

PAS 111:2012

Specification for the requirements and test methods for processing waste wood



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a world without waste



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Foreword

This Publicly Available Specification (PAS 111:2012) has been commissioned by WRAP¹⁾ in collaboration with the British Standards Institution (BSI).

The aim of this PAS is to provide a specification for individuals and organizations recovering and processing post-industrial and post-consumer waste wood into wood products such that potential customers will be assured that they are procuring a material of consistent and verifiable quality.

If the minimum specification is met or exceeded then the material is PAS 111 compliant; if the minimum requirements are not met, then the material is non-compliant, even if an end user's specification is met.

The following markets account for the majority of recovered wood consumed in the UK and are covered by PAS 111:

- Panelboard manufacture²⁾;
- Biomass energy generation³⁾;
- Animal bedding;
- Mulches;
- Equine surfaces;
- Pathways and coverings; and
- Industrial and commercial applications.

¹⁾ WRAP (Waste & Resources Action Programme) works in England, Scotland, Wales and Northern Ireland to help businesses and individuals reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way. www.wrap.org.uk.

²⁾ For convenience, the term "panelboard manufacture" is used in this PAS, however, the term "wood-based panel manufacture" is more accurate.

³⁾ "Biomass energy generation" includes treatment processes that convert the energy in biomass into useful forms of energy, including electrical power, process steam, hot water, and combined heat and power processes.

Under current legislation, all forms of waste wood covered by this PAS are classified as waste until incorporated into an end use application. It follows that handling, transportation storage and use of these materials must comply with all regulations arising from the Waste Framework Directive (WFD)⁴⁾ [1].

NOTE 1 *Regulators may provide guidance on waste legislation and how it applies to waste wood e.g. the Environment Agency has a regulatory position statement which advises when wood is considered to be waste and what regulatory controls apply.*
www.environment-agency.gov.uk/static/documents/Research/PS_005_Regulation_of_wood_v3.0.pdf.

NOTE 2 *The Waste Protocols Project is working on the development of a Quality Protocol where waste wood processed in accordance with its requirements for specific end-uses would be considered a non-waste.*

Acknowledgement is given to the following organizations that have been instrumental in the development of this PAS:

- Association for Organics Recycling (AFOR);
- AW Jenkinson Forest Products;
- Consulting With Purpose;
- Environment Agency;
- Fichtner Consulting Engineers Limited;
- Hadfield Wood Recyclers & UK Wood Recycling;
- National Farmers' Union (NFU);
- Sembcorp Utilities (UK);
- SITA Power;
- Timber Research and Development Association;
- Wood Panel Industries Federation (WPIF);
- Wood Protection Association (WPA);
- Wood Recyclers' Association (WRA).

⁴⁾ EU Waste Framework Directive (2008/98/EC) [1].

Wider comments from other interested parties were invited by BSI. The expert contributions made by organizations and individuals consulted in the development of this PAS are gratefully acknowledged.

Technical authorship for this PAS has been provided by Oakdene Hollins⁵).

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NOTE For more detail, please refer to WRAP's Terms & Conditions: www.wrap.org.uk.

⁵ Oakdene Hollins Limited is an independent company specializing in consultancy and research in sustainable technologies, waste management and remanufacturing (www.oakdenehollins.co.uk).

Publishing information

Presentational conventions

The provisions of this PAS are presented in upright, roman type. Its requirements are expressed in sentences in which the principal auxiliary verb is shall.

Commentary, explanation (guidance) and general informative material is presented in smaller italic type, and does not constitute normative elements (requirements). Much of this appears as notes in this PAS, each beginning with NOTE, and other such material appears in the annexes marked informative.

Requirements in this PAS are drafted in accordance with *The BSI guide to standardization – Section 2: Rules for the structure, drafting and presentation of British Standards*.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. In addition, nothing in this publication implies that any product is fit for any particular end purpose.

Users are responsible for the correct application of the PAS.

Compliance with a PAS cannot confer immunity from legal obligations.

Introduction

In 2010 the UK's annual arising of waste wood generated by households and businesses was estimated at 4.1 million tonnes⁶⁾. About 2 million tonnes were diverted or recovered from the waste stream for recycling or energy recovery, but the remainder continues to be sent to landfill, resulting in considerable environmental and economic costs.

NOTE WRAP's Closed Loop Economy Directorate is working with the wood recycling industry to boost the landfill diversion rate for waste wood.

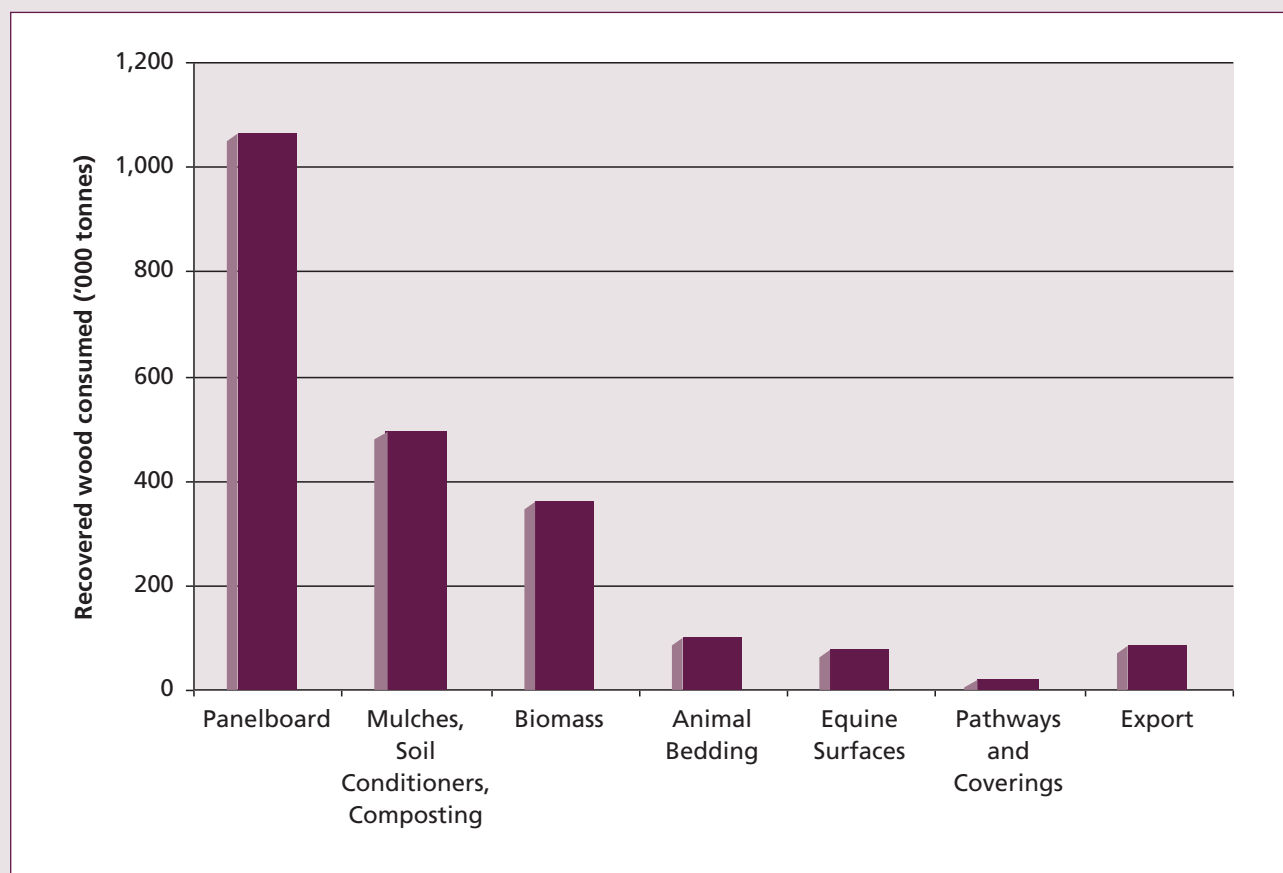
As Figure 1 shows, the panelboard manufacturing industry recycles most of the recovered material, with biomass energy generation and animal bedding production being the next largest markets⁷⁾. A large number of wood reprocessing companies of varying sizes and levels of sophistication have emerged in the UK to collect, grade, and process waste wood in order to supply these end markets.

Waste wood arises in a multitude of forms, and a lack of consistency in the way waste wood is accepted, graded and processed is a barrier to the industry's objective of increased recovery rates. Moreover, waste wood reprocessors supply material to a number of markets using unpublished (and sometimes confidential) agreements and, within a single end use market, specified material acceptance criteria may vary from customer to customer and from supplier to supplier. In more mature and well regulated markets, end users work with national and international standards, whereas many end users in less well regulated markets do not work to a single well recognized standard. End users need confidence in the uniformity and quality of recovered wood, while waste wood reprocessors need to know how to design their operations to meet the requirements of their customers and the regulators.



⁶⁾ WRAP, 2011. Wood Waste Market Situation Report.

⁷⁾ Wood Recyclers' Association. 2009. Waste Wood to Markets Statistics.

Figure 1 – Major end markets for recovered post-consumer waste wood in the UK, 2009

Source: Wood Recyclers' Association, Waste wood to markets statistics, 2009.

This PAS does not seek, therefore, to override other published standards or customer-specific material specifications. Its aim is to harmonize with such standards and regulations, and to establish a minimum set of criteria and processing requirements for material to be deemed to be suitable for onward sale, albeit as a waste derived material. PAS 111 only prescribes absolute limits on physical and chemical attributes of the recycled wood materials where such limits are not elsewhere established by the end user or by regulations. However, for the avoidance of doubt PAS 111 sets out minimum requirements. If the minimum is met or exceeded then the material is PAS 111 compliant; if the minimum requirements are not met, then the material is not PAS 111 compliant, even if the limits established elsewhere such as by the end user or regulations are met.

In addition, waste wood other than that from virgin sources, such as forestry operations, sawmills, etc, comes under waste controls. As such, the processing and use of the material will be subject to waste regulations in order to ensure that there is no risk to the environment or to animal or human health from these operations until such time as it has ceased to be a waste.

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1 Scope

This Publicly Available Specification (PAS) provides the definitions, minimum requirements and test methods for processing waste wood into materials intended for use in suitable new applications or end products. It is applicable to the receipt, storage, grading, preparation and testing of waste wood intended for use in end markets, as outlined in Figure 2.

The primary audience for this PAS is the waste wood processing sector comprising companies of any operational size or level of sophistication.

NOTE 1 *Secondary audiences may include individuals and organizations generating waste wood and those end users of recovered wood.*

Major end markets include:

- panelboard manufacture (more accurately known as “wood-based panel manufacture”);
- biomass energy generation; and
- animal bedding.

Other end uses for recycled wood can be divided into:

- products for placement on porous soil surfaces, where the product will degrade (e.g. mulches, or for composting), following which the material may be incorporated under the surface (see Note 2);
- products for use on sealed surfaces where the intention may be to remove or to top-up the product at a later date (e.g. equestrian surfaces, paths and some mulches); and
- industrial and commercial applications (e.g. absorbents and odour filtration).

NOTE 2 *PAS 100:2012, sets out clear processing and testing requirements for composted materials using source-segregated biowastes, including waste wood. For this reason, the processing of waste wood for compost has been excluded from the requirements of PAS 111.*

This PAS does not apply to the reuse of wood products or to the processing of pre-consumer wood waste.

NOTE 3 *The term “pre-consumer” refers to wood products and residues from the forestry and saw mill industry, and not to wood waste arisings from*

manufacturing or sub-manufacturing processes⁸⁾.

For the purposes of this PAS, the latter is termed “post-industrial” wood wastes as many waste wood reprocessors in the UK will be handling significant quantities of such material.

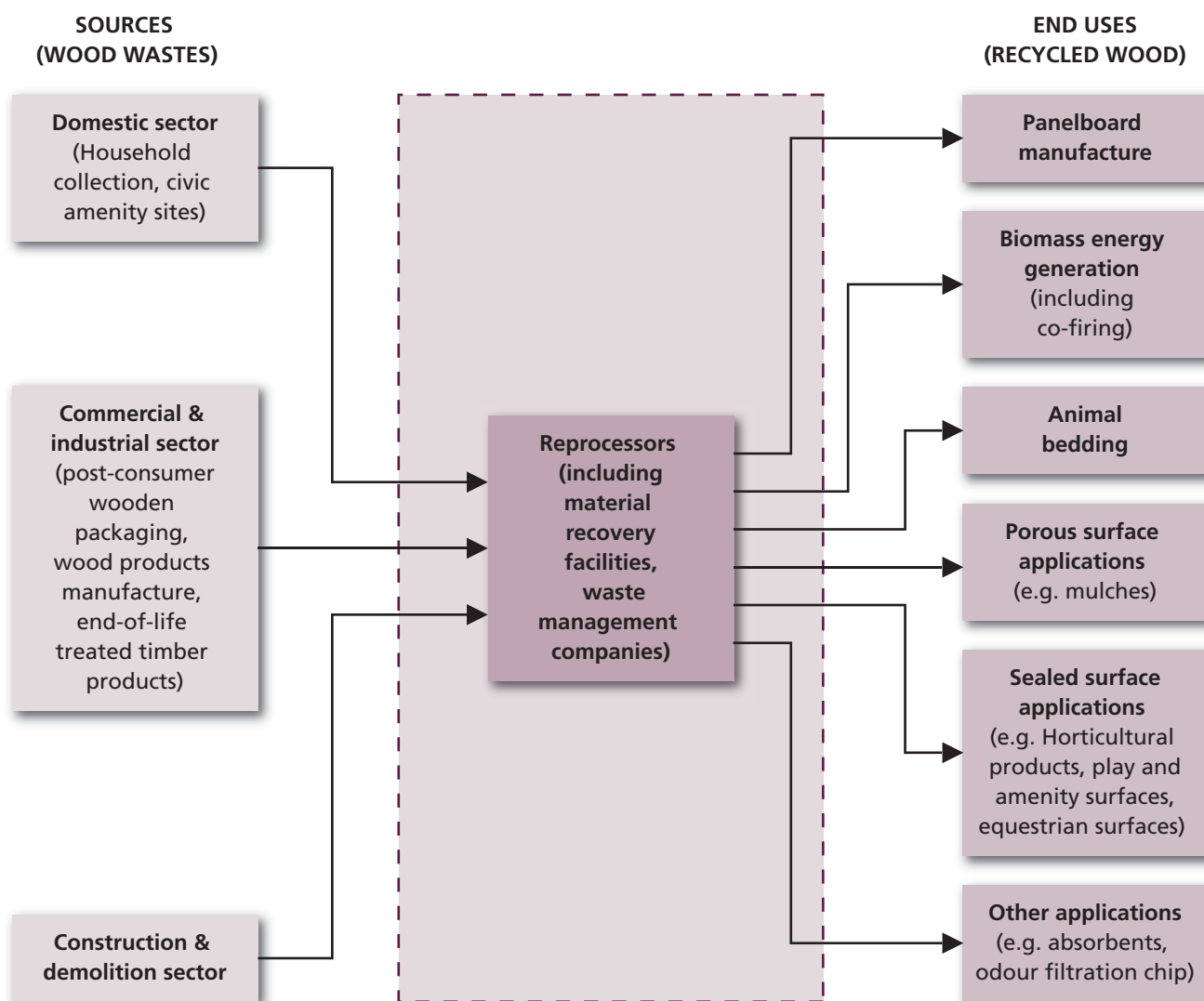
This PAS is not applicable to the growers of virgin biomass material.



⁸⁾ It is noted that ‘The European Panel Federation Standard for delivery conditions for recycled wood’ uses the term “pre-consumer wood” to refer to “by-products from processing and manufacturing sites”, i.e. “post-industrial” material in the terminology of this PAS.



Figure 2 – Applicability of the PAS in the waste wood collection and recycling supply chain



2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

PAS 104:2004, *Wood recycling in the panelboard industry*



3 Terms and definitions

For the purposes of this PAS the following terms and definitions apply.

3.1 animal bedding

material, cut or shredded, to provide bedding and soiling material for livestock and domestic pets



3.2 biomass

fuel source derived from any recently living material, commonly plant or animal matter

3.3 chipboard

panel material manufactured under pressure and heat from particles of wood

3.4 collector

organization that aggregates post-consumer wood from various sources and delivers it to the reprocessor

3.5 compost

solid particulate material that is the result of composting, that has been sanitized and stabilized and that confers beneficial effects when added to soil, used as a component of a growing medium, or is used in another way in conjunction with plants

3.6 contaminant

non-wood item, material or chemical present in or on waste wood or recycled wood product

3.7 CCA

chromated copper arsenate

3.8 equine surfaces

surface comprising wood chips upon which horses are exercised or trained

3.9 feedstock

raw material for a wood processing facility

3.10 fibreboard

NOTE See 3.43.

3.11 grading

arranging of materials into categories according to quality, weight or size

3.12 hardboard

fibreboard made in a wet process where the primary bond is typically derived from the felting of fibres which are subsequently subjected to heat and pressure

3.13 hardwood

wood from broadleaved trees

NOTE Such as oak, beech, ash, birch, maple, iroko, rubberwood; it is often darker in colour, longer lasting, denser and more decorative than the wood of coniferous trees.

3.14 hazardous waste wood

waste wood that is covered by legislation on hazardous waste and subject to the associated controls

NOTE 1 Waste wood that has been treated with CCA or creosote is likely to be classified as hazardous waste.

NOTE 2 See also 3.20 for definition of non-hazardous treated waste wood.

NOTE 3 The classification of waste wood as non-hazardous or hazardous is in most cases a complex matter requiring information on the specific chemicals in the wood and their concentration⁹⁾.

3.15 heavy metal

a member of a loosely defined subset of elements with a high relative atomic mass and which exhibit 'metallic properties'

NOTE Heavy metals can have a high impact on human and animal life, due to their persistence and propensity to accumulate.

3.16 load

material from a collection or shipment that is presented as one delivery

3.17 medium density fibreboard (MDF)

fibreboard manufactured in a dry process with the application of heat and pressure and where the primary bond is formed by the addition of a synthetic binder

3.18 moisture content

mass of water contained in wood, expressed as a percentage of the total mass of the wood, including the water

3.19 mulch

material spread and allowed to remain on the soil surface to conserve soil moisture, suppress weeds and shield soil particles from the erosive forces of raindrops and runoff

⁹⁾ See Wood Protection Association Guidance Note Dealing with treated wood related waste streams. Third edition, October 2009.