excess creosote over the whole pole with a dark, wet and shiny appearance.



17.3 Comparisons

17.3.1 Photograph 9

The bottom pole in this picture is dark in colour but is DRY. The pole on top has a dark, WET, shiny patch on the inside of the poles which is a layer of excessive creosote on the surface; this is a bleeding pole although it is only in patches.



17.3.2 Photograph 10

The centre pole on this photo is a bleeding pole and WET. There is a clear difference in the appearance of the surface and stands out against the surrounding poles which are all DRY.



17.3.3 Photograph 11

This is another photo that clearly shows the difference between a wet and dry pole. The bottom of the pole is dark and shiny (WET) with excess creosote to the extent where the grain cannot be seen. The top has the appearance of a DRY pole and the grain is clearly visible.



17.3.4 Photograph 12

This is a bleeding pole, but this photo shows clearly the difference in appearance from a DRY or WET pole. The top section of this pole is WET, there is excessive surface creosote on the pole and it has a dark and extremely shiny surface and will have a WET appearance. The lower section however has the appearance of a DRY pole.



18. APPENDIX 2 – POLE SAP NUMBERS

18.1 Pole Rationalisation

The specification for the construction of HV overhead lines up to 33kV (OHL-03-099) has been significantly reviewed, bringing major efficiencies and making things much easier and clearer for designers and delivery staff.

The number of wood pole material codes we purchase on the framework has been reduced from 962 to 146. The new poles have the following key changes:

- New SAP codes for poles have been created and material descriptions have been made clearer.
- HV Poles are now dual drilled for poles for legacy specifications (e.g. L10) and new line specifications (OHL-03-099). Note: all unused holes in wood poles shall be plugged with a suitable pole plug (30050643).
- Only LV ABC specification (OHL-03-101) poles are included in the framework, in creosote and Copper Salt treatments. For LV Open wire, additional holes will be drilled on site.
- Half metre sizes are no longer on the framework.

There are now 3 basic pole fabrications (plus H pole variants):

- LV Pole.
- HV Pole for 50mm², 100mm² & 150mm² conductors.
- HV Pole for 200mm² & 300mm² conductors.

As part of this rationalisation, a number of poles, that have not had any usage for several years, have been removed from the pole purchasing framework. If there becomes a requirement to purchase any of these poles, please contact SPEN Purchasing for those individual poles to be added to the framework. Note: this will delay the delivery lead time.

The tables below list the new pole codes in use on the current pole framework contract. For a mapping table of previous codes to new codes, please contact the author of this document.

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18.2 LV ABC Poles – SP4007758

Pole Height (m)	Dia. 1.5m from Butt	Class	Preservative	SPEN Code	SAP Description
9	220	Medium	Copper Salts	30037286	POLE LV CU BIOCIDE 09M MEDIUM
	275	Stout	Copper Salts	30037287	POLE LV CU BIOCIDE 09M STOUT
10	230	Medium	Copper Salts	30037288	POLE LV CU BIOCIDE 10M MEDIUM
	285	Stout	Copper Salts	30037289	POLE LV CU BIOCIDE 10M STOUT
11	240	Medium	Copper Salts	30037290	POLE LV CU BIOCIDE 11M MEDIUM
	295	Stout	Copper Salts	30037292	POLE LV CU BIOCIDE 11M STOUT
12	250	Medium	Copper Salts	30037293	POLE LV CU BIOCIDE 12M MEDIUM
	305	Stout	Copper Salts	30037294	POLE LV CU BIOCIDE 12M STOUT
13	260	Medium	Copper Salts	30037395	POLE LV CU BIOCIDE 13M MEDIUM
	320	Stout	Copper Salts	30037396	POLE LV CU BIOCIDE 13M STOUT
14	275	Medium	Copper Salts	30037397	POLE LV CU BIOCIDE 14M MEDIUM
	335	Stout	Copper Salts	30037398	POLE LV CU BIOCIDE 14M STOUT
16	305	Medium	Copper Salts	30037401	POLE LV CU BIOCIDE 16M MEDIUM
	365	Stout	Copper Salts	30037402	POLE LV CU BIOCIDE 16M STOUT
9	220	Medium	Creosote	30033345	POLE LV CREOSOTE 09M MEDIUM
	275	Stout	Creosote	30033346	POLE LV CREOSOTE 09M STOUT
10	230	Medium	Creosote	30033347	POLE LV CREOSOTE 10M MEDIUM
	285	Stout	Creosote	30033348	POLE LV CREOSOTE 10M STOUT
11	240	Medium	Creosote	30033349	POLE LV CREOSOTE 11M MEDIUM
	295	Stout	Creosote	30033350	POLE LV CREOSOTE 11M STOUT
12	250	Medium	Creosote	30033351	POLE LV CREOSOTE 12M MEDIUM
	305	Stout	Creosote	30033352	POLE LV CREOSOTE 12M STOUT
13	260	Medium	Creosote	30033353	POLE LV CREOSOTE 13M MEDIUM
	320	Stout	Creosote	30033354	POLE LV CREOSOTE 13M STOUT
14	275	Medium	Creosote	30033355	POLE LV CREOSOTE 14M MEDIUM
	335	Stout	Creosote	30033356	POLE LV CREOSOTE 14M STOUT
16	305	Medium	Creosote	30033359	POLE LV CREOSOTE 16M MEDIUM
	365	Stout	Creosote	30033360	POLE LV CREOSOTE 16M STOUT

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18.3 HV Single Poles – 50mm² HAZEL, 100mm² OAK, 150mm² ASH – SP4147690

Pole Height (m)	Dia. 1.5m from Butt	Class	Preservative	SPEN Code	SAP Description
9	220	Medium	Creosote	30050543	POLE HV 09M MEDIUM CREO
	275	Stout	Creosote	30050544	POLE HV 09M STOUT CREO
	295	Extra Stout	Creosote	30050545	POLE HV 09M EXTRA STOUT CREO
	315	Extra Stout Plus	Creosote	30050546	POLE HV 09M EXTRA STOUT PLUS CREO
10	230	Medium	Creosote	30050547	POLE HV 10M MEDIUM CREO
	285	Stout	Creosote	30050548	POLE HV 10M STOUT CREO
	305	Extra Stout	Creosote	30050549	POLE HV 10M EXTRA STOUT CREO
	325	Extra Stout Plus	Creosote	30050550	POLE HV 10M EXTRA STOUT PLUS CREO
11	240	Medium	Creosote	30050551	POLE HV 11M MEDIUM CREO
	295	Stout	Creosote	30050552	POLE HV 11M STOUT CREO
	315	Extra Stout	Creosote	30050553	POLE HV 11M EXTRA STOUT CREO
	335	Extra Stout Plus	Creosote	30050554	POLE HV 11M EXTRA STOUT PLUS CREO
12	250	Medium	Creosote	30050559	POLE HV 12M MEDIUM CREO
	305	Stout	Creosote	30050560	POLE HV 12M STOUT CREO
	325	Extra Stout	Creosote	30050555	POLE HV 12M EXTRA STOUT CREO
	345	Extra Stout Plus	Creosote	30050561	POLE HV 12M EXTRA STOUT PLUS CREO
13	260	Medium	Creosote	30050562	POLE HV 13M MEDIUM CREO
	320	Stout	Creosote	30050563	POLE HV 13M STOUT CREO
	340	Extra Stout	Creosote	30050564	POLE HV 13M EXTRA STOUT CREO
	365	Extra Stout Plus	Creosote	30050565	POLE HV 13M EXTRA STOUT PLUS CREO
14	275	Medium	Creosote	30050566	POLE HV 14M MEDIUM CREO
	335	Stout	Creosote	30050567	POLE HV 14M STOUT CREO
	355	Extra Stout	Creosote	30050568	POLE HV 14M EXTRA STOUT CREO
	375	Extra Stout Plus	Creosote	30050569	POLE HV 14M EXTRA STOUT PLUS CREO
16	305	Medium	Creosote	30050570	POLE HV 16M MEDIUM CREO
	365	Stout	Creosote	30050571	POLE HV 16M STOUT CREO
	385	Extra Stout	Creosote	30050572	POLE HV 16M EXTRA STOUT CREO
	405	Extra Stout Plus	Creosote	30050573	POLE HV 16M EXTRA STOUT PLUS CREO

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18.4 HV H Poles – 50mm² HAZEL, 100mm² OAK, 150mm² ASH – SP4147691

Pole Height (m)	Dia. 1.5m from Butt	Class	Preservative	SPEN Code	SAP Description
9	220	Medium	Creosote	30050574	POLE HV 09M MEDIUM H CREO
	275	Stout	Creosote	30050575	POLE HV 09M STOUT H CREO
	295	Extra Stout	Creosote	30050576	POLE HV 09M EXTRA STOUT H CREO
	315	Extra Stout Plus	Creosote	30050577	POLE HV 09M EXTRA STOUT PLUS H CREO
10	230	Medium	Creosote	30050578	POLE HV 10M MEDIUM H CREO
	285	Stout	Creosote	30050579	POLE HV 10M STOUT H CREO
	305	Extra Stout	Creosote	30050580	POLE HV 10M EXTRA STOUT H CREO
	325	Extra Stout Plus	Creosote	30050581	POLE HV 10M EXTRA STOUT PLUS H CREO
11	240	Medium	Creosote	30050582	POLE HV 11M MEDIUM H CREO
	295	Stout	Creosote	30050583	POLE HV 11M STOUT H CREO
	315	Extra Stout	Creosote	30050584	POLE HV 11M EXTRA STOUT H CREO
	335	Extra Stout Plus	Creosote	30050585	POLE HV 11M EXTRA STOUT PLUS H CREO
12	250	Medium	Creosote	30050644	POLE HV 12M MEDIUM H CREO
	305	Stout	Creosote	30050587	POLE HV 12M STOUT H CREO
	325	Extra Stout	Creosote	30050586	POLE HV 12M EXTRA STOUT H CREO
	345	Extra Stout Plus	Creosote	30050588	POLE HV 12M EXTRA STOUT PLUS H CREO
13	260	Medium	Creosote	30050589	POLE HV 13M MEDIUM H CREO
	320	Stout	Creosote	30050590	POLE HV 13M STOUT H CREO
	340	Extra Stout	Creosote	30050591	POLE HV 13M EXTRA STOUT H CREO
	365	Extra Stout Plus	Creosote	30050592	POLE HV 13M EXTRA STOUT PLUS H CREO
14	275	Medium	Creosote	30050593	POLE HV 14M MEDIUM H CREO
	335	Stout	Creosote	30050594	POLE HV 14M STOUT H CREO
	355	Extra Stout	Creosote	30050595	POLE HV 14M EXTRA STOUT H CREO
	375	Extra Stout Plus	Creosote	30050596	POLE HV 14M EXTRA STOUT PLUS H CREO
16	305	Medium	Creosote	30050597	POLE HV 16M MEDIUM H CREO
	365	Stout	Creosote	30050598	POLE HV 16M STOUT H CREO
	385	Extra Stout	Creosote	30050599	POLE HV 16M EXTRA STOUT H CREO
	405	Extra Stout Plus	Creosote	30050600	POLE HV 16M EXTRA STOUT PLUS H CREO

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18.5 HV Single Poles – 200mm² POPLAR, 300mm² UPAS – SP4147692

Pole Height (m)	Dia. 1.5m from Butt	Class	Preservative	SPEN Code	SAP Description
9	275	Stout	Creosote	30050601	POLE L33/35 09M STOUT CREO
	295	Extra Stout	Creosote	30050602	POLE L33/35 09M EXTRA STOUT CREO
	315	Extra Stout Plus	Creosote	30050603	POLE L33/35 09M EXTRA STOUT PLUS CREO
10	285	Stout	Creosote	30050604	POLE L33/35 10M STOUT CREO
	305	Extra Stout	Creosote	30050605	POLE L33/35 10M EXTRA STOUT CREO
	325	Extra Stout Plus	Creosote	30050606	POLE L33/35 10M EXTRA STOUT PLUS CREO
11	295	Stout	Creosote	30050607	POLE L33/35 11M STOUT CREO
	315	Extra Stout	Creosote	30050608	POLE L33/35 11M EXTRA STOUT CREO
	335	Extra Stout Plus	Creosote	30050609	POLE L33/35 11M EXTRA STOUT PLUS CREO
12	305	Stout	Creosote	30050610	POLE L33/35 12M STOUT CREO
	325	Extra Stout	Creosote	30050611	POLE L33/35 12M EXTRA STOUT CREO
	345	Extra Stout Plus	Creosote	30050612	POLE L33/35 12M EXTRA STOUT PLUS CREO
13	320	Stout	Creosote	30050613	POLE L33/35 13M STOUT CREO
	340	Extra Stout	Creosote	30050614	POLE L33/35 13M EXTRA STOUT CREO
	365	Extra Stout Plus	Creosote	30050615	POLE L33/35 13M EXTRA STOUT PLUS CREO
14	335	Stout	Creosote	30050616	POLE L33/35 14M STOUT CREO
	355	Extra Stout	Creosote	30050617	POLE L33/35 14M EXTRA STOUT CREO
	375	Extra Stout Plus	Creosote	30050618	POLE L33/35 14M EXTRA STOUT PLUS CREO
16	365	Stout	Creosote	30050619	POLE L33/35 16M STOUT CREO
	385	Extra Stout	Creosote	30050620	POLE L33/35 16M EXTRA STOUT CREO
	405	Extra Stout Plus	Creosote	30050621	POLE L33/35 16M EXTRA STOUT PLUS CREO

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18.6 HV H Poles – 200mm² POPLAR, 300mm² UPAS – SP4147693

Pole Height (m)	Dia. 1.5m from Butt	Class	Preservative	SPEN Code	SAP Description
9	275	Stout	Creosote	30050622	POLE L33/35 09M STOUT H CREO
	295	Extra Stout	Creosote	30050623	POLE L33/35 09M EXTRA STOUT H CREO
	315	Extra Stout Plus	Creosote	30050624	POLE L33/35 09M EXTRA STOUT PLUS H CREO
10	285	Stout	Creosote	30050625	POLE L33/35 10M STOUT H CREO
	305	Extra Stout	Creosote	30050626	POLE L33/35 10M EXTRA STOUT H CREO
	325	Extra Stout Plus	Creosote	30050627	POLE L33/35 10M EXTRA STOUT PLUS H CREO
11	295	Stout	Creosote	30050628	POLE L33/35 11M STOUT H CREO
	315	Extra Stout	Creosote	30050629	POLE L33/35 11M EXTRA STOUT H CREO
	335	Extra Stout Plus	Creosote	30050630	POLE L33/35 11M EXTRA STOUT PLUS H CREO
12	305	Stout	Creosote	30050631	POLE L33/35 12M STOUT H CREO
	325	Extra Stout	Creosote	30050632	POLE L33/35 12M EXTRA STOUT H CREO
	345	Extra Stout Plus	Creosote	30050633	POLE L33/35 12M EXTRA STOUT PLUS H CREO
13	320	Stout	Creosote	30050634	POLE L33/35 13M STOUT H CREO
	340	Extra Stout	Creosote	30050635	POLE L33/35 13M EXTRA STOUT H CREO
	365	Extra Stout Plus	Creosote	30050636	POLE L33/35 13M EXTRA STOUT PLUS H CREO
14	335	Stout	Creosote	30050637	POLE L33/35 14M STOUT H CREO
	355	Extra Stout	Creosote	30050638	POLE L33/35 14M EXTRA STOUT H CREO
	375	Extra Stout Plus	Creosote	30050639	POLE L33/35 14M EXTRA STOUT PLUS H CREO
16	365	Stout	Creosote	30050640	POLE L33/35 16M STOUT H CREO
	385	Extra Stout	Creosote	30050641	POLE L33/35 16M EXTRA STOUT H CREO
	405	Extra Stout Plus	Creosote	30050642	POLE L33/35 16M EXTRA STOUT PLUS H CREO

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18.7 HV Delta H Poles – 200mm² POPLAR, 300mm² UPAS – SP4000875

Pole Height (m)	Dia. 1.5m from Butt	Class	Preservative	SPEN Code	SAP Description
9	275	Stout	Creosote	30035449	HVY DEL H POLE 09.0MX275MM SP4000875
	295	Extra Stout	Creosote	30035450	HVY DEL H POLE 09.0MX295MM SP4000875
10	285	Stout	Creosote	30035453	HVY DEL H POLE 10.0MX285MM SP4000875
	305	Extra Stout	Creosote	30035454	HVY DEL H POLE 10.0MX305MM SP4000875
11	295	Stout	Creosote	30035457	HVY DEL H POLE 11.0MX295MM SP4000875
	315	Extra Stout	Creosote	30035458	HVY DEL H POLE 11.0MX315MM SP4000875
12	305	Stout	Creosote	30035461	HVY DEL H POLE 12.0MX305MM SP4000875
	325	Extra Stout	Creosote	30035462	HVY DEL H POLE 12.0MX325MM SP4000875
13	320	Stout	Creosote	30035464	HVY DEL H POLE 13.0MX320MM SP4000875
	340	Extra Stout	Creosote	30035465	HVY DEL H POLE 13.0MX340MM SP4000875
14	335	Stout	Creosote	30035467	HVY DEL H POLE 14.0MX335MM SP4000875
	355	Extra Stout	Creosote	30035468	HVY DEL H POLE 14.0MX355MM SP4000875
16	365	Stout	Creosote	30035473	HVY DEL H POLE 16.0MX365MM SP4000875
	385	Extra Stout	Creosote	30035474	HVY DEL H POLE 16.0MX385MM SP4000875

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