ISO-17025 Accredited Testing Laboratory

PJLA ISO/IEC 17025:2005 Testing Accreditation# 59423

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Summary of Results : Biobased Determination using ASTM-D6866-12

Submitter:	Mr. Stefan Sollhard	**Date Received**	May 19, 2014
Company:	ADLER-Werk Lackfabrik Johann Berghofer GmbH & Co KG	**Date Reported**	May 23, 2014

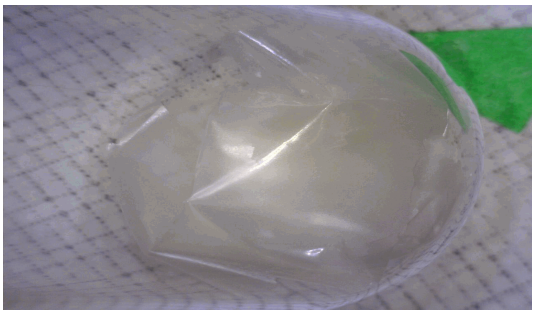
Laboratory Number	Submitter Label	Material	Method of Analysis	Biobased Result
Beta-380889	Lignovit Terra W30 53010	Biobased Material	D6866-12/Method-B	44 %



Package received -labeling COC



View of content (1mm x 1mm scale)



11.1mg analyzed (1mm x 1mm scale)

* ASTM-D6866 cites precision on The Mean Biobased Result as +/- 3% (absolute). This is the most conservative estimate of error in the measurement of complex biobased containing solids and liquids based on empirical results. Real precision for readily combustible and homogenous materials (e.g. gasoline) and especially samples recieved as CO_2 (e.g. flue gas or CEMS exhaust) can be as low as +/- 0.5-2%. The result only applies to the analyzed material. Fluctuations in carbon content within a batch of product, gasoline or flue gas must be determined separately (e.g. averaged measurements of multiple solids or liquids, and single measurement of the combination of gas aliquots collected over time). The accuracy of the result as it applies to the analyzed product, fuel, or flue gas relies upon all the carbon in the analyzed material originating from either recently respired atmospheric carbon dioxide (within the last decade) or fossil carbon (more than 50,000 years old). "Percent biobased" specifically relates % renewable (or fossil) carbon to total carbon, not to total mass or molecular weight. Mean Biobased estimates greater than 100% are assigned a value of 100% for simplification.

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Analytical Measure : Biobased Determination using ASTM-D6866-12

Submitter: Mr. Stefan Sollhard

Company: ADLER-Werk Lackfabrik Johann Berghofer GmbH & Co KG

Date received May 19, 2014

Date reported May 23, 2014

Submitter label	Material	Laboratory Number	Percent modern carbon (pmc)	Atmospheric correction factor
Lignovit Terra W30 53010	Biobased Material	Beta-380889	46.0 +/- 0.2 pMC	x 0.95

Note: % biobased = pMC x x 0.95

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Report of Biobased Content Analysis using ASTM-D6866-12

Submitter: ADLER-Werk Lackfabrik Johann Berghofer GmbH & Co KG

Submitter Label: Lignovit Terra W30 53010

Laboratory Number: Beta-380889

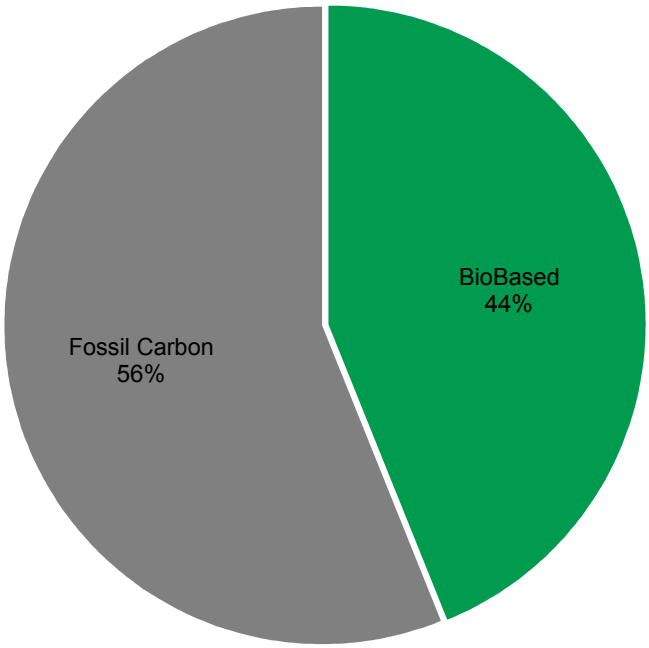
Material: Biobased Material

Date Receieved: May 19, 2014

Date Reported: May 23, 2014

Mean Biobased Result : 44 % *

Proportions Biobased vs. Fossil Based indicated by 14C content



* ASTM-D6866 cites precision on The Mean Biobased Result as +/- 3% (absolute). This is the most conservative estimate of error in the measurement of complex biobased containing solids and liquids based on empirical results. Real precision for readily combustible and homogenous materials (e.g. gasoline) and especially samples recieved as CO_2 (e.g. flue gas or CEMS exhaust) can be as low as +/- 0.5-2%. The result only applies to the analyzed material. Fluctuations in carbon content within a batch of product, gasoline or flue gas must be determined separately (e.g. averaged measurements of multiple solids or liquids, and single measurement of the combination of gas aliquots collected over time). The accuracy of the result as it applies to the analyzed product, fuel, or flue gas relies upon all the carbon in the analyzed material originating from either recently respired atmospheric carbon dioxide (within the last decade) or fossil carbon (more than 50,000 years old). "Percent biobased" specifically relates % renewable (or fossil) carbon to total carbon, not to total mass or molecular weight. Mean Biobased estimates greater than 100% are assigned a value of 100% for simplification.

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Explanation of Results

Biobased Analysis using ASTM-D6866-12, May 2012

The application of ASTM-D6866 to derive a "Biobased content" is built on the same concepts as radiocarbon dating, but without use of the age equations. It is done by deriving a ratio of the amount of radiocarbon (14C) in an unknown sample to that of a modern reference standard. This ratio is calculated as a percentage with the units "pMC" (percent modern carbon). If the material being analyzed is a mixture of present day radiocarbon and fossil carbon (containing no radiocarbon), then the pMC value obtained correlates directly to the amount of biomass derived carbon in the sample.

The modern reference standard used in radiocarbon dating is a NIST (National Institute of Standards and Technology) standard with a known radiocarbon content equivalent approximately to the year AD 1950. AD 1950 was chosen since it represented a time prior to thermo-nuclear weapons testing which introduced large amounts of excess radiocarbon into the atmosphere with each explosion (termed "bomb carbon"). This was a logical point in time to use as a reference for archaeologists and geologists. For an archaeologist or geologist using radiocarbon dates, AD 1950 equals "zero years old". It also represents 100 pMC.

"Bomb carbon" in the atmosphere reached almost twice normal levels in 1963 at the peak of testing and prior to the treaty halting the testing. Its distribution within the atmosphere has been approximated since its appearance, showing values that are greater than 100 pMC for plants and animals living since AD 1950. It has gradually decreased over time with today's value being near 105 pMC. This means that a fresh biomass material such as corn, sugar cane or soybeans would give a radiocarbon signature near 105 pMC.

Combining fossil carbon with present day carbon into a material will result in a dilution of the present day pMC content. By presuming ~105 pMC represents present day biomass materials and 0 pMC represents petroleum derivatives, the measured pMC value for that material will reflect the proportions of the two component types. For example, a material derived 100% from present day soybeans would give a radiocarbon signature near 105 pMC. But if it was diluted with 50% petroleum carbon, it would give a radiocarbon signature near 53 pMC.

The "biobased content" of a material is reported as a percent value relating total renewable organic carbon to total organic carbon. The final result is calculated by multiplying the pMC value measured for the material by 0.95 (to adjust for bomb carbon effect). The final value is cited as the MEAN BIOBASED RESULT and assumes all the components within the analyzed material were either present day living (within the last decade) or fossil in origin.

The results provided in this report are uniquely applicable to the analyzed material and are reported using the designated labeling provided with the sample. Although analytical precision is typically 0.1 to 0.5 pMC, empirical data has demonstrated that indeterminant errors can introduce uncertainty to 2 to 3 pMC. As such, ASTM-D6866 cites an uncertainty of +/- 3 % (absolute) on each result. Remember the results only relate carbon source, not mass source. A reported percentage does not represent to the total mass of fossil vs. renewable components present. Only the amount of renewable carbon vs fossil carbon present is indicated.