Summary of woodfuel standards

Prepared by:

1 Introduction

Wood burns, doesn't it? So what is the point of a set of standards for woodfuel?

Put simply standards provide a language which allows woodfuel to be described in an accurate and unambiguous way for both buyers and suppliers

While petrol and diesel may appear superficially to be very similar, if you put the wrong one in your car you won't get home and you'll receive an expensive repair bill. Similarly if you put woodchips of the wrong moisture content or chip size in your chip boiler that too will stop working, you'll get cold and receive an expensive repair bill! Or if you use unseasoned firewood on a wood burning stove you will also get cold, and spend more money on fuel, maintenance and replacing the boiler earlier than you need to.

The key parameters that need to be specified in an unambiguous way for woodfuel are[1]:

- Moisture content – because water doesn't burn!
- Dimensions – to make sure it fits the appliance and its fuel handling system
- Origin – where does it come from and what does it consist of
- Ash content

There are other parameters may also need to be given for specific types of woodfuel, but these are the key ones.

Approximately 12 years ago the European Union commissioned the Comité Européen de Normalisation (CEN) (the European Committee for Standardisation) to develop standards for solid biofuels. Subsequently CEN established Technical Committee 335 – Solid biofuels, which covers woody biomass, including wood from forests, plantations and landscape management. TC/335 then created a suite of interconnected technical standards (TS) defining terminology, specification, fuel quality assurance (FQA), sampling and the range of tests required to quantify fuel properties. Over time the CEN/TSs for solid biofuels are being revised and upgraded to Euro Norms ENs) displacing all other national standards across the EU (*eg* ONORM & DIN). They are also being used as the basis for new ISO standards (ISO/TC 238).

Although at first sight these standards may appear large and complex, the key parts any fuel supplier actually needs to know in detail are usually pretty small. The purpose of this document is to demystify the purpose and usage of the standards and highlight and explain the important issues.

[1] These parameters appear in a different order in the standards themselves, however this is likely to be the order of importance for many users.

2 Why standards?

So why do we need standards?

Unambiguous fuel standards can make life easier for everyone involved.

Table 1 Benefits of fuel standards

Ensure fuel is appropriate for the combustion equipment	Different boilers are designed to use different fuels. Some boilers can use a range of fuels, but may still need to be manually recalibrated to tell the control system that fuel properties have changed
	Inappropriate fuel properties for a given boiler may reduce efficiency, increase emissions or even cause it to stop working. The same fuel in a different system might work fine
	Some fuel might cause blockages or breakdown of the fuel feed system
Ensure the customer knows what they are paying for and whether they are getting it	Different biomass fuels may look very similar, but the energy content (or other important parameters) may be very different
	Accurately characterized and presented fuel properties allow suppliers offering premium fuel to be rewarded and customers to understand the price differential
	Knowing fuel properties allows system performance to be monitored and any drop in performance to be investigated
	Different grades of fuel, suitable for different users or systems, can be offered at different prices, allowing customers to buy what they need, and no more
Allow analysis of any problems with the system	If a combustion system fails to operate as expected, or breaks down, unambiguous standards allow the fuel to be eliminated as contributory
	Clear standards prevent the manufacturer of faulty equipment blaming the fuel supplier unfairly
	Clear standards also allow the manufacturer of equipment that is not operating as intended to identify if the cause is the fuel
Gives confidence	To the user that the fuel they are buying is right for their equipment and will function as intended and that they are paying a fair price
	To the fuel supplier that their fuel is appropriate for the intended application and there can be no subsequent unfounded allegations, and also that any added value can be appropriately acknowledged and rewarded
	To the combustion equipment manufacturer that their equipment can operate reliably at full performance and any difficulties can be readily diagnosed

3 What are the standards?

What do these standards do? What parameters do they cover? How much do they dictate what I supply?

Well, the first thing is to say that although there are over 30 CEN standards applying to solid biofuels (see table 2 below), either already ratified or under development, most woodfuel suppliers need worry about very few of them, and compliance is for the most part pretty straightforward.

The standards fall into three basic types:

1. Descriptions and definitions:
   a. Fuel specifications and classes
   b. Terminology, definitions and descriptions

2. How different parameters are determined, e.g.:
   a. Moisture content
   b. Particle size distribution (e.g. chip size range)
   c. Calorific value
   d. Ash content and properties
   e. Mechanical durability of pellets

   But also:
   f. How representative sampling should be undertaken for testing
   g. Conversion of analyses to different bases

3. How fuel quality is monitored and maintained through the supply chain

Table 2 CEN solid biofuels standards

Descriptions and definitions	BS EN 14961-1:2010	Fuel specifications and classes – Part 1: General requirements
	PrEN 14961-2	Fuel specifications and classes – Part 2: Wood pellets for non-industrial use
	PrEN 14961-3	Fuel specifications and classes – Part 3: Wood briquettes for non-industrial use
	PrEN 14961-4	Fuel specifications and classes – Part 4: Wood chips for non-industrial use
	EN 14961-5:2011	Fuel specifications and classes – Part 5: Firewood for non-industrial use
	PrEN 14961-6	Fuel specifications and classes – Part 6: Non-woody pellets for non-industrial use
	EN 14588:2010	Terminology, definitions and descriptions
Measurement of parameters	BS EN 14774-1:2009	Determination of moisture content – Part 1: Oven dry method. Total moisture – Reference method
	BS EN 14774-2:2009	Determination of moisture content – Part 2: Oven dry method. Total moisture –Simplified method
	BS EN 14774-3:2009	Determination of moisture content – Part 3: Oven dry method. Moisture in general analysis sample
	BS EN 14775:2009	Determination of ash content
	BS EN 14918:2009	Determination of calorific value
	BS EN 15103:2009	Determination of bulk density
	BS EN 15148:2009	Determination of the content of volatile matter
	BS EN 15210-1:2009	Determination of the mechanical durability of pellets and briquettes- Part1: Pellets
	EN 15104:2011	Determination of total content of carbon, hydrogen and nitrogen - Instrumental methods
	EN 15105:201	Methods for determination of the water soluble content of chloride, sodium and potassium
	EN 15149-1:2010	Methods for the determination of particle size distribution -

		Part 1: Oscillating screen method using sieve apertures of 3,15 mm and above
	EN 15149-2:2010	Methods for the determination of particle size distribution - Part 2: Vibrating screen method using sieve apertures of 3,15 mm and below
	CEN/TS 15149-3:2006	Methods for the determination of particle size distribution - Part 3: Rotary screen method
	CEN/TS 15150:2005	Methods for the determination of particle density
	EN 15289:2011	Determination of total content of sulphur and chlorine
	EN 15290:2011	Determination of major elements
	EN 15297:2011	Determination of minor elements
	CEN/TS 15370:2006	Method for the determination of ash melting behaviour – Part 1: Characteristic temperatures method
Methods for sampling	CEN/TS 14778-1:2005	Sampling – Part 1: Methods for sampling
	CEN/TS 14778-2:2005	Sampling – Part 2: Methods for sampling particulate matter transported in lorries
	CEN/TS 14779:2005	Sampling – Methods for preparing sampling plans and sampling certificates
Conversion of results	EN 15296:2011	Calculation of analyses to different bases
Quality assurance	EN 15234-1:2011	Fuel quality assurance – Part 1: General requirements
	PrEN 15234-2:2010	Fuel quality assurance – Part 2: Wood pellets for non-industrial use
	PrEN 15234-3:2010	Fuel quality assurance – Part 3: Wood briquettes for non-industrial use
	PrEN 15234-4:2010	Fuel quality assurance – Part 4: Wood chips for non-industrial use
	PrEN 15234-5:2010	Fuel quality assurance – Part 5: Firewood for non-industrial use
	PrEN 15234-6:2010	Fuel quality assurance – Part 6: Non-woody pellets for non-industrial use

Note: Main documents which woodfuel suppliers should read first are highlighted in yellow

3.1 Descriptions and definitions

The fuel specifications and class standards simply set out which properties of different kinds of fuels need to be stated when selling that fuel and how the values are given (normative properties). As well as these properties, it also sets out another set of properties (informative) that may need to be given in some situations, or which may be given as supplementary information. BS EN 14961-1:2010 sets out the general requirements and lists what properties must be stated for each solid biofuel type (wood pellets, briquettes, chips, firewood and non-woody pellets). EN 14961 parts 2 to 6 each then apply to an individual solid biofuel type and describe specific classes of that fuel, such as an A1 wood pellet, or a B2 wood chip, with particular combinations of properties. EN 14961 parts 2 to 4 and 6 are still under development at the time of writing but are expected to be finalized shortly. EN 14961-5:2011 is published.

The properties that need to be stated for most forms of solid biofuels are:

- Biomass origin i.e. what is it made of and where does it come from – tree (stemwood, branches, stumps), waste wood, straw, etc.
- Dimensions (diameter, length, proportions of chips in different size ranges, etc.)
- Moisture content
- Ash content

3.1.1 Origin

The origin works on a hierarchical basis based on four main groups:

1. Woody biomass
2. Herbaceous biomass
3. Fruit biomass
4. Blends and mixtures

Each of these groups is then further divided into 2 to 4 sub-groups, and each of these is further divided and divided again down to four levels of detail. Each of these categories is represented by a one to four digit number. In this way it is possible to describe a fuel in either the broadest possible terms, e.g. just "1 woody biomass", or even just a "4.2 mixture of biomass" or in much more detail, for instance:
1.1.3.1 describes woody biomass, from forest, plantation or other virgin wood, from stemwood of broadleaf trees; or
1.2.2.2 describes woody biomass derived from by-products and residues from the wood processing industry comprising chemically treated wood residues, fibres and wood constituents including bark.

Table 3: Main codes relevant to woodchips:

1. Woody Biomass	**1.1 Forest, plantation and other virgin wood**	**1.1.1 Whole trees without roots**	**1.1.1.1 Broadleaf**
			1.1.1.2 Conifer
			1.1.1.3 Short Rotation Coppice
			1.1.1.4 Bushes
			1.1.1.5 Blends and mixture
		1.1.3 Stemwood	**1.1.3.1 Broadleaf**
			1.1.3.2 Conifer
			1.1.3.3 Blends and mixtures
		1.1.7 Segregated wood from gardens, parks, roadside maintenance and fruit orchards	

Refer to BS EN 14961-1:2010 for full details

There is no requirement to give a more detailed description of origin than you want, however certain classes of fuel will require biomass from one of a limited number of categories of origin.

This illustrates how the standards work. At their simplest they just provide a structure and system of nomenclature to describe any form of solid biofuel in a way that is unambiguous and includes the key properties. This is what is set out in BS EN 14961-1:2010, and many of the other standards simply describe how to measure individual properties. What EN 14961 parts 2 to 6 then do is to define different classes of each type of fuel for use in non-industrial boilers.

3.1.2 Dimensions

Dimensions have different meanings for different forms of solid biofuel.

Wood pellets: In the case of wood pellets it is usual to state diameter only, though an acceptable range of lengths is quoted for each diameter.

Firewood (i.e. logs): One of the key things a customer needs to know is will the logs fit in their wood stove or boiler. Hence the maximum length (or length range) and range of diameters are both stated. For example:
a delivery of 'L25' logs would all be less than 25 centimetres long; and
'D10' logs would have a diameter of between 5 and 10 centimetres.

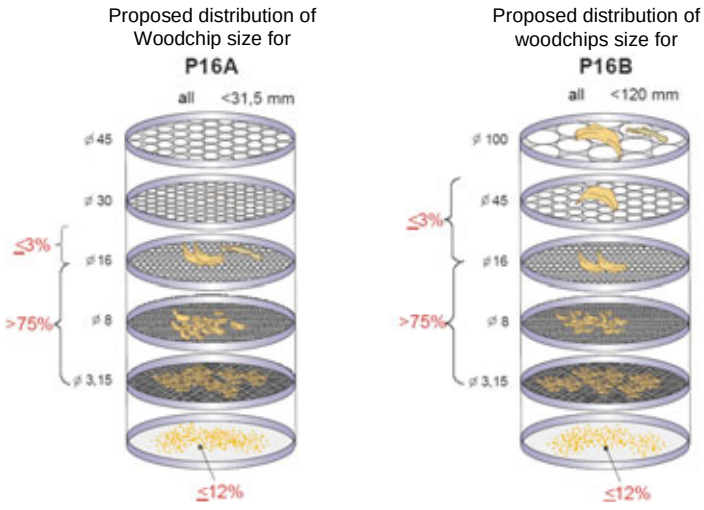
The important issue is to describe the product - the CEN standards provide a simple method of doing this.
Firewood is also given a 'quality code' of A1, A2 or B. the main characteristics of each are:

- A1 logs will be more than 90% split and will have no visible decay;
- A2 logs will be more than 50% split and may have up to 5% decay; and
- B logs will be less well seasoned with more than 25% moisture content by overall weight and tend to be larger.

Woodchips: Are slightly more complicated as it's very difficult to ensure a whole load of woodchips are of the same size, just because of the way they are produced. So the dimensions of wood chips are specified in terms of the range of sizes of 75% of the sample, measured using sieves.
While woodfuelled systems can be designed to burn a variety of woodchip sizes many modern systems have been designed to deliver very high efficiencies in converting the energy stored in the wood into heat. To work well they need woodchips of the correct size, generally with a low proportion of small, or fine, material which would reduce the efficiency of the combustion and a low proportion of larger pieces which could jam the feed system. The CEN standards use simple calibrated sieves to assess the composition of particular samples:

A common specification is likely to be P16 and this will comprise:

- 75% of the total volume of woodchips being between 3.15mm and 16mm;
- Less than 12% of the total volume of woodchips will be less than 3.15mm in size; and
- For P16A no more than 3% will be more than 16mm and all will be less than 31.5mm; OR for P16B no more than 3% will be more than 45mm and all will be less than 120mm



3.1.3 Moisture content

Moisture content is usually specified as the percentage of the total weight of the (wet) sample, i.e. wet basis. However, it can also be quoted on dry basis as (e.g. U25 ≤ 25%) with the weight of water given as a percentage of the mass of dry biomass. Although both values are equally valid, and can be readily converted from one to another, it important always to be clear which basis has been used.

Not only must moisture content be measured correctly and accurately, product sampling is particularly important when measuring moisture content as it is a parameter that can vary considerably within a pile of woodchips and within a single log. Firewood dried as roundwood in long lengths for example will dry by evaporation from the ends so will exhibit a very significant variation in moisture content from a maximum in the middle to a minimum at each end. Firewood recently cut from such a long length will show considerable variability between logs as a result.

3.1.4 Ash content

Ash comprises the non combustible mineral content of the fuel and predominantly consists of oxides of alkali and alkaline earth metals, such as potassium, calcium and magnesium. The ash content of biomass can vary considerably, with very low levels in heartwood, and much higher levels in bark. Cereal straw tends to be much higher still. Some boilers and stoves are designed to be able to burn high ash content fuels, but some cannot do so.

In addition to the quantity of ash, some ash tends to melt at a lower temperature, which can give rise to the formation of lumps of clinker or slagging. This can block air flow through the grate.

3.1.5 Calorific value

Calorific value (CV) is the energy content of the fuel. While provision of the calorific value (Q) of the fuel is not an essential requirement of the standards (i.e. it is 'informative' rather than 'normative') we suggest that provision of this information, particularly when dealing with woodchips, is beneficial. The calorific value of most forms of wood is similar based on the same weight and moisture content but the density of different tree species does affect the volume energy density. Broadleaf wood by volume generally has >30% greater energy content than softwood. Broadleaf species may appear to grow much slower than conifer species on the same site but when the calorific value is considered the difference is much less. This can be particularly important when considering the value of traditional coppice management of broadleaf species like sweet chestnut.

By definition net calorific value is defined as the energy content per unit weight (Q). It is also possible to specify energy density (E), which is energy content per unit volume. The net CV of woodfuel is highly dependent on moisture content, and consequently some people prefer to buy by volume rather than weight, which is much less sensitive to moisture content. However, to convert a volume of wood chips to energy requires a knowledge of not only species but also the chipping volume ratio (the volume of chips generated when chipping 1 m^3 of solid wood).

Table 4: Energy density of different tree species (by volume)

Species	**Net Calorific Value** (30% Moisture Content)	**Density** (30% Moisture Content)	**Energy density** (30% Moisture Content)
	kWh/kg	**kg/solid m^3**	**kWh/solid m^3**
Scots Pine	3.5	580	2,030
Sitka Spruce	3.5	520	1,820
Douglas Fir	3.5	620	2,170
Oak	3.5	800	2,800
Beech	3.5	780	2,730
Ash	3.5	750	2,625

3.1.6 Additional information

In addition to the main parameters described above, other properties may only need to be specified in certain cases, for example nitrogen, chlorine or sulphur content where the origin is chemically treated biomass, or bulk density in the case of wood chips sold by volume.

There are also a number of parameters that are included as "informative". These are only required to be given in certain circumstances, such as when there may be some reason why the value might be higher than the typical range. This might apply to biomass grown on land with high natural levels of metal ores, or where chlorine levels might be high as a result of growing near to the sea, or where the

land might be contaminated with industrial waste or sewage sludge. If this might be the case it is the responsibility of the fuel supplier to check levels and report if necessary.

In the case of pellets, and particularly non-woody pellets, the ash melting behaviour is also important and included as informative. In the case of grasses and cereals ash melting point can be significantly lower than for wood and this can cause slagging problems (formation of solid lumps of ash melted together in the grate) in many boilers and stoves.

Specific forms of biomass may also require additional properties to be stated, such as mechanical durability, bulk density and percentage of fines (dust) for pellets, any additives and net calorific value for pellets and briquettes, particle density for briquettes, etc.

3.1.7 Product labelling:

Illustration of what a woodchip product label might look like:

Supplier	**Acme Woodchips Inc**					
Product	**Woodchips**					
Quantity of delivery	**4.00**		Tonnes			
Origin	**1.1.3.1**		**Broadleaf stemwood from 'Barrow wood'**			
Country	**England**					
Particle size	P16A ☺	P16B	P31.5	P45A	Other:	
Moisture content (% water by overall weight)	M20	M25	M30 ☺	M35	Other:	
Ash content	**< 1.0**		by weight			
Energy value	**3,500**	kWh per tonne	and	**800**	kWh per lose m^3	
Other information:	**All our wood is sourced from sensitively managed coppice woodlands in the Hampshire. Further details see our website: www.acmewoodchips.co.uk**					

Illustration of what a firewood product label might look like:

Supplier	**Local Logs R Us**		
Product	**Seasoned firewood**		
Quantity of delivery	**2.0 m^3 loose**	**Note: 1 solid cubic metre of wood is the same as about 2.5 loose cubic metres of logs**	
Origin	**1.1.3.1**	**Birch stemwood from sustainably managed woods in the 'South Downs National Park'**	
Country	**England**		
Particle size	Diameter:	**D10**	**All between 5 and 10cm diameter**
	Length:	**L25**	**All less than 25 cm long**
Moisture content (% water by overall weight)	**M25**		**On average less than 25% moisture content**
Ash content	**< 1.0**		by weight
Energy density	**E1,500**	kWh per loose m^3	
Other information:	**All our wood is sourced from sensitively managed woodlands in the South Downs National Park. Please join us on 31st May 2011 for an evening walk around Barrow Wood to see how your purchase is benefiting native woodland plants and animals. Further details see our website: www.logsrus.co.uk**		

3.2 Determination of properties

What the majority of the standards do is set out how each property must be measured. If the parameters are to be regarded as absolute values, independently verifiable and comparable between different measurements, there has to be a standardized protocol. Of the suite of 30 or so standards, 20 are concerned with the determination of the parameters outlined in the previous section. Each one sets out the equipment to be used, the procedures to be employed, the level of precision, etc. for the determination of one or a number of parameters. Many of these are only of relevance to test laboratories and cannot be performed without specialist equipment and facilities, however these are for the most part determinations that will not be required for the majority of biofuel sold. Where they are required it may simply be necessary to perform an occasional measurement on a representative sample to determine that it is within the normal range.

There are, however, a few measurements which it is possible for the fuel supplier to perform for themselves without excessive expenditure or technical expertise. And these, fortunately, are the ones that it is most important to monitor on a routine basis.

Although BS EN 14774-2:2009 sets out how moisture content should be measured using specialist equipment, it can also be measured reasonably accurately using a domestic oven. A separate document, available from Wood Heat Solutions (www.woodheatsolutions.eu/fes.aspx) and the Biomass Energy Centre (www.biomassenergycentre.org.uk) describes how this is done. It is also possible to use a hand held, electrical resistance type moisture meter to measure the moisture content of a firewood log, provided it is referenced back to the oven dry method in the standards. Considerable care must be taken when doing this as there are a number of factors that can give an incorrect measurement. Many such meters give dry basis moisture content so it is important to be sure which basis is being used.

Chip size distribution can also be measured without highly expensive specialist equipment, although a set of suitable grading sieves will be required at a cost of around £100 each. The procedure is set out in EN 15149-1:2010, and a user friendly guide will also be available through Woodheat Solutions and the Biomass Energy Centre in due course.

Analysis of samples for concentration of heavy metals and other chemical species does require a specialist test laboratory, however, this is unlikely to be necessary for most fuel suppliers except possibly on an occasional basis. If it is required there is a list of UKAS accredited test labs on the Standards page of the Biomass Energy Centre website (www.biomassenergycentre.org.uk), and biomass fuel testing capability can also be searched for on the UKAS website (www.ukas.org/testing/singlesearch.asp).

3.3 Quality assurance

If the end user is to have a fuel that meets the standard for a particular class, then all points along the supply chain must be monitored and, where necessary, documented to ensure that standards are met. In addition, it must ensure that contamination is avoided, processes perform their role properly and, if there are any subsequent concerns about fuel quality it is relatively straightforward to identify where and when any slipping of standards might have occurred and how many other users of the fuel might potentially be affected. The aim of the QA standards is to guarantee the fuel quality through the whole supply chain, from the origin and source to the delivery of the solid biofuel and provide adequate confidence that specified quality requirements are fulfilled.

It is an explicit aim of the standards that: “Quality assurance measures shall establish confidence in the fuel through systems that are simple to operate and do not cause undue bureaucracy.”

A well documented quality assurance (QA) protocol ensures a fuel supplier is well protected should there be any allegation of the fuel causing difficulties.

The QA standards set out "Critical control points" at different points in the production process where factors can influence the final quality and so parameters must be monitored to ensure no degradation of quality. The QA standards set out the critical control points for each form of solid biofuel and what measurements and sampling frequency are required. They also set out any critical factors in relation to delivery and storage of the fuel to ensure quality is maintained up to the point where the end user burns it.

5. What do I need to do about them?

Do I need to take any notice of them? Can I just go on selling fuel as I have before?

There is (currently) no legal obligation for solid biofuels sold in the UK to be described according to the CEN standards, or to meet any particular fuel class. However, as time goes on and the industry and supply chain matures it is to be expected that they will become more widely demanded. Woodchip boilers will already need to specify at least the range of moisture content acceptable, and the chip size. Many of those already installed in the UK are Austrian made and specify chip in terms of the Austrian ÖNORM standard. This is being superseded both here and throughout Europe, by the pan European CEN standards and for more or less all wood chip boilers failure to meet the required fuel specification will not only invalidate the warranty, but is likely to lead rapidly to operational difficulties and failure. Larger corporate and local authority customers are likely to be very specific in demanding a fuel specification when signing a fuel supply contract. Any supplier of chips that does not meet whatever specification was demanded by the user at the point of purchase will potentially be vulnerable to legal action should a boiler fail to operate properly when burning them. The ÖNORM G30 chip size specification, for example, is very similar to P16 in EN 14961-4.

Pellet boiler manufacturers too will usually require that the fuel meets a national or European standard if the warranty is to stand. Pellets that do not meet the standard can be insufficiently durable and so prone to crumbling during handling or in storage. Excessive fines (sawdust) may also be present from the outset with poor quality pellets. Pellets made with a higher than usual proportion of bark, or where the wood has been contaminated with soil or sand, will have a higher ash content. And pellets which incorporate biomass that is not pure wood, such as straw or *Miscanthus*, will not only have a high ash content, but also a lower ash melting point which will give rise to clinker formation, potentially causing damage to the boiler. Again, any supplier of pellets that does not meet the appropriate standard will potentially be legally vulnerable should the boiler experience difficulties.

In the case of firewood there is often a less direct relationship between incorrect specification and failure of the combustion equipment. Insufficiently dry logs used in a log stove will not burn as well or efficiently as they should, so more fuel will be needed, will be more smoky, and will lead to deposits of soot and tars (creosote) in the flue as well as fouling any stove window. Creosote is acidic and over time will corrode the flue lining and soot can potentially cause a chimney fire if not swept regularly. Used in a modern, high efficiency batch type log boiler insufficiently dry logs can cause it to 'trip out'.

6. What about testing?

Do I need to get everything tested? Who can do the testing? Am I supposed to get every property of every last twig tested by someone?

Firstly, as explained above, not every property needs to be stated, and different fuels need different properties given. In many cases, unless there is a reason to suspect that it might be otherwise, typical values can be assumed. Situations where this might not be acceptable are where biomass has been grown on land treated with sewage sludge, on geology that includes metal ores, or where it has been grown sufficiently near the sea that spray borne salt may be present in the bark potentially giving elevated chlorine (and sodium) levels unless the bark is removed.

Some parameters, such as moisture content, may well need to be measured periodically and chip size distribution should also be checked regularly to ensure that factors such as degrading of the condition of the chipper blades has not led to sub-standard chips. When feedstock is being sourced consistently from the same supply, and there is no reason to believe that any important parameter is likely to have changed or be outside the normal range, then it may be sufficient simply to rely on typical values for many of the parameters, or test only occasionally to ensure compliance.

Just as there is currently no absolute requirement to produce fuel to a particular standard unless demanded by the customer, there is equally no absolute requirement to have any testing performed by any particular test house. If the customer is happy for in house testing then that should suffice, though any measurement should be either according to the standard procedure, or calibrated to it. However, where independent verification of a property is required, a test house accredited by UKAS should be used. There is a list of UKAS accredited test labs on the Standards page of the Biomass Energy Centre website (www.biomassenergycentre.org.uk), and biomass fuel testing capability can also be searched for on the UKAS website (www.ukas.org/testing/singlesearch.asp).

7. How can I get hold of a copy of the standards?

The key standards, those of particular relevance to producers and suppliers, can currently be downloaded, free of charge, from the Biomass Energy Centre (BEC) website (www.biomassenergycentre.org.uk) under the licence for which BEC has paid. The standards available from BEC represent those which it is particularly important for producers and suppliers to understand in order to be able to supply fuel that meets the relevant standards, including those covering the determination of certain key parameters that it is potentially within the capabilities of a producer or supplier without specialist laboratory facilities to measure.

The full set of standards documents can be bought from the BSI (http://shop.bsigroup.com).

Further reading: