

**Lowfield Timber Frames Limited
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BAT Assessment
Wood preservation with chemicals
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ehrc

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1.0 Introduction

Lowfield Timber Frames Limited (the Operator) is applying for a Part A2 Permit from Shropshire Council (the Regulator) for a wood preservation with chemicals activity. Any permit granter will reflect the applicable Best Available Techniques (BAT) detailed in the BAT Reference Document on Surface Treatment Using Organic Solvents including Preservation of Wood and Wood Products with Chemicals Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control), December 2020. The Operator engaged **ehrc** to undertake a review of applicable Best Available Techniques (BAT) applicable to the activity to help guide the decision-making process for the permit application

1.1 Applicable BAT

Not all of the best available techniques detailed in the STS BRef are relevant to the activities operated at the installation. Applicable BAT is detailed as follows:

BAT	Description	Applicable?
1	Environmental Management systems	Generally applicable
30	Improving overall environmental performance	Generally applicable
31	Reducing solvent emissions	Generally applicable
32	Substitution of harmful substances	Generally applicable
33	Resource efficiency	Generally applicable
34	Delivery, storage and handling of chemicals	Generally applicable
35	Preparation/conditioning of wood	Generally applicable
36	Non-pressure application processes	Not applicable
37	Spray application processes	Not applicable
38	Pressure application processes	Generally applicable
39	Energy reduction in pressure application processes	Generally applicable
40	Post-treatment conditioning and interim storage	Generally applicable
41	Reducing waste	Generally applicable
42	Waste management	Generally applicable
43	Emissions to water	Generally applicable
44	Groundwater quality	Generally applicable
45	Emissions in waste gases	No – Solvent / creosote only
46	Emissions to soil and groundwater	Generally applicable
47	Emissions to water and wastewater management	Generally applicable
48	Creosote operations	No – Solvent / creosote only
49	Reducing VOC emissions to air	No – Solvent / creosote only
50	Reducing VOC emissions (creosote impregnating oils)	No – Solvent / creosote only
51	Reducing VOC emissions (creosote equipment)	No – Solvent / creosote only
52	Reducing NOx emissions in waste gasses	No – Solvent / creosote only
53	Reducing noise emissions	Generally applicable

2.0 BAT Review

2.1 BAT 1 - Environmental Management systems:

In order to improve the overall environmental performance, BAT is to elaborate and implement an Environmental Management System (EMS) with the prescribed features:

Description / applicability	Assessment
Overarching EMS in line with the features (i) to (xx) in BAT1.	Operator to cross refer in-house existing overarching EMS in line with features (i) to (xx) in BAT1. To be completed within 12-months of permit issue to ensure that all permitting references can be adopted. Documented BAT30 EMS supplied with permit application.

2.2 BAT 30 - Improving overall environmental performance

In order to improve the overall environmental performance, BAT is to elaborate and implement an Environmental Management System (EMS) that incorporates all of the features (i) to (xx) of BAT 1 as well as the following specific features:

Description / applicability	Assessment
(i) Keeping up to date with the developments in biocidal products and in associated legislation (e.g., authorisation of products under the BPR) with a view to using the most environmentally friendly processes.	Proposes to use water-based preservative solutions.
(ii) Inclusion of a solvent mass balance for solvent-based and creosote treatment (see BAT 33 (c)).	Not applicable. No solvent-based or creosote treatments proposed for use.
(iii) Identification and listing of all environmentally critical process and abatement equipment (whose failure could have an impact on the environment) (see BAT 46 (c)). The list of critical equipment is kept up to date.	On-site documented plant maintenance checks proposed for all environmental critical equipment proposed.
(iv) Inclusion of plans for the prevention and control of leaks and spillages, including waste management guidelines for dealing with waste arising from spillage control (see BAT 46).	Documented accident management plan proposed for dealing with leaks and spillages and waste arising from leaks and spillages.
(v) Recording of accidental leakages and spillages, and improvement plans (countermeasures).	Documented records proposed following leaks and spillages.

2.3 BAT 31 – Reducing solvent emissions

In order to prevent or reduce emissions of PAHs and/or solvents, BAT is to use water-based preservatives:

Description / applicability	Assessment
Exclusive use of water-based preservatives proposed. No plans to implement solvent-based preservatives.	No further action required.

2.4 BAT 32 - Substitution of harmful substances

In order to reduce the environmental risk posed by the use of treatment chemicals, BAT is to substitute treatment chemicals currently in use with less hazardous ones based on a regular (e.g. once every year) check aiming at identifying potentially new available and safer alternatives.

Description / applicability	Assessment
Substitution may be restricted due to product quality requirements or specifications.	A periodic review will be carried out with the suppliers of our preservatives to identify new and safer alternatives. The Operator proposes to use Protim ME7 Treating Solution which contains specific biocides and pesticides required for the protection of construction materials.

2.5 BAT 33 - Resource efficiency

In order to increase resource efficiency and to reduce the environmental impact and risk associated with the use of treatment chemicals, BAT is to reduce their consumption by using all of the techniques given below:

Description / applicability	Assessment
a) The use of an effective preservative application system.	Effective closed loop high treatment system proposed.
b) Control and optimisation of the consumption of the treatment chemicals for the specific use.	The treatment Process will incorporate a computerised control system. This will monitor uptake of solution and treats to a target retention which is based on the volume of wood being treated, timber species and Use Class.
c) Solvent mass balance.	Not applicable to water-based processes.
d) Measurement and adjustment of wood moisture before treatment.	Not applicable: wood with a specific moisture content not required.

2.6 BAT 34 - Delivery, storage and handling of chemicals

In order to reduce emissions from delivery, storage and handling of treatment chemicals, BAT is to use technique (a) or (b) and all of the techniques (c) to (f) given below:

Description / applicability	Assessment
a) Back-venting.	Not applicable to water-based processes.
b) Capture of displaced air.	Not applicable to water-based processes.
c) Techniques to reduce evaporation losses due to heating up of stored chemicals.	Not applicable to water-based processes.
d) Securing delivery connections.	A documented delivery procedure will be in place
e) Techniques to prevent overflows during pumping.	All internal pumping activities will be undertaken within a fully contained treatment area. The vessel and tanks will be fitted with limit switches and level indicators visible on the computer control system.
f) Closed storage containers.	Closed tanks other than the vessel when loading / emptying.

2.7 BAT 35 - Preparation/conditioning of wood

In order to reduce the consumption of treatment chemicals and the consumption of energy and to reduce emissions of treatment chemicals, BAT is to optimise the wood charge of the vessel and to avoid trapping of treatment chemicals by using a combination of the techniques given below:

Description / applicability	Assessment
a) Separation of wood in packs by spacers.	Packs for treatment will be spaced and 'stickered' for separation.
b) Sloping of wood packs in horizontal treatment vessels.	Packs will be sloped as far as practicable because the vessel does not tilt. Final vacuum reduces surplus fluid in any event.
c) Use of tilting treatment vessels.	Not proposed due to irregular pack sizes and low throughput of timber treated.
d) Optimised positioning of shaped wood pieces.	Shaped pieces of wood will be packed in a manner to prevent trapping of chemicals, and spacers are inserted as required.
e) Securing wood packs.	Straps or chains will be used to secure packs inside the vessels to limit movement. The vessel itself will be equipped with anti-floatation rails
f) Maximisation of the wood load.	See (b) above. Vessel will filled to capacity for every charge where practical.

2.8 BAT 38 - Pressure application processes

In order to prevent or reduce emissions of treatment chemicals from pressure processes (autoclaves), BAT is to use all of the techniques given below:

Description / applicability	Assessment
a) Process controls to prevent operation unless the treatment vessel door is locked and sealed.	Vessel door interlocks will prevent the operation of the treatment plant unless the door is locked and sealed.
b) Process controls to prevent the treatment vessel from opening while it is pressurised and/or filled with preservative solution.	A control system will monitor all stages of the process which are displayed on the control screen. This includes vacuum & pressure readings, solution levels in vessel and storage tanks and it will also indicate when charge has been completed and door is safe to open.
c) Catch-lock for the treatment vessel door.	Vessel door interlocks will prevent the door from being opened whilst there is fluid in the vessel. Retaining brackets (catch locks) to prevent the door from being moved outwards by the weight of fluid behind it
d) Use and maintenance of safety relief valves.	A safety relief valve will be fitted to the vessel, and these will vent into the bunded area.
e) Control of emissions to air from the vacuum pump exhaust.	Vacuum exhaust will be vented into the bunded area.
f) Reduction of emissions to air when opening the treatment vessel.	After the final vacuum a final air vent and final drain will occur as part of the treatment process. This allows mist in the vessel to settle, to reduce emissions, before opening the door.
g) Application of a final vacuum to remove excess treatment chemicals from the surface of treated wood.	A final vacuum will be applied as part of the treatment process.

2.9 BAT 39 - Energy reduction in pressure application processes

In order to reduce energy consumption in pressure processes (autoclaves), BAT is to use variable pump control:

Description / applicability	Assessment
After reaching the required working pressure, the treatment system is switched to a pump with reduced power and energy consumption.	The control system will monitor the operation of both pressure and vacuum pumps giving variable pump control. Once full vacuum and pressure levels are reached the pumps stop and then re-start if the levels drop off to a pre-set level.

2.10 BAT 40 - Post-treatment conditioning and interim storage

In order to prevent or reduce the contamination of soil or groundwater from the interim storage of freshly treated wood, BAT is to allow sufficient dripping time after treatment and to remove the treated wood from the contained/bunded area only once it is deemed dry:

Description / applicability	Assessment
To allow the surplus treatment chemicals to drip back into the treatment vessel, treated wood/wood packs are held in the contained/bunded area (e.g. above the treatment vessel or over a dripping pad) for a sufficient time after the treatment and before transfer to the post-treatment drying area. Then, before leaving the post-treatment drying area, treated wood/wood packs are, for example, lifted by mechanical means and suspended for a minimum of 5 minutes. If no dripping of treatment solution occurs, the wood is deemed to be dry.	Packs will be drained and left to drip dry on or above the track system in the containment area. Packs will not be removed from the treatment plant track until they are drip dry. The Operator proposes a documented procedure in place for the 'drip dry' test.

2.11 BAT 41 - Reducing waste

In order to reduce the quantity of waste sent for disposal, especially of hazardous waste, BAT is to use the techniques (a) and (b) and one or both of the techniques (c) and (d) given below:

Description / applicability	Assessment
a) Removal of debris prior to treatment.	Wood is machined on site, meaning that a high standard of quality control can be applied to ensure that timber is free of debris prior to treatment.
b) Recovery and re-use of waxes and oils.	Not applicable: waxes and oils are not used in the process.
c) Bulk deliveries of treatment chemicals.	Preservative will be delivered in bulk as a 'ready to use product'.
d) Use of re-usable containers.	Because preservative solution will be delivered in bulk (BAT 41c) the use of reusable containers is not considered applicable.

2.12 BAT 42 - Waste management

In order to reduce the environmental risk related to waste management, BAT is to store waste in suitable containers or on sealed surfaces and to keep hazardous waste separately in a designated weather-protected and contained/bunded area:

Description / applicability	Assessment
Keep Hazardous waste separately in a designated weather-protected and contained/bunded area.	Any liquid waste generated by the process (such as pump-out from the bund) will be re-used in the process. If the treatment vessel, storage tanks or bund require cleaning, this will be undertaken by a specialist, and any waste removed under consignment note.

2.13 BAT 43 - Emissions to water

BAT is to monitor pollutants in waste water and potentially contaminated surface run-off water prior to each batch discharge in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality:

Description / applicability	Assessment
Potentially contaminated surface run-off water	There are no discharges to wastewater: The treatment process operates as a closed-loop system. Treatment process operations will be undertaken within a covered bunded treatment area to prevent contaminated surface water run-off. Treated timber will be 'drip dry' before removal from the treatment plant.

2.14 BAT 44 - Groundwater quality

BAT is to monitor pollutants in groundwater with a frequency of at least once every 6 months and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. The monitoring frequency may be reduced to once every 2 years based on a risk assessment or if pollutant levels are proven to be sufficiently stable (e.g. after a period of 4 years):

Description / applicability	Assessment
Relevant substances are: Protim ME7 treating solution, containing: ➤ Amines, coco alkyldimethyl, N-oxides ➤ (2-methoxymethylethoxy) propanol ➤ 2-(2-butoxyethoxy)ethanol ➤ tebuconazole (ISO) ➤ permethrin (ISO) ➤ propiconazole (ISO) ➤ phosphoric acid ➤ acetic acid	It is important to note that this refers to the measurement of actual pollution from the start of the permit rather than emissions or historical pollution. The timber treatment plant and all associated treatment / drip drying will be located in an engineered concrete bund with no releases to soil or groundwater. Documented policies and procedures are in place for deliveries, 'drip-dry' test, maintenance, training and for plant leaving the treatment plant. The Operator proposes a monitoring plan for the quantified assessment of soil and groundwater conditions to be agreed with the Regulator during the permit determination period. A risk assessment process has also concluded that repeat sampling should be once every two years.

2.15 BAT 46 - Emissions to soil and groundwater

In order to prevent or reduce emissions to soil and groundwater, BAT is to use all of the techniques given below:

Description / applicability	Assessment
a) Plant and equipment containment or bund.	The whole treatment activity will be undertaken in a fully contained area designed for the purpose.
b) Impermeable floors.	The whole treatment area is an impermeable engineered contained concrete are designed for the purpose.
c) Warning systems for equipment identified as critical.	The treatment control system will monitor all tank levels. Any fault detected during the treatment process will be displayed on control system display and has to be addressed to allow the process to continue.
d) Prevention of leaks from underground storage and ductwork for harmful/hazardous substances and record-keeping.	No below-ground storage tanks or pipework proposed.
e) Regular inspection and maintenance of plant and equipment.	A planned preventative maintenance system is proposed, including documented operator checks.
f) Techniques to prevent cross contamination.	Cross contaminated has been designed out. Treated timber will remain on or above the treatment vessel track system until drip dry, meaning that the treated packs will not contaminate transport areas The design of the plant means that transfer equipment such as fork trucks cannot access the treatment bund.

2.16 BAT 47 - Emissions to water and wastewater management

In order to prevent or, where that is not practicable, to reduce emissions to water and to reduce water consumption, BAT is to use all of the techniques given below:

Description / applicability	Assessment
a) Techniques to prevent contamination of rain and surface water run off water.	Timber treatment will be undertaken fully undercover and in a contained area, meaning that there will be no surface water run-off.
b) Collection of potentially contaminated surface water run off water.	Note required: there will be no surface water run off.
c) Use of potentially contaminated surface water run off water.	No surface water run off.
d) Re-use of cleaning water.	Any cleaning water (old containers etc.) will be re-used as far as practicable, or disposed of as hazardous waste.
e) Treatment of wastewater.	Wastewater treatment is not required.
f) Disposal as hazardous waste.	Process waste is generally only from vessel cleaning, which will be infrequent. All such waste is disposed of as hazardous waste, and consignment notes retained.

2.17 BAT 53 - Reducing noise emissions

In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques given below:

Description / applicability	Assessment
The applicability is restricted to cases where a noise nuisance at sensitive receptors is expected and/or has been substantiated.	Not considered applicable: the activity is not inherently noisy

Resources:

STS BREF

Surface Treatment Using Organic Solvents including Wood and Wood Products Preservation with Chemicals | Eippcb (europa.eu)

STS BREF BAT Conclusions

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020D2009&from=EN>