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Lonza Wood Protection

Tanalith E™

WOOD PRESERVATIVE

Hales (Market Drayton)

Engineering & Technical Services Report

Part A2 Supplementary Information

Date: 17th December 2014

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C1 Plant on site

C1.1 Treatment vessels 1 & 2

Plant 1 Serial no. 2570-LON-A

Plant 2 Serial no. 2570-LON-B

Each autoclave is 2.00m. external diameter x 15.00m. Lg., over the vessel strake. The strake is defined as straight cylinder length from the joint face of the door to the dished head butt weld.

The autoclave door will be a davit hung unit with manual open/close, and manual lock/unlock and fitted with all the appropriate safety devices including test cock and fitted with devices to prevent door opening when liquid is present.

Neck rings, door rings, and clamping rings, are appropriate to the operating pressures and design of the autoclave shell and heads.

The vessel is constructed in accordance with PED 97/23/EC and also in accordance with the Pressure Safety Systems Regulations 2000, and CE marked as appropriate.

The vessel will be designed in accordance with PD-5500 Cat 2 in compliance with PED 97/23/EC and all other regulatory standards.

The operating conditions for the autoclave will be:

Maximum design working pressure	:	14.00 BarG
Max design Vacuum	:	-1.03 BarG
Max Operational working pressure	:	12.50 BarG and full vacuum.
Test pressure	:	18.00 BarG held for a minimum 30 mins.
Temperature	:	0°C and 50°C

The autoclave is to be fitted with an over pressure relief valve set at working pressure (14.00bar.g) and is to discharge into the working solution tank below. (The pressure transmitter on the control system will trigger an alarm and halt the process, should the maximum set pressure be exceeded)

The vessel is fitted with internal rails, to support a bogie on wheels laden with wet timber at 800kg/m^3, plus the weight of the bogie. The vessel is also fitted with an antiflotation rail to prevent displacement of the bogie due to the buoyancy of the wood, when the wood is held on using holding down straps.

The autoclave will be fitted with pipe flanges to EN 1092-1:2007 with PN16 pressure requirement.

The 2no. main flood lines will be DN200 for improved filling and emptying.

A pressure relief pipeline (DN40), with a pressure relief valve set at 12.00 bar.g will be employed to release pressure.

All threaded fittings will be to BSP to EN 10241:2000.

The door seal will be a lipped seal of Nitrile polymer.

Storage capacity of the bund is 426,247 Litres. The capacity of the two treatment plant storage tanks (ones under the treatment plant but in the bund) are 109,216 Litres each so 218,432 Litres total. So there will be a spare capacity of 207,815 Litres.

C1.2 Operational storage tank 1

The operational storage tank is of all welded construction using steel plate to EN 10025-2:2004, specifically, EN 10025-S275JR or equivalent and steel sections to EN 10025-S235JRG2 or equivalent. The tank is to be built in accordance with BS799-5:2010 or equivalent standard for rectangular construction solution storage tanks with top cover plate.

The tank is one half section of the complete tank nominally 16.50m. Lg. x 3.66m. W. x 2.00m. H. split into two independent storage tanks and the plate used in manufacture is to be 6mm thick, suitably reinforced to hold timber preservative with a nominal specific gravity of 1.05 at maximum operating level.

The tank is also to be strengthened to support the autoclave on four columns across the tank, when the autoclave is full with preservative, or with timber loaded onto the bogie and preservative, whichever is of greater mass. The tank will also require suitable strengthening to be able to support the autoclave when it is fully loaded with the wet timber at 800 kg/m³ (average 15.00m³ per charge) and bogie.

The tank is also to be reinforced to support any pumps and ancillary equipment fitted for use with the timber treatment process, including a control panel mounting or retaining frame work.

The tank is fitted with pipe work connections with pipe flanges to EN 1092-1:2007 suitable for PN16 pressure rating.

Internally the tank has all surfaces treated and prepared to be coated with Jotun Jotamastic 87 protective coating applied in accordance with the manufacturers' instructions.

C1.3 Operational storage tanks 2, 3 & 4

Identical to storage tank 1 in terms of dimensions and operating capabilities

C1.4 Process pipework

The process pipework can be of flanged and welded construction or assembled using threaded components, as appropriate sealed liquid, and air tight. Materials can be carbon steel or stainless steel, as is deemed appropriate for the function. In terms of compatibility with TANALITH E preservative, carbon steel is acceptable. Materials:

- Carbon steel tubes to EN 10255:2004, threaded in accordance with EN 10226-1:2004
- Stainless steel tubes to EN 10217:2005 using materials to EN 10088-2:1.4401.
- Pipe work connections with pipe flanges to EN 1092-1:2007 suitable for PN16 pressure rating.
- All threaded fittings will be to BSP to EN 10241:2000, with threads to EN 10226-1:2004.

The pipework will be capable of withstanding pressures at 14.00 bar.g maximum operating (PN16 rated) and full vacuum, operating at 12.00 bar.g and full vacuum.

C1.5 Pumping equipment

C1.5.1 Vacuum Pumps

Each treatment plant is fitted with the following pumping equipment:-

2 No… Travaini Vacuum pump, model TRVA 65-450 c/w 415V. / 3Ph. / 50Hz. / 11.00kW.@1450 r.p.m. TEFC motor close coupled to pump.

Materials of construction will be:

- Cast iron casing for the pump body and bearing housing
- Ductile iron impellor
- Stainless steel shaft AiSi-420
- The pump is to be fitted with mechanical seals at the drive and non-drive end

C1.5.2 Pressure pump

1 No… Lowara pressure pump, model 5SV28F040T : 415V. / 3 Ph. / 50 Hz. / 4.00kW. @ 2900 r.p.m. TEFC motor

C1.5.3 Air Compressor

Each plant has an air compressor with a 50 litre reservoir and the following electrical specification.

230 V. / 1 Ph. / 50 Hz. / 1.10 kW.

The compressors are equipped with an over pressure relief valve and integrated pressure switch.

C1.5.4 Hydraulic Pump

The Casappa hydraulic pump supplied as part of the package is for rail bridge up/down and bogie in/out

The hydraulic power pack has a displacement of 7.20 l/minute operating at a maximum pressure of 200 bar.g with an oil tank of 30 litres and fitted with Eaton Vickers solenoid valves for flow direction.

415 V. / 3 Ph. / 50 Hz. / 3.00 kW.

- Bogie drive system In/Out
- Railbridge Up/Down

C1.5.5 Timber bogie

The bogies comprise of a chassis fabricated from the steel sections and able to support 15.00m³ of timber, on average at 800 kg/m³ when wet. The bogie has sufficient pairs of wheels to distribute the load of the wet timber and bogie on the internal and external rails adequately so as to avoid any distortion or damage.

The bogie are fitted with relocatable raised top members, able to move along the chassis of the bogie to positions able to support various packs lengths of timber in the most convenient location. The cross members are designed so that they are retained by the bogie chassis to prevent any displacement of the wood and manufactured to accommodate the holding down straps.

C1.5.6 Bogie drive system

The hydraulic bogie drive system is driven from the main power pack, specified earlier. The drive is remote start and will be fitted with a dead man switch to prevent the bogie movement continuing if the operator moves away from the control station.

The bogie drive system is to be capable of moving a bogie in and out of the vessel with potentially on average 15.00m³ of timber on board at an S.G. of 800kg/m³.

C1.5.7 Railbridge

The lift-up rail bridge will be motivated by a hydraulic cylinder.

C2 How will the installation operate?

This section of the application aims to describe:

- the context of the application in relation to the Environmental Permitting Regulations 2010 (as amended) in terms of the activities undertaken at the installation, and;
- the installation, including an overview of the equipment and chemicals used, and;
- the timber treatment processes.

C2.1 Activities undertaken

C2.1.1 Wood preservation

Hales Sawmills Ltd operates an activity for the preservation of wood and wood products with a production capacity exceeding 75m3 per day.

This places the activity within Chapter 6, Section 6.6 (Timber Activities) Part A(2)(a) of Schedule 1 to the Environmental Permitting (England and Wales) Regulations 2010 (as amended) (The EPR) as follows:

Part A2

(a) Preservation of wood and wood products with chemicals with a production capacity exceeding 75 m³ per day other than exclusively treating against sap stain.

The production capacity is generally considered to be the greatest potential throughput of the installation, based on the treatment vessel volume (the maximum useable volume of wood that can be treated) and the maximum number of treatment cycles that could be undertaken in a 24-hour day as follows:

Production capacity = N x V
Where:

N = number of treatment cycles that can be undertaken in a 24 hour period, based on the shortest possible treatment cycle that the plant is capable of.
V = Volume of wood treated in each cycle.

The maximum theoretical production capacity is 454.80m³ per day. The maximum theoretical production capacity is calculated as follows:

Tanalith Plant 1			**Tanalith Plant 2**		
Typical UC1/2 cycle:	65	mins	Typical UC1/2 cycle:	65	mins
Change over time:	30	mins	Change over time:	30	mins
Total charge time:	95	mins	Total charge time:	95	mins
	1.58	**hours**		**1.58**	**hours**
Charges in 24 hours (N)	15.16		Charges in 24 hours (N)	15.16	
Vessel Capacity (V):	15	m³	Vessel Capacity (V):	15	m³
Production Capacity:	**227.40**	**m³**	**Production Capacity:**	**227.40**	**m³**
			Total Production Capacity	**454.80**	**m³**

The only restrictions on capacity are technical or legal limitations such as treatment vessel capacity and planning conditions limiting treatment working hours. Site permitted operating hours are 7am to 8pm are in place for Hales Sawmills Ltd. Adjustment of capacity to a 13 hour operating day is therefore 246.35m³.

C2.1.2 Manufacturing wood products

Hales Sawmills Ltd currently does not hold any other environmental permits for this site.

For the purposes of this application, the stationary technical unit forming the Part A timber treatment activity is the limits of the treatment facility within the site boundary. See site plan.

C2.1.3 Solvent Emission Activities

Hales Sawmills Ltd do not operate a Solvent Emission Activity.

C2.2 The installation

C2.2.1 Overview

Hales Sawmills Ltd operates two specially constructed treatment vessels for wood preservation at the Western Way installation (see plans 2570-LON-GA-01 and 2072-109A for floor plan and elevation drawings), these being:

Two vacuum pressure timber impregnation plants for the application of Tanalith E, which is a water based wood preservative that contains copper and organic biocides.

Tanalith E pressure treated timber has a long term protection against fungal and insect attack, for both in and out of ground contact, interior and exterior applications when treated to the correct end use specification. TANALITH E pressure treated timber has an initial natural green colouration. Upon external exposure, the green colour slowly weathers to a warm, honey brown and in the longer term becomes a natural silver grey. This weathering process does not indicate any loss of preservative protection.

The ‘end use specification’ mentioned above is usually referred to as Use Class. Use Classes are based on the potential threat to the timber from decay or insect attack in its end-use application.
A summary of the four Use Classes is as follows:

Use Class 1:	Internal, dry (e.g. upper floor joists)
Use Class 2:	Internal, risk of wetting (e.g. tile battens)
Use Class 3.1:	Outdoors, coated, above ground (e.g. window frames)
Use Class 3.2:	Outdoors, uncoated above ground (e.g. fence panels)
Use Class 4:	Direct soil or fresh water contact (e.g. fence posts)

The type of timber treated and the desired use class will have an impact on the timber treatment time, and therefore the number of treatment cycles that can be undertaken in any day. In general, the greater the level of protection required, the longer the timber treatment cycle and therefore the fewer treatment cycles that can be undertaken in any one day.

Vacuum, high pressure treatments are most suitable for the full range of timber end uses. They are particularly relevant for external applications, both in and out of ground contact – Use Classes 1 to 4 – providing a service life protection ranging from 15 to 60 years. They force the preservative deep into the cellular structure of the timber and generally result in a pale green colouration to the finished component. Additives are available that can give either a rich brown colouration, usually for rough sawn fencing and landscaping timbers, or an effective extra water repellent protection for decorative external timbers, such as decking and cladding timbers.

Timber is a naturally variable material, whose characteristics and properties vary from species to species and from tree to tree in the same species. A growing tree consists of two types of wood, the inner heartwood and the outer sapwood under the bark. The sapwood is living cells that transport water up the trunk and store food for tree growth, and a new ring of sapwood grows on the tree each year. The cells in the sapwood (called lumen) are hollow are naturally connected to each other and run up and down the tree (the grain), as mentioned for the transport of water and food within the growing tree. The lumen in heartwood are filled with the trees naturally occurring waste products.

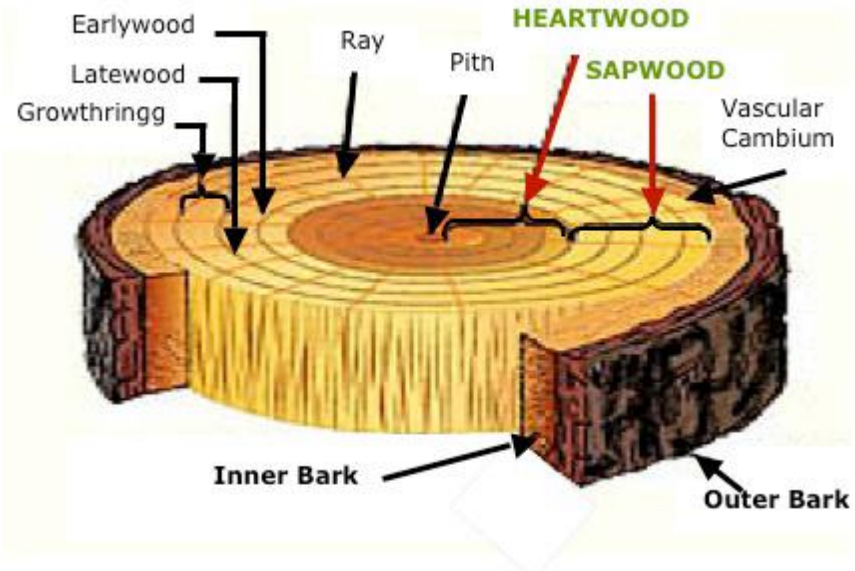

Figure 1: The structure of wood

Waste materials from the trees growth systems in the softwood are disposed of in the heartwood. The darker heartwood containing the waste products from the tree is unattractive to fungi and insect pests, making it naturally resistant to decay and insect attack.
Sapwood is rarely naturally resistant to fungi and insect pests unless it is treated with preservative. For economic reasons, trees that are now used for building timber are grown fast and felled quite young, and all of the wood is used quite efficiently (i.e, not just the heartwood is used). This means that nearly all timber used for

building must be preserved if it is to be protected from decay. The durability classes of timber are detailed in table 1 below.

Durability class	Description	Example species
Class 1	Very durable	Afromosa, Greenheart
Class 2	Durable	European Oak, Iroko
Class 3	Moderately durable	Western Red Cedar, Keruing
Class 4	Slightly durable	Scots Pine(Redwood), Norway Spruce (whitewood)
Class 5	Not durable	Beech, Birch

Table 1: Wood durability classes

When timber is being preserved, some preservative is forced into the end grain, where the wood has been cut across the lumen. However, most of the preservative is being forced through the side of the wood, and across the cell walls. The final penetration of the preservative depends on how easily is will pass though the cell walls. The penetration is determined by the size and structure of the pits that connect the cells together. Some species such as Scots pine (redwood) are easier to treat than other Spruce (whitewood). Wood can therefore also be classified according to treatability. The treatability classes of timber are detailed in table 2 below.

Treatability class	Description	Penetration
Class 1	Easy to treat (permeable)	Timber can be completely penetrated by pressure treatment
Class 2	Moderately easy to treat (moderately resistant)	Usually complete penetration not possible; 6mm lateral penetration expected
Class 3	Difficult to treat (resistant)	3mm to 6mm lateral penetration expected
Class 4	Extremely difficult to treat (extremely resistant)	Very minimal lateral and longitudinal penetration

Table 2: Wood treatabiity classes

The durability of the wood and the treatability of the wood are all considered when determining how the timber is treated in order to achieve the desired or certified Use Class. An example of treatment time with species and Use Class are shown in table 3 below.

Use class	Species	Treatment time
Class 1/2	Redwood	35 minutes
Class 1/2	Whitewood	60 minutes
Class 3	Redwood	75 minutes
Class 3	Whitewood	120 minutes
Class 4	Redwood	120 minutes
Class 4	Whitewood	180 minutes

Table 3: Wood treatment times with Use Class and Species

C2.2.2 Untreated timber

Timber for treatment is either kiln dried seasoned timber such as decking, or unseasoned timber such as feather edge board and posts. Timber is either kiln or air dried on site or delivered to site ready for treatment.

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C2.2.3 Timber treatment chemicals & their storage

Timber treatment chemicals are solely supplied by Arch Timber Protection, and are:

- Tanalith E8000
- Tanaguard
- Tanatone

The location of the storage tanks can be seen in plan 2570-LON-GA-01. All preservative chemicals are stored under cover within the process building as follows:

Tanalith E8000

Tanalith E8000 preservative concentrate is supplied by bulk tanker. The Tanalith concentrate storage tank is located to the right of the treatment vessels within the main plant bunded area. The tank, measuring 2.6m (d) x 4.13m (h), with a calculated maximum volume of 20,000 litres and designed for a maximum s.g. of 1.5. The storage is connected to the treatment plant using carbon steel pipe work, pump and valves. See figure 2 below.

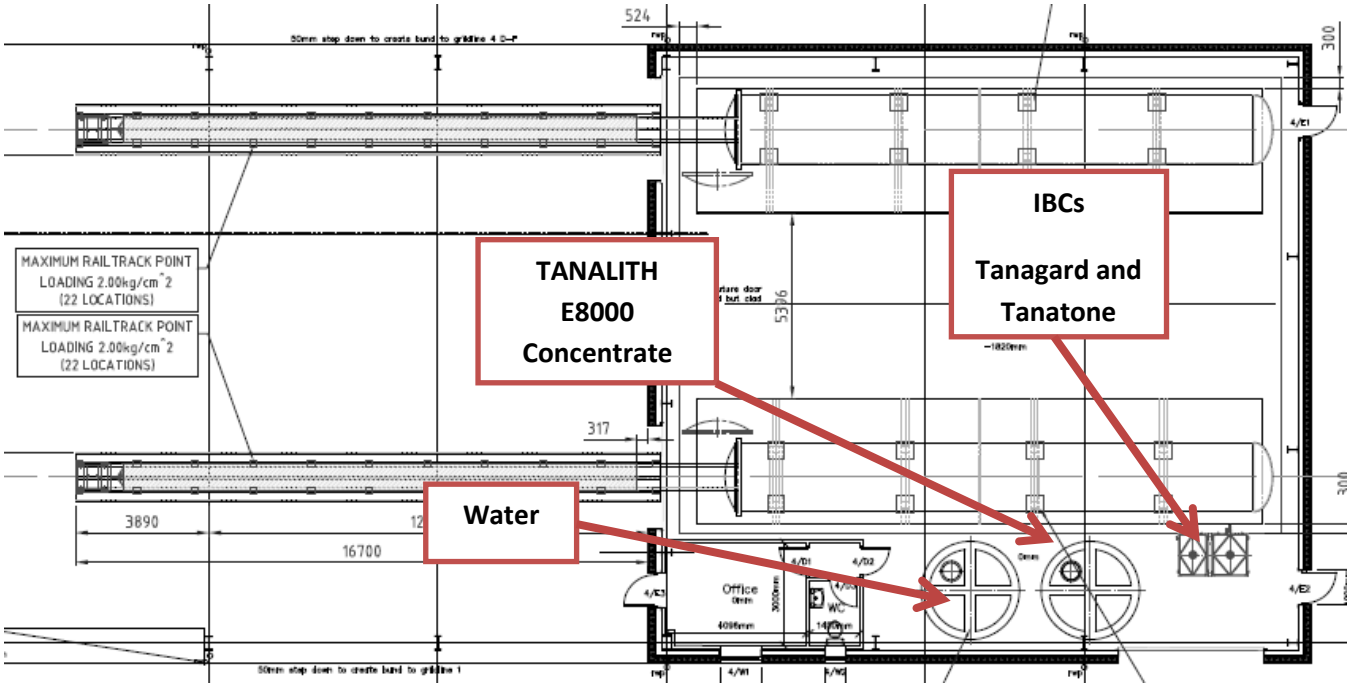


Figure 2: Tanalith E8000, water and Tanaguard IBCs

Tanalith E8000 is mixed with water to ready to use concentration directly to the ready to use solution storage tanks located beneath the treatment vessels (referred to locally as storages T1-4). The two storage tanks used for each plant measures 16.50m. Lg. x 3.66m. W. x 2.00m. H and sits under the vessel with a total capacity of 120,780 litres. Each storage has a maximum working capacity (mix volume) of ~54,000 litres.

TANAGARD

TANAGARD preservative additive is supplied in 640 litre Intermediate Bulk Containers (IBCs) on a just in time basis. When in use, the TANAGARD concentrate IBC is located at the end of the treatment vessel on a bunded spill pallet. The IBC is connected to the treatment plant using a braided stainless steel hose, pump, valves and stainless steel pipe work also equipped with shut off valves.

TANATONE

Tanatone preservative additive is supplied in 1000 litre Intermediate Bulk Containers (IBCs) on a just in time basis. When in use, the Tanatone concentrate IBC is located at the end of the treatment vessel on a bunded spill pallet. The IBC is connected to the treatment plant using a braided stainless steel hose, pump, valves and stainless steel pipe work also equipped with shut off valves.

Water

In addition to the preservative chemicals storage tanks, one vertical cylindrical water tank supplied from a ground water harvesting tank system installed on site. The tank, measuring 2.6m (d) x 4.13m (h), with a calculated maximum volume of 20,000 litres. The water harvesting tank has a capacity of 50,000 litres. The tank is set to maintain a level of approx. 20,000 litres using towns make up water as required. The remainder of the tank volume is available to collect rain water for use in the process. The tanks is automatically topped up with town mains water in periods of low rainfall.

All of the fixed storage tanks are equipped with high level warning indicators linked to a the Auto-Treater plant control system in the treatment control room. In addition, an audible alarm sounds in the event of a high-level switch being activated.

C2.2.4 Timber treatment equipment

Two separate timber treatment plants are to be operated within the installation: Plant 1 and Plant both using Tanalith E8000. Both plants are e identical in terms of plant design and performance and operated using the 'Auto-Treater' computerised control system.

Plant 1: Tanalith E8000

Treatment vessel information:	
Make:	Tweddle
Serial number:	2570-LON-A
Date of manufacture:	Refurbished in 2014
Maximum working vacuum / Pressure:	-1000 mbar / 12,500mbar
Dimensions:	2.0m x 15.0m
Max vessel capacity:	15.0 m^3

Table 4: Tanalith plant1 details

Plant 2: Tanalith E 8000

Vacuum high pressure plant is in use for Tanalith E. The details of the plant are as follows:

Treatment vessel information:	
Make:	Tweddle
Serial number:	2570-LON-B
Date of manufacture:	Refurbished in 2014
Maximum working vacuum / Pressure:	-1000 mbar / 12,500mbar
Dimensions:	2.0m x 15.0m
Max vessel capacity:	15.0 m^3

Table 5: Tanalith plant 2 details

The vessel is of all steel construction on a concrete foundation, and fully contained within a concrete bunded area. The plant can be seen in figure 3 below.

Figure 3: Tanalith E Plant 1 during installation

Each Tanalith E plant is equipped with the following:

- Motorised loading track.
- Interlocked loading door.
- Vacuum pumps.
- Vacuum vents.
- Vacuum chest.
- Service liquid tank.
- Pressure pump.
- Flow control valves.
- High level limit switches.

The vessels are of all steel construction on a concrete foundation, and fully contained within a concrete bunded area.

Auto-Treater

The treatment process is operated using the 'Auto-Treater' computerised control system which was developed by the manufacturers of the wood preservative. It is a fully automated preservative mixing and management system with pre-programmed and custom treatment cycles, semi-manual and manual override. The Auto-Treater system includes:

- Visual display of the mixing and treatment operations.
- Visual display of solution concentration and volume.
- Visual display of vacuum, pressure and valve/pump status.
- High and low level limit switches.
- Generation of charge sheets, management statistics and treatment certificates.
- The concentration and the flow of the treatment solution is computer controlled by the 'Auto-treater' system which operates the dosing pumps, and is displayed on screens in the control office.

Example screenshots from an Autotreater system for the Tanalith E mixing and treatment plant are shown in figures 4 and 5 respectively.

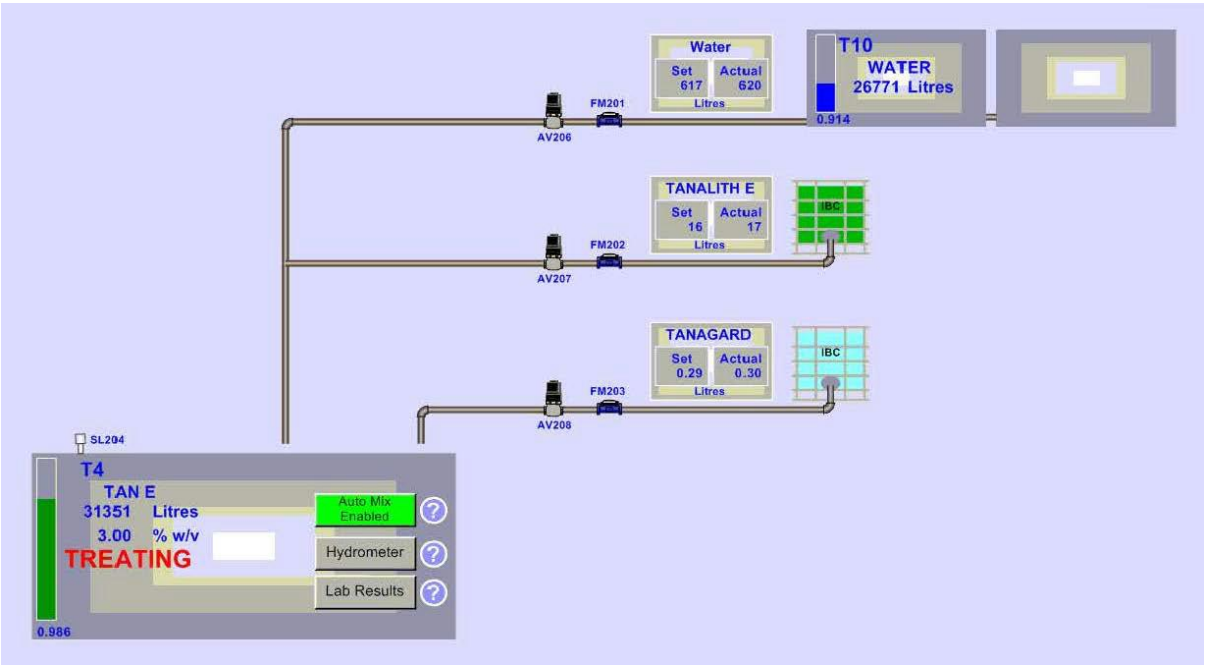


Figure 4: Tanalith E mix plant schematic

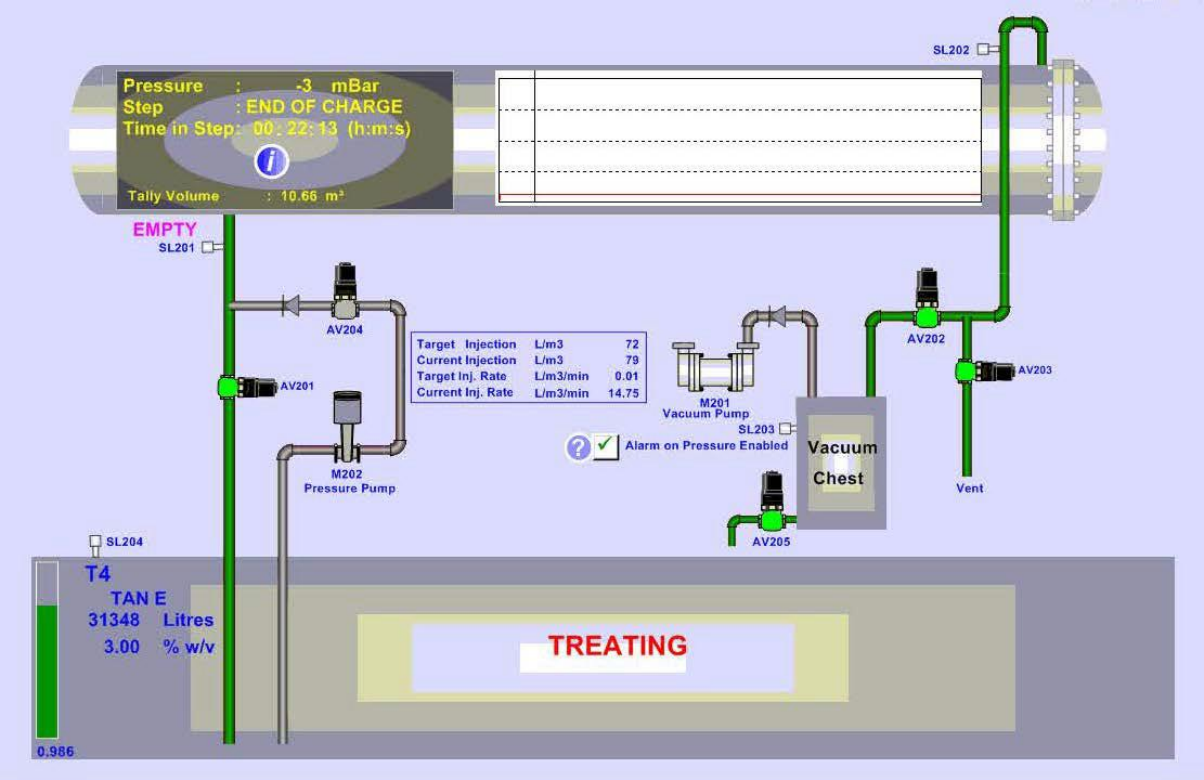


Figure 5: Tanalith E treatment plant schematic

C2.2.5 Timber treatment process

The timber treatment processes are described as follows:

C2.2.5.1 Tanalith E treatment process

Packs of wood to be treated are loaded onto a motorised track system set into the concrete floor in front of the treatment vessel. The concrete floor slopes towards the treatment vessel bund for the collection of any preservative fluid run-off.

Packs are stacked on the track either flat or with a slight slope (depending on the wood being treated) to promote the free drainage of preservative solution after the treatment process. Packs are loosely strapped to the track with webbing straps or chains to enable preservative fluid penetration, but also to prevent wood floating around the vessel during the treatment process. The track is retained in the vessel by way of an anti-flotation rail to additional prevent the buoyancy of the pack lifting it off the rail system.

Tracks are loaded into the vessel via the track system using a rail bridge to span the gap across the tank and the vessel itself. The rail bridge must be moved aside to enable the vessel door to be locked shut for treatment to take place.

The treatment process consists of the following stages:

1. Initial vacuum
2. Flood
3. Pressurise
4. Drain
5. Vacuum
6. Air release and drain

The phases of the pressure vacuum treatment cycle are shown in figure 6 and are described below:

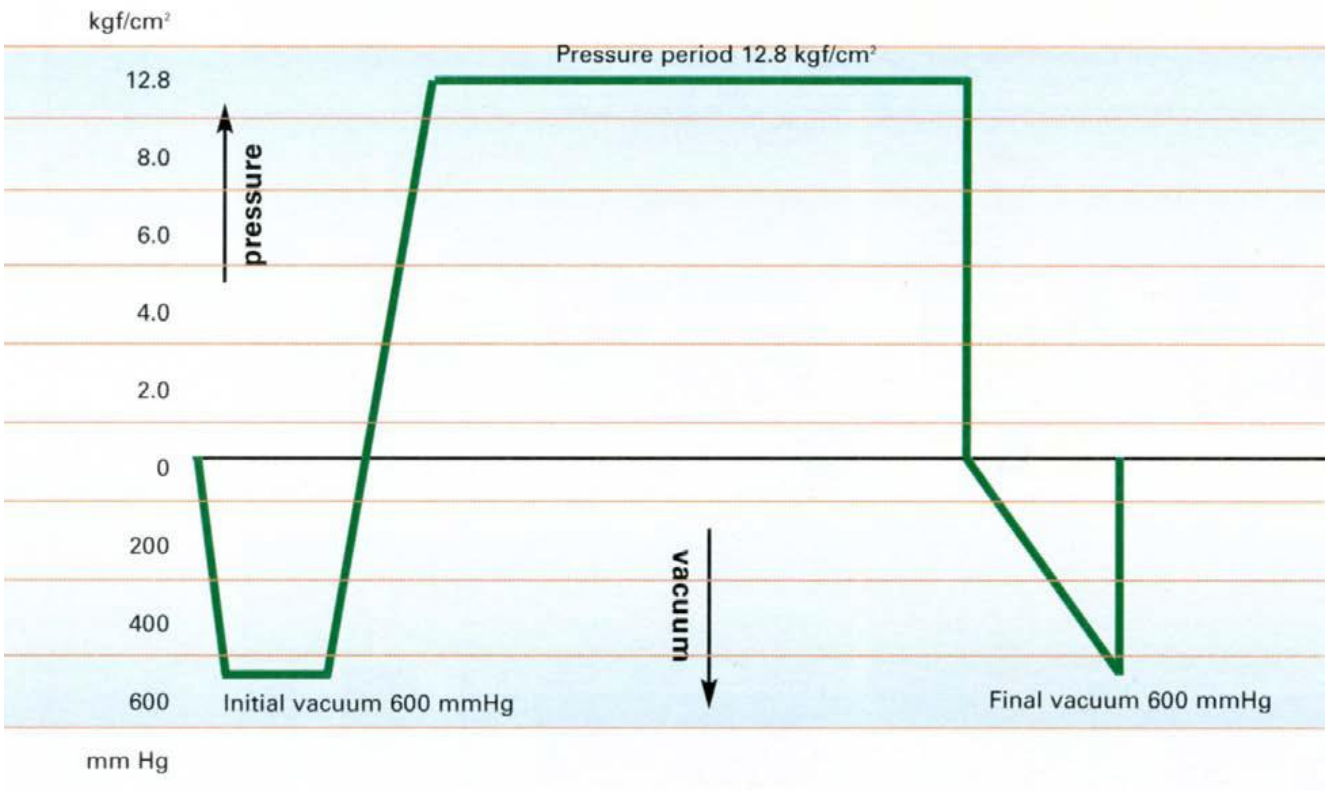
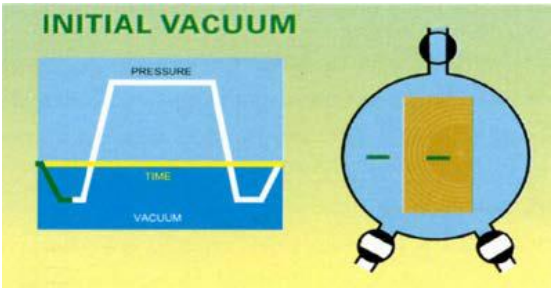


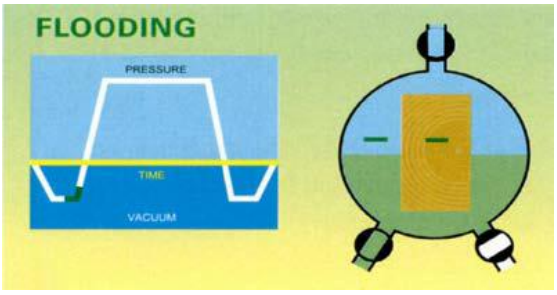
Figure 6: Pressure vacuum treatment cycle

1. Initial vacuum



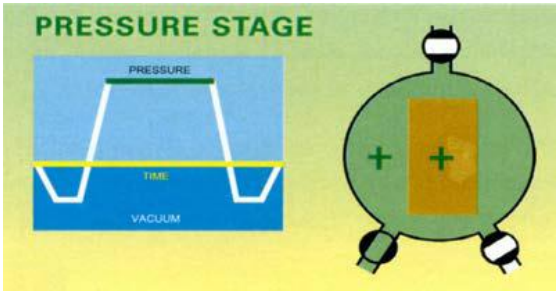
The objective of the full cell treatment process is to obtain maximum retention of preservative in the treated timber. The timber is loaded into the treatment vessel and the door is closed and safely locked. The initial vacuum removes air from the timber, which would otherwise inhibit preservative penetration. The duration and level of vacuum affects the penetration and retention of the preservative in the timber, and this will be adjusted according to the timber being treated and the required treatment specification. For very permeable species, the initial vacuum may be omitted to reduce the possibility of over-absorption of the preservative. A treatment process where the initial vacuum is omitted is often referred to as the empty cell process. The initial vacuum is applied (vacuum pump on and valve opened) and a vacuum is held at around 600mmhg or above for 15 minutes.

2. Flooding



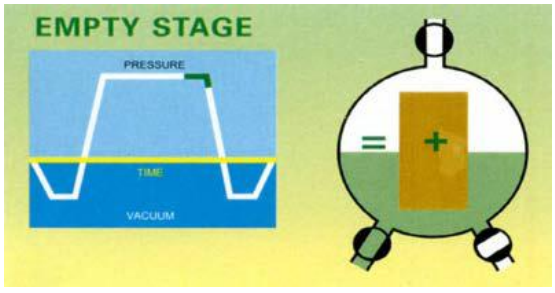
Preservative solution is pumped from the mix tank under the vessel to the treatment vessel once the initial vacuum period has finished by opening the main flood valve. The vacuum is maintained during preservative solution transfer so that its effect is maintained.

3. Pressure period



The pressure period is the time the timber spends in the flooded timber treatment vessel under high pressure. The pressure is achieved by pumping more preservative into the vessel once it is flooded (pressure pump started and pressure pump valve opened). This stage of the process forces the preservative solution into the timber until the desired level of penetration is achieved. Pressure is often held for 60-120 minutes.

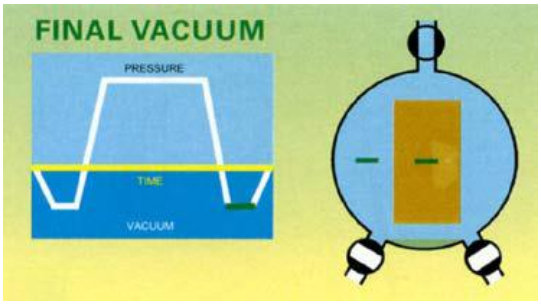
4. Pressure Release & Empty



At the end of the pressure period, the pressure is released though the main flood valve and the preservative fluid is transferred back to storage in the tank under the vessel. As soon as the pressure is released from the vessel, any air compressed in the pressure period expands and blows the preservative out of the cells of the timber being treated such that only the cell walls are coated with preservative. This is referred to as ‘kickback’; however the initial vacuum stage should minimise this effect.

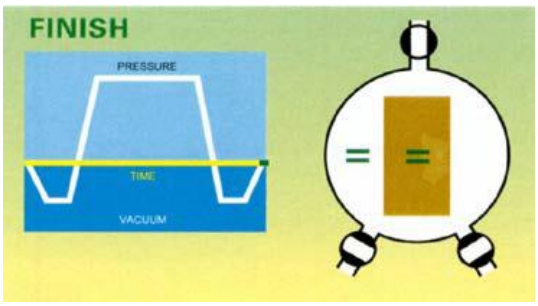
5. Final vacuum

A final vacuum is applied to the timber in the empty vessel to help remove excess preservative from the surface of the treated timber, which speeds-up the dripping of the excess preservative into the vessel. The final vacuum is general 15 minutes or when a vacuum of 600mmHg is achieved.



6. Air release and drain

After the air is released, any excess preservative leaving the treated timber is drained back into the storage tank for re-use. The treated timber is then ready to be removed from the vessel.



C2.2.5.2 Post treatment drying

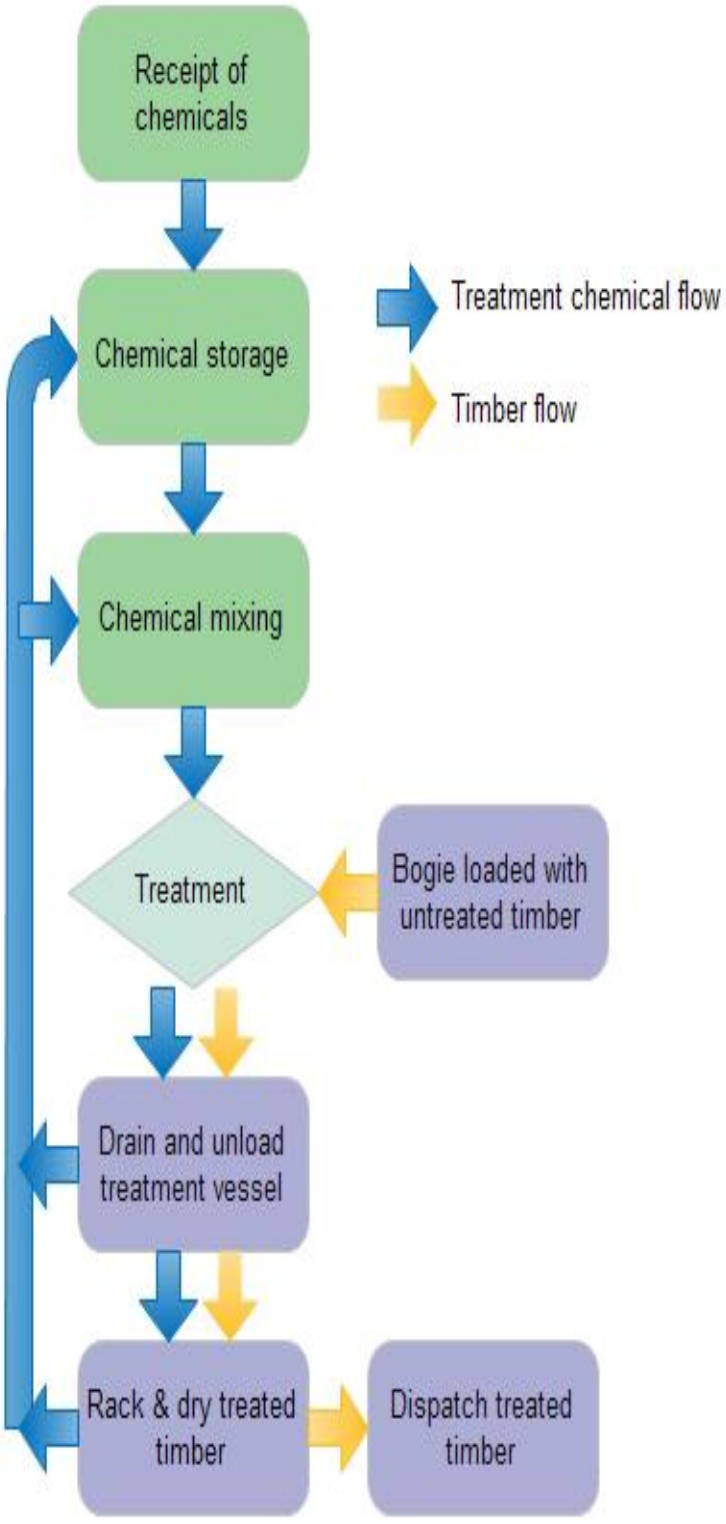
After the treatment process has been completed, the vessel door is opened and the treated timber removed from the vessel on the track rails.
Treated timber packs are unstrapped from the rail system, and then lifted using the fork lift truck used to load the packs to allow any excess treatment solution to drain from the wood. This initial draining process is undertaken over the rails on the concrete pad immediately in front of the treatment vessel, meaning that the preservative liquid is collected for re-use in the treatment process.

Once the initial drain has been completed, particularly for pressure treated timber, treated packs are transferred to the drying area for the final drying period. The final dying period is undertaken at ambient conditions and is therefore temperature and weather dependent but can take between 24 hours and 2 days depending on the type of timber treated and the prevailing weather conditions.
The capacity of the holding area is currently approximately 400m³ plus the combined capacity of the rail systems in front of the treatment vessels (30.0m³).

C3: Releases, techniques and monitoring

C3.1: Releases

The process flow is described as follows:



Potential or Expected releases

Preservative delivery

- No volatile emissions to air
- Potential for odour
- Potential for trace emission to sewer in abnormal event

Preservative storage tanks

- No volatile emissions to air
- Low / No potential for odour
- Potential for loss to containment bund in abnormal event

Treatment vessel

- No volatile emissions to air
- Low / No potential for odour
- Potential for loss to containment bund in abnormal event

Unloading area

- No volatile emissions to air
- Low / No potential for odour

Timber drying area

- No volatile emissions to air
- Low / No potential for odour
- Potential for trace emission to sewer in abnormal event

Figure 7: Process flow diagram

A description of releases and the quantification of those releases under normal operating circumstances for each process stage (including start-up, shutdown) and accidental releases are detailed in this section.
The wood preservation activity does not include any combustion processes, nor are there any process chimneys or associated ductwork. This means that:

- There are no contained emissions to air.
- Abatement plant is not necessary to meet emission limit values.
- There are no substantial emissions to air.
- The activity is free from smoke emissions.
- There are no persistent visible emissions or emissions of water vapour that could lead to droplet fallout.
- There are no contained emissions to water.
- There is potential for trace emissions to sewer.

C3.1.1 Releases from receipt of chemicals

Release under normal operating circumstances
There are no releases of Tanalith E under normal operating circumstances. It is delivered by bulk road tanker. A minor release within the timber treatment area (a few millilitres) is possible during the hose connection and disconnection procedure. This is captured using a simple drip tray arrangement and can be recovered in to the plant.

Accidental releases
Accidental release of Tanalith E is highly could occur in the event of delivery hose or valve failure. However the tanker off-loading point is within the bunded area so potential for loss to the environment is very low.

C3.1.2 Releases from storing chemicals

Release under normal operating circumstances
There are no releases of Tanalith E under normal operating circumstances. It is stored in the closed concentrate storage tank within the timber treatment area.

Accidental releases
Accidental release of Tanalith E in the treatment area could only occur in the event of storage tank failure or pipeline failure. The maximum potential for release is the volume of the relevant storage tank as detailed in section C2.2.3.

C3.1.3 Releases from mixing chemicals

Release under normal operating circumstances
Tanalith E concentrate is mixed with water in the tanks under the process vessels to the desired concentration (usually 3% or 5%). There are no releases during normal mixing operations. There is no process effluent from the activity, with no direct emissions to water.

Accidental releases
A release of mixed product to the treatment area could occur if the storage tanks were to overflow. However, these are all fully computer controlled and fitted with independent high level alarms that would stop mixing or fluid transfers.

C3.1.4 Releases from vessel loading

Release under normal operating circumstances
Opening the vessel doors for loading may result in a small amount of preservative being released and returned to the storage tank directly below the relevant treatment vessel door.

Accidental releases
Accidental releases of preservative fluid during vessel loading are unlikely. The process pumps are not operating.

C3.1.5 Releases from timber treatment

Release under normal operating circumstances

Other than air displaced through the vacuum system during initial and final vacuum stages of the process there are no emissions from the process.

Accidental releases
Any failure of the vessel during a treatment cycle would lead to a liquid release into the treatment area. The liquid contents of the vessel depends on the pack size being treated, however the maximum liquid capacity of the Tanalith E vessel is approx. 47,000 litres.

C3.1.6 Releases from vessel unloading

Release under normal operating circumstances
Opening the vessel doors at the start and end of the treatment cycle may lead to some liquid release (a few litres) from the Tanalith plant back to the storage tank below. There is no process effluent from either timber treatment operation, and no release to water.
The vessel door is open for the duration of the unloading procedure.
Timber saturated with chemical preservative is withdrawn from the vessel for initial draining, where excess preservative will run off the freshly treated timber and onto the concrete pad. It is not possible to quantify the quantity of fun-off from each charge as this will depend on the type of wood being treated, the quantity of wood in the change and the prevailing weather conditions. There is no process effluent from the activity, with no direct emissions to water.

Accidental releases

Accidental releases could only occur if the concrete treatment area was compromised.

C2.1.7 Releases from drying area

Release under normal operating circumstances
Treated wood is placed in the post treatment timber holding area to dry. There is no process effluent from the activity, with no direct emissions to water. Any run off from the timbers is recovered to the treatment process.

Accidental releases

Accidental releases could only occur if the concrete treatment area was compromised or if dripping timber was removed from the timber treatment area.

C3.1.8 Releases from ancillary activities

Releases under normal operating circumstances
Treated timber has the potential to cause trace emissions of preservative to sewer, however this should be no more significant than storing treated timber at a builders merchants.

Process vessel cleaning will produce a residue.

Accidental releases
There should be no potential releases from ancillary activities.

C3.2: Techniques

C3.2.1 Techniques to minimise releases from receipt of chemicals

IBCs of preservative additive chemicals are delivered to site by road vehicle on a just in time basis. IBCs and kegs are off loaded by forklift into the treatment area. The whole of the treatment area is protected by a containment kerb, meaning that any leak would be contained within the bund. The IBCs remain lidded and capped until connected to the treatment plant.

Bulk tanker deliveries are received in accordance with a delivery procedure. The tanker connection point is located with the storage tank containment bund. All delivery lines are blown though to ensure that they are free from preservative solution at the close of the delivery. Delivery connection points are also equipped with manual shut-off valves and connection point caps. The treatment area containment kerb and bulk tanker delivery connection point are shown in general arrangement drawing 2570-LON-GA-01. Spillage kits are available for use during bulk tanker deliveries.

C3.2.2 Techniques to minimise releases from storing chemicals

Control techniques for the storage of IBCs prior to use are the same as that for delivery.
The bulk storage tanks for Tanalith E are contained within formed concrete containment bunds as shown in figure 8. The pump system for the Tanalith E systems are also shown in that figure.

Figure 8: Tanalith E storage tanks containment bunds
Visible water is from rain prior to building erection

C3.2.3 Techniques to minimise releases from mixing chemicals

Tanalith E concentrate is mixed to a precise concentration by the Auto-Treater control system, using preservative solution from concentrate storage and water to the storage tanks positioned below the treatment vessels.

Preservative concentrate is stored in the concentrate storage tank positioned to the side of the treatment plant area within the bunded plant area.

Water is supplied to system from the plant water storage tank which is supplied from the water harvesting system on site and is fitted with a Type A air gap. Thus ensuring there is no direct connection of town water with the mixing system. This eliminates the potential for back-siphoning of preservative solution to the mains water supply.

C3.2.4 Techniques to minimise releases from vessel loading

A forklift truck is used for timber treatment operations. The vessel loading area is under cover, and is a fully concreted area. A potential localised release when the treatment vessel door is opened is possible due to passing valves; therefore the vessel door is opened for the shortest time possible when loading the track system, and the vessel door is kept closed and locked when the vessel is not in active use.

C3.2.5 Techniques to minimise releases from timber treatment

Tanalith E treatment process

The timber treatment vessel is purpose built and is contained within the covered process building and within the containment bund area. The control system controls the preservative mix concentration, the flow of liquid preservative and the pressure / vacuum period according to the desired specification. The treatment plant can be operated manually to safe closedown should the computer system fail.

The vessel is fitted with interlocks and devices to prevent the operation of the vessel if the loading door is not locked shut, and to prevent the vessel door from opening or being opened during the treatment process, or whilst there is working liquid in the process vessel as follows:

- Vessel door closed / locked position switch.
- Low level test cock device with position switch
- Empty switch in the bottom outlet of the treatment vessel.

Electrical interlocks on the process vessel door that confirm that the door is locked shut. The interlocks prevent the operation of the treatment process if the vessel door is not properly closed. This is also linked to an audible alarm See figure 9.

Figure 9: Tanalith E treatment plant door locking ring interlocks and low level test cock

- The readout on the control system provides a visual indication of the liquid level in the storage tank so that it can be determined whether or not there is liquid in the process vessel. The vessel is also fitted with sensors to detect that the vessel is empty.
- In an emergency situation, or in the event of door failure, the vessel can be manually controlled. The area in front of the vessel door forms part of the plant main bund meaning that any preservative fluid released in the event of a problem will be safely contained. The bunded area is always maintained at a level that would allow it to contain the contents of the process vessel in an emergency situation.

Other safety equipment fitted to the process vessel is as follows:

- Safety relief valve on the pressure pump (set to operating pressure by the preservative manufacturers engineers to maintain the pressure treatment period, usually 12.0 BarG for Tanalith plants).
- Emergency relief valve and overflow on the top of the plant (all fluid contained within the bund under the process vessel) usually set to 14BarG for Tanalith plants. This is set at the design pressure of the vessel and the valve should be set by the valve supplier and be fitted with a sealed / tagged cap.
- Digital and analogue gauges display working pressure and vacuum in the vessel during operation.

C3.2.6 Techniques to minimise releases from vessel unloading

Tanalith E treatment process

Wood packs are stacked, spaced and sloped in order to maximise the free drainage of solution whilst the pack is inside the treatment vessel. Packs are also lightly strapped with webbing straps to ensure that the timber remains on the track during treatment, but no so tight that the preservative cannot fully penetrate the timber. Tracks are held in the vessel during treatment by way of an anti-flotation rail. All of the above minimise the likelihood of timber becoming stuck within the treatment plant, which cause operational problems in clearing blockages and prolongs the period of time that the vessel door is open for unloading. Again, the tracks are also designed to shed preservative solution.

On opening the vessel door after treatment, a small amount of preservative fluid will escape from the door seal. This is unavoidable, but is contained and returned to the storage tank for re-use

The track system removes the treated pack from the vessel on the rail system. The rail system is a raised system with integral drip tray to ensure that all residual preservative dripping from the treated pack flows back into to the storage tanks for re-use. See figure 10.

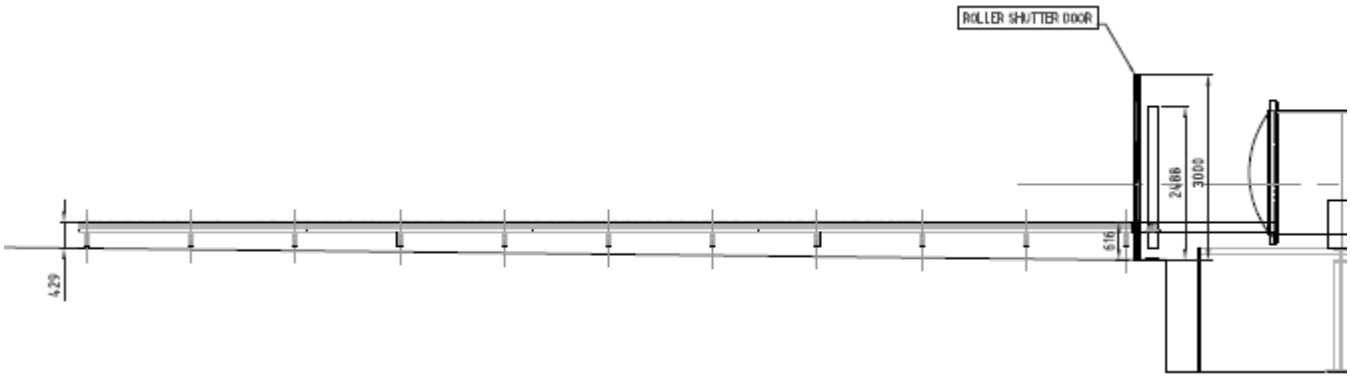


Figure 10 side elevation of timber handling system with integral drip tray.

C3.2.7 Techniques to minimise emissions from racking and drying

Treated packs are removed from the track systems with a side lifter forklift. They are transferred to the holding areas for drip drying. Drip drying generally relates to the Tanalith process which produces a wetter product due to the pressure treatment process. Drip drying takes place within the process building and within the containment kerb. The concreted area has a slope that drains towards the treatment vessel / main plant bund, meaning that preservative solution can be re-used in the process.
Packs of treated timber remain in the drying area until the packs are defined as dry. The time taken for the pack to be defined as dry is dependent on a number of factors, including:

- The type of timber treated (seasoned timber usually dries faster than unseasoned timber).
- Weather conditions.

To be defined as dry, the pack must be free from drips of liquid preservative and the treatment plant operator will use his judgement based on the type of timber treated and the prevailing weather conditions. If a pack is lifted and drips are identified, the pack will remain in the drying area until drying has been completed.

C3.2.8 Techniques to minimise releases from ancillary activities

Only empty IBCs are stored outside the bunded areas. All storage areas are of concrete construction. All IBCs stored are capped and lidded. When emptied IBCs are washed out thoroughly with water which is re-used in the treatment process. Only clean decontaminated IBCs will be stored outside the timber treatment plant. Once decontaminated the IBCs can be returned to Schutz for re-use/recycling.

Dried and treated timber is stored on site (inside and/or outside) for dispatch to the customer. Once the preservative solution has initially dried, it is considered ‘fixed’ into the timber and is unlikely to cause pollution if stored on a concrete surface.

Whilst a fork lift is used for the timber treatment operations, this vehicle can occasionally leave the timber treatment area for use in other areas and for maintenance. Timber storage within the timber holding area will be done such that any run off from the timbers is away from the main areas the fork lift is operating meaning the potential for migration of chemical is minimal.

Process vessel cleaning if it is to be needed at some time in the future will be undertaken by a specialist contractor as required. The contractor would remove any effluent produced in the cleaning process that cannot be re-used within the timber treatment activity in a tanker for specialist disposal at a waste water treatment facility.

C3.3: Monitoring

C3.3.1 Monitoring releases from receipt of chemicals

No emission concentration limit needs to be met for emissions to air from the receipt of product. No emissions monitoring is possible, however the following monitoring will be undertaken:

- IBCs containing preservative additives are regularly inspected for their contents and for damage and leaks.
- The potential for trace emissions to land from this area will be confirmed by the site condition report.

C3.1.2 Monitoring releases from storing chemicals

No emission concentration limit needs to be met for emissions to air from the storage of chemicals other than the absence of offensive odour beyond the installation boundary. No emissions monitoring is possible, however the following monitoring will be undertaken:

- Storage tanks containing preservative solution are regularly inspected for damage and leaks.
- Pipework carrying preservative solution are regularly inspected for damage and leaks.
- High level warning alarms are regularly tested.
- The potential for trace emissions to land from this area will be confirmed by the site condition report.

C3.3.3 Monitoring releases from mixing chemicals

No emission concentration limit needs to be met for emissions to air from the storage of chemicals other than the absence of offensive odour beyond the installation boundary. No emissions monitoring is possible, however the following monitoring will be undertaken:

- Storage tanks containing preservative solution are regularly inspected for damage and leaks.
- Pipework carrying preservative solution are regularly inspected for damage and leaks.
- High level warning alarms are regularly tested.
- The potential for trace emissions to land from this area will be confirmed by the site condition report.

C3.3.4 Monitoring releases from track loading

The process vessel doors will be only be kept open for the shortest time practicable. This will form an auditable item.

C3.3.5 Monitoring releases from timber treatment

No emission concentration limit needs to be met for emissions to air from timber treatment other than the absence of offensive odour beyond the installation boundary. No emissions monitoring is possible, however the following monitoring will be undertaken:

- The concrete containment bund is regularly inspected for damage.
- Pipework carrying preservative solution are regularly inspected for damage and leaks.
- The potential for trace emissions to land from this area will be confirmed by the site condition report.

C3.3.6 Monitoring emissions from vessel unloading

No emission concentration limit needs to be met for emissions to air from treatment vessel unloading and timber draining other than the absence of offensive odour beyond the installation boundary. No emissions monitoring is possible, however the following monitoring will be undertaken:

- The concrete containment bund is regularly inspected for damage.
- The potential for trace emissions to land from this area will be confirmed by the site condition report.

C3.3.7 Monitoring releases from drying area

No emission concentration limit needs to be met for emissions to air from treated timber drying area other than the absence of offensive odour beyond the installation boundary. No emissions monitoring is possible, however the following monitoring will be undertaken:

- Packs are managed using pack labels and charge sheets.
- The dripping area is regularly inspected.
- The potential for trace emissions to land from this area will be monitored.

C3.3.8 Monitoring releases from ancillary activities

No emission concentration limit need to be met for emissions to air from stored chemicals other than the absence of offensive odour beyond the installation boundary.

- The potential for trace emissions to land from this area will be monitored.

C4 Groundwater discharges

Under the groundwater Directive and the groundwater Regulations, groundwater is all water which is below the surface of the ground in the saturated zone and in direct contact with the ground or subsoil.

C4.1 Discharges of List I and List II substances

C4.1.1 List I substances

There are no intentional point source emissions of List I substances.
List I substances include:

a) organohalogen compounds and substances which may form such compounds in the aquatic environment;
b) organophosphorus compounds;
c) organotin compounds;
d) substances which possess carcinogenic, mutagenic or teratogenic properties in or via the aquatic environment (including substances which have those properties which would otherwise be in list II);
e) mercury and its compounds;
f) cadmium and its compounds;
g) mineral oils and hydrocarbons;
h) cyanides.

No List I substances are used in the wood preservation activity.

C4.1.2 List II substances

There are no intentional point source emissions of List II substances.

List II substances include:

A substance is in list II if it could have a harmful effect on groundwater and it belongs to one of the following families or groups of substances–

a) the following metalloids and metals and their compounds:

Zinc	Tin	**Copper**	Barium
Nickel	Beryllium	Chromium	Boron
Lead	Uranium	Selenium	Vanadium
Arsenic	Cobalt	Antimony	Thallium
Molybdenum	Tellurium	Titanium	Silver

b) **biocides** and their derivatives not appearing in list I;
c) substances which have a deleterious effect on the taste or odour of groundwater, and compounds liable to cause the formation of such substances in such water and to render it unfit for human consumption;
d) toxic or persistent organic compounds of silicon, and substances which may cause the formation of such compounds in water, excluding those which are biologically harmless or are rapidly converted in water into harmless substances;
e) inorganic compounds of phosphorus and elemental phosphorus;
f) fluorides;
g) ammonia and nitrites.

The following list II substances are in use at the installation:

- Copper.
- Biocides.

C5 Raw materials, water etc.

C5.1 Preservative chemicals and additives

The following raw materials are in use at the installation in addition to timber:

- Tanalith E 8000
- Tanaguard
- Tanatone
- Water

The raw materials in use are described as follows:

C5.1.1 Tanalith E 8000

Tanalith E 8000 is the main wood preservative in use at the installation. It is a water-based timber preservative that has been available since the 1980's. It is applied by vacuum pressure and contains a combination of Copper and Triazole biocides. It is bright blue in concentrate, does not contain any ammoniacal component and does not contain Chromium or Arsenic. Tanalith E 8000 is supplied as a concentrated product, which is mixed with water on site to produce a ready-to-use solution. Treated timber is green. The Copper acts as both an internal fungicide and insecticide, and the Triazoles are effective against brown rots. Tanalith E is normally diluted to a 3.0% w/v solution. Higher solution strength may be used for heavy industrial uses at 5%w/v. A 3% & 5% solution will be used.

The Safety Data Sheet for Tanalith E 8000 is provided in appendix 2. Tanalith E 8000 is an approved product for use as a wood preservative, and as a supplied mixture, contains the Risk Phrases R20/21/22, R34, and R50/53. It is not a mixture classified as carcinogens, mutagens, or toxic to reproduction, are assigned or need to carry the hazard statement designations H340(R45), H350(R46), H350i(R49), H360D(R60), or H360F(R61), so does not need to be replaced, as far as possible by less harmful substances or mixtures within the shortest possible time.

Tanalith E 8000 as a mixture contains the following components:

- 2-Aminoethanol.
- Copper(II) carbonate--copper(II) hydroxide (1:1).
- Tallow alkyl amines, ethoxylated.
- Organic acids.
- Fatty acids, C8-10.
- N,N-Didecyl-N,N-dimethylammonium carbonate (3:2).
- Propiconazole.
- Tebuconazole.
- Didecyldimethylammonium chloride.

Tanalith E contains 2-Aminoethanol (MEA). In their pure form, amines may be classed as Volatile Organic Compounds (VOCs)

Chapter V of IED gives provisions for installations and activities using organic solvents and points to Annex VII for the relevant emission limits. In these documents the definition of organic solvent is given as:

> (46) 'Organic solvent' means any volatile organic compound which is used for any of the following:
>
> (a) alone or in combination with other agents, and without undergoing a chemical change, to dissolve raw materials, products or waste materials.

In the preservative concentrate, the 2-Aminoethanol is not used as a solvent carrier but is a constituent part of the product. The Copper raw materials are dissolved by reaction with an amine, before the addition of water and the additional co-biocide(s), and are physically bound in both solution and ultimately the treated timber and therefore not free for release.

Therefore in copper-amine based wood preservatives amines are neither volatile nor solvents.
Tanalith E 8000 is considered fit for purpose, even though is and its components are considered to be very toxic to aquatic organisms, and may cause long-term adverse effects in the aquatic environment. The product should not be allowed to enter drains, water courses or the soil. There are no current alternatives or substitutes for the required level of timber treatment. The wood preservative manufacturers update their products according to the prevailing chemical and biocide legislation, meaning that the Operator cannot substitute with materials presenting lower risks to the environment.

C5.1.2 Tanaguard

Tanaguard 3755 is a component of the Tanalith E treatment process, acting as a treatment solution sterilant. It is always added to the ready to use mixture using a dosing system. This is to minimise Operator exposure to the Tanaguard concentrate. The Auto-Treater system handles the Tanaguard dosing arrangements. The operator uses the Tanaguard as a supplied mixture carries the Risk Phrases R20/21/22, R34, R43 and R50/53, so does not need to be replaced, as far as possible by less harmful substances or mixtures within the shortest possible time. The Safety Data Sheet for Tanaguard is provided in appendix 3.

Tanaguard as a mixture contains the following components:

- mixture of: 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2Hisothiazol-3-one (3:1).

- 2-Octyl-2H-isothiazol-3-one.
- Copper (II) nitrate, trihydrate.

Tanaguard is fit for purpose and does not contain any substance considered to be persistent, bio accumulating or toxic (PBT), nor does it contain substances considered to be very persistent or very bio accumulating (vPvB), however it should not be allowed to enter drains, water courses or the soil as It is very toxic to aquatic organisms, and may cause long-term adverse effects in the aquatic environment.

C5.1.3 Tanatone

Tanatone 3950 is a compoenent used in conjunction with Tanalith E, providing the treated timber with a mid brown colour. Typically this is dosed at 1%w/v to the treatment solution storage designated for brown treatments. The operator uses the Tanatone as a supplied mixture carries the Risk Phrase R43 so does not need to be replaced, as far as possible by less harmful substances or mixtures within the shortest possible time. The Safety Data Sheet for Tanatone is provided in appendix 3.

Tanatone as a mixture contains the following components:

- Azo dyestuff
- Hydrochloric acid

Tanatone is fit for purpose and does not contain any substance considered to be persistent, bio accumulating or toxic (PBT), nor does it contain substances considered to be very persistent or very bio accumulating (vPvB), however it should not be allowed to enter drains, water courses or the soil.

C5.2 Waste minimisation (optimising the use of raw materials)

The use of raw materials in the wood preservation industry is at quite an advanced stage of optimisation, with the widespread use of rainwater harvesting, treatment solution re-use and the capture and containment of process water run-off. Estimated annual average consumption of raw materials are:

- 27,000m³ treated timber
- 32,400kg Tanalith E concentrate

Lonza Wood Protection has developed a generic assessment tool to compare the quantity of treated timber against preservative consumed, as a ready reckoner for preservative use efficiency.

Lonza

Lonza Wood Protection

Approx Product & Additives Usage by Treated Timber

Total Site Treated Production m³
27,000

Treated Timber Volumes	Production Split %	Treated Volume m³	Tanalith E @ 3% kg
Tanalith E	70	**18,900**	22,680
Tanatone 3999 treated	0	**0**	0
Tanatone 3950 Treater	30	**8,100**	9,720
Extra (water repellant)	0	**0**	0

Figure 11: Approximate annual product consumption

The approximate product use against timber treated as estimated by the Lonza tool is shown in figure 11. The actual use of the preservative varies however depending on the type of timber treated, and the use class to which that timber is treated and can be obtained from the Auto-Treater plant control system once the site is operational.

C5.3 Water use

A water efficiency audit cannot be undertaken prior to the submission of this application given this is a new installation. The information in this application presents an estimate of water use at the timber treatment installation based on forecast production rates when the plant is fully operational.
Water used in the activity is both mains (Town) water and harvested rainwater. Tanalith E 8000 is generally supplied as a concentrate, diluted on site with water for use as a 3% or 5%w/v solution. This could be used as the basis of an assessment of water use, where the calculated water requirement is compared to the metered water use for the installation.
Lonza Wood Protection has devised a tool for the purpose of benchmarking, and a screen shot of the tool containing approximate annual water consumption data for the wood preservation activity is shown below in figure 12.

Water & Additive Usage Calculator

TANALITH E8000

Annual Tanalith E Usage		Av soln Strength	Volume of RTU	Volume of Water		Metered Water reading	Recovered water volume
kg	litres	%w/v	Litres	Litres	m³	m³	m³
32,400	27,458	3%	1,080,000	1,052,542	1,053	0	**1,053**

Estimated

Additive usage	Production Split %	**Usage kg**
Tanagard	100	**540**
Tanatone 3999 usage	0	**0**
Tanatone 3950 usage	30	**4860**
Extra (water repellant	0	**0**

Note Tanagard always 100% as used in all treatments

Notes:
1. Enter the number of kilograms of Tanalith E used annually
2. If the site is currently metering the water usage on site end the annual water reading. This will provide a value for recovered water used on site.
3. If water to the treatment facility is not metered then leave the water reading at zero and water consumed is calcualted from the Tanalith E used.

Figure 12: Approximate annual water consumption

The initial assessment for the water required to use Tanalith E at an average working concentration is 1,053m³. The site will be fitted with a water meter to the whole site so an assessment of the amount of recovered water will be possible after the plant has been in operation. Although the water meter is for the whole site and not just the wood preservation activity will be by far the largest consumer of water on site.

C6 Waste

C6.1 Waste produced

The main wastes produced in operating the process are:

- Empty IBCs and containers formerly holding preservative additive chemicals.
- Waste treatment water removed during planned preventative maintenance.
- Damaged treated timber.
- Plastic wrapping.

C5.2 Waste streams, quantities, fate and opportunities

The waste streams, quantities, fate and opportunities are detailed below:

	Waste type	Quantity (number, litres or kg)	Handling & storage	Fate	Opportunity for prevention	Opportunity for re-use	Opportunity for recycling
5.2.1	*Empty IBCs and containers formerly holding preservative chemicals.*	Approx 10 per annum.	Once empty are fully washed out. So no environmental risk	Recycled.	The only way that this waste stream could be reduced is to use bulk tanker deliveries of chemicals. This would require additional delivery infrastructure not currently in place at the installation.	Limited use on site.	SCHÜTZ UK collection system
5.2.2	Waste treatment water removed during planned preventative maintenance.	Waste producer registration	Removed by vacuum tanker.	Disposal.	None.	None.	None.
5.2.3	Damaged treated timber.	Quantity?	Waste skip.	Disposal.	Careful handling of timber and timber packs.	Some on-site re-use.	None.
5.2.4	Plastic timber wrapping	Quantity?	Waste skip.	Disposal.	?	None.	None.

Table 6: Waste streams, quantities, fate and opportunities

Lonza Wood Protection

C7 Energy

Electricity if the sole source of energy used in the activity, which are used to drive the following types of equipment:

- Vacuum pumps.
- Pressure pumps.
- Air compressor.
- Hydraulic pumps.
- Water pumps.
- Preservative concentrate pumps.

Lonza Wood Protection has developed an energy use calculator based on the type and number of pumps in operation, and the number of treatment charges. See figure 23 below.

There is minimal scope for improvement sin energy use efficiency, because equipment is only operated when required (as opposed to all of the time). Pumps etc will be replaced for more efficient models when replaced at the end of useful life.

Name of Motor	Power Rating - kW	Running Time per Cycle - Minutes	Voltage - V	Running Current - Amps	For Single Phase Motor	Estimated Consumed Power per hour kWh	
Vacuum Pump_1	11.00	50.00	415.00	26.51		9.17	Enter actual running time of the motor
vacuum Pump_2	11.00	50.00	415.00	26.51		9.17	Enter actual running time of the motor
Pressure Pump	4.00	25.00	415.00	9.64		1.67	Enter actual running time of the motor
Air Compressor	1.10	60.00	415.00	2.65		1.10	Enter actual running time of the motor
Hydraulic Pump	3.00	20.00	415.00	7.23		1.00	Enter actual running time of the motor
Water Pump	0.37	10.00	415.00	0.89		0.06	Enter actual running time of the motor
Concentrate Pump	0.46	10.00	415.00	1.11		0.08	Enter actual running time of the motor
Tanagard Pump	0.46	3.00	415.00	1.11		0.02	Enter actual running time of the motor
Tanatone / Extra Pump	0.46	3.00	415.00	1.11		0.02	Enter actual running time of the motor

Only Modify the Numbers in the Blue Shaded Area.

Unit cost per kW Hour.	£0.15	Enter unit cost per kW hour

Name of Motor	Power Rating	Running Time per Cycle - Minutes	Running Time (Hours)	kW Hours		kJ	Cost per kilowatt hour	Cost per kilojoule
Vacuum Pump_1	9.17	50.00	0.833	7.639		27500.0	£1.15	£1.15
vacuum Pump_2	9.17	50.00	0.833	7.639		27500.0	£1.15	£1.15
Pressure Pump	1.67	25.00	0.417	0.694		2500.0	£0.10	£0.10
Air Compressor	1.10	60.00	1.000	1.100		3960.0	£0.17	£0.17
Hydraulic Pump	1.00	20.00	0.333	0.333		1200.0	£0.05	£0.05
Water Pump	0.06	10.00	0.167	0.010		37.0	£0.00	£0.00
Concentrate Pump	0.08	10.00	0.167	0.013		46.0	£0.00	£0.00
Tanagard Pump	0.02	3.00	0.050	0.001		4.1	£0.00	£0.00
Tanatone / Extra Pump	0.02	3.00	0.050	0.001		4.1	£0.00	£0.00
Total Running Time		231.00	3.85					
			Electricity Unit Cost	Total kW Hours		Total kJ.	£0.15	£0.00004
			Total Energy	17.43		62751.28		
						Total Cost per charge	**£2.61**	**£2.61**
		Number of charges	1,800			Total Cost per Year	**£4,706.35**	

Figure 13: Approximate annual energy consumption

C8 Noise and vibration

C8.1 Noise report specification

Wood preservation activities are not inherently noisy operations; however as part of the planning application for the whole site a noise assessment has been completed. The specification for the noise assessment report was as follows:

1. A description of the location and environmental setting including:

   - Plant and equipment (main noise sources).
   - Other activities on site (main noise sources).
   - Locations of noise sensitive receptors.

2. Noise assessments including:

   - Noise assessments (background and source specific).
   - Complaints.
   - Opportunities for noise attenuation.

C8.1 Noise report

CONCLUSIONS AND RECOMMENDATIONS

The results have shown that under the proposed operational conditions complaints about noise are not likely to arise from any of the tested locations according to the test standard BS4142. Some locations would however be classed as being 'of marginal significance' or 'above marginal significance' according to the wording of the standard.

It should also be understood that the living environment for narrow boat owners on the canal is not a continual 46dB LA90. By definition the 'background' level is the level which is *exceeded* for 90% of the time (LA90) and therefore the general noise environment will be greater than 46dB for 90% of the time. Given that the contribution to this 'ambient noise' from the proposed new activities on the site is at worst 8dB above background (and this includes a 5dB subjectivity weighting) we would suggest that the new operations on site will have a minimal impact on the overall noise climate of the area.

The noise report is included as appendix 4 to this application.

The earth bund along the east side of the site (which runs along the canal) is 4.05m High so we are putting a 1.0m High Reflective Barrier on top of the bund (to make it 5.0m in Total Height). The acoustic barrier confirms and tested to BS EN 1793, BS EN 1794-1 & BS EN 1794-2 – Category B3. All Forklift truck work will be to a minimum with each truck having minimizing noise from the reversing beeper. Trucks not to drag there forks along either the steel bogeys (on treatment plant), steel runners on lorries or along the concrete surface. They will only be used as per planning consent.

C9 Site report

C9.1 Site report specification

The aim of the site report is to identify whether or not **current** activities subject to environmental permitting have had a detrimental impact on land such that land can be returned to a satisfactory state on cessation of regulated activates. Land will be assumed as 'clean' or 'uncontaminated' unless the site condition report identifies historical activities having the potential to cause contamination. The presence of actual contamination caused by either historical or current land uses may be confirmed by soil testing, however soil testing will not be carried out to the detriment of any containment bund or solid concrete surface, as this is likely to have the potential to cause pollution.

A general specification for the site condition report is as follows:

1. A description of the location and environmental setting (e.g. Envirocheck or Groundsure), including:

   - Geology
   - Hydrogeology
   - Surface waters

2. A description of the historical land uses, to identify whether any former land uses may have caused or have had the potential to cause contamination.

   - Historical land use mapping (such as Envirocheck or Groundsure)

3. A description of the site and current land use

   - History of the use of the land in its current form, for example previous treatment vessels, their locations and chemicals used (in particular chromated copper arsenate).
   - Description of the site and activities.
   - Include a site plan.
   - Include a site drainage plan.

4. A summary of likely pollution:

   - Likely pollution from all land uses.
   - Is there any evidence of land pollution?
   - Describe the condition of containment measures and hardstanding.
   - Any previous contaminated land assessments?

5. A risk assessments:

   - Assess risks to soil and groundwater etc.
   - Guides decision for the need for environmental sampling.

6. Baseline data:

   - Soil, sediment and water samples as necessary / practicable.
   - **Do not under any circumstances compromise containment bunds or hardstanding areas to obtain an environmental sample.** If a suitable area adjacent to the treatment area is accessible, and hast the potential to have been contaminated, take the sample there. Likewise, if any surface water run-off is likely to have caused the migration of preservative chemicals to a land drain or pond, take a sample (sediment and/or water) from the land drain or pond.
   - Provide results in a report.

C9.2 Site report

Prior to the development of the land where the new timber treatment installation is located it's use was agricultural land.

During the development of the site and installation of the ofundations for the buildings ther was no evidence of any prior land use or suspected pollution of the land.

It is therefore the opinion of Hales Sawmills limited that the land can be assumed to be uncontaminated and accept responsibility for its return to an uncontaminated state should there be a need to surrender the permit at some point in the future.

As set out in Environmental Permitting regulations Site condition report guidance and templates H5 2013 a site condition report is not being submitted for the grounds stated above.

C10 How will the installation be returned to a satisfactory state?

C10.1 Site closure plan

Hales Sawmills Ltd envisage many years of trading from the new Market Drayton site, however we are obliged to produce a site closure plan and will do so once the Environmental Permit application process is completed. This document will provide information on the steps which may be taken if the treatment activity closes, and associated plant, buildings and structures are decommissioned for alternative use.

An initial site closure plan is to be produced once the site is fully operational, and will be available for review at a later date, detailing the general principles the company proposes to follow upon the definitive cessation of the regulated activity.
The site closure plan will include:

- Site security
- General principles of decommissioning, dismantling and site clearance
- Site specific decommissioning, dismantling and site clearance proposals
- Site condition and soil testing
- Plan updates
- Site closure report

The site closure plan review process is based on the principles shown in the flow diagram below, and in section 10.2:

Site Closure Plan. If we closed down the treatment facility we would get in a professional cleaning company to empty the treatment plants, storage tank and bund of any chemical and then steam clean all areas where treatment may have gone onto (Drying area, bund). We would then remove the treatment plants and then turn the shed into a workshop by filling in the bund and re-concreting the floor and cladding the shed.

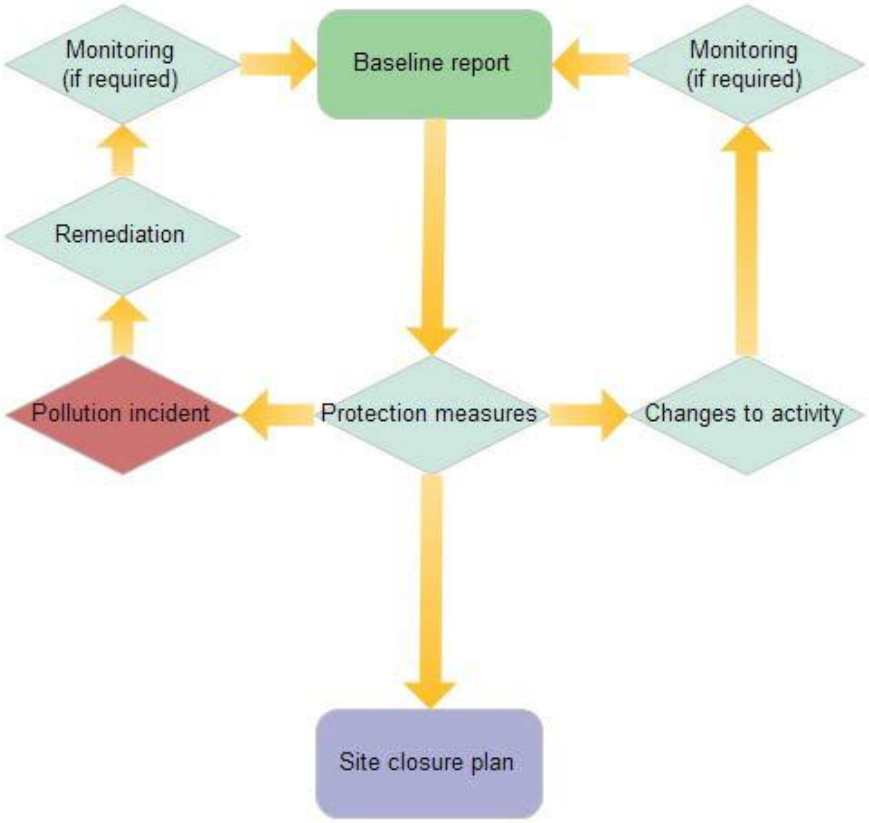


Figure 14: Site closure planning flow diagram

C10.2 Maintaining the site closure plan

The decision on the future of the site, its structures, plant and equipment may change at the time of closure, and this may result in alterations to the site closure plan. Considerations for the alteration of the site plan are as follows:

C10.2.1 Changes to the activity

Where there have been changes to the installation affecting the boundary, the site boundary plan will be re-drawn. It may also be necessary to consider updating the baseline data to include or exclude areas within or outside the new boundary.
Where there have been changes to the activity that fundamentally affect the site closure plan, for example a change to the treatment chemicals, replacement treatment vessel, new or substantial building alterations, these changes and any potential for impact of the site closure plan and the baseline data will be recorded.
Where any 'dangerous substances' not identified in the Application Site Condition Report have been used or produced as a result of the permitted activities these changes and any potential for impact of the site closure plan and the baseline data will be recorded.

C10.2.2 Measures taken to protect land

Site audit records will be used to summarise whether pollution prevention measures worked. This will include:

- Inspection records and summary of findings of inspections for all pollution prevention measures.
- Records of maintenance, repair and replacement of pollution prevention measures.

C10.2.3 Pollution incidents that may have had an impact on land, and their remediation

All pollution incidents that may have damaged the land will be recorded. The records aim to demonstrate how pollution incidents were investigated and remedied. This will include:

- Records of pollution incidents that may have impacted on land.
- Records of their investigation and remediation.

C10.2.4 Soil, gas and water quality monitoring

Where relevant, soil and water quality information for the installation will be updated. Where new data is obtained, this will be assessed against the baseline to see if the quality has deteriorated as a result of the permitted activities. Monitoring information will include:

- The investigation process.
- A description of the soil and/or water monitoring undertaken.
- Monitoring results.
- Any remediation undertaken.

C10.3 Site closure planning

Hales Sawmills Ltd will endeavour to ensure that a financial contingency in place to return the site of the installation to a satisfactory state upon definitive cessation of activities.

C11 Environmental management

Hales Sawmills Ltd deploys and plan to deploy the following systems and procedures in relation to the wood preservation activity. Operational procedures etc will be finalised on receipt of the environmental permit in order to ensure the permit requirements are fully reflected in our systems.
Environmental management systems include:

- Operational procedures.
- Planned preventative maintenance.
- Training.
- Pollution incidents.

11.1 Operational procedures
General operational procedures are available in the form of the Lonza Wood Protection 'Treat Right' Plant Operator and Site Management training manual. The full manual is not reproduced in this application, however a summary of the information included in the manual is as follows:

- The structure and enemies of wood.
- Preservatives, preservation and timber treatment specifications.
- Good treatment practice.
- Operation and maintenance of treatment plant.
- Environmental protection.
- Personal health and safety.

11.2 Planned preventative maintenance.
Planned preventative maintenance will be undertaken by both Lonza Wood Protection Service Engineers and Hales Sawmills Ltd site staff.

C11.2.1 Lonza Wood Protection planned preventative maintenance
2 visits per year are made by Lonza Wood Protection Service Engineers for treatment vessel servicing, amounting to a 6-month and a 12-month service. Emergency call-outs are also included in the timber treatment vessel service package.

C11.2.2 Lonza Wood Protection planned preventative maintenance
The treatment activity Operators complete a Plant Maintenance Record Sheet which includes both daily and weekly planned preventative maintenance and vessel cleaning. The checks demonstrate ongoing compliant

operation of the treatment vessels and provide a structured mechanism for the early identification of faults and defects.

The treatment plant operators will either be in house trained or have a NVQ Level 2 Wood Presenting – Industrial Pre Treatment (100-5124/7) as a company we have two people that are trained with NVQ's. All Treatment procedures will be as per NVQ training. Also i have sent you a Tanalith E Tanker Off-Loading manual.

11.3 Training

All staff authorised to operate the timber treatment vessels are trained by Lonza. A list of staff authorised to operate the equipment and their training certificates will be held on site.

11.4 Pollution incidents

A pollution incident reporting system is being developed to complement the site condition report process / closure plan process.

C12 Impact on the environment

C12.1 Potential significant local environmental effects

The potential significant local environmental effects (including nuisance) of the foreseeable emissions have been subjectively assessed, taking account of the Best Available Techniques proposed by this application. This assessment specifically excludes accidental release detailed in section C11.2 of this permit application. The key emissions to consider include:

- Odour

		Emissions Compliance		
		Meets emission limits 1	Likely to meet emission limits 2	Emission Limits exceeded 3
Nuisance & other sensitivities e.g. AQMA in relation to foreseeable emission	No nuisance or AQMA 1	Acceptable 1	Generally Acceptable 2	Moderate 3
	No nuisance or AQMA 2	Generally acceptable 2	Moderate 4	High Risk 6
	Nuisance or AQMA for specified releases 3	Moderate 3	High Risk 6	Unacceptable Risk 9

Specified release	Nuisance & other sensitivities e.g. AQMA	Emissions Compliance	Risk Score
Odour	No nuisance or AQMA	Meets emission limits	1 Acceptable

C12.2 Accidental releases

The prevention of accidental releases from the activity will be achieved through good management and handling techniques, principally to avoid leaks and spills of preservative materials, and by maintaining a good level of housekeeping.

Accidental releases from the installation have also been considered, both in terms of the nature of these accidental releases, the likely environmental hazard and the subsequent environmental risk using the following risk matrix:

		Severity of impact		
		Low 1	Medium 2	High 3
Nuisance & other sensitivities e.g. AQMA in relation to foreseeable emission	Possible 1	Trivial 1	Generally Acceptable 2	Moderate 3
	Probable 2	Generally acceptable 2	Moderate 4	High Risk 6
	Likely 3	Moderate 3	High Risk 6	Unacceptable Risk 9

Foreseeable emissions	Likelihood of occurrence	Severity of impact	Risk Score
Preservative leak from high pressure treatment vessel	Possible ➢ Vessel is maintained in good condition	Low ➢ Tank under vessel area and concrete containment bund and secondary kerb should provide sufficient containment. ➢ No open drains within containment area	1 Trivial

Table 7: Likely release environmental impact assessment

Foreseeable emissions	Likelihood of occurrence	Severity of impact	Risk score
Additive spillage during IBC delivery	Possible ➢ IBCs are sealed and robust. ➢ IBCs are sited on their own containment bund	Medium ➢ Leak will be contained in spill containment bund and the main plant bund forms a back up to this. ➢ Open drains which then collects to oil interceptor outside bunded area. Potential to contain spill if material was lost outside the contained area.	**2 Generally Acceptable**
Preservative spillage during bulk tanker delivery	Possible ➢ Delivery point and connections are under cover and well within the containment bund	High ➢ Larger quantities involved. ➢ Open drains which then collects to oil interceptor outside bunded area. Potential to contain spill. ➢ Low probability of reaching the drains as the connections will be in the plant area.	**3 Moderate**
Additive leak during IBC storage	Possible ➢ IBCs are sealed and robust.	Low ➢ IBCs stored within bunded area. ➢ Open drains which then collects to oil interceptor outside bunded area. Potential to contain spill.	**1 Trivial**
Preservative leak from bulk storage	Possible ➢ Storage tanks are single skin HDPE and new at time of installation.	Low ➢ Capacity of bund sufficient to hold all storage tanks. ➢ Open drains to foul sewer outside bunded area will not be affected affected.	**1 Trivial**
Preservative drag-out from contained area on forklift wheels	Likely ➢ Fork truck not fully dedicated to timber treatment area.	Low ➢ Very small quantity of contamination likely to be moved on vehicle wheels. Data from other sites have shown no actives detected from modern preservatives.	**2 Generally Acceptable**
Preservative dripping from treated timber outside containment area	Possible ➢ Treated timber overhanging containment area.	Medium ➢ Small quantity of contamination. ➢ All storage is within contained area so very low probability ➢ Open drains which then collects to oil interceptor outside bunded area.	**2 Generally Acceptable**

Table 8: Accidental release environmental impact

The combination of plant maintenance, good management and handling practices coupled with emissions monitoring will ensure that the risk of the environmental hazards actually occurring through unforeseen or uncontrolled emissions remain as low as possible.

C12.3 Sites of special scientific interest (SSSIs) and other designated sites

The installation is unlikely to have any effect on sites of special scientific interest (SSSIs) or European protected sites and therefore no implications for the purposes of the Conservation (Natural Habitats etc.) Regulations 1994 because none of the following are within 2 kilometres of the installation:

- Special Areas of Conservation (SACs).
- Special Protection Areas (SPAs).
- Sites of Special Scientific Interest (SSSIs).
- RAMSAR sites.

DEFRA's MAgiC Map service was used to confirm the absence of the designated sites listed above. Maps are included below in figure 15.

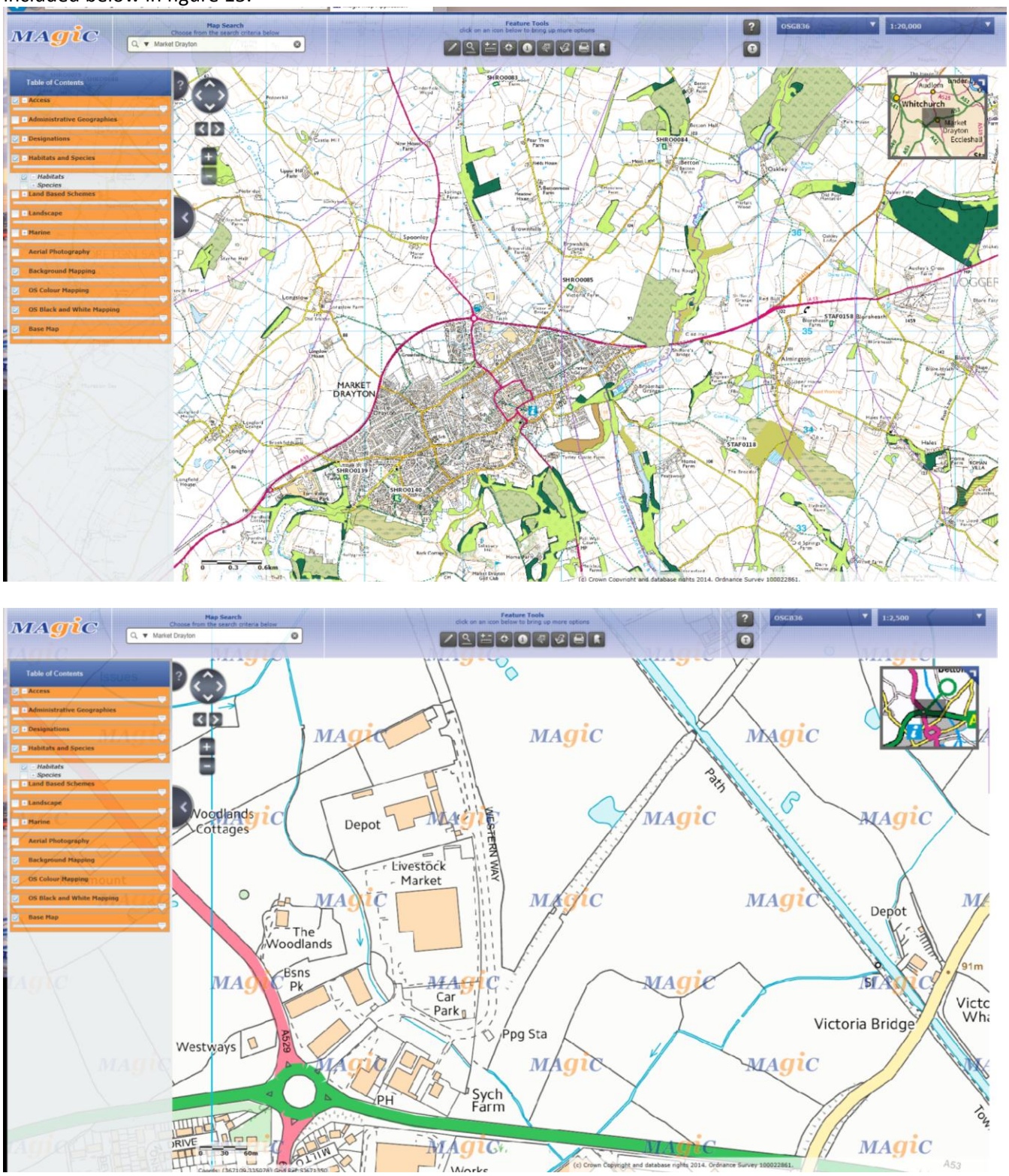


Figure 15: DEFRA Magic Map Images for Market Drayton and site vicinity

C12.4 Environmental impact assessment

A full environmental impact assessment is not required in addition to the contents of this application, nor was one required under planning legislation.

C13 Alternatives

C13.1 Alternative control techniques

The treatment plant is designed to operate on a total containment basis for operation. Currently there is no formally issued guidance documentation at assess BAT for a timber treatment installation. The design of the new timber treatment installation is thought to meet all the requirements of the Wood Protection Association Code of Practice for timber treatment installations and should allow safe operations of the facility with little or no risk to the environment.

C13.2 Alternatives to customers in the event of not receiving permit approval

Given this is a new installation it will be operating at the highest levels of environmental protection standards. If this installation is not granted a permit it is unlikely that any treatment installation will meet requirements and the availability of treated timber in the area severely restricted and will result in loss of business and jobs.