

## **Supplement to document "180821 DIN standards for analysis of biomass, HTC coal and process water.docx" - Explanation of DIN Standards**

Note: The standards listed here are the current (as of October 2018) DIN standards for the analysis of biofuels and for water analysis, which are proposed and recommended by HTCycle AG.

### **1 DIN standards for the analysis of biofuels (biogenic solid fuels as well as HTC coal)**

#### **dry substance**

- DIN EN ISO 18134-1:2015-12 Biogenic solid fuels - Determination of water content - Kiln drying - Part 1: Total water content - Reference method (ISO 18134-1:2015)

#### **Ash content (550 °C)**

- DIN EN ISO 18122:2016-03 Biogenic solid fuels - Determination of ash content

#### **Ash content (815 °C)**

- DIN 51719:1997-07 Testing of solid fuels - Determination of ash content

#### **Calorific value (HHV) and calorific value (LHV)**

- DIN EN ISO 18125:2017-08 Biogenic solid fuels - Determination of calorific value (ISO 18125:2017)

#### **Carbon, hydrogen, nitrogen**

- DIN EN ISO 16948:2015-09 Biogenic solid fuels - Determination of the total content of carbon, hydrogen and nitrogen (ISO 16948:2015)

#### **Oxygen**

- DIN EN ISO 16993:2016-11 Biogenic solid fuels - Conversion of analytical results from one reference base into results from another reference base (ISO 16993:2016)

#### **Sulphur and chlorine**

- DIN EN ISO 16994:2016-12 Biogenic solid fuels - Determination of total sulphur and chlorine content (ISO 16994:2016)

#### **Aluminium, Calcium, Iron, Magnesium, Phosphorus, Potassium, Silicon, Sodium and Titanium**

- DIN EN ISO 16967:2015-07 Biogenic solid fuels - Determination of main elements - Al, Ca, Fe, Mg, P, K, Si, Na and Ti

## **ash melting behaviour**

- DIN 51730:2007-09 Testing of solid fuels - Determination of ash melting behaviour  
**Temperature at the beginning of shrinkage, softening temperature DT 1, hemispherical temperature HT 1, flow temperature FT1 1**

- DIN CEN/TS 15370-1:2006-12 Solid biofuels - Methods for determining the melting behaviour of ash - Part 1: Methods for determining characteristic temperatures

## **arsenic, cadmium, cobalt, chromium, copper, mercury, manganese, molybdenum, nickel, lead, antimony, vanadium and zinc**

- DIN EN ISO 16968:2015-09 Biogenic solid fuels - Determination of trace elements (ISO 16968:2015)

## **2 DIN standards for process water analyses**

### **TOC (based on dry substance)**

- DIN EN 13137:2001-12 Characterisation of waste - Determination of total organic carbon (TOC) in waste, sludges and sediments

### **TOC and DOC**

- DIN EN 1484:1997-08 Water analysis - Guidance for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)

### **COD**

- DIN 38409-41:1980-12 German standard methods for water, waste water and sludge analysis; Summarized effect and substance parameters (Group H); Determination of chemical oxygen demand (COD) in the range above 15 mg/l (H 41)

### **BOD**

- DIN EN 1899-1:1998-05 Water quality - Determination of biochemical oxygen demand after n days (BSB<sub>n</sub>) - Part 1: Dilution and inoculation methods after addition of allylthiourea (ISO 5815:1989, modified); German version EN 1899-1:1998

### **pH**

- DIN EN ISO 10523:2012-04 Water quality - Determination of pH (ISO 10523:2008)

### **Carbonate**

- See DIN EN 13137:2001-12

### **bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate**

- DIN EN ISO 10304-1:2009-07 Water quality - Determination of dissolved anions by liquid ion chromatography - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulphate (ISO 10304-1:2007)

### **Ammonium nitrogen and ammonium**

- DIN EN ISO 11732:2005-05 Water quality - Determination of ammonium nitrogen - Method using flow analysis (CFA and FIA) and spectrometric detection (ISO 11732:2005)

### **Kjeldahl nitrogen**

- DIN EN 25663:1993-11 Water quality; determination of Kjeldahl nitrogen; selenium digestion method (ISO 5663:1984)

**Aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, gallium, indium, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, phosphorus, potassium, selenium, silicon, silver, sodium, strontium, sulphur, tin, titanium, tungsten, vanadium, zinc and zirconium.**

- DIN EN ISO 11885:2009-09 Water quality - Determination of selected elements by inductively coupled plasma atomic emission spectrometry (ICP-OES) (ISO 11885:2007)

### **Organic acids volatile in water vapour, calculated as acetic acid**

- DIN 38414-19:1999-12 German standard methods for water, waste water and sludge analysis - Sludge and sediments (Group S) - Part 19: Determination of organic acids volatile in water vapour (S 19)