Wood Protection Association

Code of Practice:

Timber Treatment Installations

Design and Operation

6th edition: June 2021

The Wood Protection Association (WPA)

The WPA is a not for profit technical and advisory organisation focussed on the development and promotion of wood protection technology to support the use of wood as a cost effective, sustainable and low environmental impact construction material.

The WPA acts as a technical advisor to British and European Standards setters on wood preservation, modified wood and the fire protection of wood. On the Regulations governing wood protection, the WPA enjoys lead body status with agencies like the Health & Safety Executive, Environment Agency, Scottish Environmental Protection Agency, the Department for Environment, Food & Rural Affairs and the Highways Agency.

The WPA operates Benchmark quality approval schemes for preservatives, flame retardants and modified wood – providing valid independent assessment and verification. Designed to further assure products and processes are fit for purpose.

As designers look increasingly to wood as a low carbon construction material the WPA is committed to providing guidance on the best ways to ensure wood is fit for the purpose intended.

Benchmark QUALITY APPROVAL SCHEMES WPA

About this Code of Practice

The purpose of the Code is to give practical guidance on environmental, safety and health issues relevant to all companies engaged in the activity of industrial timber treatment. Although there is no statutory obligation to adopt this Code, in doing so participants confirm their commitment to ensure compliance with current legislation and to adopt progressive practices by continuous improvement.

Front cover image: courtesy of James Jones

WPA
Wood Protection Association

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1. Introduction

Industrial wood treatment using preservatives or flame retardants is a well-established process in the UK and has been a key factor in promoting the wider use of wood in construction and many other end uses.

Wood is one of the few renewable resources available and its energy efficiency and other environmental life cycle benefits compared to many other construction materials are being increasingly recognised. Treatments applied in controlled and monitored industrial installations confer the desired improvement in wood durability without compromising health and safety or environmental protection.

Purpose of the Code of Practice

This Code, first developed in 1989 and revised in 1991, 1998, 2003, 2009 and now in 2021 to keep up to date with changing technology and legislation, has formed the basis for defining good practice in the UK wood treatment industry. The application of these recommendations will minimise environmental and safety risks, help improve efficiency and profitability and ultimately, reduce the burden of regulation and enforcement by governmental bodies.

Timber treatment installations are not standard and will differ in their complexity, size, purpose and legislative requirements. The purpose of this document is to provide generic guidance to operators of treatment installations and other stakeholders, such as treatment plant manufacturers and regulators. This guidance is considered to be best practice, but it remains the responsibility of the operator to comply with mandatory legal requirements.

Scope

This code is applicable to all industrial timber treatment plants used for the pressure or double vacuum impregnation of water-based wood preservatives and flame retardant treatments. The use of organic solvent preservatives or creosote is not covered in this Code and specialist guidance is required, due to specific and extensive legislation on VOC emissions. This Code is not applicable to superficial methods of applying timber treatments such as brushing, spraying or dipping.

A typical wood preservative pressure treatment plant. Photo courtesy of Södra.

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2. Planning a new timber treatment installation

A timber treatment installation is a significant investment which requires careful and detailed planning. The project will involve decisions on plant location, buildings and civil engineering requirements, plant design and capacity, availability of utilities and integration with other operations.

Engagement with external stakeholders is essential at an early stage of the installation project and the following organisations should be consulted:

2.1 Preservative or flame retardant supplier and treatment plant manufacturer

Suppliers will help to define the treatment equipment required in order to meet the capacity, environmental, health & safety and civil engineering requirements of the installation The sale, marketing and use of biocidal products such as wood preservatives are regulated under the Control of Pesticides Regulations (COPR) and the Biocidal Products Regulation (BPR), (as implemented in the UK following Brexit). Preservative manufacturers will advise on their products and compliance status.

WPA Member suppliers of timber treatment products

2.2 Relevant environmental regulator

Depending on the location in the UK, the environmental regulator will advise on whether an environmental permit is required to operate the proposed installation and the status of that permit. Whether a treatment operation falls within scope will depend on the capacity of the plant and is covered in detail in Section 3. Regardless of permitting requirements, treatment installations should always be operated in accordance with Best Available Techniques (BAT), (*see section 3.3*), and this Code of Practice.

2.3 Local Authority

Planning permission may be required for the installation if new buildings are required. It is unlikely that a new timber treatment installation would be considered to be a 'permitted development' if new buildings are required.

2.4 Others

Depending on the specific development it may be necessary to consult with the Health & Safety Executive, the Fire & Rescue Service and/or utilities companies, (*water and electricity*).

A pressure treatment vessel under construction. Photo courtesy of Tweddle Engineering.

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3. Environmental permitting requirements

Under the EU Industrial Emissions Directive (IED), timber treatment activities with plants having a capacity of more than 75m^3 per day, (*24 hours*), are required to operate in accordance with a regulated permit. In the UK, the IED has been incorporated into law as follows:

In **England and Wales,** Schedule 1, Part 2, Section 6.6 A(2) (a) of the Environmental Permitting Regulations 2016 (EPR). Permitting authority: Local Authority

In **Scotland,** Schedule 1, Part 1, Section 6.6, Part A of the Pollution Prevention and Control (Scotland) Regulations 2012 (PPCR). Permitting authority: SEPA

In **Northern Ireland,** Schedule 1, Part 1, Section 6.6, Part A (b) of the Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013. Permitting authority: NIEA

The full text of the legislation has been published by the UK Government.

3.1 Calculation of plant capacity

The UK interpretation of capacity has been defined as **N x V** where:

N = Number of production cycles carried out in a 24 hour period.

A production cycle is defined as the shortest treatment cycle that the plant is capable of and will almost always be a Use Class 1 cycle (BS8417-2011). It can include the time taken for a charge changeover. The only allowable restriction to a 24 hour day will be a legal restriction on the operation of the plant.

V = Volume of wood treated in each cycle.

This will be the maximum volume capacity of the plant, allowing for spacers in packs.

In reality, the majority of new installations will be above the 75m^3 threshold and therefore will require permits to operate.

Photo courtesy of Lonza Wood Protection.

3.2 Applying for a permit

Permit applications should be made to the relevant permitting authority as detailed above. The application involves completion of a number of sections:

Section A

General information about the site, location, operator organisation and contacts.

Section B

B1 Site maps and baseline site reports including an assessment of soil and groundwater condition and any contamination that may pose a pollution risk.

B2 Proposed techniques to comply with BAT. This section will describe the management system and techniques used to ensure compliance with the environmental regulations.

B3 Proposed Emissions. A timber treatment operation is operated as a closed system and there should be no fugitive emissions from the process.

B4 Predicted Impact. An assessment of the impact on the environment and human health is required to complete this section.

Section C

Application fee and authorised signatures. Details of application fees and permit maintenance fees are available from the relevant regulator.

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3.3 BREF & BAT Conclusions

The EU Best Available Techniques (BAT) reference document (BREF) for wood treatment with chemicals was published by the EU in 2020 and has been adopted by the UK regulators. Treatment installation permit conditions will be guided by BAT and detail of the relevant BAT conclusions is presented in Annex 1. Operators should ensure and demonstrate that the installation will comply with BAT when preparing a permit application for a new operation.

3.4 Permit maintenance

The installation will be subject to periodic inspections by the regulator to ensure that the permit conditions continue to be met. The frequency of inspections will usually be determined by a risk rating applied to each site. Annual subsistence charges are payable to maintain the licence. Further applications will be required for variations, transfers or surrender of the permit.

Periodic groundwater and soil analysis will be a condition of the permit and again the frequency will be determined through a risk assessment. The default frequency is every 6 months for groundwater and 10 years for soil.

An Environmental Management System (EMS) is a requirement of the permit and this should encompass all of the BAT requirements that form part of the application. The EMS does not need to be independently audited but should be maintained and updated as necessary. Operating under a certified EMS such as ISO 14001 will fulfil the permit requirement but may require some expansion.

4. Management systems

The implementation of a formal and documented Management System can greatly enhance the safe and efficient operation of a timber-treatment facility. It can also be used to save money through reducing waste and raw materials and as a tool to prevent pollution.

As requirement of an IED permit is to implement and operate an EMS and many organisations choose to have this certified under ISO 14001. Annex 2 details the features that must be incorporated into a timber treatment installation EMS. Other management systems commonly operated by timber treatment operators include Health and Safety management (ISO 45001) and Quality management (ISO 9001). Guidance and technical documents on achieving certification are available from national accreditation bodies and sector associations.

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5. Plant & equipment

Timber treatment plants are usually specific to the operation and requirements of the operator. Advances in engineering and technology are constantly improving the efficiency, safety and process control but the basic equipment requirements remain the same:

5.1 Essential features

- Treatment vessel and door. Cylindrical (for high and low pressure processes) or rectangular (only for low pressure) vessel. Usually constructed from mild steel but stainless steel may be specified. The vessel contains a rail track to transfer the timber charge.
- Storage tank and mixing system. A storage tank to hold the fluid and if necessary, a mixing system to prepare treatment chemical from a concentrate and water.
- Railtrack & bogies. Timber is placed on wheeled bogies and transferred to and from the treatment vessel on a rail track.
- Pumps, valves and pipework. Used to move the treatment fluid between storage and the treatment vessel as well as creating vacuum and pressure as required.
- Process control. From manual to fully automatic, treatment plants require process control. This is combined with sensors and gauges to measure liquid levels and pressure or vacuum intensity.
- Containment. The installation should be placed within a bund that is capable of holding at least 110% of the maximum volume of liquid contained within the installation.

5.2 Optional upgrades

There are a wide variety of upgrade options which are designed to improve efficiency and performance. Some of the most important upgrades that are currently available include:

- Tilting vessels and rail tracks which can significantly improve drainage of freshly treated timber and especially profiled sections such as deck boards.
- Increased diameter vessels, (e.g. 3m), allowing charges with two standard pack height, increasing capacity on a similar footprint.
- Second door. Having a door at both ends of the vessel will reduce the time required to changeover the charge.
- Switch tracks and transfer systems reduce the time taken to change a charge and therefore increase plant capacity.
- Fully computerised process control can optimise treatment times and fluid usage as well as providing valuable management information and recording of quality metrics. In addition, such systems allow remote access for site maintenance and trouble shooting.
- Vessel baffles on larger cylindrical vessels will reduce the empty volume during a treatment process, leading to reduced cycle times and lower stock of fluid.
- Vessel pack clamps eliminate the need to secure packs on bogies with chains or straps, reducing potential operator contact with preservatives and also cycle changeover time.
- Roller systems that eliminate rail tracks and bogies allow for improved handling of timber charges.
- An automatic door and rail bridge will reduce manual handling, potential for contact with the preservative and reduce cycle times.

Plant manufacturers often have their own proprietary design upgrades and should be consulted about their individual offering.

WPA member treatment plant manufacturers

Photo courtesy of PTG Treatments.

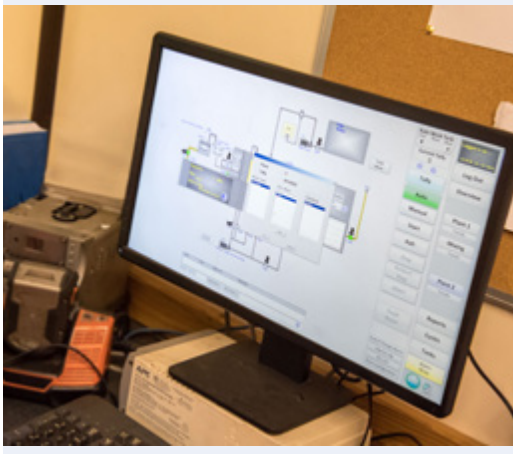

Photo courtesy of BSW Timber.

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6. Environmental protection

Effective environmental protection at timber treatment installations can be achieved by adopting the following actions. Evidence of such measures will be required as part of an environmental permit application.

Wood treatment products should only enter the treatment site in sealed, properly labelled and approved containers, conveyed from suitable and designated vehicles to bunded storage tanks, and leave it in treated timber. Industrial timber treatment should be a 'closed' process with no permitted emissions to air, land or water.

6.1 Product & process

- Measures should be taken to eliminate, or where this is not possible, minimise and render harmless any releases to air, water (*surface and groundwater*) or land.
- The principle of total containment should be followed during site design and applied to processing plant, treatment fluid storage area and the holding area for treated timber until it is deemed drip free.
- Any waste produced or handled must be disposed of safely by following the relevant legal waste management requirements including the Duty of Care.
- Permanent tanks used for the storage of products on site should be properly labelled, secure and provided with adequate secondary containment, usually a bund.
- Clean uncontaminated rain or surface water should be diverted away from the plant area unless a purpose designed and built water harvesting system is operational.
- Wherever possible, the use of processes and products that present lower risks to the environment and the workplace should be adopted.
- Periodically review the product(s) that you use in your timber treatment plant.
- Periodically review the timber treatment processes you currently use in your plant and ask your supplier and others whether there are less hazardous alternatives or ones that create less waste.
- It is recommended that the process operator draws up emergency preparedness and response protocols, including the prevention and/or mitigation of adverse (*environmental*) impacts of emergency situations.
- Implementation of appropriate maintenance programmes especially for equipment that is deemed to be environmentally critical.
- Periodic independent internal and external environmental and safety audits will provide valuable management information and assist in achieving the above objectives.

6.2 Containment of the timber treatment installation

The plant, its associated loading and/or unloading area and preservative storage tanks should be located within secondary containment, generally provided by bunding. This bunding should be impervious to the treatment chemical being used and made of, or sealed with, a substance resistant to the chemicals being used. It must also be strong enough to withstand the hydrostatic pressure when the bund is full of liquid.

In most situations, a cast-concrete or steel construction is preferable to block or brick for a long service life. A cast concrete foundation should be reinforced with fibres to reduce the need for joining. Non-reinforced block or brick is not suitable.

Some plant designs now contain an integral bund where the plant is enclosed within its own bund. Services should not pass through bund walls or bund floors. Sumps should be included to facilitate the collection and removal of any fluids from the bund. Gravity drains or automatic pumps should not be incorporated in the sump design.

The bund should be in a covered and enclosed area to avoid the collection of rainwater and the possible contamination with treatment fluid. The disposal of contaminated rainwater can be very expensive and must be carried out by a registered waste management company. Provision should also be made for the secure and contained storage of packaging that contains wood preservatives such as drums or intermediate bulk containers (IBCs).

Photo courtesy of Lonza Wood Protection.

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Empty containers should be stored in a dedicated waste storage area located in a secure covered compound, sent back clean to the supplier or IBC supplier depending on the contractual arrangements or disposed of safely via a registered waste carrier.

Vehicle movements should be considered when siting storage areas and secondary containment to minimise the risk of damage by impact. Bunds should be designed to withstand:

- Static and dynamic loads that would be exerted by the escape of liquid through a failure of primary containment.
- The weight of the primary containment when filled with liquid and any other forces that arise from activities carried out within the bunded area and act on the base of the bund, including timber loading on the bogies and rail track.
- Stresses induced by ground conditions, for example differential settlement and aggressive ground materials.
- Thermal and shrinkage stresses (*for example, fire and climate weathering*).
- The bunding provision should have a large enough capacity to contain a spillage that would arise from the worst credible failure in the storage system, plus 10%. i.e. at least 110% of the total quantity of treatment fluid in each bunded area. An allowance within the bund should also be made for fire water and foam and/or additional containment provided elsewhere on the site. Operators should discuss this requirement with their local Fire & Rescue Service and environmental regulator.

Bunded areas should be maintained in a dry, clean condition to facilitate regular and inspection and maintenance.

The bund should be constructed so as to catch spillage from the vessel door in the event of a door-seal failure (*door baffles may be required to achieve this*). Adequate space should be provided between the plant and the bund wall to enable a person to inspect the walls of the bund. It may be necessary to create a walkway to allow safe access. This should be taken into account when assessing bund capacity.

The bund should be examined regularly for cracks, faults or signs of decay or corrosion. A record of routine inspections and remedial action should be kept on site as part of the planned preventative maintenance schedule. In addition, there should be a full annual inspection by a competent person.

A bund specification should be obtained from a competent person at an early stage in the development of the project proposal.

6.3 Post-treatment containment and conditioning areas

Post-treatment dripping should be minimised by sloping loads during treatment and/or by modifying the process and using techniques such as tilting vessels and bogies. Where possible by good design, flat metal areas should be eliminated from the bogie construction.

Loads should be stacked with appropriate spacers to preclude capillary retention between surfaces, and shaped profiles should be positioned so as not to provide traps that collect free solution. Where possible, it is recommended that the strapping around packs of smooth sawn timber be released after the dripping period, followed by an extended dripping period with the packs of timber sloped to help the treating solution to run out of any shaped profiles in the timber and be recovered.

Treated wood should be held until the surfaces are deemed dry. It should be held within a bunded area on a site that is maintained to prevent loss of treatment product to the environment.

A contained and impermeable dripping area for freshly treated timber should be provided and be situated adjacent to the plant and storage tank bund. Timber should be transferred from the plant to the posttreatment dripping area within the total containment zone. Drips should be collected for reuse. The dripping area must not discharge into surface water drains, the foul sewer, groundwater or watercourses, and provision should be made to divert away all uncontaminated water. The storage area should be covered to prevent rainwater ingress.

Photo courtesy of BSW Timber.

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This area should be large enough to allow treated timber to dry before being released and not restrict the capacity requirement of the installation. Operational practices to eliminate the spread of contamination, via vehicle wheels or footwear are necessary to again ensure environmental containment. It is best practice to use dedicated forklift trucks inside the containment area to meet this requirement and this is likely to be a condition of many future environmental permits.

6.4 Storage of conditioned timber

Dry treated wood should be stored in conditions that reflect its intended use class. Wood treated to be used in Use Classes 1, 2 or 3.1 (BS EN 335) should be protected from exposure to the weather for prolonged periods. Dry treated wood intended for Use Class 3.2, 4 or 5 may be stored in the open once dry unless preservative authorisation conditions, the preservative manufacturer or a regulator require different storage conditions.

Photo courtesy of Södra.

6.5 Waste management

A statutory Duty of Care applies to anyone who produces or imports, keeps, carries, treats or disposes of controlled waste. **Wastes associated with wood-preservation processes may be classed as hazardous waste and must be disposed of accordingly.** Such wastes are likely to be:

- **Redundant preservative solution**
- **Sludge and debris from tanks**
- **Sawdust or other materials used to soak up spills**
- **Redundant containers that contain residues of the product**
- **Redundant plant and equipment (prior to decontamination)**
- **Contaminated rainwater (within bunds, etc.)**
- **Contaminated soil**

It is advisable to seek advice from the manufacturer of the wood preservative or a waste consultant.

It is best practice to introduce management procedures and waste-minimisation techniques and technologies. Not only will this demonstrate a commitment to environmental protection, but it makes commercial sense to reduce waste and subsequent disposal costs.

6.6 Bulk delivery of treatment products

Photo courtesy of PTG Treatments.

The risk of chemical spillage is greatest at the delivery and handling stages. If tanker deliveries are necessary, they should be made according to a written supervision procedure that includes a checklist covering all the safety-critical steps in the delivery process:

- Provision should be made to contain any potential spillage from the tanker, delivery and/or handling vehicle, taking the discharge system into account. For example, siting the tanker in a containment area during discharge or incorporating a suitable emergency sump with shut-off valves, which are closed during deliveries, prevents any liquids from leaving the site in the drains.
- Tankers that deliver chemicals in bulk should discharge to storage via a lockable fixed coupling within the containment area.
- Receiving points should be marked with the appropriate product identity.
- Tanker access to the plant should be unobstructed to minimise the length of discharge hose necessary.
- Bulk storage tanks should be fitted with a high level alarm. Such alarms should ideally be powered independently of the plant itself.
- A trained representative of the receiving company should authorise and attend the receipt of the product. The operation should not be left unattended by either the tanker driver or the company representative, and the procedure should be covered in the site emergency plan. Refillable bulk containers should be stored and emptied in a secure bunded area.

The risk of spillage during the loading and handling of smaller containers or packages, such as IBCs or drums, is significant. Similar measures should be taken for these deliveries to those detailed above for tankers.

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7. Plant and equipment safety

7.1 Principles

The process of timber impregnation requires consideration of the whole operation, including safe storage, handling, use, transport and disposal of all the materials used, as well as the end product.

Effective health and safety policies, arrangements and procedures must be drawn up and properly implemented with the necessary commitment by all concerned, whether employer, self-employed contractor, employee or visitor. This entails the provision, use and maintenance of safe plant equipment, systems of work and health, and welfare facilities.

Appropriate training instruction, information and supervision are required. Due regard should be given to the public and others who may be affected by the work activities.

Manufacturers and suppliers of plant and machinery have duties to provide safe equipment under the Supply of Machinery (Safety) Regulations as well as under Section 6 of the Health and Safety at Work etc. Act (for new and second hand machinery and other equipment). Users also have a duty to check plant and machinery that is supplied to them and to take all reasonable steps to ensure safety in relation to work equipment.

Suppliers of hazardous materials (that is, substances and preparations dangerous for supply) must meet the requirements of the Chemical (Hazard Information and Packaging for Supply) Regulations and Section 6 of the Health and Safety at Work Act.

Wood preservatives are specifically controlled under the Control of Pesticides Regulations (CoPR) or the GB Biocidal Products Regulation (GB BPR) (in Northern Ireland the EU BPR). In addition, there are regulations on the transport of dangerous goods by road that need to be considered.

The safe operation of timber-treatment plants depends upon sound design, regular maintenance and correct operation by trained competent operators. Failure to attend to any of these aspects can lead to accidents, environmental incidents, possible prosecution and loss of reputation.

Plants and installations must be designed and constructed so that they can be used and operated in a safe manner and with minimal risk at all times. This includes during installation, use, cleaning and maintenance by persons at work. This requirement applies equally to new, second-hand and hired plant.

Adequate operating information must be provided by the supplier of the plant. The information should be sufficient to enable the plant to be used safely and should cover all the foreseeable risks, both to people and the environment.

7.2 Risk assessment

Photo courtesy of PTG Treatments.

Health and safety legislation reinforces the need for employers to review and control standards at work, largely by assessing the risks that arise from their activities and then to either eliminate or reduce the risks to a reasonable level. Risk assessment is not a difficult process and does not necessarily require specialist expertise. It is common sense and observation applied in a practical way using the following five steps:

a) **Look for and identify the hazards (anything that may cause harm)**

b) **Decide who may be harmed and how.**

c) **Assess the risks that arise from the hazards and whether existing precautions are adequate or more should be done.**

d) **Record the significant findings, maintain such records and actions to demonstrate compliance.**

e) **Review the assessment from time to time and revise it as necessary.**

Effective management of health and safety aspects of a business is indistinguishable from sound management practices associated with quality, efficiency and business excellence. Good risk reduction and control measures are very cost effective and beneficial to business.

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7.3 Workplace environment

The plant area should be maintained in a safe condition to minimise the risk of accidents. The following minimum standards should be achieved:

- Walkways and gangways kept clear.
- Steps, stairs and floor surfaces maintained in clean and even conditions.
- Slipping hazards, such as water or product on floor surfaces.
- Adequate lighting provided in work areas.
- All containers stored in designated areas.

Consideration should be given to altering the workplace layout to ensure that safe conditions can be maintained. A system of regular checks should be implemented to ensure that standards are being maintained. Sufficient time must be allowed for employees to carry out the necessary housekeeping work.

7.4 Treatment plant door safety

If the timber-treatment vessel door is not closed and fully locked during the treatment process it may be dislodged and blown open, either by internal pressure or by the weight of the wood and treatment liquid. Techniques for ensuring this does not happen include:

- The process should not be able to start until the door is fully closed and locked.
- The plant should be equipped with a mechanism to give an indication of the internal pressure and presence of liquid in the vessel before the door is opened. For example, by means of an interlocked low-level test cock that has to be opened before the vessel door can be unlocked.
- A catch-lock mechanism should be present to permit the door to open by a small amount while not allowing any remaining liquid in the vessel to force the door open violently. Examples include stepped castellations on the door locking ring and hinged restraining brackets.
- Treatment vessel doors that do not meet these requirements should be retrofitted at the earliest opportunity, for example, during a maintenance period.

The door should be kept closed when the treatment vessel is not in use. On each occasion before the vessel door is closed, the operator should ensure the liquid seal is in position and the seal face is wiped clean of any debris. Drip trays should be provided to collect preservative for reuse.

7.5 Treatment vessel working pressure

Photo courtesy of BSW Timber.

All vessels should be fitted with a safety relief valve set to the design pressure of the vessel. The over pressure allowance (normally 10%) should be consistent with the vessel design code. The discharge contents should be directed to a tank at atmospheric pressure in a flow with negative static head on the discharge.

All vessels should be fitted with a second relief valve to control the working-process pressure of the plant and this should not be set above the maximum design pressure of the autoclave. Preferably, the working pressure should be set to a level 10% below the design pressure. The discharge from the relief valve should be directed to a tank at atmospheric pressure in a flow with a negative static head, to prevent back-pressure on the discharge.

In the case of a plant designed for a high pressure treatment process, in addition to the relief valves, pressure switches may be fitted to control the working-process pressure of the plant, which should not be set above the maximum design pressure of the autoclave. Again, in addition to the mechanical relief valve devices, an over-pressure switch may be fitted to stop the process if the safe working pressure of the autoclave has been exceeded.

All treatment vessels should be fitted with a pressure and/or vacuum gauge that give an accurate indication of the conditions inside the vessel. These gauges should preferably be visible from the operating position of the door(s) and be calibrated and tested at regular intervals.

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7.6 Maintenance and examination

A planned written scheme of maintenance and examination should be prepared by a competent third party inspector and followed. It is advisable that this should include all protective devices, pressure valves and pipe work that could give rise to danger in the event of failure.

For new plant, a scheme is provided by the plant supplier. For older plant, it will be the process operator's responsibility to obtain information and prepare a scheme. Advice from a competent person should be sought in the preparation of the scheme. A thorough examination of the vessel and its fittings should be performed by a person competent to carry out the work; normally an engineering surveyor for an insurance company.

Under pressure systems regulations, the maximum inspection interval is 26 months. The report of the examination should be available for inspection on site as required. Note that while the Pressure Systems Safety Regulations 2000 does not normally apply to treatment plants, the HSE Code of Practice L122 'Safety of Pressure Systems' provides examples of good practice. Records should be kept of all routine maintenance, periodic servicing, examinations and remedial work.

7.7 Treatment vessel marking

The following information should be marked clearly on the vessel, or on a plate attached to it, in a visible and legible form:

- The manufacturer's name.
- Serial number to identify the vessel.
- The date of manufacture of the vessel.
- The standard to which the vessel was built.
- The maximum design pressure and safe working pressure of the vessel.
- The minimum design pressure of the vessel, where it is other than atmospheric.
- The design temperature.
- Test date and test pressure.
- CE or UKCA mark.

A warning notice should be positioned on the door face to remind the operator to check just before opening the door that all the wood-preservative solution is back in the storage tank.

Photo courtesy of WTT.

7.8 Open tanks

Measures should be taken to prevent people from falling into open tanks or pump wells, such as the provision of tank covers or fencing of suitable height around the tank, in accordance with the Workplace (Health, Safety and Welfare) Regulations 1992.

Safe systems of working should be provided when access is needed to tanks and specific precautions are needed to allow such work to be carried out safely.

7.9 Water supply

There should be a siphon break, (excluding non-return valves, which are not permitted by water companies), in the water supply to mixing tanks to prevent wood-preservative solution from being sucked back into the water mains system as a result of a fall in supply pressure. This recommendation should also apply to any other non-mains water supply.

There should be a minimum 150 mm clear gap between the top of the mixing tank and the outlet end of the water supply line, which should also incorporate an isolating valve. A device or system should be fitted to prevent the overfilling of mixing tanks.

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8. Occupational health & employee welfare

8.1 Control of substances hazardous to health

The Control of Substances Hazardous to Health Regulations (COSHH) requires employers to ensure that the exposure of employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled.

A COSHH assessment should be carried out to identify the risks present and the appropriate control measures needed. Examples of engineering control measures might include the automation of mixing and the handling of the wood preservative, the venting of treatment vessels before opening the door and operational measures, such the use of stickers and sloping of the packs of timber in the treatment vessel.

Personal protective equipment (PPE) is the least preferred control measure in the hierarchy of such measures outlined in COSHH. Employers should ensure that the protective clothing requirements set out on the label for the treatment product are followed. Advice may be sought from the treatment chemical supplier. Protective clothing should be fit for use and kept clean and in good repair.

8.2 Manual handling and loading equipment

Manually moving items, for example by pushing or carrying, can potentially lead to injuries such as muscle strain and back pain. The best way to reduce manual handling injuries is to reorganise or mechanise handling operations as far as possible (e.g. use lifting equipment and handling aides). If this is not an option, the necessary manual handling tasks should be assessed to see if the risk of injury could be reduced. Risk is created when the load, the task and the working environment do not match the capabilities of the handler. Where manual handling has to be done, employees must be trained to carry out the tasks safely.

Forklift truck drivers must receive adequate instruction and training. The movements of lift trucks and other vehicles must be properly controlled (e.g. separation of Forklift trucks from pedestrians).

Further guidance can be found in the HSE Guidance on Manual Handling Operations.

Photo courtesy of BSW Timber.

8.3 Entry into treatment vessels

There are likely to be circumstances in which entry into vessels or tanks will be required. In such situations a dangerous atmosphere may be present and oxygen may be deficient. The requirements of the Confined Spaces Regulations 1997 should be followed.

For short-duration entry, such as to remove fallen timber, a documented permit-to-work system should be operated and any person who enters the vessel may need to be equipped with suitable respiratory protective equipment. Advice should be sought from the wood-preservative product supplier and the suppliers of respiratory protective equipment or the local office of the HSE. Entry into vessels for longer periods of time for maintenance or repair purposes should be carried out only by persons who have been trained in the procedures necessary to work in confined spaces, and the use of air-line or self-contained breathing apparatus is likely to be necessary.

8.4 Training and staff awareness

No person should use a biocidal product, including a wood preservative, in the workplace unless they have received adequate information, instruction and training in the safe and efficient use of such products and is competent for the duties which they are called upon to perform, in accordance with regulations.

Employers should provide employees with information on the products to be used, plus written instruction and training on their handling and use. This training should be carried out by a competent person. All operators should be fully trained and hold a certificate of training specific to the product being used. Such certification should include an assessment of practical competence. Refresher training and reassessment are important to ensure employees and management are kept up to date. Employers should keep adequate training records.

Training should be provided to ensure that employees are aware of the risks to health created by exposure to the wood preservative and are aware of the precautions that need to be observed to avoid such exposure.

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8.5 Health surveillance

The purpose of health surveillance is to detect as early as possible adverse health effects caused by exposure to hazardous substances. Health surveillance under COSHH is not a substitute for preventing or adequately controlling exposure, but it is a system to ensure that any adverse effect on the employee is detected at the earliest stage and is also a means of evaluating the effectiveness of any control measures in place as a result of the COSHH assessment.

Further information on occupational health monitoring at industrial timber-treatment plants can be found at the HSE guidance for Industrial timber treatment plants.

8.6 Welfare Facilities

Employees should have ready access to suitable and sufficient washing and changing facilities. The facilities should be located to prevent the spread of contamination from protective clothing to personal clothing, or from one process to another. Separate storage accommodation should be provided for workers' own personal clothing (e.g. clothes worn to and from work) and work clothing (e.g. PPE and overalls).

If these facilities are not within the plant area itself, the minimum of sterile eyewash and 'dry' cleaning materials should be provided to remove the worst of any contamination prior to a thorough washing elsewhere. In situations where whole body contamination is possible, a deluge shower unit should be provided.

Suitable and sufficient toilet facilities should be available on site. Eating, drinking and smoking should be prohibited in the designated treatment area in order to minimise the risk of employees ingesting hazardous substances. Separate facilities must be provided where workers can rest, eat and drink away from the risk of contamination.

8.7 Working alone

It may be necessary for operators of timber treatment plants to work alone, although where possible this should be avoided. Site operators have obligations to ensure the health and safety of such workers. The HSE publication, 'Protecting lone workers,' provides general guidance on working alone. It offers advice on how to comply with duties towards lone workers under the Health and Safety at Work etc Act 1974 and the Management of Health and Safety at Work Regulations 1999.

9. Fire precautions

The outbreak of a fire at a wood treatment installation not only involves potential injury to personnel, losses and damage to property but also the risk of causing environmental pollution.

The HSE publishes practical fire safety guidance and legal obligations for employers.

Damage to watercourses and/or groundwater may arise from the direct spillage of the wood treatment fluid or from water/foam run-off during flame-fighting. Operating companies should consult with the Fire & Rescue Service and the relevant environment agency, (see Section 10 for details), during the preparation of their emergency procedures for the site, to ensure that the run off generated in the event of a fire and/or major spillage is managed and contained on site. There are various options to do this, including:

- The installation of additional containment systems, and/or;
- The use of pollution control equipment such as drain seals, land booms and portable tanks held on site and/or carried by the local Fire & Rescue Service Environmental Protection Unit;
- Use of 'controlled burn' as a fire-fighting strategy to prevent water pollution.

Photo courtesy of PTG Treatments.

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10. Emergency planning & response

All workplaces need an emergency plan that will detail the necessary action in the event of an emergency situation such a fire, flood, extreme weather event or environmental incident. The first stage in preparing a plan is to complete a risk assessment specific to the workplace and consider what might happen and the potential consequences. The HSE publishes guidance on Emergency planning and procedures .

Timber treatment installations will have specific emergency response procedures and the following should be considered when developing a plan:

- A notice at the site entrance showing the location of relevant emergency instructions.
- First Aid procedures; the legal requirements for first aid are available from HSE (First Aid legal duties)
- An up-to-date inventory of all wood-preservative chemicals and quantities stored on site should be readily available. This inventory should include a site plan that shows the locations of such products as well as any associated drainage.
- Maps of surface-water drainage systems and soak-away should be colour-coded blue, while foul-water drainage should be colour coded red. Manhole covers on each system could usefully be colour coded (e.g. with spray paint) for emergency identification.
- The drainage layout should highlight any incorporated shut-off valves or other containment system for immediate site attention in the event of an accident, the location of equipment needed to do this plus an appropriate downstream blockage point where relevant.
- The process authorisation number under the Environmental Permitting Regulations (where relevant)
- Up-to-date copies of the relevant Product Safety Data Sheets.
- The following telephone numbers and information should be clearly displayed:

  Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency or Northern Ireland Environment Agency Hotline *as applicable to the site location*.

  Local Health and Safety Executive office

  Local sewerage undertaker

  Wood preservative manufacturer / supplier *(including 24-hour emergency service number)*

  Local Fire & Rescue Service

  Local doctor and hospital

  The police

Specific guidance is available from regulators (SEPA, NIEA & NRW) on Pollution Incident Response Plans (GPP 21).

The emergency plan should include procedures for notification of incidents in accordance with current legislation.

A key aspect of successful emergency response is **nominating competent people to take control, training staff** and **conducting regular emergency training exercises.**

Photo courtesy of BSW Timber.

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11. Annex 1. Best Available Techniques (BAT)

Compliance Checklist

The use of **organic solvent preservatives** or **creosote** is not covered in this Code and therefore BAT conclusions that refer only to use of these preservatives, are excluded from this list.

Full text of the BAT conclusions

BAT	DESCRIPTION	COMPLY? Y/N	NOTES
Environmental Management Systems			
1	Environmental Management System (EMS)	✔ ✘	An EMS that meets the requirements of ISO14001 or EMAS and covers the treatment operation will be sufficient. This does not have to an externally audited or certified system. See Annex 2
30	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 of BAT 1 as well as additional specific features: 1. Keep up to date with developments in preservatives with a view to using the most environmentally benign processes. 2. Identification and listing of all environmentally critical process equipment and keep this up to date. See BAT 46 3. 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). 4. Recording of accidental leakages and spillages and improvement plans.	✔ ✘	The additional provisions will need to be incorporated into the EMS. See Annex 2
Substitution of harmful/hazardous substances			
32	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.	✔ ✘	
33	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	✔ ✘	Techniques need to be demonstrated that control and optimise the use of preservative uptake. Process control reports or charge sheets can be used as evidence to meet this requirement. A report on the review of the process and techniques used will need to be included in the permit application.
Delivery, storage and handling of treatment chemicals			
34	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. a. Back venting tanks b. Capture of displaced air c. Reduce evaporation loss due to heating d. Securing delivery connections e. Prevent overflows during pumping f. Closed storage containers	✔ ✘	Techniques 'a' to 'c' are only relevant for solvent or creosote, so not applicable. Delivery connections must be inside a bunded area. Tanks need to be fitted with high level alarms. Containers are not left open.

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BAT	DESCRIPTION	COMPLY? Y/N	NOTES
	Preparation/conditioning of wood		
35	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. a. Separation of wood in packs by spaces b. Sloping of packs in horizontal treatment vessels c. Use of tilting pressure treatment vessels d. Optimised positioning of shaped wood pieces e. Securing wood packs f. Maximisation of the wood load	✔ ✘	Commercially this BAT does not deviate from the norm and all of the techniques are routinely practiced to improve efficiency.
	Preservative application process		
36	In order to prevent accidental leakage and emissions of treatment chemicals from non-pressure processes, BAT is to use one of the techniques given below. a. Double-walled treatment vessels with automatic leak detection devices b. Single-walled treatment vessels with sufficiently large and wood-preservative-resistant containment, fender and automatic leak detection device	✔ ✘	
37	In order to reduce emissions of aerosols from wood and wood products preservation using water-based treatment chemicals, BAT is to enclose spraying processes, collect overspray and reuse it in the preparation of wood preservation solution.	✔ ✘	Not applicable to low or high pressure treatment processes but need to ensure that any venting pipes are directed into the bund.
38	In order to prevent or reduce emissions of treatment chemicals from pressure processes (autoclaves), BAT is to use all of the techniques given below. a. Process controls to prevent operation unless the treatment vessel 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 c. Catch-lock for the treatment vessel door d. Use and maintenance of safety relief valves e. Control of emissions to air from the vacuum pump exhaust f. Reduction of emissions to air when opening the treatment vessel g. Application of a final vacuum to remove excess treatment chemicals from the surface of treated wood	✔ ✘	
39	In order to reduce energy consumption in pressure processes (autoclaves), BAT is to use variable pump control.	✔ ✘	
	Post-treatment conditioning and interim storage		
40	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.	✔ ✘	Suggested technique of lifting treated packs and watching for drips for 5 minutes. Alternative methods will require justification.

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BAT	DESCRIPTION	COMPLY? Y/N	NOTES
	Waste management		
41	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: a. Removal of debris prior to treatment b. Recovery and reuse of waxes and oils c. Bulk delivery of treatment chemicals d. Use of reusable containers	✔ ✘	Delivery will be either bulk delivery or concentrate in returnable IBC's. IBC containers are returnable.
42	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.	✔ ✘	Hazardous waste should be removed from site by appropriate contractors and not be stored for extended periods. There will need to be a designated and signed Waste Storage Area for other waste.
	Monitoring		
43	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.	✔ ✘	There are no BAT AELs for emissions to water and sewer. Emissions to water or sewer, where appropriate, need to be monitored and reported as part of permit conditions.
44	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).	✔ ✘	
	Emissions to soil and groundwater		
46	In order to prevent or reduce emissions to soil and groundwater, BAT is to use all of the techniques given below a. Plant and equipment containment or bund b. Impermeable floors c. Warning systems for equipment identified as 'critical' d. Prevention and detection of leaks from underground storage and ductwork for harmful/hazardous substances and record-keeping e. Regular inspection and maintenance of plant and equipment f. Techniques to prevent cross-contamination	✔ ✘	
	Emissions to water and waste water management		
47	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: a. Techniques to prevent contamination of rain and surface run-off water b. Collection of potentially contaminated surface run-off water c. Use of potentially contaminated surface run-off water d. Reuse of cleaning water e. Treatment of waste water f. Disposal as hazardous waste	✔ ✘	
	Emissions to air: Noise		
53	In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of techniques.	✔ ✘	The applicability is restricted to cases where a noise nuisance at sensitive receptors is expected and/or has been substantiated.

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12. Annex 2. Environmental Management System (EMS) requirements

Timber treatment installations that have a capacity of over 75m^3 per day are required to operate under a regulated environmental permit. An essential element of this permit is to implement a formal Environmental Management System that incorporates all off the following features:

1. Commitment, leadership, and accountability of the management, including senior management, for the implementation of an effective EMS.
2. An analysis that includes the determination of the organisation's context, the identification of the needs and expectations of interested parties, the identification of characteristics of the installation that are associated with possible risks for the environment (*or human health*) as well as of the applicable legal requirements relating to the environment.
3. Development of an environmental policy that includes the continuous improvement of the environmental performance of the installation:
4. Establishing objectives and performance indicators in relation to significant environmental aspects, including safeguarding compliance with applicable legal requirements:
5. Planning and implementing the necessary procedures and actions (*including corrective and preventive actions where needed*), to achieve the environmental objectives and avoid environmental risks:
6. Determination of structures, roles and responsibilities in relation to environmental aspects and objectives and provision of the financial and human resources needed:
7. Ensuring the necessary competence and awareness of staff whose work may affect the environmental performance of the installation (*e.g. by providing information and training*):
8. Internal and external communication:
9. Fostering employee involvement in good environmental management practices:
10. Establishing and maintaining a management manual and written procedures to control activities with significant environmental impact as well as relevant records:
11. Effective operational planning and process control:
12. Implementation of appropriate maintenance programmes:
13. Emergency preparedness and response protocols, including the prevention and/or mitigation of the adverse (*environmental*) impacts of emergency situations:
14. When (re)designing a (*new*) installation or a part thereof, consideration of its environmental impacts throughout its life, which includes construction, maintenance, operation and decommissioning:
15. Implementation of a monitoring and measurement programme; if necessary, information can be found in the Reference Report on Monitoring of Emissions to Air and Water from IED Installations:
16. Application of sectoral benchmarking on a regular basis:
17. Periodic independent (*as far as practicable*) internal auditing and periodic independent external auditing in order to assess the environmental performance and to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained:
18. Evaluation of causes of nonconformities, implementation of corrective actions in response to nonconformities, review of the effectiveness of corrective actions, and determination of whether similar nonconformities exist or could potentially occur:
19. Periodic review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness:
20. Following and taking into account the development of cleaner technique:
21. 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 benign processes:
22. Inclusion of a solvent mass balance for solvent-based and creosote treatment:

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23. 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:
24. 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):
25. Recording of accidental leakages and spillages, and improvement plans (*countermeasures*).

Regulation (EC) No 1221/2009 establishes the European Union eco-management and audit scheme (EMAS), which is an example of an EMS consistent with this BAT.

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Other useful publications available from the WPA

All of the WPA publications can be found, free of charge at our website - just head to the RESOURCE CENTRE page.

WPA Code of Practice: Industrial Wood Preservation

Provides detailed guidance on industrial wood preservation for specifiers, wood treaters and those involved with using treated wood.

The Buyer's Guide to Preservative Treated Wood

It's a mistake to assume that all pressure treated wood is the same. This illustrative and concise guide to preservative treatment summarises the differences.

WPA Guidance Notes

The ever growing library of Guidance Notes covers everything about specifiying and working with treated wood from **indoor air quality** to **installing fence posts.**

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Wood Protection Association

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