安鋒實業股份有限公司

台中市南屯區工業區 24 路 29 號 TEL：886-4-23501155（代表） FAX：886-4-23507373
E-mail：anvictor@ms45.hinet.net 網站：www.twanfong.com

含 OH 基蓖麻油聚醇樹脂 ALBODUR 912

規格：

固成份	：100 %
黏度	：約 600 mPas
酸價	：≤ 2 mg KOH/g
碘值	：≤ 5
生質碳含量(以有機碳總量為基礎)	：**86% (後方有相關檢測報告)**
OH 含量	：約 **6.29%(供給份)**

特性：

ALBODUR 912 是一支**無溶劑、中等硬度、極疏水性**、含 OH 基的蓖麻油聚醇樹脂(蓖麻油為可再生的原料)。

應用：

ALBODUR 912 **作為一支有很好施工性的通用型樹脂，用於一般工業地板漆和金屬塗料，有非常好的耐化性**。可應用在下列領域：

1. **一般工業地床**。
2. **防銹蝕保護金屬塗料**。
3. **儲槽、管件塗料**。
4. **黏膠**。

成膜性能：

94.5% ALBODUR 912 + 5.0% Albolith MS C 350 + 0.5% BYK 088 + Suprasec 2496 MDI
架橋率 110%，固化室溫×7 天。

斷裂伸長率	拉伸強度	Shore A 硬度	Shore D 硬度
約 167%	**約 15.4 N/mm^2**	**約 93**	**約 44**

適合的原材料：

- 消泡劑
  BYK-A 530　BYK-A 501　Tego Foamex 944　EFKA SI 2008
- 流平劑
  BYK 320
- 填料
  Millisil W 6　Baryt Flour EWO
- 分散劑
  DISPERBYK 111　DISPERBYK 2155　Tego Dispers 670　EFKA PU 4063
- 防沉劑
  Sylysia 350　Albothix 85-32　RHEOBYK-7410 ET　GARAMITE-7303
- 除水劑
  Albolith MS C 350

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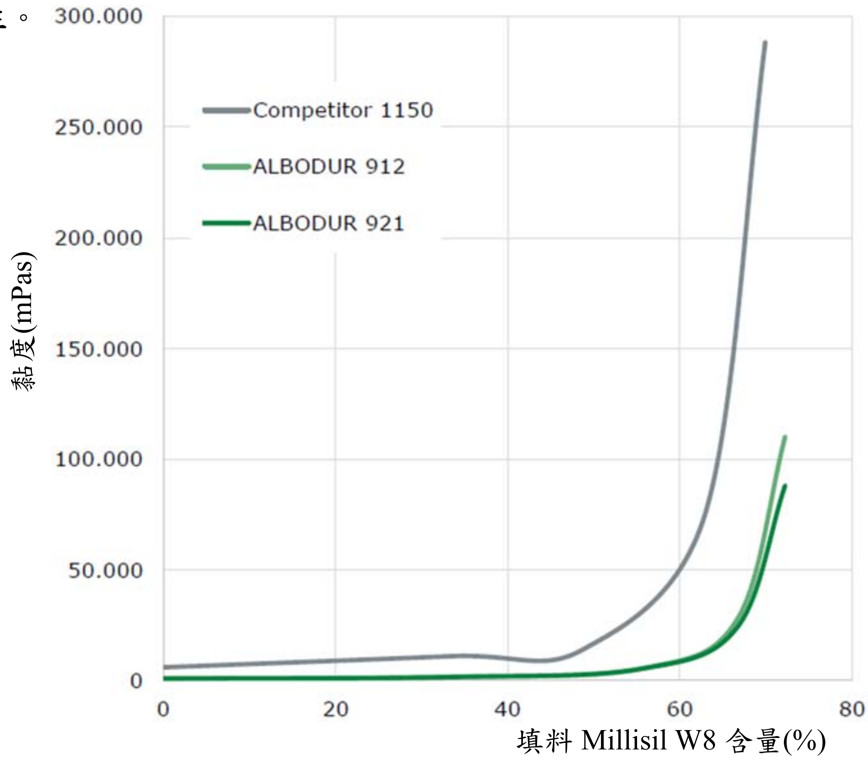
多元醇黏度及顏料濕潤性的影響：

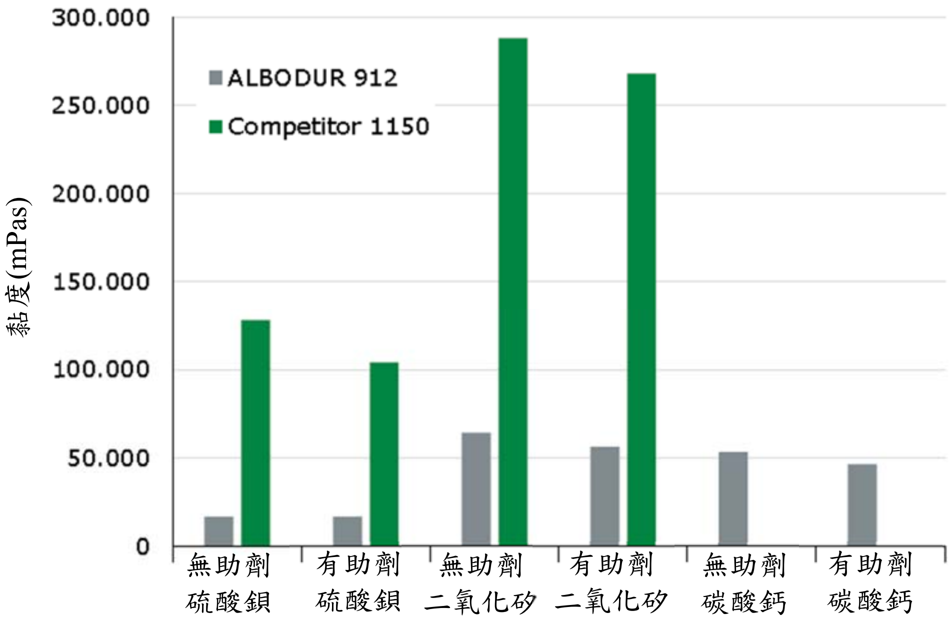
1.ALBODUR 多元醇與市場標準品相比，**具有較低黏度和較高疏水性。因此可提高顏料/填料負載和降成本。ALBODUR 912 與競品相比，可配製>20%的填料、矽砂**。也可搭配濕潤劑、分散劑來提高負載。**高疏水性提供低穩泡、多元醇的剪切稀化表現及自流平性。其硬度和彈塑性發展與競品 1150 相似。**



2.**黏度比較**

30%多元醇 + 70%填料	競爭品 1150			ALBODUR 912		
	硫酸鋇 Weiβspat EWO	二氧化矽 Millisil W8	碳酸鈣 Omiacarb 5	硫酸鋇 Weiβspat EWO	二氧化矽 Millisil W8	碳酸鈣 Omiacarb 5
黏度(mPas)*	128000	288000	無法測量	16800	64000	53000

*以 7 號針/20rpm 來測量。



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一般工業地床參考配方 FP 912-04：

順序	原材料	比例
1	ALBODUR 912	41.85
2	消泡劑 EFKA SI 2008	0.50
3	潤濕分散劑 EFKA PU 4063	1.00
4	分子篩漿 Albolith MS C 350	6.65
5	填充料 Millisil W 6	45.00
6	顏料 Heucosin G 7610	3.00
7	防沉劑 Sylysia 350	2.00
	總計	100.00

- 架橋劑：

  建議 NCO:OH 的架橋率 110%，或每 100 份上述配方中加 24.29 份 SUPRASEC 2496。

- 機械性：

  以 SUPRASEC 2496 架橋所做的測試。

物性項目	室溫 x24 小時	50℃x72 小時
斷裂伸長率	54%	21%
Shore A 硬度	94	>100
Shore D 硬度	50	74

防銹蝕塗料參考配方 FP 912-05：

順序	原材料	比例
1	ALBODUR 912	30.78
2	ALBODUR 921	30.77
3	防銹劑/顏料 Halox SZP 391	9.10
4	鈦白粉 Kronos 2190	16.32
5	防銹劑 Halox 630	3.99
6	消泡劑 Perenol E 8	0.52
7	分散劑 Texaphor P 63	0.94
8	濕潤劑 Perenol F 40	0.56
9	分子篩漿液 ALBOLITH MS C 350	6.17
10	流變改質劑 Hardener DT	0.85
	總計	100.00

- 架橋劑：

  建議 NCO:OH 的架橋率 110%，或每 100 份上述配方中加 37.18 份 SUPRASEC 2496。

包裝：190kg

儲存：未開封原裝桶儲放在 5~30℃的乾燥環境，保質期自生產日起至少 6 個月。

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配方及工業製程相關作業建議事項：

1.ALBODUR 配方的準備作業

一般批量的 ALBODUR 配方中含有 1-2 種須在工廠製備。將配方中 ALBODUR 所需的量由 200 公升原裝鐵桶裝入另一乾淨且乾燥的容器內。配方中其它成份須在攪拌下加入(例如可使用攪拌器)，再混合入製劑中。**如果分子篩漿液(ALBOLITH MS C 350)未使用整桶(120 公升/桶)，請先將欲使用的量在使用前攪拌完全，因為 MS C 350 可能會有沉澱的狀況。待混合 ALBODUR 配方約半小時達混合完全後，將配方液轉儲放至容器內，配方液須靜置至少 24 小時才可進行後續作業。**

***僅可使用已除濕氣的填料和顏料。**

***請使用真空攪拌器來達到最佳的性能。**

2.基材表面準備作業：

(1)基材表面必須是乾淨、乾燥、無粉塵、無油脂的，須移除所有鬆散、脫落的材料，建議使用機械清理器具來處理。

(2)**須隨時檢測殘餘濕氣含量，基材深度 2 公分內濕氣應小於 3%**，建議使用 C-aqua meter 來檢測。

(3)**基材溫度須控制在比露點高 3℃的溫度**。(相關露點資訊請參考下頁第 8 點)

3.打底作業(primer)：

強烈建議要進行打底的步驟，如此才能防止鹼性物質及水氣的滲入，以提供後續塗佈有良好的密著性，且**建議要打兩次底**。下列是建議的底塗配方：

(1)1K-PU，例如:SUPRASEC 2060(70%溶液於 Solvesso 100)或 SUPRASEC 2416(100%無溶劑型)

(2)**2K-PU，例如:ALBODUR 912 以 1:1 比例與 SUPRASEC 9584 混合、架橋來做為底塗。**

為了達到最佳密著，建議當底塗仍然潮濕時，可將加熱乾燥的石英砂撒在上面。

4.ALBODUR 混合液的製備作業：

在 400rpm 機械攪拌下，緩慢添加所需的硬化劑量至 ALBODUR 配方液中，然後攪拌至配方液達到完全均質。為避免混合液有不均勻的狀況發生，建議將產品移至另一乾淨、乾燥的容器內。

5.ALBODUR 混合液與面塗(例如:AC 27401)的搭配應用：

(1)溫度 20℃下，**25-30kg 量(適合塗佈面積約 10-15m^2)的 ALBODUR 混合液的可使用期(pot-life)約 45-60 分鐘**。ALBODUR 混合液建議使用抹刀或鋸齒抹刀**以最小厚度 1.5mm(塗膜厚,相當於約 2.3kg/m^2)來塗佈**。

(2)以 ALBODUR 為塗佈底的自流平地床須用有脫氣的釘滾輪(spike roller)來塗佈，為了視覺美觀，15 分鐘後可將 PVC 色片鋪撒在表面。

(3)為了達到不易滑跤的要求，建議在應用 ALBODUR 混合液 15 分鐘後將小石子砂鋪灑在表面，完全硬化後須以刷子將過多的小石子砂清除掉。

(4)**為了表面的密封性，建議使用以 AC 27401 為主劑的水性 2K 系統面塗(塗膜厚約 150g/m^2，可參考配方 FP 27401-04)。AC 27401 面塗需在應用 ALBODUR 的 12-24 小時後才可應用，完全固化需時 7 天。**

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6.器具的清理作業：

攪拌器及其他器具可用乙酸丁酯(BAC)或乙酸乙酯(EAC)來清洗乾淨。

7.安全性操作建議：

須避免接觸皮膚和眼睛，建議在操作時配戴適當的防護手套、護目鏡及遵守一般化學品安全操作事項。

8.空氣相對溼度-露點關係資料表：

濕度(%) / 氣溫(℃)	45	50	55	60	65	70	75	80	85	90	95
2	-7.77	-6.56	-5.43	-4.4	-3.16	-2.48	-1.77	-0.98	-0.26	0.47	1.2
6	-4.49	-3.07	-2.1	-1.05	-0.08	0.85	1.86	2.72	3.62	4.48	5.38
10	-1.26	0.02	1.31	2.53	3.74	4.79	5.82	6.79	7.65	8.45	9.31
14	2.2	3.76	5.1	6.4	7.58	8.67	9.7	10.71	11.64	12.55	13.36
18	5.9	7.43	8.83	10.12	11.33	12.44	13.48	14.56	15.41	16.31	17.25
20	7.73	9.3	10.72	12	13.22	14.4	15.48	16.46	17.44	18.36	19.18
22	9.54	11.16	12.52	13.89	15.19	16.27	17.41	18.42	19.39	20.28	21.22
24	11.34	12.93	14.44	15.73	17.06	18.21	19.22	20.33	21.37	22.32	23.18
26	13.15	14.84	16.26	17.67	18.9	20.09	21.29	22.32	23.32	24.31	25.16
28	14.96	16.61	18.14	19.38	20.86	22.07	23.18	24.28	25.25	26.2	27.18
30	16.79	18.44	19.96	21.44	23.71	23.94	25.11	26.1	27.21	28.19	29.09
34	20.42	22.19	23.77	25.19	26.54	27.85	28.94	30.09	31.19	32.13	33.11
38	23.97	25.74	27.44	28.87	30.31	32.62	32.78	33.96	35.01	36.05	37.03
40	25.79	27.66	29.22	30.81	32.16	33.48	34.69	35.86	36.98	38.05	39.11
45	30.29	32.17	33.86	35.38	36.85	38.24	39.54	40.74	41.87	42.97	44.03

BETA Beta Analytic® TESTING LABORATORY

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ISO/IEC 17025:2017-Accredited Testing Laboratory

October 23, 2023

Markus Dimmers
ALBERDINGK BOLEY GmbH
Duesseldorferstr. 53
Krefeld
47829
Germany

Dear Mr. Dimmers

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as "% Biobased Carbon". This indicates the percentage carbon from "natural" (plant or animal by-product) sources versus "synthetic" (petrochemical) sources . For reference, 100 % Biobased Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biobased Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as "percent modern carbon (pMC)". This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biobased Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions please contact us. We welcome your inquiries.

Sincerely,

R.E. Hatfield

Ronald E. Hatfield President

Beta Analytic
TESTING LABORATORY

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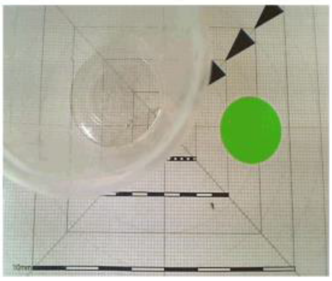
Summary of Results - % Biobased Carbon Content
ASTM D6866-22 Method B (AMS) TOC

Certificate Number: 567114677515144095
Validation:

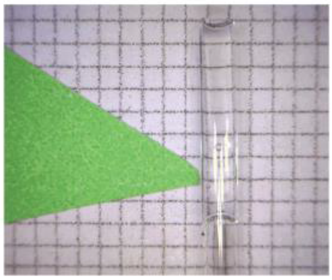
Submitter	Markus Dimmers
Company	ALBERDINGK BOLEY GmbH
Date Received	October 17, 2023
Date Reported	October 23, 2023
Submitter Label	Albodur 912
RESULT:	86 % Biobased Carbon Content (as a fraction of total organic carbon)

Laboratory Number	Beta-677515
Percent modern carbon (pMC)	85.98 +/- 0.19 pMC
Atmospheric adjustment factor (REF)	100.0; = pMC/1.000

Package received - labeling COC



Representative content (1mm x 1mm scale)



Representative sample analyzed (1mm x 1mm scale)

Disclosures: All work was done at Beta Analytic in its own chemistry lab and AMSs. No subcontractors were used. Beta's chemistry laboratory and AMS do not react or measure artificial C 14 used in biomedical and environmental AMS studies. Beta is a C14 tracer-free facility. Validating quality assurance is verified with a Quality Assurance report posted separately to the web library containing the PDF downloadable copy of this report.

Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO_2 in the air and/or from fossil carbon (more than 40,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report

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Summary of Results - % Biobased Carbon Content
ASTM D6866-22 Method B (AMS) TOC

Certificate Number: 567114677515144095
Validation:

Submitter	Markus Dimmers
Company	ALBERDINGK BOLEY GmbH
Date Received	October 17, 2023
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Submitter Label	Albodur 912

RESULT: 86 % Biobased Carbon Content (as a fraction of total organic carbon)

Laboratory Number	Beta-677515
Percent modern carbon (pMC)	85.98 +/- 0.19 pMC
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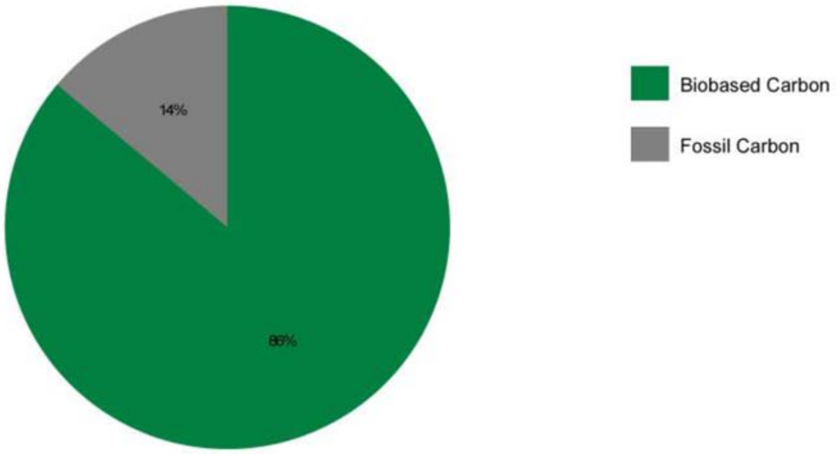

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% Biobased Carbon Content ASTM D6866-22 Method B (AMS) TOC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-based). By 2003 there was growing demand for a standardized methodology for applying Carbon-14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

The analytical procedures for measuring radiocarbon content using the different standards are identical. The only difference is the reporting format. Results are usually reported using the standardized terminology "% biobased carbon". Only ASTM D6866 uses the term "% biogenic carbon" when the result represents all carbon present (Total Carbon) rather than just the organic carbon (Total Organic Carbon). The terms "% biobased carbon" and "% biogenic carbon" are now the standard units in regulatory and industrial applications, replacing obscure units of measure historically reported by radiocarbon dating laboratories e.g. disintegrations per minute per gram (dpm/g) or radiocarbon age.

The result was obtained by measuring the ratio of radiocarbon in the material relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). This ratio was calculated as a percentage and is reported as percent modern carbon (pMC). The value obtained relative to the NIST standard is normalized to the year 1950 AD so an adjustment was required to calculate a carbon source value relative to today. This factor is listed on the report sheet as the terminology "REF".

Interpretation and application of the results is straightforward. A value of 100% biobased or biogenic carbon would indicate that 100% of the carbon came from plants or animal by-products (biomass) living in the natural environment and a value of 0% would mean that all of the carbon was derived from petrochemicals, coal and other fossil sources. A value between 0-100% would indicate a mixture. The higher the value, the greater the proportion of naturally sourced components in the material.

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Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: October 25, 2023
Submitter: Mr. Markus Dimmers

QA MEASUREMENTS

Reference 1

Expected Value:	0.44 +/- 0.04 pMC
Measured Value:	0.44 +/- 0.04 pMC
Agreement:	Accepted

Reference 2

Expected Value:	129.41 +/- 0.06 pMC
Measured Value:	129.42 +/- 0.35 pMC
Agreement:	Accepted

Reference 3

Expected Value:	96.69 +/- 0.50 pMC
Measured Value:	97.40 +/- 0.28 pMC
Agreement:	Accepted

COMMENT: All measurements passed acceptance tests.

Validation: R.E. [signature] Digital signature on file   Date: October 25, 2023