

Plant Health

Standard Operating Procedure

SOP Ref No:	Plant Health 10
References:	Forestry Commission Processing Licence
Key Words:	Phytophthora, Processing Licence, Inspections, processing sites, sawmills, wood fuel, wood chip, woodfuel, woodchip, ramorum
Category:	Techniques
Title:	Inspecting sites which process and manage <i>Phytophthora ramorum</i> -affected material
Scope:	To describe inspections and handling controls at processing sites for Plant Health Inspectors
Amendments	<p>September 2010 - First draft</p> <p>14/02/13 - review after Inspectors' meeting in 2012, and minor edit to Background.</p> <p>27/01/14 - Method and Annexes 1, 2, 3 and 4 updated after consultation with <i>P. ramorum</i> OMT.</p> <p>17/07/14 - Updated after second Working Group Meeting.</p> <p>November 2014 - Further update.</p> <p>February 2015- Annex 8 and Annex 9 inclusion</p> <p>August 2015 Annex 10 inclusion</p> <p>February 2020 – EU PH Regulation requirements added for Plant passporting of conifer and chestnut (see section 18).</p>
Background:	<p><i>Phytophthora ramorum</i> (<i>P. ramorum</i>) has infected millions of larch trees on the western seaboard of Great Britain (GB) and, to a lesser extent, in some other areas. The Forestry Commission has decided that felling larch in woodlands known to be infected is the preferred management strategy.</p> <p>NOTE: All species extracted, stacked and despatched along with larch from <i>P. ramorum</i>-affected sites (i.e. without separation) will be treated as infected material. Please see the harvesting and movement Decision Matrix, point 2 at Annex 4 for further details.</p> <p>Timber processors must apply for a Forestry Commission Processing Licence to manage round timber from <i>P. ramorum</i>-affected sites. This will include species in which cankers can form, including larch, sweet chestnut, common ash, Holm and Turkey oak, and any other species extracted, stacked and despatched with larch from <i>P. ramorum</i>-affected sites (see caveat above), at processing sites such as sawmills, panel board manufacturing sites and woodchip woodfuel suppliers' premises.</p> <p>Processing sites handling <i>P. ramorum</i>-infected material must be</p>

inspected to ensure that Processing Licence conditions can be met, and that the biosecurity issues are understood. Essentially, the wood will be made bark-free and any co-products produced via the removal of the bark must be:

- destroyed by burning on the processing site; or
- taken to another licensed site for burning as authorised by a movement licence; or
- used in a process that involves heat treatment to achieve the internationally recognised phyto-sanitary treatment of 56 degrees Celsius for 30 minutes throughout the profile of the material.

Alternatively, depending on the type and end use of the co-products they may be kiln dried (see Annex 8 and Annex 9).

The Forestry Commission's Cross Border Plant Health Service is responsible for inspecting and licensing all *P. ramorum*-affected wood-processing sites in England, Wales and Scotland. This SOP has been written to ensure that inspectors follow a common protocol throughout GB.

The EU Plant Health Regulation (EU) 2016/2031 which came into force on 14th December 2019 requires the use of protected zone plant passports for the movement of plant health forestry regulated material within the EU and within GB i.e. all conifers and *Castanea* species (including sweet chestnut) with bark. If a business or individual is involved with the movement of plant health forestry regulated material, then they are advised to check whether you are affected by these regulations. If you are affected, then you must register as a Professional Operator. See for details of how to register and to become authorised to issue plant passports <https://www.gov.uk/guidance/register-as-a-professional-operator-to-issue-plant-passports>

Stacking and Storage

1. Mills which intend to continue to sell material from non-infected sites into horticultural markets or untreated animal bedding supply chain must, as well as separating co-product, themselves be swept down before switching from infected to uninfected material. All sweeping debris must be treated as infected material and disposed of by burning or suitable heat treatment.
2. Concrete or tarmac hard standing areas should be used to store *P. ramorum*-infected material if at all possible. Where concrete or tarmac areas are not available, other hard standing such as crushed stone may be used. In non-concrete/tarmac areas, log-stacking bearers should also be used where it is safe to do so, to support material and to avoid it coming into contact with wet and muddy conditions, which are favourable to *P. ramorum* development. Accumulations of fallen, loose bark should be managed at suitable intervals, and burned or included with another co-product that will have a burning end use.
3. Log stacks in mill yards must NOT be in direct contact with live growing plants, e.g. overhanging susceptible tree species, rhododendrons or heathland species.

All handling facilities must ensure that *P. ramorum*-infected roundwood and debris is kept separate from other roundwood and

Method:

living material. Handling equipment must be swept clean of debris, and all debris from handling and storage areas and equipment must be burned.

4. In some situations inspectors will see sawdust, chipped wood, bark and butt reducer co-product stored in open-air conditions. A risk-based approach must be taken to this activity and reported back to your manager for advice.

Storing co-product next to susceptible vegetation on which it could fall is not acceptable. Particular care is required with sawdust storage since it is easily blown some distances in windy conditions.

Storing woodchip on large open aired industrial sites such as former airfields, where there is little or no susceptible vegetation, would, however, be acceptable.

Sawdust

5. Co-product created by sawing (i.e. sawdust) can be treated as uninfected material if it comes from a log that was debarked before sawing. Otherwise it must be treated as infected material. Please see Annex 6 for guidance on using sawdust from non-debarked logs.

Rejected Material

6. The processor must describe the management system that will be used to manage the rejection of individual logs and full lorry loads of logs from *P. ramorum*-affected sites, which shall include biosecurity arrangements for the material.

Debarking, Chipping, Bark Freedom and Kiln Drying

7. Co-product created by debarking operations should be kept separate from non-*P. ramorum* - infected material if the mill intends to continue to sell non-infected material into horticultural supply chains. In the current absence of any FC approved heat treatment methods for isolated bark material (protocols are being finalised), bark from *P. ramorum*-infected timber must be burned at the end-use point.

8. Co-product created by chipping non-debarked roundwood, or roundwood debarked by mobile chippers, must also be kept separate from non- *P.ramorum* - infected material if the mill intends to continue to sell non-infected material into horticultural or untreated animal bedding supply chains.

Woodchips from non-debarked roundwood, or roundwood debarked by mobile chippers, must only be used in processes where heat treatment is used, i.e. particle board or fuel pellet manufacture, or burning in licensed woodfuel applications. Mills that use mobile de-barkers will not be able to market woodchips from infected logs as uninfected, and they will have to be moved under the authority of a Forestry Commission Movement Licence.

9. Woodchips produced from roundwood from *P. ramorum*-affected material which has undergone debarking by a fixed, in-line mill debarker can be treated as uninfected material for the purpose of onward sale and movement without a Forestry Commission

Movement Licence. This is based on the standard of de-barking achieved by such de-barkers, i.e. a minimum of 0.15% of residual bark by volume (an industry standard).

All bark-free sawn or bark-free machine-rounded material is considered free of risk of spreading the disease. Fencing material may retain small amounts of bark within a specified tolerance when it is treated with copper-based wood preservatives.

Please refer to "Sawn wood: residual bark" issued by Plant Health on 11th January 2011 at Annex 1 for more details, including the retained bark cover levels permitted on heat-treated and kiln-dried sawn timber.

10. Guidance on the inspection requirements for the drying of wood from *P.ramorum* affected sites to below 20% moisture content (expressed as a percentage of dry matter) is provided at Annex 8 and Annex 9. This guidance will apply to a range of wood product end uses e.g. biomass (including woodchip and firewood) etc.

Haulage Biosecurity

11. Lorries hauling roundwood must be swept clear of bark and other material onto a hard standing surface before leaving the processing site. This debris material must be collected and burned. Haulage of roundwood need not involve covered or enclosed transport.
12. Lorries hauling bark and chip co-product must be swept clear of these products onto a hard standing surface before leaving the processing site, and this material must be used in the approved process or burned. Haulage of these co-products must be in covered or enclosed transport.

Export Prohibition for Infected Material

13. Infected roundwood and co-product **MUST NOT** be exported outside GB, but it may be transported around the GB coast by ship. Ships handling and transporting roundwood must be swept clear of bark and other material before leaving the port. The debris material must be collected and burned.

Movement Licences, Movement Licence Schedules and Other Accepted Systems

14. All movement of infected product from *P. ramorum*-affected stands (outside the Management Zone in South-West Scotland) must ordinarily be moved using a Movement Licence and Movement Licence Schedule. Exceptions to this requirement are detailed in Annexes 3 and 5. In addition, Movement Licence Schedules are not required (although Movement Licences are still required) where managers and processors can supply the despatch record information as described in Annex 7. Dispatch records shall be retained for three years from date of dispatch.

Woodfuel Processors

15. For woodchip woodfuel processors, please see the instructions in Annex 3, which detail biosecurity for the customers of woodchip processors.
16. For solid woodfuel (firewood) processors, please see the instructions in Annex 5, which detail biosecurity for customers of solid woodfuel processors.

Inspection Records

17. Complete Annex 2, which records observations during your site visit. Inspectors must identify extra licence conditions on their report where required. Inspectors have the option of using annotated aerial photographs indicating location of processing and storage areas etc to support their written reports.

Plant passporting

18. Verify that the business is registered and authorised to issue plant passports for the movement of controlled forestry material (conifer and sweet chestnut with bark). Verification should be secured prior to the site visit to assess the *P. ramorum* processing licence application. Verification can be achieved through contacting plant.health@forestrycommission.gov.uk

Bark heat treatment for low risk domestic use in England & Wales only

19. Annex 10 describes the process which can be used to heat treat bark in England and Wales from *Phytophthora ramorum* affected sites. Note that this process is not approved for use in Scotland.

Wood Pellet and Wood Briquette Manufacture

20. Wood pellets and wood briquettes manufactured by processes that use heat and pressure to create wood pellets or wood briquettes, using larch with bark and/or other conifers with bark from *Phytophthora ramorum* affected sites will be managed as products that have undergone adequate phytosanitary control. No Forestry Commission *Phytophthora ramorum* licensing restrictions will be placed on the movement of wood pellets or wood briquettes within GB or exported from GB.

Maintenance: Yearly revision by Regional Plant Health Manager North

Calibration: At yearly maintenance.

Validation: Plant Health Service

Operator Competence: Instruction by Plant Health Service

Bibliography: Forestry Commission Processing Licence

Health and Safety: Complete a risk assessment incorporating lone working procedure. Follow guidance supplied by FISA Guides and site operators.

List of referenced SOPs:

SOP Number	Full title
10	Inspecting sites which process and manage Phytophthora ramorum-affected material

Written By: Ian Murgatroyd

Date: 30/08/12 by I Murgatroyd; updated 14/02/13; updated 11/07/13; updated 27/01/14 by I Murgatroyd and I Brownlee; updated 17/07/14 after second Working Group Meeting; updated January 2015. Updated August 2015 by I Murgatroyd with Annex 10. Updated by N Mainprize with regard to plant passporting para 19.

Agreed By: Nick Mainprize

Date: February 2020

Approved: Nick Mainprize

Date: 27th February 2020

Annex 1

1 | Sawn wood: residual bark | Plant Health Service | 24/01/11

Sawn wood: residual bark

Introduction

1. This instruction sets out the requirements to be followed when producing sawn wood products from trees harvested in accordance with statutory notices served under the Plant Health (Forestry) Order 2005 or the Plant Health (Forestry) (*Phytophthora ramorum*) (Great Britain) Order 2004.
2. They are considered necessary in order to minimise the risk of transmission of Ramorum disease of larch. They will be kept under review and may be subject to amendment from time to time. The version published on the Forestry Commission's website shall be the authoritative version.

Types of sawn wood

3. For the purpose of this instruction, three categories of sawn wood are described:
 - a. untreated;
 - b. heat treated; and
 - c. kiln dried.
4. The following sections set out the requirements for residual bark. For this purpose, **residual bark** does not include the vascular cambium, in-grown bark around knots, or bark pockets between rings of annual growth, and there is no requirement to remove any of this material.

Untreated

5. For sawn wood which has not been either heat treated or kiln dried, all products shall be bark free. It will not, however, be necessary to achieve this through square sawing, and there shall be no limit on the amount of wane which may be present.

Heat treated

6. Heat treatment is the process whereby wood is subject to a specific time-temperature schedule which achieves a minimum temperature of 56°degrees Centigrade for a minimum duration of 30 continuous minutes throughout the entire profile of the wood. Many heat treatment facilities have been accredited under Forestry Commission procedures for the purpose of producing wood packaging material, or components thereof, in compliance with ISPM (International Standard for Phyto-sanitary Measures) No. 15 "Regulation of wood packaging material in international trade", and are approved to mark product accordingly.
7. Sawn wood which has been heat treated in accordance with this specification may retain any number of visually separate and clearly distinct small pieces of bark if they are:
 - less than 3cm in width (regardless of the length); or
 - greater than 3cm in width, with the total surface area of an individual piece of bark less than 50 square centimetres.

8. Each piece of sawn wood which has been heat treated and which retains any residual bark shall be marked "HT". Heat-treated sawn wood which is totally bark free need not be marked.
9. Operators of heat treatment facilities which have not been approved by the Forestry Commission under ISPM15 procedures shall need to satisfy the Plant Health Service that their facilities can achieve the heat treatment specification set out in paragraph 6 before being authorised to apply an "HT" mark.

Kiln-dried

10. Kiln drying is the process whereby wood is dried in a closed chamber using heat and/or humidity control to achieve a moisture content of below 20% expressed as a percentage of dry matter.
11. Sawn wood which has been kiln dried in accordance with this specification may retain any amount of bark.
12. Each piece of sawn wood which has been kiln dried and which retains any residual bark shall be marked "KD" or "kiln dried". Kiln-dried sawn wood which is totally bark free need not be marked.

Wood Preservatives

13. Wood preservatives are formulated to provide protection against a range of insects and wood-rotting fungi. Although the principal preservatives currently in use in the UK might not have been tested specifically for efficacy against *P. ramorum*, the information provided by the preservative manufacturers suggests that the risk of transfer of infection is low, especially in the case of formulations containing copper-based compounds with wide-spectrum toxicity.

Timber obtained from *P. ramorum*-infected sites may be utilised in bark-free or kiln-dried or heat-treated round or sawn sections. Alternatively, and especially when fencing products are being produced, timber should be treated with a wood preservative applied by an impregnation process which involves pressure and/or vacuum cycles. Some processes may also involve elevated temperatures.

Where timber is to be used in ground contact situations, the preservative should comply with the requirements of BS8417 and BS EN 335, Part 1, Use Class 4. For uses above ground, the appropriate Use Class (1-3), as per BS EN 335:2013, should be specified.

Where copper-based preservatives have been used in accordance with the above specifications, processed wood, for the purposes of phyto-sanitary control against *P. ramorum*, may retain any number of visually separate and clearly distinct small pieces of bark if they are:

- less than 3cm in width (regardless of the length); or
- greater than 3cm in width, with the total surface area of an individual piece of bark less than 50 square centimetres.

Further advice

14. Further advice on any aspect of this instruction should be sought in the first instance from

Plant Health Forestry,
Forestry Commission,
Silvan House,
231 Corstorphine Road,
Edinburgh,
EH12 7AT;

Tel: 0300 067 5155;

E-mail: plant.health@forestrycommission.gov.uk

Annex 2

Date

Ref:

Dear

Inspection Report for sites processing *P. ramorum*-infected material

Log stacking area	
Is this designated and separate?	
Surface description	
Is the stacking area free of overhanging vegetation?	
Co-product stacking area	
Is this designated and separate?	
Surface description	
Is the stacking area free of overhanging vegetation?	
Is there a risk of co-product being transferred to live plants by wind or other site condition?	
Non-larch species	
Are other species in mixed loads (i.e. not separate) with larch from <i>P. ramorum</i> -affected sites being treated as infected material at the processing facility?	
Managing rejected logs	
Describe the management procedures for the rejection of individual logs and full loads of logs.	
Bark management	
How will bark and debris be managed or segregated for horticultural-use bark?	
Butt reducer	
How will bark and debris be managed?	
De-barking	
How will bark and debris be managed?	
Chipper canter	
How will chips be managed?	
Vehicle cleaning	

Is there a designated area for sweeping vehicles?	
Sawmill/machinery hygiene	
Are clean-down procedures in place?	
Sawdust	
Is sawdust from non-debarked roundwood kept separate and treated as infected material?	
Sawn material	
Is sawn material bark free?	
If sawn material is not bark free, does it meet the conditions of Annex 1 in SOP 10?	
Bark	
Will bark be moved in covered transport?	
Woodchips	
Will woodchips (where they are presumed to be affected by <i>P. ramorum</i>) be moved in covered transport? See SOP point 4.	
Woodfuel Processing	
Use this box to describe the storage and processing facilities seen at all properties processing wood for fuel (i.e. wood stored in a silage pit or shed, and wood moved across a concrete yard to a wood chipper and blown into a secure shed or purpose-built bunker for storage).	
Movement Licence Schedule	
Has a Movement Licence Schedule (or despatch record) been obtained for co-product?	
Port facilities	
Do the handling facilities ensure that <i>P. ramorum</i> -infected roundwood and debris are kept separate from other roundwood and living material? Is the handling equipment swept clean of debris, and are arrangements in place for all debris from handling and storage areas and equipment to be burned?	
Are procedures in place to ensure that infected roundwood and co-product is NOT exported? (It may be transported around the GB coast by ship.) Are ships handling roundwood swept clear of bark and other material before leaving the port? Are arrangements in place to collect and burn the swept material?	
Woodfuel Processors	

Has Annex 3 and Annex 5 been explained to woodfuel processors supplying woodchip and solid woodfuel to customers?	
Kilns and kiln type structures for drying wood	
Can the criteria in Annex 8 be met by the applicant? Describe the kiln or kiln type structure drying process, making reference to the criteria in Annex 8.	
Sampling methods for stacks and moisture content	
Can the criteria in Annex 9 be met by the applicant? Describe the sampling methods used making reference to the criteria in Annex 9.	
Administration	
Are arrangements in place to systematically file in a secure location for 3 years all records of <i>P. ramorum</i> -affected material received and dispatched to onward processors?	

EXTRA LICENCE CONDITIONS

If extra conditions are required, please list them here.

Conclusion

I conclude that the facility and management systems described by <insert name>.....

to the Plant Health Inspector during their site visit on

<insert date>.....

will meet the Terms and Conditions of a Forestry Commission Processing Licence.

<insert name>

Plant Health Regional Manager

Annex 3

Phytophthora ramorum and biosecurity in the woodchip woodfuel supply chain

The following system must be used when woodfuel processors supply **woodchip** product derived from *P. ramorum*-affected woodland sites identified by a Statutory Plant Health Notice or equivalent letter. In most cases woodchip woodfuel processors will supply woodchips directly to end-user customers. When woodchip woodfuel processors supply woodchips to retailers, the retailers will also need to be licensed and subsequently managed as woodchip woodfuel processors.

1. The woodfuel processor must have an approved Processor Licence and Movement Licence issued by the Forestry Commission's Cross Border Plant Health Service, Silvan House, Edinburgh, to process *P. ramorum*-affected wood and move *P. ramorum*-affected woodchip product.

The woodfuel processor must complete a Forestry Commission Woodfuel Boiler End Use Licence application form for each existing and new woodchip customer (with contact details, address and phone number) being supplied with *P. ramorum*-affected woodchip and return it to the Cross Border Plant Health Service at Silvan House in Edinburgh.

The Woodfuel Boiler End Use Licence will be allocated a number by the Forestry Commission Cross Border Plant Health Service at Silvan House, and its details will be recorded on a spreadsheet by the Forestry Commission for reference. The woodfuel processor will also maintain similar records for its customers.

2. The approved woodfuel processor can use a Forestry Commission Movement Licence Schedule to record woodchip deliveries to each woodchip customer where the approved woodfuel processor has confirmed that acceptable, bio-secure delivery arrangements are in place. This can be achieved via a pre-delivery interview and where a biosecurity information note has been issued to the customer. (See paragraph 3 below for details).

Alternatively, to minimise paperwork, the approved woodfuel processor can keep a spreadsheet detailing delivery details to each customer where the approved woodfuel processor has confirmed that acceptable, bio-secure delivery arrangements are in place, via a pre-delivery interview and where a biosecurity information note has been issued to the customer. (See paragraph 3 below for details). The spreadsheet will record the customer's Woodfuel Boiler End Use Licence number, date of delivery and address, and an estimation of load volume or weight. The spreadsheet must be made available to the Forestry Commission on request.

3. Before the supply of *P. ramorum*-affected woodchip product to its customers, the approved woodfuel processor must complete a pre-delivery biosecurity arrangement telephone interview or site visit with each of its customers, and keep a record of these interviews on a spreadsheet, which must be available to the Forestry Commission on request. During the telephone interview or site visit, the woodfuel processor must explain to receivers of *P. ramorum*-affected woodchip product the following important biosecurity requirements, which are necessary when handling their woodchip product to prevent the spread of the disease:
 - a) all woodchip created from *P. ramorum*-affected wood delivered to a customer's secure woodchip storage facility must be used exclusively for burning in a biomass boiler;

- b) the customer's woodchip storage facility must be secure and able to contain woodchips such that woodchips cannot spill or be transferred into the wider environment. The facility must be clear of overhanging vegetation;
 - c) no woodchip can be removed from the customer's secure woodchip store and be used for any other purpose (e.g. garden mulch or play area/pathway covering), whilst *P. ramorum*-affected material is being received;
 - d) delivery drivers must sweep out vehicles, sweep up any spilt material, and place all sweepings into the customer's secure storage for burning. If partial loads are delivered, the vehicle biosecurity sweep-out can be completed on the last delivery;
 - e) where Movement Licence Schedules are used in the delivery of woodchip product, the customer must retain these for 3 years for future review by the Forestry Commission; and
 - f) the woodchip customer should contact the Forestry Commission Cross Border Plant Health Service, Silvan House, 231 Corstorphine Road, Edinburgh, EH12 7AT; Tel: 0300 067 5155; email: plant.health@forestry.gsi.gov.uk if they have any concerns about biosecurity arrangements or the supply of *P. ramorum*-affected woodfuel in general.
4. The approved woodfuel processor must issue a biosecurity information note on company letter-headed paper to end users of woodchip product listing, as a minimum, the biosecurity requirements described in paragraphs 3 (a) to 3 (f) above.

Annex 4: Decision Matrix

***P.ramorum* (Pr) – Statutory Plant Health Notices and the harvesting and movement of material from site – Decision matrix**

Background

To date, harvesting and moving timber from sites under SPHN controls have been considered to pose a phyto-sanitary (plant health) risk, albeit a relatively low one. A minimum buffer zone of 100m around symptomatic larch trees has been used to delineate the area to be felled under notice, and any timber contained within this zone has been subject to movement controls. The risk from timber is principally related to the presence of the organism within infected inner bark, and contamination from infected larch needles is secondary to, and much less important than, contamination from infected inner bark.

Movement of all material arising from sites under notice to processors is controlled through licensing. The source of timber is defined as “any tree species originating on sites known to be infected with *P. ramorum* and from which the movement has been restricted by the Forestry Commission or Natural Resources Wales”.

An increase in the area of infected larch has been observed, principally in south Wales and Galloway. We have therefore reviewed this approach to determine whether the current restrictions on movement are still proportionate or whether they can be relaxed in some situations. As a result we have relaxed the requirements by allowing material from other conifer species within 100m of infected larch **(or any other distance set by Plant Health authorities)** to be treated as uninfected.

The decision matrix below describes the situations where SPHNs are required or not required, and describes the associated mitigation measures required to reduce the risk of disease spread. The proposed mitigation under (1) would be **voluntary** where infection is not confirmed and SPHNs are not in place. In addition, in the colour-coded columns it provides guidance on how the bark from trees in the different situations should be treated, depending on its end use.

SOP10 (Version Feb 2020) Inspecting processing sites managing Phytophthora affected material

Situation and relevant material	Treatment	SPHN	Mitigation to reduce risk	Bark – end use			
				Biomass	Compost	Mulch	Export
1. Non-larch timber, regardless of proximity to symptomatic larch stands, but not contained within SPHN areas.	Treat as uninfected	No SPHN required	Normal felling licence restrictions apply. Biosecurity for low-risk activity to be applied as per FC Biosecurity Guidance	√	√	√	√
2. Non-larch timber contained within SPHN areas	Treat as uninfected	SPHN conditions apply	<p>Biosecurity for high-risk activity to be applied as per FC Biosecurity Guidance.</p> <p>Produce must be forwarder extracted, stacked and despatched separately from larch.</p> <p>Apply the following biosecurity measures in woodland to minimise presence of contaminated material on lorries and to minimise contamination with felling debris during extraction:</p> <ul style="list-style-type: none"> • where possible, avoid extraction through infected sites; • stack logs on bearers; and • ensure that lorries are free of debris before loading. 	√	√	√	√
3. Larch, sweet chestnut, common ash, Holm oak and Turkey oak timber not in proximity to symptomatic larch stands and not contained within SPHN areas	Treat as uninfected	No SPHN required	<p>As (1) above, normal felling licence restrictions apply.</p> <p>In regions described as high risk zones no approvals for felling during the winter period when needles are not present on trees.</p> <p>And to note that owner-occupier has a legal obligation to report potential infection.</p>	√	√	√	√

4. Larch, sweet chestnut, common ash, Holm oak and Turkey oak timber from SPHN areas	Treat as infected	SPHN conditions apply	<p>Biosecurity for high-risk activity to be applied as per FC Biosecurity Guidance.</p> <p>Apply the following biosecurity measures in woodland to minimise presence of contaminated material on lorries and to minimise contamination with felling debris:</p> <ul style="list-style-type: none"> • extract by forwarder; • stack logs on bearers; and • ensure that lorries are free of debris before loading.. <p>A Processing Licence is required for:</p> <ul style="list-style-type: none"> • handling round wood derived from <i>P. ramorum</i>-affected wood; • handling co-product, residue and plant debris arising from the initial processing of wood from infected sites; and • operating mobile processing plants in-forest. 	√	√	√	X
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√ = No processor controls applied; ✓ = Processor must heat treat bark to an agreed standard; X = Export of round timber and bark products is prohibited.

NB Co-product created by sawing (i.e. sawdust) can be treated as uninfected material if it comes from a log that was fully debarked before sawing. Otherwise it must be treated as infected material.

Annex 5

***Phytophthora ramorum* and biosecurity in the solid woodfuel (firewood) supply chain**

The following system must be used when solid woodfuel processors supply product derived from *P. ramorum*-affected woodland sites identified by a Statutory Plant Health Notice or equivalent letter. Solid woodfuel processors can supply both to retailers and directly to end-user customers, and both of these supply chains are acceptable.

1. The solid woodfuel processor must have an approved Processor Licence and Movement Licence issued by the Forestry Commission's Plant Health Service, Silvan House, Edinburgh, to process *P. ramorum*-affected wood and move *P. ramorum*-affected solid woodfuel product.

The solid woodfuel processor must complete a Forestry Commission Processor Licence application form for retailers (with contact details, addresses and phone numbers) being supplied with *P. ramorum*-affected solid woodfuel, and return it to the Plant Health Service at Silvan House, Edinburgh. The retailer's Processor Licence will be allocated a number by the Forestry Commission Plant Health Service at Silvan House, and its details will be recorded on a spreadsheet by the Forestry Commission for reference. The solid woodfuel processor will also maintain similar records for its retailer customers. When solid woodfuel processors supply directly to end-user customers, a Processor Licence application is not required for the customer.

2. The approved solid woodfuel processor can use a Forestry Commission Movement Licence Schedule to record solid woodfuel deliveries to each solid woodfuel retailer where the approved solid woodfuel processor has confirmed that acceptable, bio-secure delivery arrangements are in place, via a pre-delivery interview and where a biosecurity information note has been issued to the retailer. (See paragraph 3 below for details.)

Alternatively, the approved solid woodfuel processor can keep a spreadsheet detailing delivery details to each retailer to minimise paperwork. The spreadsheet will record the retailer's Processor Licence number, date of delivery, customer address and an estimate of load volume or weight. The spreadsheet must be made available to the Forestry Commission on request. When solid woodfuel processors supply directly to end-user customers, a Forestry Commission Movement Licence Schedule or spreadsheet can be used.

3. Before the supply of *P. ramorum*-affected solid woodfuel product to retailers, the approved woodfuel processor must complete a pre-delivery biosecurity arrangement telephone interview or site visit with each of its retailers, and keep a record of these interviews on a spreadsheet, which must be available to the Forestry Commission on request.

During the telephone interview or site visit the woodfuel processor must explain to retailers of *P. Ramorum*-affected solid woodfuel product the following important biosecurity requirements (a) to (f), which are necessary when handing their solid woodfuel product to prevent the spread of the disease:

- a) all solid woodfuel created from *P. ramorum*-affected wood delivered to a customer's secure solid woodfuel storage facility must be used exclusively for burning;
 - b) the customer's solid woodfuel storage facility must be secure and able to contain solid woodfuel such that bark and solid woodfuel cannot be transferred into the wider environment. The facility must be clear of overhanging vegetation;
 - c) no solid woodfuel can be removed from the customer's secure solid woodfuel store and be used for any other purpose (such as garden edging etc), whilst *P. Ramorum*-affected material is received;
 - d) delivery drivers must sweep out vehicles, sweep up any spilt material, and place all sweepings into the customer's secure storage for burning. If partial loads are delivered, the vehicle biosecurity sweep-out can be completed on the last delivery;
 - e) Where Movement Licence Schedules are used in the delivery of solid woodfuel, the customer must retain these for 3 years for future review by the Forestry Commission; and
 - f) The solid woodfuel retailer or end-user customer should contact the Forestry Commission Plant Health Service, Silvan House, 231 Corstorphine Road, Edinburgh, EH12 7AT; tel: 0300 067 5155; email: plant.health@forestrycommission.gov.uk if they have any concerns about biosecurity arrangements or the supply of *P. ramorum*-affected woodfuel in general.
4. The approved solid woodfuel processor must provide a label (either on the product or within the bag) with biosecurity information to end users of solid woodfuel product listing, as a minimum, the biosecurity requirements described in paragraphs 3 (a) to 3 (f) above.

ANNEX 6: Guidance for using sawdust from non-debarked logs

Sawdust created by sawing non de-barked logs of species of trees which form *P. ramorum* cankers (i.e. larch, sweet chestnut, common ash, Holm and Turkey oak) from - *P. ramorum*-affected felling sites is classified as *P. ramorum*-affected material.

The majority of sawdust from large sawmills is used in markets which involve heat treatment processes e.g. panel board manufacture. The movement of sawdust from sawmills to these panel board manufacturers will involve Movement Licences and the processing of material by the panel board manufacturers will involve Processor Licences.

It is recognised however that on occasion, both large and some smaller sawmills also supply sawdust to the animal bedding market.

Sawdust created by sawing non de-barked logs from *P. ramorum*-affected felling sites supplied to customers for animal bedding use is generally either then used as a composted waste material on the customer's premises eg farm, equestrian centre etc or it is supplied to a waste recycling facility for composting. Treatment at these waste recycling facilities involves composting to British Standards Institution PAS 100 i.e at temperatures >65 degrees Celsius for 7 days with regular mixing of the material. This is the national compost benchmark, which sets the minimum requirements for the process of composting, the selection of materials from which compost is made, and how it is labeled.

A Movement Licence and Movement Licence Schedule (or agreed despatch note) will be required for moving the sawdust from sawmills to the animal bedding etc supplier. The end user will not require a Forestry Commission Processing Licence for the composting of the sawdust.

Annex 7: Despatch records which can be used to replace Movement Licence Schedules

Ordinarily the movement of infected products from *P. ramorum*-affected woodland requires a Movement Licence and Movement Licence Schedule. However, the following timber conveyance control processes, as utilised by the private and public forestry sectors, can be used in lieu of a Movement Licence Schedule.

(NB: movement of infected material within the South-West Scotland Management Zone does not require a Movement Licence. Any infected material moving out of the SW Scotland Management Zone does require a Movement Licence)

Private-Sector Sites

1. Contracts for the purchase of *P. ramorum*-infected timber will be set up with a PR suffix on the site name or compartment number, e.g.

Estate or Forest Name:	Suchandsuch Estate
CPT Number or name:	Long Wood PR
Product:	Larch millwood

There must be a unique, serially numbered conveyance note accompanying each load of infected material, stating the estate's name, Statutory Plant Health Notice number or compartment number, including the 'PR' suffix reference and the reference number of the purchase contract.

2. Receiving mills or processing plants will have an electronic timber management system suitable for recording and managing the data required for *P. ramorum*-affected material.
3. Before delivery of roundwood from *P. ramorum*-affected sites, individual contracts will be set up in the mill or processing plant system with the appropriate site name PR suffix.
4. A copy of the appropriate mill licence and licence number must be kept on the harvesting site file with relevant site info (as per Forest Stewardship Council certification procedures).
5. *P. ramorum*-infected timber and co-products will then be handled by mills and processing plants as per the current Movement Licence conditions.

Forest Enterprise (England and Scotland) and Natural Resource Wales sites

1. Sales Recording Programme Contract schedules (Lot Name) and Stock records / Access Codes (held at coupe level) carry the prefix PR against *P. ramorum*-infected larch.
2. The Movement Licence number must be recorded on the site-specific conditions, and form part of the contract documentation.
3. The Despatch Reference Number (DRN) must be annotated by the haulier with the site name, pre-fixed with PR.
4. The DRN would maintain the link / trail back to the contract upon uplift, and hence the movement licence number associated to the contract.
5. A copy of the appropriate mill licence and licence number must be kept on the harvesting site file with relevant site info (as per Forest Stewardship Council certification procedures).
6. *P. ramorum*-infected timber and co-products will then be handled by mills and processing plants as per the current Movement Licence conditions.

Annex 8 Inspecting kilns and kiln type structures for drying wood from *Phytophthora ramorum* affected sites to below 20% moisture content (expressed as a percentage of dry matter)

In December 2014 the FC's Cross Border Plant Health Service performed a review of moisture content reduction as a phytosanitary control measure against *P. ramorum* which included seeking advice from Dr Joan Webber Forest Research on the efficacy of the treatment. The review concluded that wood moisture content reduction should be achieved using a specified wood drying methodology before it can be accepted as a phytosanitary control measure against the disease. The drying must be carried out in a closed chamber (closed chamber will be taken to mean a kiln or other engineered structure) using heat and humidity control to meet the requirements for the "kiln dried" phytosanitary standard. The wood must be dried to below 20% moisture content expressed as a percentage of dry matter. A 'KD' mark must also be applied to the wood or packaging containing the product.

Kiln or similar drying facilities and systems must meet the following criteria during inspection and the specified conditions must be agreed before the FC can issue *P. ramorum* affected material Processor Licence;

1. The system must use forced warm air.
2. The system must have a closed chamber or other engineered structure and material being dried must not be re-wetted post drying.
3. The system must have calibrated temperature and moisture sensors to record the temperature and humidity of wood product or exhaust air. This information can be used to inform operators when the target wood moisture content may have been achieved, prior to confirmation via sampling and testing using approved protocols.
4. A stack sampling method approved by the Forestry Commission must be used to inform sample collection for wood moisture content testing.
5. An oven dry based wood moisture calculation method approved by the Forestry Commission must be used to calculate wood moisture content expressed as a percentage of dry matter. Only wood with a moisture content of below 20% expressed as a percentage of dry matter will be accepted as being treated against *P. ramorum*.
6. Before *P. ramorum* affected material is treated in the system, a test run shall be conducted using a full load with unaffected material and samples collected and tested using Forestry Commission approved systems.
7. The applicant must send a method, sampling and testing protocol for Forestry Commission approval.
8. Records of wood moisture content testing must be kept for three years.
9. Dried wood products retaining bark must only be used for firewood or burning in biomass systems. Other uses for dried products such as woodshavings used as animal bedding will be considered.
10. Once approved a condition of the processing licence will be that the dried wood products will not be exported out with Great Britain. This condition will not apply to kiln dried sawn timber which has been treated in a conventional timber drying kiln to long established standard specifications for time, temperature and stacking regimes for the type of timber being dried.
11. Drying systems may be subject to review by the Forestry Commission at any time and the FC may withdraw the processors licence at any time where the drying

system is not achieving the required standard of wood moisture content reduction. The FC may also independently test the moisture content of material at any time.

Annex 9 STACK AND MOISTURE CONTENT SAMPLING METHODS



Testing moisture content (simple method)

This is a simplified version of the drying and analysis method found in the draft standard for woodfuel moisture content analysis published in the UK by the British Standards Institution¹ (BSI). The methodology contained here is designed to give an approximate figure for personal use using the minimum of specialist equipment and should not be used for marketing purposes or as a substitute for a complete analysis conducted by an approved test centre. Further details of the detailed methodology and testing laboratories are available from the Biomass Energy Centre website at www.biomassenergycentre.org.uk

Setting up

Equipment

You will need the following equipment:

Sample containers	These must be airtight sealable containers appropriate to the type of fuel. Plastic food containers are appropriate for chip but for logs sealable airtight plastic bags may be used. You should weigh all containers before use.
Oven	An electric oven will work best. You need to check the oven's specifications for the maximum length of time that it can be run continuously. Fan ovens may not be appropriate for testing chip as the air circulation may blow fine particles out of the sample container.
Containers (for chip)	Should be corrosion resistant, non-combustible, and large enough to contain a complete sample (eg clean metal or ceramic roasting tin). You should weigh all containers before use.
Scales	Must be accurate to the nearest 1g, should have a "re-zero" or "tare" button to allow for the weight of containers, and be able to weigh several kg
Oven thermometer	In-oven thermometers are widely available from kitchen stores. Should be accurate to nearest 2°C, adjustable and must have a waterproof sensor for calibration.
Heat proof mat	To provide insulation between hot samples and the scales.
Heat proof gloves	eg oven gloves.

¹ Based on the suite of standards produced by CEN/TC335. A full, detailed methodology is contained in documents: BS EN 14774-2:2009, BS EN 14778-1:2005 BS EN 14778-2:2005 available from BSI or from BEC

1 | For more information contact the Biomass Energy Centre, (01420) 526197
| biomass.centre@forestry.gsi.gov.uk or go to www.biomassenergycentre.org.uk
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Testing Moisture Content (simple method)

Calibration

The process of heating wood removes the water from your sample, but may also release other volatile compounds within the wood. This has been allowed for under the testing methodology, but it does mean that samples must be dried at a standardised temperature to avoid unreliable results. Domestic ovens are not precision instruments and frequently have a wide margin of error in terms of temperature control, so some form of calibration is necessary.

Thermometer calibration

First you need to check the calibration of the oven thermometer. The most straightforward way of doing this is to place it in a large bowl of ice water. When the temperature of the water stops changing adjust the thermometer according to the manufacturers instructions so that it reads 0°C. If the thermometer does not read low enough, then boiling water may be used to calibrate to 100°C, but bear in mind that this is more difficult to do safely.

Oven Calibration

To calibrate the oven, place the calibrated thermometer in the middle of the oven and set to 200°C (using the main oven control) when the oven has reached temperature check the reading on the thermometer against the oven setting. The oven manufacturer should provide instructions on any fine tuning of the temperature calibration possible.

When you have calibrated the oven, turn it down to 105° (the working temperature for moisture testing) and check it against the thermometer. Some oven models only allow calibration in 5° or even 10° increments and it may be that even with calibration you still need to set the oven control higher or lower to achieve an accurate temperature, using the calibrated thermometer as your guide.

Taking a sample

The critical factor in taking a sample is that it should be representative of the whole. You should have the same distribution of particle sizes in your sample as exist in the store, and the sample should have the same moisture content as the surrounding material.



Sampling and testing chip

In a large stack of fuel, there will be variations in the moisture content throughout the stack and you will need to take a sample from more than one place to allow for this. You should take a minimum of 5 samples, taking material from the upper, middle and lower parts of the fuel stack. Ignore any material from the lowest 30cm of the stack as this is likely to pick up additional moisture and other contamination from the ground.

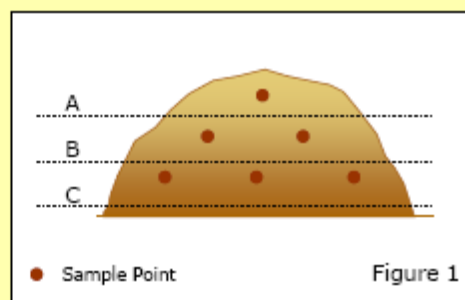


Figure 1

2 | For more information contact the Biomass Energy Centre, (01420) 526197

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Testing Moisture Content (simple method)

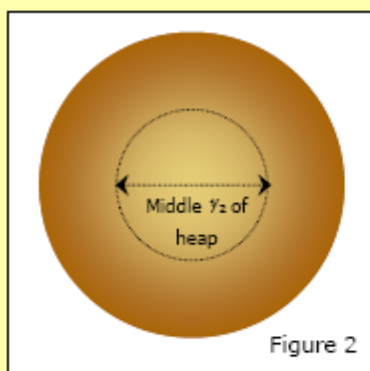


Figure 2

You should dig through the heap and take samples of at least 1 litre each from different points (As shown in figure 1) from the middle $\frac{1}{2}$ of the heap as shown in figure 2. The number of samples required will increase with the amount of fuel to be tested. For batches of over 15 tonnes, increase the number of samples taken from layer C by 1 for every 5 additional tonnes². The samples should all be the same size, and include the same proportions of over and undersized pieces as the area they are taken from. If there is a large amount of observable variation through the stack, then you will need to collect more samples to take account of this. All samples should then be sealed in a pre-weighed airtight containers (eg plastic food containers) as soon as you have collected them. Do not mix the samples.

Testing the chip samples

- Preheat the oven to the point marked during calibration for an internal temperature of 105°C. You should use the thermometer used during calibration to double check.
- Weigh the samples in the airtight container before opening. This provides an accurate weight of the sample before any material or water is lost from the sample.
- Weigh the heatproof container that you will be using to heat the chip.
- If you are testing more than one sample, remember to label the containers so that you know which results apply to each sample.
- Transfer each sample from the airtight container to a labelled heatproof container
- Put all of the samples in the oven at the same time.
- Log each sample weight every two hours (you should make sure that you have a heat proof mat between your samples and the scales.) when the weight of a sample remains unchanged (to within 10g) for two consecutive measurements it can be considered to be oven dry.
- This process can take a long time, so make sure that you do not run the oven for longer than the manufacturers recommend. If the samples take longer than this (or you need to leave the samples) then switch off the oven leaving the samples inside and allow it to cool down and start heating again later.
- Meanwhile thoroughly dry the airtight containers on a radiator or similar and re-weigh (if any material has stuck to the inside)

Remember that it is very easy for heated, dry wood to catch fire. Make sure that you take care while testing and dispose of your sample in an appropriate manner afterwards.

² NB this methodology is not suitable for quantities in excess of 30 tonnes

³ | For more information contact the Biomass Energy Centre, (01420) 526197
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Testing Moisture Content (simple method)

Sampling and testing logs

As with chip, you should choose logs to give a representative section of the load. Bear in mind that there is potentially a much greater variability between, and within logs than with other woodfuels. In the case of logs that have been seasoned before cross cutting, you should remember that logs cut from the end of the length will be significantly drier than those cut from the middle.

Moisture content is likely to vary between logs with different: size, species, number of split faces, and cracks, as well as where they occur in the stack.

You should pick a minimum of two logs to test per cubic metre. The logs should be chosen from the middle of the stack and not have been in contact with the ground.

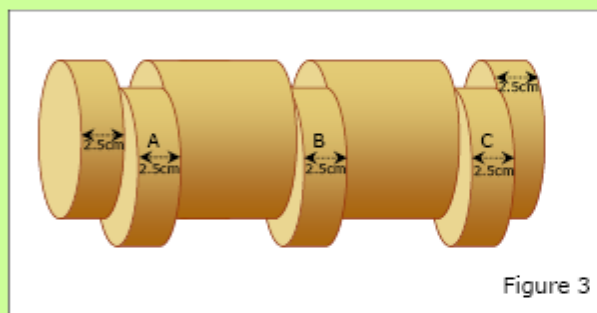


Figure 3

Remove all bark from the logs and cut one 2.5cm thick slice 2.5cm in from each end and one from the centre of the log (see figure 3). Make sure that your sample is representative as any areas that have been split or have been stored with the bark already stripped will be drier than logs which still have bark on.

When you have cut your sample sections from the logs, you should place them in an airtight container immediately (eg sealable plastic bags)

Testing the log samples

- Preheat the oven to the point marked during calibration for an internal temperature of 105°C. You should use the thermometer used during calibration to double check.
- Weigh the samples in the airtight container before opening. This provides an accurate weight of the sample before any material or water is lost from the sample.
- If you are testing more than one sample, remember to label them using a permanent marker so that you know which results apply to each sample.
- Put all of the samples in the oven at the same time (lay them directly on the oven shelves).
- Log each sample weight every two hours (you should make sure that you have a heat proof mat between your samples and the scales.) when the weight of a sample remains unchanged (to within 10g) for two consecutive measurements it can be considered to be oven dry.

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Testing Moisture Content (simple method)

- This process can take a long time, so make sure that you do not run the oven for longer than the manufacturers recommend. If the samples take longer than this (or you need to leave the samples) then switch off the oven leaving the samples inside and allow it to cool down and start heating again later.
- Meanwhile thoroughly dry the airtight containers on a radiator or similar and re-weigh (if any material has stuck to the inside)

Remember that it is very easy for heated, dry wood to catch fire. Make sure that you take care while testing and dispose of your sample in an appropriate manner afterwards.

Determining moisture content

You should now have accurate weights for:

- The airtight container
- The heatproof container (if used)
- The sample before drying
- The sample after drying
- The weight of any moisture left inside the airtight container after transfer to the oven
- The weight of any other material left inside the airtight container after transfer to the oven

You should be able to use these weights to determine the total weight of each sample before and after drying.

The moisture content (MC) of a piece of wood is defined as the weight of water expressed as a percentage of the weight of the wood either the total (wet) sample weight (wet basis) or the dry wood weight (dry basis) All fuel calculations are carried out on a "wet basis" (MC_{wb})³

The wet basis moisture content is a measurement of the proportion of the sample which is water expressed as a percentage of the total sample. For example if the wood in a sample weighs 50kg and the water in the sample also weight 50kg, then the total MC of the sample would be 50% as half of the sample is water.

$$\text{The } MC_{wb} = (\text{the weight of water in a sample} / \text{total initial weight of the sample}) \times 100$$

³ "Dry basis" is expressed as the percentage of the oven dry weight of the wood. For example, if the wood in a piece of timber weighs 50kg and the water also weighs 50kg then the dry basis moisture content is 100%. The main advantage of this method is that the oven dry weight of the wood remains constant. This method is the standard used by many of the organisations doing research on wood, as well as building surveyors and architects. (It is rare to use dry basis measurements when talking about woodfuel)

$$\text{The } MC_{db} = (\text{Weight of water in a sample} / \text{oven dry weight of sample}) \times 100$$

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Testing Moisture Content (simple method)

Analysis

If you have taken samples as shown in the methodology above, you should have a figure for moisture content (in %) for each sample taken. Based on these sampling rates you can then work out a simple average (mean) of all the values to calculate a moisture content figure for the whole volume.

If your sampling regime is different from the one above, you will need to take into account the extent to which your distribution of samples is representative of the whole and if necessary adjust the mathematical weighting of different samples accordingly.

ANNEX 10 P. RAMORUM POTENTIALLY INFECTED LARCH BARK HEAT TREATMENT FOR LOW RISK DOMESTIC USE IN ENGLAND & WALES

P. RAMORUM POTENTIALLY INFECTED LARCH BARK HEAT TREATMENT FOR LOW RISK DOMESTIC USE IN ENGLAND & WALES

PROTOCOL

OPEN WINDROW HEAT TREATMENT- USING SPECIALISED WINDROW TURNING MACHINERY

Introduction

A treatment protocol is required to provide full traceability of diseased bark from incoming source to outgoing sale to ensure Biosecurity and system credibility.

Treatment process to be carried out on an approved site suitably prepared and equipped with the necessary machinery to carry out the treatment process.

Describe the approved method of treatment, processing, monitoring and records.

Provide agreed standards for the treatment process with clearly defined methods of mechanical handling.

Provide agreed minimum temperature and time standards.

A system of recording daily temperatures with details of monitoring equipment used

Records of assessment for each batch result.

Records of each batch process in terms of pass or fail.

Calibration records of monitoring equipment.

Use of approved laboratory service for external testing

Agreed frequency for external testing of treated bark to check process.

Sales records of treated bark.

Declaration of passing the agreed standard for heat treatment.

Agreed final protocol to be approved by the Forestry Commission Plant Health Service and included in the operating company's ISO Quality Management System.

1. SITE PREPARATION.

1.1 Weighbridge to record incoming and outgoing loads.

1.2 A dedicated clearly defined area away from other products or materials.

1.3 Hard impermeable level base, suitable for heavy machinery to operate on.

1.4 Free draining, to a secure water catchment point close to the delivery area.

1.5 Slope of the site should ensure that water drainage flows are away from the treated material back towards the contaminated material catchment point to ensure no risk of cross contamination.

1.6 Layout of the site should allow a flow of incoming material through the treatment process to storage of treated material prior to despatch avoiding the risk of any cross contamination.

1.7 Signage for each batch number with start date.

2. INTAKE RECORDS

To include

Date, Ticket Number, Suppliers details, Forest region, Vehicle registration Number, Weight, *Phytophthora* Movement Licence Schedule.

Bio security of delivery vehicle – sweep out and spray with approved chemical.

3. BATCH FORMATION

3.1 Tip fresh loads of contaminated bark into the dedicated intake area ready for shredding

Ideally the material should be as fresh as possible or of a similar age. The treatment site should liaise with the supplying sawmill to ensure that the bark being processed comes from similar aged timber.

3.2 Deliveries should be arranged for a sufficient tonnage in order to minimise the time required for a windrow to be formed.

3.3 As soon as sufficient tonnage is available to form a viable windrow add water if necessary to achieve moisture content of 55-60%, shred the material and form into a windrow ready for monitoring to start. (Water may be used from the catchment point to add moisture before the treatment begins).

3.4 Windrows should be formed evenly with a triangular profile and of a consistent height and width to allow the use of a straddle windrow turner.

3.5 Windrows should not exceed the capacity width or height of the windrow turner.

4. BATCH FORMATION AND MONITORING RECORD

To include

4.1 A specific Batch Record Number.

4.2 Load Delivery Ticket numbers forming the batch.

4.3 Total tonnage/m³ in the batch.

4.4 Dates of shredding, formation and monitoring of windrow. Shredding and formation of the windrow should be carried out as one continuous process. Delays between shredding and formation will cause uneven temperature build up.

4.5 Dimensions of windrow to determine the number of temperature monitoring points.

4.6 A minimum of 1 core temperature monitoring point per 10m windrow length.

4.7 Daily temperature records – manual temperatures.

4.8 Daily temperature records – USB data loggers programmed with the start date and time.

4.9 Dates and times of windrow turning.

4.10 Windrows should be turned as soon as the core temperature measured using manual probes exceeds the agreed temperature for the agreed timescale.

4.11 The standard has been set at 56°C for 30 continuous minutes as recorded at the core temperature monitoring points throughout the complete windrow during the treatment period of 7 to 14 days.

5. BATCH MANAGEMENT

5.1 Following the windrow formation the windrow temperatures should be manually monitored daily using Hanna or similar 1 metre temperature probes and when the temperature reaches or exceeds 56°C for a minimum of 30 minutes along the complete length of the windrow at all monitoring points the windrow should be turned using a special straddle windrow turner. Komptech Topturn X60 or similar.

5.2 The windrow must achieve 3 consecutive periods of heating to a minimum 56°C for 30 continuous minutes along the complete length at all core monitoring points. This is achieved by the sequence – Formation – **HEAT 1.** to 56°C - Turn 1 – **HEAT 2.** to 56°C - Turn 2 – **HEAT 3.** to 56°C IN EACH PERIOD FOR 30 CONSECUTIVE MINUTES.

The process of mechanical turning will ensure that the row is thoroughly mixed to ensure full treatment.

5.3 Prior to turning the windrow both ends should be removed with a front end loading shovel and added back into the main body of the windrow.

5.4 Windrows should be maintained in a tidy manner, any overspill at the ends of the row from the turning process should be returned to the row maintaining an even height and width.

6. BATCH ASSESSMENT

- 6.1** This record can be combined with the Batch Monitoring record.
- 6.2** Assess the Batch after seven days in terms of temperatures meeting the agreed standards for time temperature and number of heating periods.
- 6.3** RECORD PASS or FAIL.
- 6.4** If a PASS then the windrow could be classed as suitable for further processing prior to resale.
- 6.5** If a partial FAIL continue to monitor and turn for a further seven days.
- 6.6** If a PASS at the end of 14 days then the windrow could be classed as suitable for further processing for resale.
- 6.7** Download the USB data loggers at the end of the treatment to confirm the manual temperature records. Include this data with each batch record.
- 6.8** If still a FAIL after the 14 day period then the complete batch should be sent for incineration using a *Phytophthora ramorum* Movement Licence to an approved incineration facility.

7. INDEPENDENT EQUIPMENT CALIBRATION CHECKS

- 7.1** Temperature monitoring probes and data loggers should be tested annually by the manufacturers for accuracy. Records to be maintained of each calibration check.
- 7.2** In house calibration checks can be carried out during the year using thermometers or by comparing the temperatures of two or more units in the same environment.
- 7.3** Manufacturers annual calibration certificates should be retained with other records for reference.

8. INDEPENDENT BATCH TESTING

Forestry Commission Plant Health should determine a suitable testing regime for the treated bark to show that the heat treatment process is working effectively.

9. SALES.

- 9.1** Sales of treated materials are restricted to supply within England & Wales
- 9.2** Treated materials are only for low risk end uses like play bark, landscaping and amateur garden use. Treated products should not be used in high risk situations e.g. landscaping around *P. ramorum* host species
- 9.3** A certificate of conformity to the heat treatment process will accompany each delivery and include details of approved uses, as above. (See 10)
- 9.4** It will not be permitted to supply fines from potentially infected bark into the horticultural market
- 9.5** Bark fines resulting from the process will be destroyed by incineration at a facility licenced to receive *Phytophthora Ramorum* infected material
- 9.5** A record must be maintained linking sales of Heat Treated Bark Batch numbers to specific sales or product mixes providing full traceability from source to destination.

Note.

This becomes more difficult if the Heat Treated Bark is screened and mixed with other materials to form a new product. A record should be maintained of the dates and products the Batch has been used for.

10. DECLARATION CERTIFICATE OF CONFORMITY FOR EACH BATCH

A Certificate or label declaring conformity to the testing process should be raised by the processing company for each batch and made available to purchasers of treated material or products screened or made from treated material.

EXAMPLE

Bark R Us

HEAT TREATED LARCH BARK

CERTIFICATE NUMBER..... (printed here)
TREATED BATCH REFERENCE NUMBER... (printed here)
DELIVERY NOTE NUMBER ... (recorded here)
PRODUCT NAME.....

WARNING

THIS PRODUCT CONTAINS LARCH BARK SOURCED FROM POTENTIALLY PHYTOPHTHORA
RAMORUM INFECTED TIMBER

THE BARK HAS UNDERGONE A FORESTRY COMMISSION APPROVED HEAT TREATMENT
PROCESS TO ELIMINATE THE P. RAMORUM SPORES PERMITTING THE USE OF THIS PRODUCT
IN ENGLAND AND WALES IN LOW RISK SITUATIONS e.g. PLAY AREAS, LANDSCAPING AND
AMATEUR DOMESTIC USE.

**THIS PRODUCT SHOULD NOT BE USED IN HORTICULTURAL GROWING MEDIA OR IN HIGH
RISK AREAS SUCH AS LANDSCAPING AROUND P.RAMORUM HOST SPECIES**

TMA BARK SUPPLIES PROCESSOR LICENCE NUMBER... (printed here).....

11. RECORD KEEPING.

All records should be retained for 6 years and made available for inspection by Plant Health
Officers or other agencies as may be required.
Records may be held in hard copy or electronic format.

12. BIOSECURITY

- 12.1** Transport Vehicles carrying potentially contaminated material should be cleaned
after each load as prescribed under the ***Phytophthora ramorum* Movement Licence.**
- 12.2** On site plant such as the windrow turner, shredder and loading shovels should be
cleaned thoroughly after each batch and sprayed with an approved disinfectant
effective against *Phytophthora ramorum*.