



Title: Determination of the ash content and fibre fraction in Envirodeck HB cedar

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Entries: Ash content, fibre fraction, Envirodeck HB cedar, HDPE,

1. Introduction

- 1.1 Assignment Determination of the fibre fraction and ash content including the element analysis in WPC (wood polymer composite) Envirodeck HB cedar
- 1.2 Date assignment August 28, 2007

2. Materials and methods

- 2.1 Tested product WPC Envirodeck HB cedar
- 2.2 Product description A (terrace) decking product of composite material with a hollow profile, consisting of a fibre component and HDPE as synthetic component.
- 2.3 Procedure
- Determination of the moisture content**
- The moisture content of the material has been determined by means of the oven dry method, in which the material has been dried to a constant weight at 103 °C.
- Determination of the ash content**
- The ash content has been determined by means of an ash oven at 620 °C.
- Chemical analysis**
- The chemical analysis has been carried out by means of an ICP-screening after decomposition with a solution of sulphuric and nitric acid.
- Determination of the fibre fraction in WPC material**
- In order to dissolve the HDPE, the WPC material has been boiled in two steps in xylene. The remaining wood fibres and dissolvable parts from the HDPE have been collected and the fraction in comparison to the total product has been determined. The dissolved HDPE has been separated from the xylene by means of evaporation. From the recovered HDPE and the weight of the fibres which have been found, the mass balance has been made. Because of the loss of fibres or synthetic material, the incomplete evaporation of the xylene, the dissolving or evaporating of the components from the fibres, deviations of a 100% accurate mass balance is possible. For verification, the basic material of the fibres and the HDPE has been decomposed in the same way as the WPC.

3. Results

The moisture content and ash content of the WPC, the HDPE and the fibres are assembled in table 1. The analysis results of the element analysis of the ash are assembled in the appendix. The table shows that calcium appears in relative high concentration. Calcium (chalk) is often added to WPC material. Also iron and titan, which are known components from pigments, appear in relative high concentration.

The fraction fibres and undissolved parts in WPC, in the fibres and in the HDPE basic material are assembled in table 2. Based on the calculations of the data in tabel 2 and corrected for the undissolved parts in the HDPE, the fibre fraction found in the WPC is **55,8%**.

Table 1. Moisture content and ash content

Code / description	Moisture content	Ash content
Envirodeck HB cedar	3,9%	6,2%
HDPE	0,2%	-
Fibres	11,1%	-

Table 2. Fibre fraction / part undissolved parts.

Description	Weighed samples	Profit fibres and undissolved parts	Profit HDPE	Total profit	Fraction fibres and undissolved parts		Mass balance
					Per determination	Average	
	[g]	[g]	[g]	[g]			
WPC cedar	0,988	0,523	0,451	0,973	52,9%	60,3%	99,5%
	0,922	0,588	0,337	0,925	63,7%		
	1,084	0,696	0,386	1,082	64,2%		
HDPE	1,266	0,078	1,189	1,267	6,2%	4,4%	99,3%
	2,019	0,055	1,933	1,988	2,7%		
Fibres	0,902	0,861	0,011	0,872	95,4%	95,4%	96,6%