

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.

Explanation

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 'comminution 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 N0.3 S0.03 Cl0.02 Q8.3
production disc chipper

C1



OENORM C 4005 wood chips C1 P63 M35

ISO/FDIS 17225-1 wood chips 1.1.3.3 P31 M35 A1.0 F05 BD250 N0.2 S0.02 C10.02 Q12.4
production drum chipper 80 mm 50% 1.1.3.1 50% 1.1.3.2

C1



OENORM C 4005 **wood chips C1 P45B M35** A3.0 F25

ISO/FDIS 17225-1 **wood chips** 1.1.8 P31 M30 A3.0 F20 BD250 S0.03 Cl0.02
production **drum chipper** 80 mm 90% 1.1.3.1 10% 1.1.4.1/1.1.4.3

C1



Source: HFA, FHP



Source: HFA, FHP [50]

Raw material group C2

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 $\leq 25\%$ 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%.

OENORM C 4005 **wood chips C2 P45B M35**

ISO/FDIS 17225-1 **wood chips 1.1.4.3 P45 M30 A3.0 F10 BD250 N0.3 S0.04 Cl0.02 Q12.6**
production **drum chipper 70 mm**

C2



Source: HFA, FHP

Source: HFA, FHP [53]

OENORM C 4005 **wood chips C2 P45B M35 A7.0 F25**

ISO/FDIS 17225-1 **wood chips 1.1.8 P16 M25 A7.0 F20 BD250 N0.5 S0.08 Cl0.02**
production **drum chipper ns 15% 1.1.3.1 85% 1.1.4.1/1.1.4.3**



Source: HFA, FHP



Source: HFA, FHP [32]

C2

Raw material group C3

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



C3

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



C3

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 Cl0.02
production drum chipper ns 10% 1.1.4.1/1.1.4.3 90% 1.1.4.2

C3



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

OENORM C 4005 **hogfuel C4 P100 M55**

ISO/FDIS 17225-1 hogfuel 1.1.5 P45 M50 A5.0 F10 BD300 N0.2 S0.02 Cl0.02 Q8.9
production shredder ns



OENORM C 4005 **hogfuel C4 P- M45** A7.0+ F-

ISO/FDIS 17225-1 **hogfuel** 1.1.5 P45 M40 A10.0+ F30+ BD350 N0.2 S0.02 Cl0.02
production shredder 120 mm



IMPRINT:

Media owner/publisher: Österreichische Gesellschaft für Holzforschung,
Franz-Grill-Straße 7, 1030 Vienna, Austria

Editor: Holzforschung Austria, Franz-Grill-Straße 7, 1030 Vienna, Austria
Tel. +43 (0)1 798 26 23 -0, Fax -50
hfa@holzforschung.at - www.holzforschung.at

Technical editor: DI Monika Steiner

Print: Druckerei Janetschek GmbH, Heidenreichstein

Copyright: Reprints and photomechanical reproduction, even in part, only allowed with permission of the media owners. All rights are reserved, including the acceptance of articles in accordance with § 44 Section 1 of the Copyright Act. Published texts and pictures pass into the ownership of the media owner. No claims can be asserted, except possible fees.

Photo credits: Holzforschung Austria (HFA), Arbeitskreis Energie in der Kooperationsplattform Forst Holz Papier (FHP), Bundesforschungszentrum für Wald (BFW), Maschinenring Salzburg reg.Gen.m.b.H (MR Salzburg), Komptech GmbH



Supported by:



Contact

Holzforschung Austria
Franz Grill-Straße 7, 1030 Vienna, Austria
Bioenergy group
+43 (0)1 798 26 23-0
hfa@holzforschung.at
www.holzforschung.at