Wood chips & hog fuel
Introduction

The energetic use of biomass is widely spread in Austria. In order to meet the growing demand for renewable energy through solid biofuels emphasis must be laid on the efficient use of these fuels in the future. Huge differences in quality can be found especially in wood chips and hog fuel, which may lead to lower efficiency in the combustion process and increased maintenance of boilers. Short supply chains and low processing increase the influence of the raw material on the final quality of the fuel. OENORM C 4005, which was published in 2013, takes this into account by the formation of raw material groups. Still, also the production, transport and storage of the fuel can lead to significant changes in quality.

The examples described should give producers, traders and consumers of wood chips and hog fuel insight into the range of existing fuel qualities and raise awareness for the efficient use of solid biofuels.
The classification of fuel properties is based on the following standards:

OENORM C 4005:2013-02  Wood chips and hog fuel for energetic use in heating appliances with a thermal output over 500 kW

ISO/FDIS 17225-1:2013-05  Solid biofuels - Fuel specifications and classes - Part 1: General requirements

ISO/FDIS 17225-1 is expected to replace the currently valid EN 14961-1 in 2014 as an EN ISO 17225-1 and will require further adaption of OENORM C 4005. This adaption mainly affects the particle size classification as well as the content of fine particles, as already can be seen in the comparison of the results according to OENORM C 4005 and ISO/FDIS 17225-1.

The reading of this example collection requires knowledge of the above mentioned standards and does not replace their acquisition.
The product declarations of the examples include the following information:

**OENORM C 4005** ‘traded form’ ‘raw material group’ ‘particle size’ ‘moisture content’ ‘ash content’ ‘content of fine particles’ ‘nitrogen’ ‘chlorine’

If no values are given for A, F, N and Cl they correspond to the typical values given in OENORM C 4005 for the respective raw material group. For some examples single properties are not given due to missing analyses; in this case the respective properties are missing for the results of the ISO/FDIS 17225-1 as well.

**ISO/FDIS 17225-1** ‘traded form’ ‘raw material class’ ‘particle size’ ‘moisture content’ ‘ash content’ ‘content of fines’ ‘bulk density as received’ ‘nitrogen’ ‘sulphur’ ‘chlorine’ ‘net calorific value as received’

In case of missing analyses the next property class is given.

**Production** ‘communion unit’ ‘screen size’ ‘post-treatment’ ‘mixing ratio raw material’

If no information exists for comminution unit, screen size and post-treatment, ‘ns’ is given. If no ”mixing ratio raw material” is given, the solid biofuel consists to 100% of only one raw material class.
Raw material – origin and source

1.1.1.1 Whole trees without roots, deciduous
1.1.3.1 Stemwood, deciduous
1.1.3.2 Stemwood, coniferous
1.1.3.3 Stemwood, blends and mixtures

Typical values: A2.0 F15

The examples include mixtures with raw material from C1 or \( \leq 25\% \) of the raw material group 1.1.4.3. This raw material group has no or negligible amounts of needles.
OENORM C 4005  wood chips  C1  P63  M55
ISO/FDIS 17225-1  wood chips  1.1.1.1  P45  M50  A2.0  F10  BD250  NO.3  S0.03  CL0.02  Q8.3
production  disc chipper

Source: HFA, FHP
Raw material group C2

Raw material – origin and source

1.1.1.2 Whole trees without roots, coniferous
1.1.4.3 Logging residues, deciduous, stored

Typical values: A3.0 F15

The examples include mixtures with raw material from C1, C2 or ≤ 25% of the raw material classes 1.1.4.1, 1.1.4.2, 1.1.4. The overall share of coniferous wood with a branch diameter < 4 cm is 25%.
Raw material – origin and source

1.1.1.3 Whole trees without roots, short rotation coppice
1.1.1.4 Whole trees without roots, bushes
1.1.1.5 Whole trees without roots, blends and mixtures
1.1.4.1 Logging residues, deciduous (fresh/green, includes leaves)
1.1.4.2 Logging residues, coniferous (fresh/green, includes needles)
1.1.4.4 Logging residues, coniferous, stored
1.1.4.5 Logging residues, blends and mixtures
1.1.7 Wood from gardens, parks, roadside maintenance, vineyards, fruit orchards

Typical values: A5.0 F25

The examples include mixtures with raw material from C1, C2 and C3.
OENORM C 4005  wood chips  C3  P45B  M45

ISO/FDIS 17225-1  wood chips  1.1.4.5 P45 M45 A5.0 F25 BD300 N1.0 S0.08 Cl0.05
production  drum chipper  80 mm  50% 1.1.4.1/1.1.4.3  50% 1.1.4.2
OENORM C 4005  wood chips  C3  P-  M55+  F-

ISO/FDIS 17225-1  wood chips  1.1.4.4  P-  M55+  A5.0  F30+  BD350  N1.0  S0.08  Cl0.05  Q6.4

production  drum chipper  100 mm
OENORM C 4005  wood chips  C3  P-  M55  F-

ISO/FDIS 17225-1 wood chips  1.1.4.5 P31 M50 A2.0 F30 BD350 N0.5 S0.05 CI0.02
production drum chipper ns  10% 1.1.4.1/1.1.4.3  90% 1.1.4.2

Source: HFA, FHP

Source: HFA, FHP
Raw material group C4

Raw material – origin and source

1.1.2 Whole trees with roots
1.1.5 Stumps/roots
1.1.6 Bark (from forestry operations)
1.1.8 Blends and mixtures

Typical values: A7.0 F25
Contact

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