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# Analytical Report

**Energy Pellets Moerdijk BV**
Attn: Mr. Hylko Brandsma
Apolloweg 4 Harbour no. M189A
4782 SB Moerdijk
Netherlands

| | | | |
|---|---|---|---|
| Reportnr. | : **650653 version 1** | Disponent Number | : EPM.woodpellets.6mm.28.06.2016 |
| Product recognized as | : Hout/Wood/Bois/Holz/Madera | | |
| Product Specification | : EPM.woodpellets.6mm.28.06.2016 | Sampling Date | : 29-Jun-2016 |
| Reference | : | Samplesize (kg) | : 6,671 |
| AWB / BarCode | : | Sealed / Seal Code | : No / |
| Packing | : Plastic, ambient | Sample Arrival Date | : 01-Jul-2016 08:00 |
| Sample Type | : BIS | ReportDate Version | : **07-Jul-2016 16:36** |

**Composition Determination**

| Parameter | Amount (a.r.) | Amount (o.d.) | Amount (as det.) | Amount (d.a.f.) | | |
|---|---|---|---|---|---|---|
| Total Moisture | 5,60 | | | | % | Q |
| Moisture Airdry | | | 7,54 | | % | Q |
| Ash | 0,63 | 0,66 | 0,61 | | % | Q |
| Volatile matter incl. moisture. | | | 83,49 | | % | Q |
| Volatile matter | 77,54 | 82,14 | 75,94 | 82,69 | % | |
| Fixed Carbon | 16,23 | 17,20 | | | % | |
| Gross Calorific Value | 4555,4 | 4825,7 | 4461,7 | 4857,8 | kcal/kg | Q |
| | 19,07 | 20,20 | 18,68 | 20,34 | GJ/mt | |
| | 8199,7 | 8686,2 | 8031,0 | 8744,1 | B.T.U.'s/Lb | |
| Nett Calorific Value (cV) | 4255,2 | | | | kcal/kg | |
| | 17,82 | | | | GJ/mt | |
| | 7659,4 | | | | B.T.U.'s/Lb | |
| Nett Calorific Value (cP) | 17,74 | | | | GJ/mt | |
| Emissionfactor CO2 (cV) | 99,63 | | | | t CO2/TJ | |
| Emissionfactor CO2 (cP) | 100,00 | | | | t CO2/TJ | |
| Hydrogen | 5,47 | 5,80 | 6,20 | 5,84 | % | Q |
| Carbon | 48,41 | 51,28 | 47,41 | 51,62 | % | Q |
| Nitrogen. | 0,21 | 0,23 | 0,21 | 0,23 | % | Q |
| S. (Sulfer) | 0,02 | 0,02 | 0,02 | 0,02 | % | Q |
| Oxygen (by difference) | | | | 42,29 | % | |

**Composition Determination**

**Common**

| Parameter | Amount (a.r.) | Amount (o.d.) | Amount (as det.) | | |
|---|---|---|---|---|---|
| AFT. (oxid) DT | | | 1440 | gr. C | |
| Diameter pellets (n=25) | | | 5,9 | mm | Q |
| Length of pellets | | | 11,3 | mm | Q |
| Sieve < 3,15 mm | | | 0,4 | % | |

**Metal and other elements**

| Parameter | Amount (a.r.) | Amount (o.d.) | Amount (as det.) | | |
|---|---|---|---|---|---|
| Cd (Cadmium) | 0,093 | 0,098 | 0,091 | mg/kg | Q |
| Pb (Lead) | 1,59 | 1,68 | 1,56 | mg/kg | Q |
| As (Arsenic) | 0,086 | 0,091 | 0,084 | mg/kg | Q |

Demanded 01-Jul-2016 by Energy Pellets Moerdijk BV
Analyses according to annex
Drs. ing. H. Janssens Director TLR International Laboratories

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| | | | | | |
|---|---|---|---|---|---|
| Hg (Mercury) | < 0,020 | < 0,020 | < 0,020 | mg/kg | Q |
| Ni (Nickel) | < 3,0 | < 3,0 | < 3,0 | mg/kg | Q |
| Cl (Chlorine) | 0,016 | 0,017 | 0,016 | % | Q |
| Cr.(Chromium) | < 5,0 | < 5,0 | < 5,0 | mg/kg | |
| Cu.(Copper) | < 5,0 | < 5,0 | < 5,0 | mg/kg | |
| Zn. (Zinc) | 12,3 | 13,0 | 12,0 | mg/kg | |

**Other Analysis**

**Common**

| **Parameter** | **Amount (a.r.)** | **Amount (o.d.)** | **Amount (as det.)** | | |
|---|---|---|---|---|---|
| Mechanical Durability | | | 98,0 | % | Q |
| Bulk density | | | 702,50 | kg/m3 | Q |

**Preparation**

**Common**

| **Parameter** | **Amount (a.r.)** | **Amount (o.d.)** | **Amount (as det.)** | | |
|---|---|---|---|---|---|
| Preparation sample | Biomass preparation according NEN-EN14780 | | | | Q |

Q - Analysis accredited by RvA

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**ANNEX**

**Method Descriptions**

**Composition Determination**

**Common**

| Method Description | Method Code |
|---|---|
| Determination of ash; gravimetric method<br>Coal: NEN-ISO 1171 Biomass : EN-14775; Secondary bio fuels : NEN-EN-15403 | .. |
| Determination of carbon (C), nitrogen (N), hydrogen (H) with the element analyser<br>Coal : NEN-ISO29541, Biomass : NEN-EN 15104, Secondary bio fuels NEN-EN 15407 | .. |
| Determination of fusibility of ash; acc EN-plus, ash formed (815°C), cube form | Own method |
| Determination of gross caloric value by bombcaloric method and calculation of net caloric value<br>Coal: NEN-ISO 1928, Solid Biofuels NEN-EN14918; secundairy biofuels NEN-EN15400 | .. |
| Determination of moisture in the analyse sample; gravimetric method<br>Coal: NEN-ISO 11722;Biomass: NEN-EN14774-3; Secondary bio fuels : NEN-EN15414-3 | .. |
| Determination of particle size distribution; vibrating screen method using sieve apertures of 3,15mm and below | Acc. NEN-EN 15149-2 |
| Determination of Sulphur (S); NEN-EN 15289 | .. |
| Determination of the length and diameter of the woodpellets | Eq. NEN-EN 16127:201 |
| Determination of total moisture in the sample; gravimetric method<br>Coal: ISO-589 biomasss: NEN-EN14774-1; Secondary bio fuels : NEN-EN15414-1 | .. |
| Determination of volatile matter content; gravimetric method<br>Coal: NEN-ISO 562; Biomass: NEN-EN15148; secundairy biofuels: NEN-EN 15402 | . |

**Metal and other elements**

| Method Description | Method Code |
|---|---|
| Deteminiation of Vanadium (V), Cobalt (Co), Nickel (Ni) | eq. NEN-EN 15297 |
| Determination of chloride (Cl);<br>Destruction feeding stuffs: bomb calorimetric method; analysis: Ion chromatography<br>Biomass: according EN-15289/DIN51727 Coal: Own method | .. |
| Determination of lead (Pb); ICP-MS, | eq. NEN-EN 15297 |
| Determination of mercury (Hg); GFAAS, | cf NEN EN 15297 |
| Determination of minor elements. As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V and Zn | acc. NEN-15297 |

**Other Analysis**

**Common**

| Method Description | Method Code |
|---|---|

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| | |
|---|---|
| Determination of bulk density (poured) and tamped bulk denisty | Acc.NEN-EN-ISO 17828 |
| Determination of mechanical durability of pellets | acc. NEN-EN 15210-1 |

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