## LABORATORIO DE ENSAYO |TESTING LABORATORY

# INFORME/ REPORT 25-0524&25-1323-BI/1

25-0524
25-1323

## EMPRESA | COMPANY

DIGIDELTA INTERNACIONAL IMPORT EXPORT, S.A.
ZONA INDUSTRIAL DE TORRES NOVAS, LOTE 1
2350-483 CASAL TORTEIRO
TORRES NOVAS
PORTUGAL

**SOLICITANTE |** PETITIONER

Sónia Casimiro

## ASUNTO | SUBJECT

**Análisis del contenido del carbono de origen biológico.**
Analysis of Bio-based Carbon Content.

**Firma electrónica del personal autorizado** | Electronic signature of the authorized personnel

# CONTENIDO DEL INFORME | REPORT CONTENT

**Muestras** | Samples

**Ensayos** | Tests

A.- Determinación del % del contenido de carbono de origen biológico EN 16640:2017 (AMS) Anexo E Método B TC.

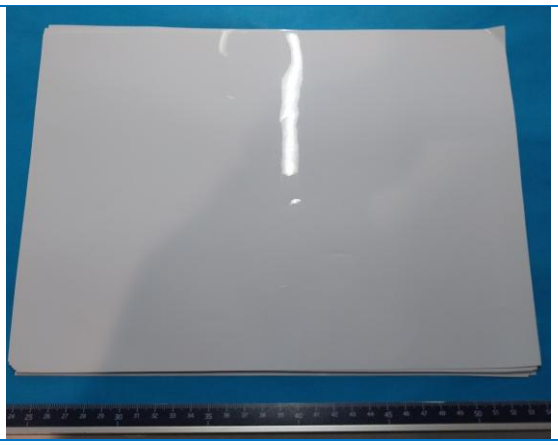
A.- Determination of % Bio-based Carbon Content EN 16640:2017 (AMS) Annex E Method B TC.

**Resultados** | Results

**Prescripciones** | Terms and conditions

[a] Ensayo subcontratado a un laboratorio reconocido por TÜV Austria/ Test subcontracted to a laboratory recognised by TÜV Austria.

## MUESTRAS



| Referencia aportada por el cliente |
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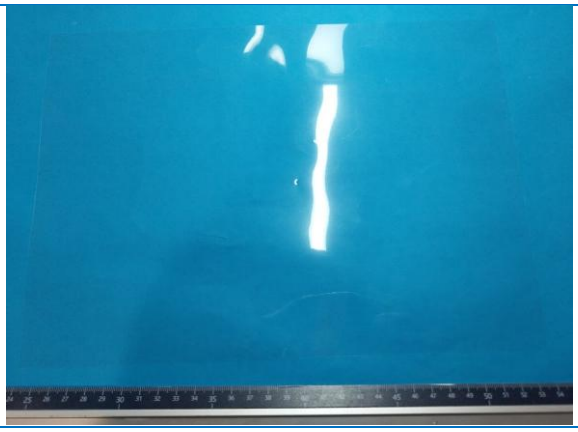
| **Descripción** |
| Ver fotografía |
| **Fecha de recepción** |
| 12/02/2025 |



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| Ver fotografía |
| **Fecha de recepción** |
| 14/02/2025 |

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| **Descripción** |
| Ver fotografía |
| **Fecha de recepción** |
| 14/02/2025 |

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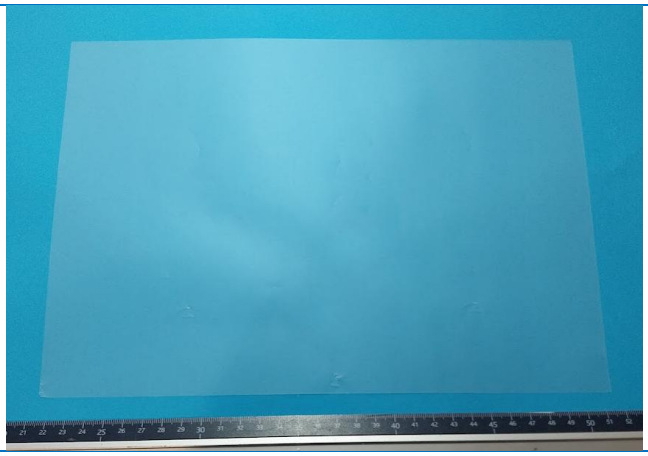
| **Descripción** |
| Ver fotografía |
| **Fecha de recepción** |
| 14/02/2025 |



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| **Código AIMPLAS** |
| 25-0524-5 |
| **Descripción** |
| Ver fotografía |
| **Fecha de recepción** |
| 14/02/2025 |

# ENSAYO A

## Determinación del % del contenido de carbono de origen biológico EN 16640:2017 (AMS) Anexo E Método B TC.

## 25-0524-1

## Biond Bio-Print Film white glossy/white matte

### Método de ensayo

| | |
|---|---|
| Norma: | Determinación del % del contenido de carbono de origen biológico EN 16640:2017 (AMS) Anexo E Método B TC. |
| Método: | El resultado se obtuvo utilizando el isótopo radiocarbono (también conocido como Carbono-14, C14 o 14C), un isótopo natural del carbono que es radiactivo y decae de tal manera que no queda ninguno después de unos 45.000 años de la muerte de un ser vivo. Su uso más común es la datación por radiocarbono por parte de los arqueólogos. También se desarrolló una aplicación industrial para determinar si los productos de consumo y las emisiones de $CO_2$ proceden de plantas/biomasa o de materiales como el petróleo o el carbón (de origen fósil).<br><br>Por lo general, los resultados se comunican utilizando la terminología normalizada "% de carbono de origen biológico". Sólo ASTM D6866 utiliza el término "% carbono biogénico" cuando el resultado representa todo el carbono presente (Carbono Total) en lugar de sólo el carbono orgánico (carbono orgánico total). Los términos "% de carbono de origen biológico" y "% de carbono biogénico" son ahora las unidades estándar en aplicaciones normativas e industriales, sustituyendo a oscuras unidades de medida históricamente utilizadas por los laboratorios de datación por radiocarbono. Por ejemplo, desintegraciones por minuto por gramo (dpm/g) o edad del radiocarbono.<br><br>El resultado se obtuvo midiendo la proporción de radiocarbono en el material en relación con un patrón de referencia moderno del Instituto Nacional de Normas y Tecnología (NIST) (SRM 4990C). Esta relación se calculó como porcentaje y se indica como porcentaje de carbono moderno (pMC). El valor obtenido en relación con el patrón del NIST está normalizado al año 1950 d.C., por lo que fue necesario realizar un ajuste para calcular la fuente de carbono en relación con la actualidad.<br><br>La interpretación y aplicación de los resultados es sencilla. Un valor del 100% de carbono bio-basado o biogénico indicaría que el 100% del carbono procede de plantas o subproductos animales (biomasa) que viven en el medio natural y un valor del 0% significaría que todo el carbono procede de la petroquímica, el carbón y otras fuentes fósiles. Un valor entre 0-100% indicaría una mezcla. Cuanto mayor sea el valor, mayor será la proporción de componentes de origen natural en el material. |

## Resultados

Fecha de inicio: 18/02/2025
Fecha fin: 28/02/2025

La precisión del resultado es de +/- 3% (absoluto). La precisión citada en la medida analítica (pMC) es de 1 sigma (1 desviación estándar relativa). El resultado comunicado sólo se aplica al material analizado. La precisión del resultado depende de que el carbono medido en el material analizado haya estado en equilibrio reciente con el $CO_2$ del aire y/o a partir de carbono fósil (de más de más de 40.000 años) como el petróleo o el carbón. El resultado sólo se aplica al contenido relativo de carbono, no al contenido relativo de masa. El resultado se calcula ajustando pMC por el "factor de ajuste atmosférico (REF)" aplicable citado en este informe.

**Tabla 1**

| | |
|---|---|
| Porcentaje de carbono actual (pMC) | 79.95 +/- 0.19 pMC |
| Factor de ajuste atmosférico (REF) | 99.4; = pMC /0.994 |

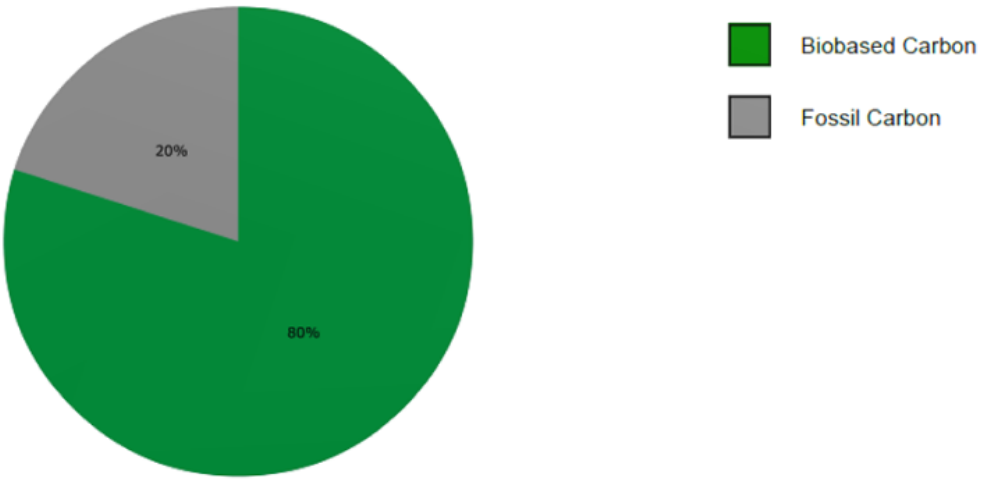



*Figura 1. Representación del contenido de carbono bio-basado frente al fósil.*

Este informe proporciona los resultados de los materiales de referencia utilizados para validar los análisis de radiocarbono antes de la presentación de informes. Los materiales de referencia de valor conocido se analizaron casi simultáneamente con las incógnitas. Los resultados se presentan como valores esperados frente a valores medidos. Los valores se calculan en relación con NIST SRM-4990C y se corrigen para el fraccionamiento isotópico. Los resultados se presentan utilizando la medida analítica directa del porcentaje de carbono moderno (pMC) con una desviación estándar relativa. La concordancia entre los valores esperados y medidos se considera dentro de una concordancia de 2 sigma (error x 2) para tener en cuenta el error total del laboratorio.

**Tabla 2**

| Material | Valor esperado | Valor Real | Cumplimiento |
|---|---|---|---|
| Referencia 1 | 129.41 +/- 0.06 pMC | 129.23 +/- 0.32 pMC | SI |
| Referencia 2 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | SI |
| Referencia 3 | 95.86 +/- 0.37 pMC | 95.74 +/- 0.24 pMC | SI |

## 25-0524-2
## Biond Bio Film clear glossy

# Resultados

Fecha de inicio: 18/02/2025
Fecha fin: 28/02/2025

La precisión del resultado es de +/- 3% (absoluto). La precisión citada en la medida analítica (pMC) es de 1 sigma (1 desviación estándar relativa). El resultado comunicado sólo se aplica al material analizado. La precisión del resultado depende de que el carbono medido en el material analizado haya estado en equilibrio reciente con el $CO_2$ del aire y/o a partir de carbono fósil (de más de más de 40.000 años) como el petróleo o el carbón. El resultado sólo se aplica al contenido relativo de carbono, no al contenido relativo de masa. El resultado se calcula ajustando pMC por el "factor de ajuste atmosférico (REF)" aplicable citado en este informe.

**Tabla 3**

| | |
|---|---|
| Porcentaje de carbono actual (pMC) | 97.69 +/- 0.21 pMC |
| Factor de ajuste atmosférico (REF) | 99.4; = pMC /0.994 |

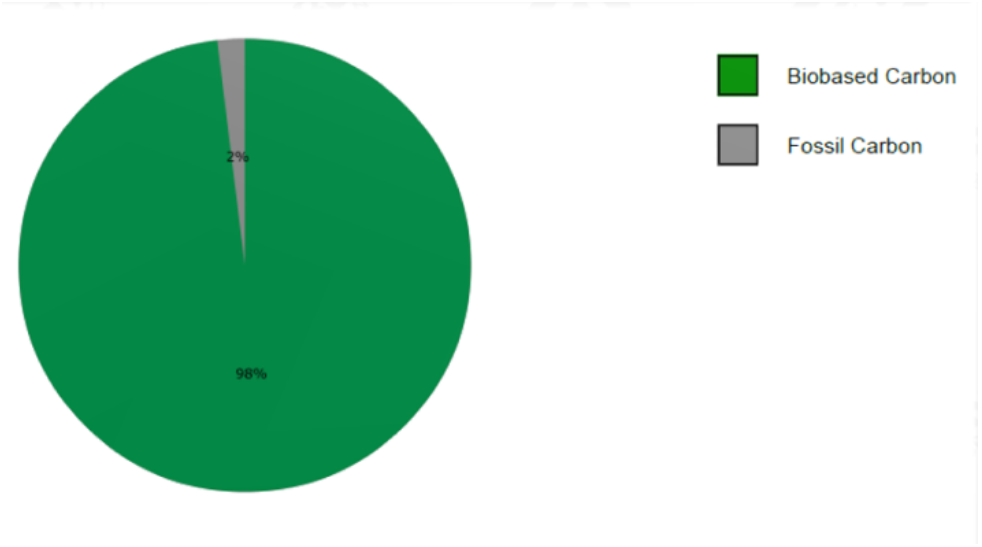



*Figura 2. Representación del contenido de carbono bio-basado frente al fósil.*

Este informe proporciona los resultados de los materiales de referencia utilizados para validar los análisis de radiocarbono antes de la presentación de informes. Los materiales de referencia de valor conocido se analizaron casi simultáneamente con las incógnitas. Los resultados se presentan como valores esperados frente a valores medidos. Los valores se calculan en relación con NIST SRM-4990C y se corrigen para el fraccionamiento isotópico. Los resultados se presentan utilizando la medida analítica directa del porcentaje de carbono moderno (pMC) con una desviación estándar relativa. La concordancia entre los valores esperados y medidos se considera dentro de una concordancia de 2 sigma (error x 2) para tener en cuenta el error total del laboratorio.

**Tabla 4**

| Material | Valor esperado | Valor Real | Cumplimiento |
|---|---|---|---|
| Referencia 1 | 129.41 +/- 0.06 pMC | 129.23 +/- 0.32 pMC | SI |
| Referencia 2 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | SI |
| Referencia 3 | 95.86 +/- 0.37 pMC | 95.74 +/- 0.24 pMC | SI |

# 25-0524-3
# Biond Bio Decor Film white matte

## Resultados

Fecha de inicio: 15/04/2025
Fecha fin: 12/05/2025

La precisión del resultado es de +/- 3% (absoluto). La precisión citada en la medida analítica (pMC) es de 1 sigma (1 desviación estándar relativa). El resultado comunicado sólo se aplica al material analizado. La precisión del resultado depende de que el carbono medido en el material analizado haya estado en equilibrio reciente con el $CO_2$ del aire y/o a partir de carbono fósil (de más de más de 40.000 años) como el petróleo o el carbón. El resultado sólo se aplica al contenido relativo de carbono, no al contenido relativo de masa. El resultado se calcula ajustando pMC por el "factor de ajuste atmosférico (REF)" aplicable citado en este informe.

**Tabla 5**

| | |
|---|---|
| Porcentaje de carbono actual (pMC) | 60.20 +/- 0.16 pMC |
| Factor de ajuste atmosférico (REF) | 99.4; = pMC /0.994 |

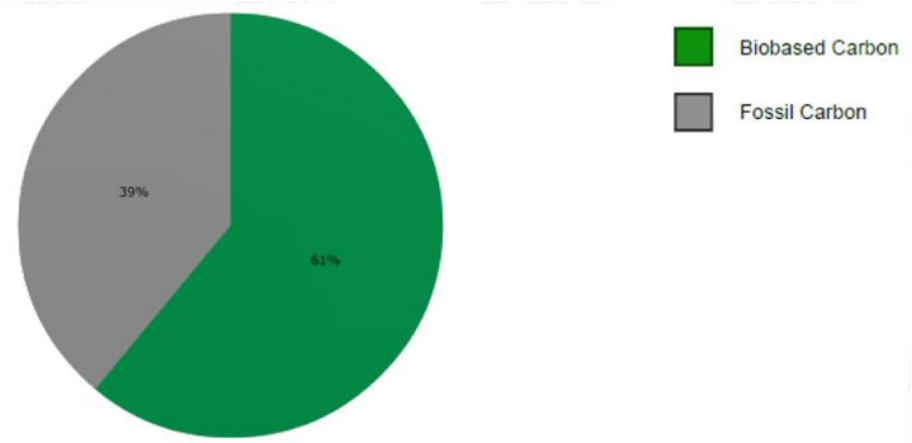



*Figura 3. Representación del contenido de carbono bio-basado frente al fósil.*

Este informe proporciona los resultados de los materiales de referencia utilizados para validar los análisis de radiocarbono antes de la presentación de informes. Los materiales de referencia de valor conocido se analizaron casi simultáneamente con las incógnitas. Los resultados se presentan como valores esperados frente a valores medidos. Los valores se calculan en relación con NIST SRM-4990C y se corrigen para el fraccionamiento isotópico. Los resultados se presentan utilizando la medida analítica directa del porcentaje de carbono moderno (pMC) con una desviación estándar relativa. La concordancia entre los valores esperados y medidos se considera dentro de una concordancia de 2 sigma (error x 2) para tener en cuenta el error total del laboratorio.

**Tabla 6**

| Material | Valor esperado | Valor Real | Cumplimiento |
|---|---|---|---|
| Referencia 1 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | SI |
| Referencia 2 | 95.86 +/- 0.37 pMC | 95.86 +/- 0.24 pMC | SI |
| Referencia 3 | 110.69 +/- 0.40 pMC | 110.20 +/- 0.27 pMC | SI |

# 25-0524-4
# Biond Bio-Protection Film clear matte embossed

## Resultados

Fecha de inicio: 15/04/2025
Fecha fin: 12/05/2025

La precisión del resultado es de +/- 3% (absoluto). La precisión citada en la medida analítica (pMC) es de 1 sigma (1 desviación estándar relativa). El resultado comunicado sólo se aplica al material analizado. La precisión del resultado depende de que el carbono medido en el material analizado haya estado en equilibrio reciente con el $CO_2$ del aire y/o a partir de carbono fósil (de más de más de 40.000 años) como el petróleo o el carbón. El resultado sólo se aplica al contenido relativo de carbono, no al contenido relativo de masa. El resultado se calcula ajustando pMC por el "factor de ajuste atmosférico (REF)" aplicable citado en este informe.

**Tabla 7**

| | |
|---|---|
| Porcentaje de carbono actual (pMC) | 94.28 +/- 0.21 pMC |
| Factor de ajuste atmosférico (REF) | 99.4; = pMC /0.994 |

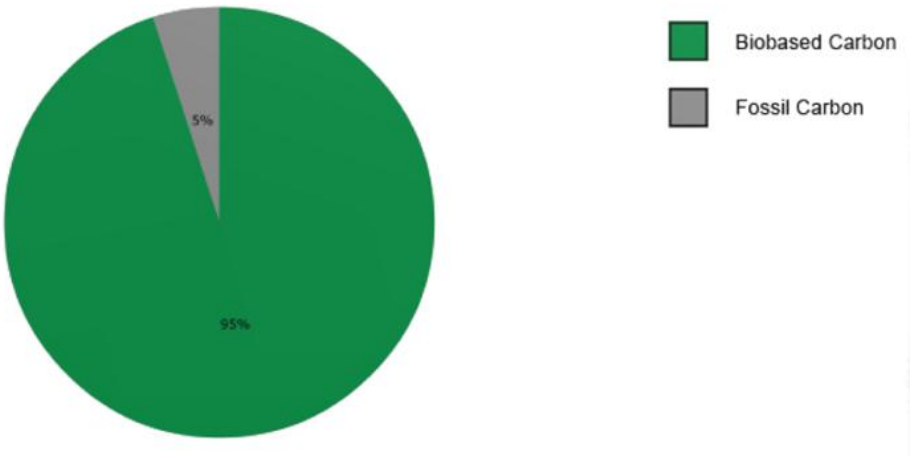



*Figura 4. Representación del contenido de carbono bio-basado frente al fósil.*

Este informe proporciona los resultados de los materiales de referencia utilizados para validar los análisis de radiocarbono antes de la presentación de informes. Los materiales de referencia de valor conocido se analizaron casi simultáneamente con las incógnitas. Los resultados se presentan como valores esperados frente a valores medidos. Los valores se calculan en relación con NIST SRM-4990C y se corrigen para el fraccionamiento isotópico. Los resultados se presentan utilizando la medida analítica directa del porcentaje de carbono moderno (pMC) con una desviación estándar relativa. La concordancia entre los valores esperados y medidos se considera dentro de una concordancia de 2 sigma (error x 2) para tener en cuenta el error total del laboratorio.

**Tabla 8**

| Material | Valor esperado | Valor Real | Cumplimiento |
|---|---|---|---|
| Referencia 1 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | SI |
| Referencia 2 | 95.86 +/- 0.37 pMC | 96.21 +/- 0.24 pMC | SI |
| Referencia 3 | 110.69 +/- 0.40 pMC | 110.47 +/- 0.41 pMC | SI |

# 25-0524-5
# Biond Bio Film clear matte

## Resultados

Fecha de inicio: 15/04/2025
Fecha fin: 12/05/2025

La precisión del resultado es de +/- 3% (absoluto). La precisión citada en la medida analítica (pMC) es de 1 sigma (1 desviación estándar relativa). El resultado comunicado sólo se aplica al material analizado. La precisión del resultado depende de que el carbono medido en el material analizado haya estado en equilibrio reciente con el $CO_2$ del aire y/o a partir de carbono fósil (de más de más de 40.000 años) como el petróleo o el carbón. El resultado sólo se aplica al contenido relativo de carbono, no al contenido relativo de masa. El resultado se calcula ajustando pMC por el "factor de ajuste atmosférico (REF)" aplicable citado en este informe.

**Tabla 9**

| | |
|---|---|
| Porcentaje de carbono actual (pMC) | 94.63 +/- 0.20 pMC |
| Factor de ajuste atmosférico (REF) | 99.4; = pMC /0.994 |

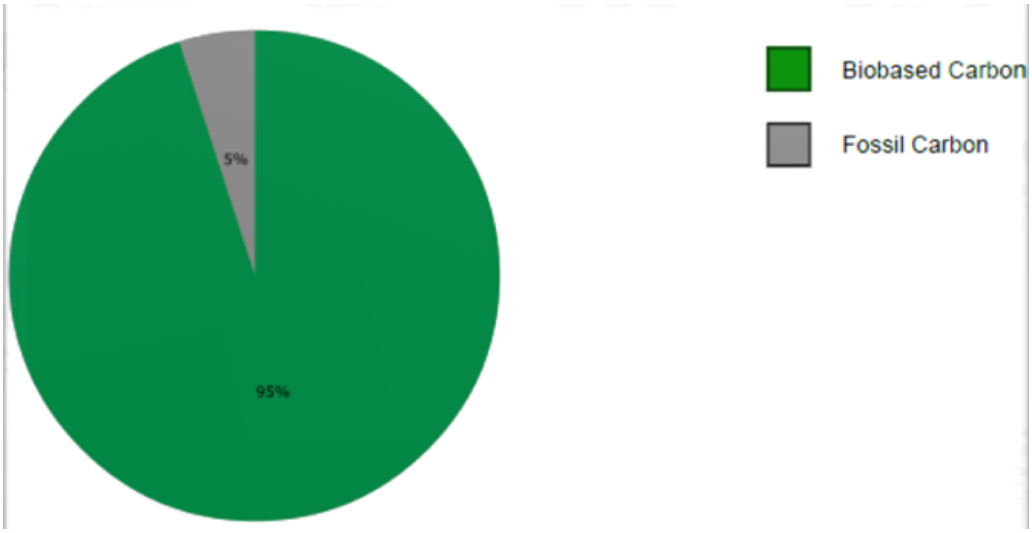



*Figura 5. Representación del contenido de carbono bio-basado frente al fósil.*

Este informe proporciona los resultados de los materiales de referencia utilizados para validar los análisis de radiocarbono antes de la presentación de informes. Los materiales de referencia de valor conocido se analizaron casi simultáneamente con las incógnitas. Los resultados se presentan como valores esperados frente a valores medidos. Los valores se calculan en relación con NIST SRM-4990C y se corrigen para el fraccionamiento isotópico. Los resultados se presentan utilizando la medida analítica directa del porcentaje de carbono moderno (pMC) con una desviación estándar relativa. La concordancia entre los valores esperados y medidos se considera dentro de una concordancia de 2 sigma (error x 2) para tener en cuenta el error total del laboratorio.

**Tabla 10**

| Material | Valor esperado | Valor Real | Cumplimiento |
|---|---|---|---|
| Referencia 1 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | SI |
| Referencia 2 | 95.86 +/- 0.37 pMC | 96.21 +/- 0.24 pMC | SI |
| Referencia 3 | 110.69 +/- 0.40 pMC | 110.47 +/- 0.41 pMC | SI |

# RESULTADOS

## A. - Determinación del % del contenido de carbono de origen biológico EN 16640:2017 (AMS) Anexo E Método B TC.

El porcentaje de carbono bio-basado para las muestras se muestra en la siguiente tabla:

**Tabla I**

| Muestra | % Carbono bio-basado |
|---|---|
| 25-0524-1 | 79.95 |
| 25-0524-2 | 97.69 |
| 25-0524-2 | 60.20 |
| 25-0524-4 | 94.28 |
| 25-0524-5 | 94.63 |

Un valor del 100% de carbono bio-basado o biogénico indicaría que el 100% del carbono procede de plantas o subproductos animales (biomasa) que viven en el medio natural y un valor del 0% significaría que todo el carbono procede de la petroquímica, el carbón y otras fuentes fósiles. Un valor entre 0-100% indicaría una mezcla. Cuanto mayor sea el valor, mayor será la proporción de componentes de origen natural en el material.

# TÉRMINOS Y CONDICIONES

1.- AIMPLAS se responsabiliza únicamente de los resultados obtenidos a partir de los métodos analíticos citados en este informe. Los resultados se refieren exclusivamente a los materiales y muestras mencionados en el mismo. La responsabilidad legal y profesional del Instituto se limitará a dichos materiales y muestras. Salvo que se indique lo contrario, las muestras han sido seleccionadas libremente, indexadas y facilitadas por el cliente.

2.- El Instituto no asume ninguna responsabilidad por la mala interpretación o el mal uso de este documento. Queda terminantemente prohibida la reproducción parcial o total de este documento sin autorización previa de AIMPLAS.

3.- Los resultados se consideran propiedad del cliente. Sin autorización previa. AIMPLAS no los divulgará a ningún tercero.

4.- Ninguna información contenida en este informe constituye una garantía para las marcas citadas si las hubiera.

5.- En caso de discrepancias en los informes, se realizará una verificación final en la sede del Instituto. El cliente se compromete a informar al Instituto de cualquier reclamación que pueda recibir en relación con este informe. De no hacerlo, el Instituto queda exento de cualquier responsabilidad.

6.- Los materiales o muestras ensayados serán almacenados en AIMPLAS durante el mes siguiente a la emisión del informe y posteriormente serán destruidos; por lo que cualquier verificación deberá ser solicitada dentro de este periodo.

7.- AIMPLAS no asumirá ninguna responsabilidad derivada de la obtención de resultados anómalos en el caso de que la muestra hubiera sido considerada no apta para los ensayos y se hubiera notificado previamente al cliente.

8.- AIMPLAS asume la responsabilidad de la información de este informe salvo la información previamente facilitada por el cliente que pueda afectar a la validez de los resultados. Dicha información no está bajo el alcance de la acreditación.

9.- Los Informes o Certificados de ensayo no constituyen un dictamen pericial para ser utilizado ante un órgano judicial y, por tanto, no podrán ser utilizados como tales, ante un tribunal.

10.- Cuando los Informes o Certificados sean solicitados para su utilización en un procedimiento judicial. AIMPLAS participará preferentemente por videoconferencia. En caso de que esto no fuera posible. los gastos de desplazamiento. dietas u otros costes adicionales que se puedan generar durante el servicio. correrán a cargo del cliente. AIMPLAS elaborará previamente un presupuesto que será enviado al cliente para su conocimiento y aprobación.

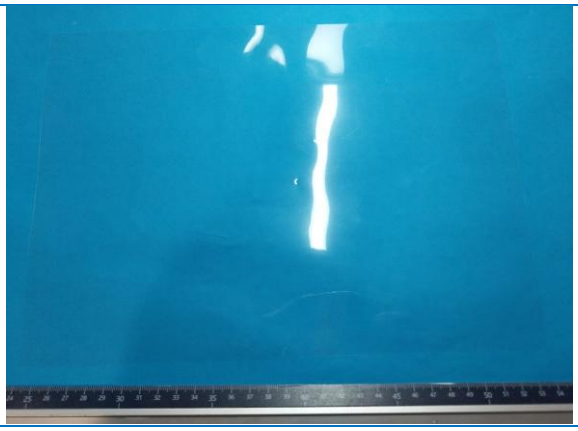
11.- Este documento firmado electrónicamente tiene validez a efectos legales y debe ser conservado. Cualquier impresión o representación gráfica que se haga del mismo será una copia y sólo será válida en los términos que determine el destinatario de la firma.

12.- Este informe ha sido emitido con la información disponible y facilitada por el cliente en la aceptación de la correspondiente oferta. por lo que en ningún caso podrá emitirse un informe posterior con información distinta a la incluida en este informe. y que haya sido aportada previamente.

13.- La incertidumbre estimada para cada uno de los ensayos de este informe está disponible en AIMPLAS a disposición del cliente.

## SAMPLE

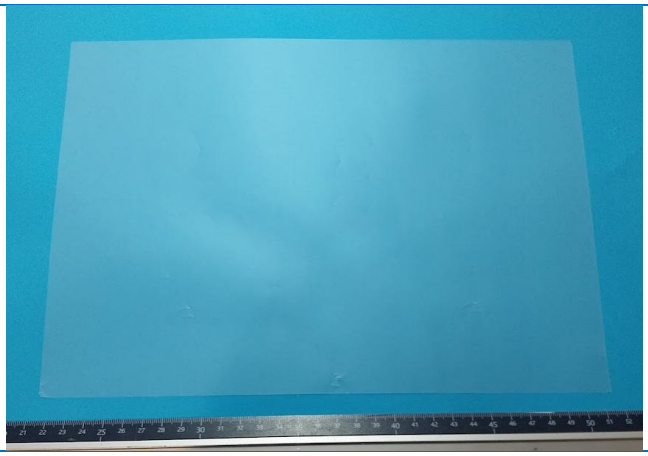
| | |
|---|---|
| **Reference provided by customer** | Biond Bio-Print Film white glossy/white matte |
| **AIMPLAS code** | 25-0524-1 |
| **Description** | See photograph |
| **Reception date** | 12/02/2025 |



| | |
|---|---|
| **Reference provided by customer** | Biond Bio Film clear glossy |
| **AIMPLAS code** | 25-0524-2 |
| **Description** | See photograph |
| **Reception date** | 14/02/2025 |

| | |
|---|---|
| **Reference provided by customer** | Biond Bio Decor Film white matte |
| **AIMPLAS code** | 25-0524-3 |
| **Description** | See photograph |
| **Reception date** | 14/02/2025 |

| Reference provided by customer |
| --- |
| Biond Bio-Protection Film clear matte embossed |
| **AIMPLAS code** |
| 25-0524-4 |
| **Description** |
| See photograph |
| **Reception date** |
| 14/02/2025 |



| Reference provided by customer |
| --- |
| Biond Bio Film clear matte |
| **AIMPLAS code** |
| 25-0524-5 |
| **Description** |
| See photograph |
| **Reception date** |
| 14/02/2025 |

# Test A

## Determination of % Bio-based Carbon Content EN 16640:2017 (AMS) Annex E Method B TC.

## 25-0524-1

## Biond Bio-Print Film white glossy/white matte

### Test method

| | |
|---|---|
| Standard: | Determination of % Bio-based Carbon Content EN 16640:2017 (AMS) Annex E Method B TC. |
| Method: | 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 $CO_2$ emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-based).<br><br>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.<br><br>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".<br><br>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. |

## Results

Start date: 18/02/2025
Finish date: 28/02/2025

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.

**Table 1**

| | |
|---|---|
| Percent modern carbon (pMC) | 79.95 +/- 0.19 pMC |
| Atmospheric adjustment factor (REF) | 99.4; = pMC /0.994 |

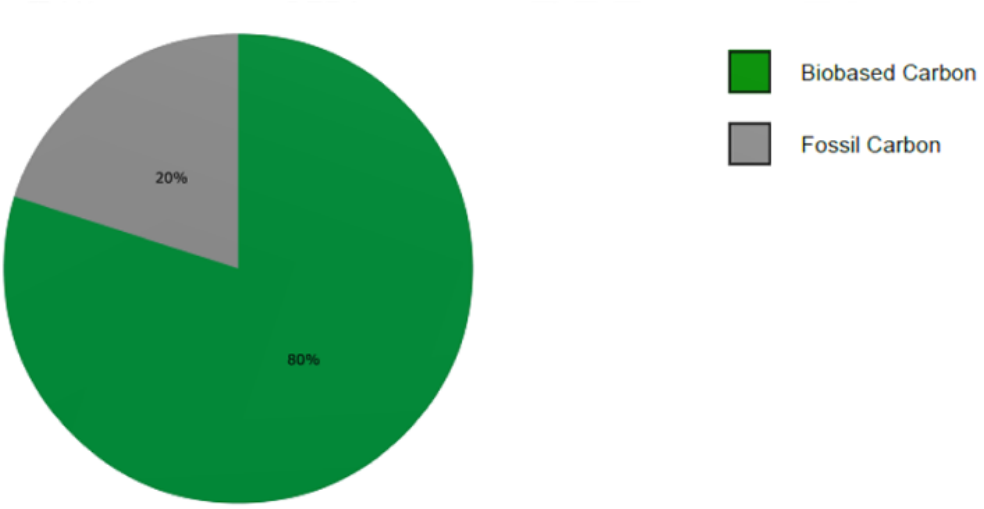



*Figure 1. Representation of bio-based vs fossil carbon content.*

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.

**Table 2**

| Material | Expected Value | Measured Value | Agreement |
|---|---|---|---|
| Reference 1 | 129.41 +/- 0.06 pMC | 129.23 +/- 0.32 pMC | Accepted |
| Reference 2 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | Accepted |
| Reference 3 | 95.86 +/- 0.37 pMC | 95.74 +/- 0.24 pMC | Accepted |

## 25-0524-2
## Biond Bio Film clear glossy

## Results

Start date: 18/02/2025
Finish date: 28/02/2025

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.

**Table 3**

| | |
|---|---|
| Percent modern carbon (pMC) | 97.69 +/- 0.21 pMC |
| Atmospheric adjustment factor (REF) | 99.4; = pMC /0.994 |

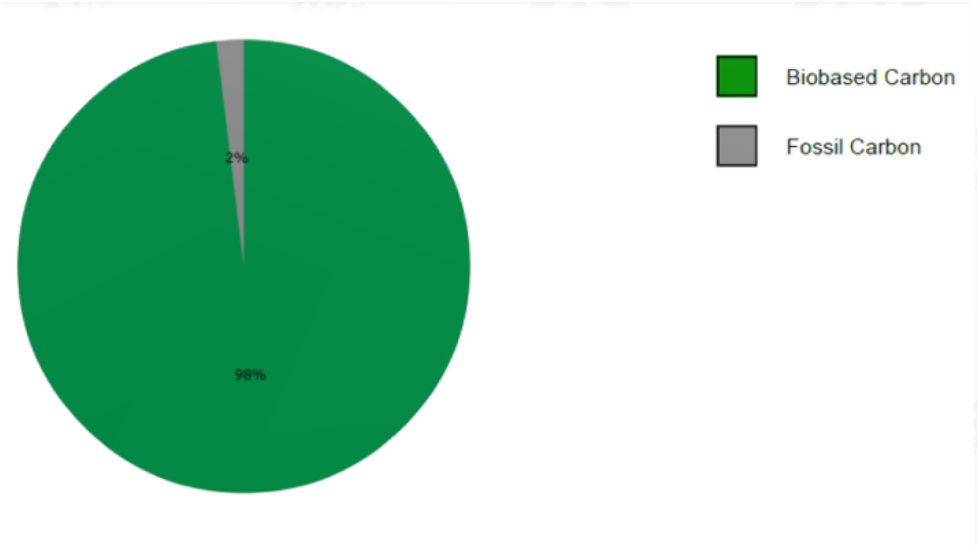



*Figure 2. Representation of bio-based vs fossil carbon content.*

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.

**Table 4**

| Material | Expected Value | Measured Value | Agreement |
|---|---|---|---|
| Reference 1 | 129.41 +/- 0.06 pMC | 129.23 +/- 0.32 pMC | Accepted |
| Reference 2 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | Accepted |
| Reference 3 | 95.86 +/- 0.37 pMC | 95.74 +/- 0.24 pMC | Accepted |

## 25-0524-3
## Biond Bio Decor Film white matte

## Results

Start date: 15/04/2025
Finish date: 12/05/2025

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.

**Table 5**

| | |
|---|---|
| Percent modern carbon (pMC) | 60.20 +/- 0.16 pMC |
| Atmospheric adjustment factor (REF) | 99.4; = pMC /0.994 |

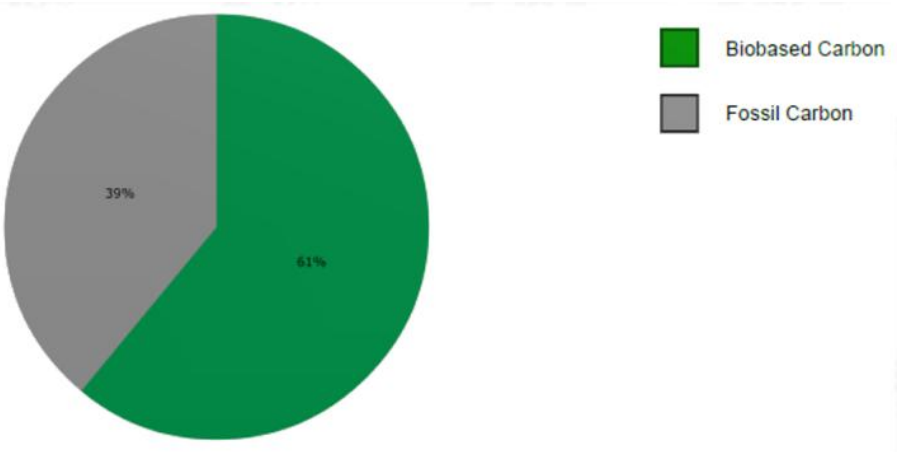



*Figure 3. Representation of bio-based vs fossil carbon content.*

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.

**Table 6**

| Material | Expected Value | Measured Value | Agreement |
|---|---|---|---|
| Reference 1 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | Accepted |
| Reference 2 | 95.86 +/- 0.37 pMC | 95.86 +/- 0.24 pMC | Accepted |
| Reference 3 | 110.69 +/- 0.40 pMC | 110.20 +/- 0.27 pMC | Accepted |

# 25-0524-4
# Biond Bio-Protection Film clear matte embossed

## Results

Start date: 15/04/2025
Finish date: 12/05/2025

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.

**Table 7**

| | |
|---|---|
| Percent modern carbon (pMC) | 94.28 +/- 0.21 pMC |
| Atmospheric adjustment factor (REF) | 99.4; = pMC /0.994 |

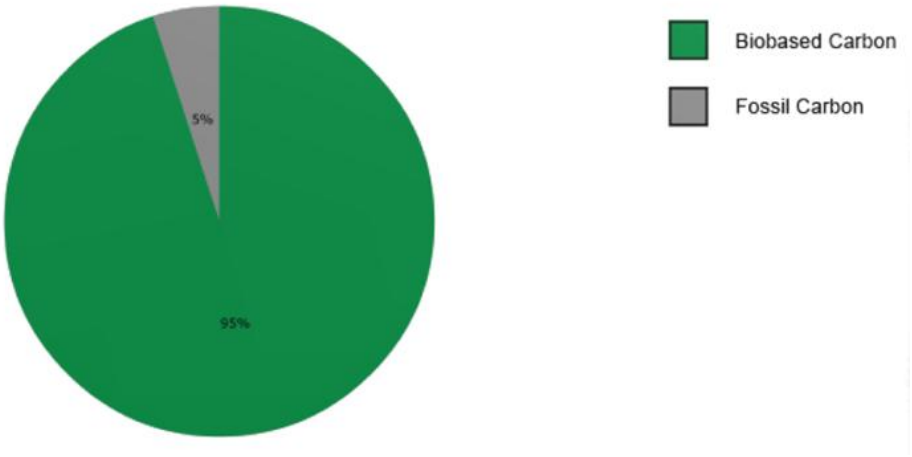



*Figure 4. Representation of bio-based vs fossil carbon content.*

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.

**Table 8**

| Material | Expected Value | Measured Value | Agreement |
|---|---|---|---|
| Reference 1 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | Accepted |
| Reference 2 | 95.86 +/- 0.37 pMC | 96.21 +/- 0.24 pMC | Accepted |
| Reference 3 | 110.69 +/- 0.40 pMC | 110.47 +/- 0.41 pMC | Accepted |

# 25-0524-5
# Biond Bio Film clear matte

## Results

Start date: 15/04/2025
Finish date: 12/05/2025

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.

**Table 9**

| | |
|---|---|
| Percent modern carbon (pMC) | 94.63 +/- 0.20 pMC |
| Atmospheric adjustment factor (REF) | 99.4; = pMC /0.994 |

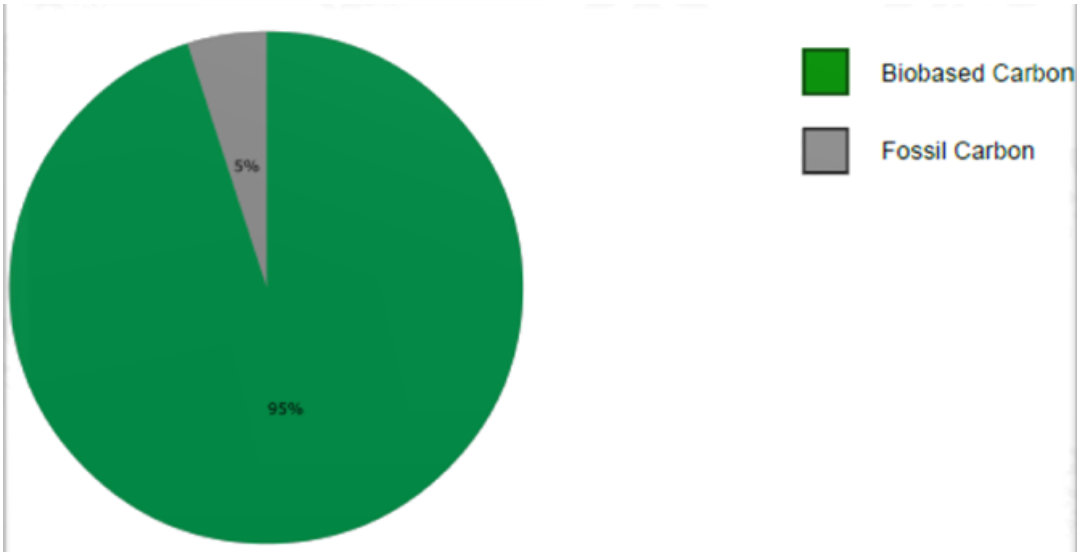



*Figure 5. Representation of bio-based vs fossil carbon content.*

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.

**Table 10**

| Material | Expected Value | Measured Value | Agreement |
|---|---|---|---|
| Reference 1 | 0.44 +/- 0.04 pMC | 0.44 +/- 0.04 pMC | Accepted |
| Reference 2 | 95.86 +/- 0.37 pMC | 96.21 +/- 0.24 pMC | Accepted |
| Reference 3 | 110.69 +/- 0.40 pMC | 110.47 +/- 0.41 pMC | Accepted |

# RESULTS

## A.- Determination of % Bio-based Carbon Content EN 16640:2017 (AMS) Annex E Method B TC.

The percentage of bio-based carbon for the samples is shown in the table below:

**Table I**

| Sample | % Bio-based carbon |
|---|---|
| 25-0524-1 | 79.95 |
| 25-0524-2 | 97.69 |
| 25-0524-3 | 60.20 |
| 25-0524-4 | 94.28 |
| 25-0524-5 | 94.63 |

A value of 100% bio-based 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.

# TERMS AND CONDITIONS

1.- AIMPLAS is responsible only for results obtained from the analytical methods cited in this report. Results exclusively refer to the materials and samples mentioned herein, the legal and professional responsibility of the Institute will be restricted to said materials and samples. Unless otherwise stated, the samples have been freely selected, indexed and provided by the client.

2.- The Institute assumes no responsibility for any misinterpretation or misuse of this document. Partial or total reproduction of this document without prior authorisation by AIMPLAS is strictly forbidden.

3.- The results are considered the property of the client. Without prior authorisation, AIMPLAS will not disclose them with any third party.

4.- No information contained in this report constitutes a guarantee for the trademarks cited, if any.

5.- In the event of any discrepancies within reports, a final verification will be carried out at the Institute's head office. The client undertakes to inform the Institute of any complaint it may receive regarding this report. Failure to do so exempts the Institute from any responsibility.

6.- The tested materials or samples will be stored in AIMPLAS for the next month after the issue of the report, and then they will be destroyed; so that any verifications have to be requested within this period.

7.- AIMPLAS will not assume any liability derived from the obtention of anomalous results in case the sample had been considered unsuitable for the tests and the customer had been previously notified.

8.- AIMPLAS assumes responsibility for the information of this report, except for the information previously provided by the customer which may affect the validity of the results. This information is not within the Scope of Accreditation.

9.- The test Reports or Certificates are not an expert opinion to be used before a judicial body and therefore they may not be used as such before a court of law.

10.- When the Reports or Certificates are requested for use in judicial proceedings, AIMPLAS will participate preferably by videoconference. In case this would not be possible, the costs of travel expenses, subsistence allowance or other additional costs that may be generated during the service, will be borne by the client. AIMPLAS will previously prepare a quotation that will be sent to the client for his knowledge and approval.

11.- This electronically signed document is valid for legal purposes and should be retained. Any printing or graphic representation that is made of it will be a copy and is only valid in the terms that determine the recipient of the signature.

12.- This report has been issued with the information available and provided by the client in the acceptance of the corresponding offer, so that in no case may a subsequent report be issued with information different from the one included in this report, and that has been contributed previously.

13.- The estimated uncertainty for each of the tests in this report is available at AIMPLAS at the client's disposal.

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# PRODUCT TYPE CLASSIFICATION OF REACTION TO FIRE IN ACCORDANCE WITH EN 13501-1:2018

| | |
|---|---|
| Petitioner's reference: | **DIGIDELTA INTERNATIONAL IMPORT EXPORT, S.A.**<br>Zona Industrial Torres Novas,<br>Lote 1 Casal Torteiro<br>Portugal |
| Prepared by: | **LGAI Technological Center, S.A. (APPLUS)**<br>Campus UAB<br>Ronda de la Font del Carme, s/n<br>E - 08193 Bellaterra (Barcelona) |
| Notified Body No: | **0370** |
| Product name: | **Biond Bio-Print Film – White Glossy, White Matte, Clear Glossy and Clear Matte**<br>**Biond Bio-Protection Film – Clear Glossy, Clear Matte and Clear Embossed**<br>**Biond Bio-Glass Etch Film**<br>**Biond Bio-Texture Décor Film** |
| Classification report nº: | **25/32304643-2** |
| Date of issue: | **29th May, 2025** |

## 1.-INTRODUCTION

This classification report defines the classification assigned to Biond Bio-Protection film in accordance with the procedures given in the EN 13501-1:2018 standard.

LGAI TECHNOLOGICAL CENTER, S.A. is notified body nº 0370 under Construction Product Regulation nº 305/2011 for CE Marking; System 3.

## 2.- DETAILS OF CLASSIFIED PRODUCT

### 2.1.-General

The product, Biond Bio-Protection film, is defined according to European Standard EN 15102:2007+A1:2012: "Decorative wall coverings. Roll and panel form".

### 2.2–PRODUCT CHARACTERISTICS

Samples of biobased films were received with the following indications in accordance with the technical specifications provided by the petitioner:

COMMERCIAL REFERENCE: (thicknesses between 60 and 120)

- Biond Bio-Print Film – White Glossy, White Matte, Clear Glossy and Clear Matte
- Biond Bio-Protection Film – Clear Glossy, Clear Matte and Clear Embossed
- Biond Bio-Glass Etch Film
- Biond Bio-Texture Décor Film

Applus internal code: 25/31153

Biobased film system with the following technical specifications, in 3 layers:

- Layer 1: Biobased film, with Applus internal code 25/32525, with a thickness of 60 µm, a superficial density of 75 g/m2, a density of 1250 kg/$m^3$ (value calculated from the lab with the values of thickness and superficial density), white colour and matte appearance.
- Layer 2: Adhesive, with Applus internal code 25/32524, with a superficial density of 20 g/$m^2$, colourless and smooth appearance. (The petitioner did not provide any data regarding thickness or density of this layer)
- Layer 3: Aluminum substrate acording EN 13238:2010 with a thickness of 1 mm, a density of 2700 kg/$m^3$, a superficial density of 2700 g/$m^2$, grey colour and a smooth appearance.

COMMERCIAL REFERENCE: (thicknesses between 60 and 120)

- Biond Bio-Print Film – White Glossy, White Matte, Clear Glossy and Clear Matte
- Biond Bio-Protection Film – Clear Glossy, Clear Matte and Clear Embossed
- Biond Bio-Glass Etch Film
- Biond Bio-Texture Décor Film

Applus internal code: 25/31154

Biobased film system with the following technical specifications, in 3 layers:

- Layer 1: Biobased film with a thickness of 120 µm, a superficial density of 75 g/m2, a density of 625 kg/$m^3$ (value calculated from the lab with the values of thickness and superficial density), white colour and matte appearance.

- Layer 2: Adhesive clear UV acrylic based with a superficial density of 20 g/$m^2$, colourless and smooth appearance. (The petitioner did not provide any data regarding thickness or density of this layer)

- Layer 3: Aluminum substrate acording EN 13238:2010 with a thickness of 1 mm, a density of 2700 kg/$m^3$, a superficial density of 2700 g/$m^2$, grey colour and a smooth appearance.

Manufacturer: Digidelta International Import Expert S.A., Torres novas, Portugal

## 3- REPORT AND RESULTS IN SUPPORT OF THIS CLASSIFICATION

### 3.1- Reports

| Name of Laboratory | Name of Petitioner | Report ref. no. | Test method and date |
|---|---|---|---|
| Applus – LGAI | Digidelta International Import Expert S.A. | 25/32304346-1 | EN ISO 1716:2010* 29-04-2025 |
| | | | EN 13823:2020+A1:2022 27-05-2025 |

*Due to classification standard EN 13501-1:2018 call up test standard EN ISO 1716:2010, we do not test the current version of it.

### 3.2- Results of the Tests

| Test Method | Results – 120 micrometers | | | |
|---|---|---|---|---|
| | **CRITERIA CLASS A2** | **Nº TESTS** | **AVERAGE** | **COMPLIANCE** |
| EN ISO 1716:2010 | PCS ≤ 4,0 MJ/m² (1) | 3 | 2,2 MJ/m² | **YES** |
| | PCS ≤ 4,0 MJ/kg (2) | | 0,0 MJ/kg | **YES** |
| | PCS ≤ 3,0 MJ/kg (3) | | 0,8 MJ/kg | **YES** |
| EN 13823:2020+A1:2022 | $FIGRA_{0,2\ MJ}$ ≤ 120 W/s | 3 | 109 | **YES** |
| | LFS < < edge of the sample | 3 | < to edge | **YES** |
| | $THR_{600s}$ ≤ 7,5 MJ | 3 | 1,4 | **YES** |
| | **CRITERIA subclass 's1'** | **Nº TESTS** | **AVERAGE** | **COMPLIANCE** |
| | SMOGRA ≤ 30 m²/s² | 3 | 0 | **YES** |
| | $TSP_{600s}$ ≤ 50 m² | 3 | 14 | **YES** |
| | **CRITERIA subclass 'd0'** | **Nº TESTS** | **AVERAGE** | **COMPLIANCE** |
| | Fall of droplets/particles in flames within 600 s | 3 | NO | **YES** |

1. External non-substantial component (Biobased film + adhesive)
2. Substantial component (Aluminum)
3. Product as a whole

## 4- CLASSIFICATION AND FIELD OF APPLICATION

### 4.1- Reference of classification

This classification has been carried out in accordance with EN 13501-1:2018: "Classification in terms of the behaviour to fire of construction products and building elements. Part 1: Classification made from the data gathered during fire reaction tests".

### 4.2- Classification

The tested products, 120 micrometers in relation to its reaction to fire behaviour is classified:

**A2**

The additional classification in relation to smoke production is:

**s1**

The additional classification in relation to flaming droplets / particles is:

**d0**

| Fire behaviour | | Smoke production | | | Flaming droplets | |
|---|---|---|---|---|---|---|
| A2 | - | s | 1 | , | d | 0 |

**REACTION TO FIRE CLASSIFICATION: A2-s1,d0**

**This classification is only valid for the final conditions of use described in the present report.**

## 4.3.- Field of application

- This classification is valid for the following product parameters:

  - Variable parameter 1: Thickness and finish

The tested product, 120 micrometers can be produced in different thicknesses and finishes.

The tests were carried out and completed with the thinnest panels (60 µm thickness) and the thickest panels (120 µm thickness) and in different finishes. As indicated by the product standard EN 15102:2007+A1:2012, by extension, it is concluded that the following panels are included in the following Euroclass:

- Biobased film, 90 mic – white glossy and white matte
- Biobased film, 120 mic – white matte and clear embossed
- Biobased film, 60 mic – clear glossy
- Biobased film, 70 mic – clear matte
- Biobased film, 90 mic – clear matte

**REACTION TO FIRE CLASSIFICATION: A2-s1,d0**

**This classification is only valid for the final conditions of use described in the present report.**

- The classification is valid for the following final use applications:

The product Biond Bio-Protection film is intended to be used as decorative covering for walls.

| | |
|---|---|
| Substrate | - |
| Fixing method | - |
| Joint | Vertical joint |
| Air cavity | Non-cavity and non-ventilated |
| Others | - |

## 5.- LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification assigned to the product in this report is appropriate to a declaration of conformity by the manufacturer within the context of system 3 of AVCP and CE marking under the Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products.

The manufacturer has made a declaration, which is held on file. This confirms that the products design requires no specific processes, procedures or stages (e.g. no addition of flame-retardants, limitation of organic content, or addition of fillers) that are aimed at enhancing the fire performance in order to obtain the classification achieved. As a consequence, the manufacturer has concluded that system 3 attestation is appropriate.

The test laboratory has, therefore, played no part in sampling the product for the test, although it holds appropriate references, supplied by the manufacturer, to provide for traceability of the samples tested.

| Laboratory Manager<br>LGAI Technological Center S.A. (APPLUS) | Responsible of Euroclasses<br>LGAI Technological Center S.A. (APPLUS) |
|---|---|
| The uncertainty expanded of the measure U, has been obtained by multiplying the typical measurement uncertainty by the coverage factor k, such that the coverage probability is approximately 95% | |
| The results refer exclusively to the samples tested at the time and under the conditions indicated. The results refer exclusively to the samples tested at the time and under the conditions indicated. The decision rule agreed with the client to give a declaration of conformity with the specification or standard, is following a simple binary decision rule, in line with what is established ILAC G8. | |
| Uncertainty associated to the Combustion Heat Determination Test: $PCS_{biobased\ film}$= ± 0,3 MJ/Kg, $PCS_{adhesive}$= ± 1,5 MJ/Kg<br>Uncertainty associated to the Single Burned Item (SBI) Test: FIGRA0,2MJ ±124 W/s; THR600s=±2,5 MJ; SMOGRA=±7 $m^2/s^2$; TSP600s=±32 $m^2$; Time (Fall of droplets/particles) =N.A. | |
| Applus+ guarantees that this task has been carried out in compliance with the requirements of our Quality and Sustainability System, and furthermore, that the contractual terms and legal regulations have been complied with. In the framework of our improvement programme, we would appreciate any comments you may deem appropriate. These should be addressed to the manager who signs this document, or to the Quality Director of Applus+, at the following address:satisfaccion.cliente@applus.com | |

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# CLASSIFICATION REPORT

| | |
|---|---|
| Petitioner's reference: | **Digidelta Internacional Import Export, S.A.**<br>Industrial zone Torres Novas, Lote 1<br>Casal Torteiro, 2350-483 Torres Novas<br>Portugal |
| Prepared By: | **LGAI Technological Center, S.A. (APPLUS)**<br>Campus UAB<br>Ronda de la Font del Carme, s/n<br>E - 08193 Bellaterra (Barcelona) |
| Product name: | **Biond Bio Print Film + Biond Bio Protection Film** |
| Report nº: | **25/32302198-2** |
| Date of issue: | **22th April, 2025** |

## 1.-INTRODUCTION

This classification report defines the railway classification assigned to "Biond Bio Print Film + Biond Bio Protection Film" in accordance with the procedures given in the EN 45545-2:2020+A1:2023 standard.

## 2.-OBJECT OF THE TEST

Fire tests of railway products in compliance with the following standards:

- ISO 5658-2:2006 and ISO 5658-2 Amd1:2011: "Reaction to fire tests -- Spread of flame Part 2: Lateral spread on building and transport products in vertical configuration."

- ISO 5660-1:2015 and ISO 5660-1:2015/Amd1:2019: "Reaction to fire tests -- Heat release, smoke production and mass loss rate -- Part 1: Heat release rate (cone calorimeter method)".

- EN ISO 5659-2:2017: "Plastics -- Smoke generation -- Part 2: Determination of optical density by a single-chamber test".

- EN 17084:2018 Method 1: "Railway applications. Fire protection on railway vehicles. Toxicity test of materials and components"

- EN 45545-2:2020+A1:2023: Railway applications - "Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components ".

## 3.- DETAILS OF CLASSIFIED PRODUCT

In accordance with the technical specifications provided by the petitioner:

Product trade name: Biond Bio Print Film + Biond Bio Protection Film

The product is composed by two layers:

- Layer nº1 (Exposed face): Biobased
  - Thickness (µm): 60 ± 5%
  - Grammage (g/m$^2$) = 75 ± 10%
  - Colour: Clear

- Layer nº2: Biobased
  - Thickness (µm): 90
  - Colour: White
  - Appearance: Matte

Petitioner does not provide any information of density nor grammage of layer nº2. Density of layer nº1 is not specified either.

Fixing method: The test has been performed with the product stick to the steel sheet in accordance with the standard EN 13238:2010.

Manufacturer: Digidelta Internacional Import Export, S.A (Torres Novas, Portugal)

## 4.-REPORT AND RESULTS IN SUPPORT OF THIS CLASSIFICATION

### 4.1-REPORTS

| Name of Laboratory | Name of sponsor | Report ref. no. | Test method and date |
|---|---|---|---|
| Applus – LGAI (Nº9/LE895) | Digidelta Internacional Import Export, S.A. | 25/32302198-1 | ISO 5660-1:2015 and ISO 5660-1:2015Amd1:2019 19-04-2022 |

| Name of Laboratory | Name of sponsor | Report ref. no. | Test method and date |
|---|---|---|---|
| APPLUS RESCOLL* (Nº1-1995) | Digidelta Internacional Import Export, S.A. | 2502332 | ISO 5658-2:2006 and ISO 5658-2 Amd1:2011 |
| | | | EN ISO 5659-2:2017 EN 17084:2018 Method 1 |

* Test performed by a partner accredited laboratory; the complete tests report is attached in this classification report in Annexes, with file number: 2502332.

### 4.2.- TEST RESULTS

**REQUIREMENT 1**

| Test method | Parameter | Number of tests | Continuous parameter mean | Compliance parameters R1-HL1 | Compliance parameters R1-HL2 | Compliance parameters R1-HL3 |
|---|---|---|---|---|---|---|
| T02 ISO 5658-2 | CFE (kW/m$^2$) | 3 | **22.9** | ≥ 20 kW/m$^2$ | ≥ 20 kW/m$^2$ | ≥ 20 kW/m$^2$ |
| T03.01 ISO 5660-1: 50 kW/m$^2$ | MARHE (kW/m$^2$) | 3 | **8.26** | -- | ≤ 90 kW/m$^2$ | ≤ 60 kW/m$^2$ |
| T10.01 EN ISO 5659-2 : 50 kW/m$^2$ | Ds (4 minutes) (dimensionless) | 3 | **34.4** | ≤ 600 | ≤ 300 | ≤ 150 |
| T10.02 EN ISO 5659-2 : 50 kW/m$^2$ | VOF4 (min) | 3 | **90.7** | ≤ 1200 min | ≤ 600 min | ≤ 300 min |
| T11.01 EN 17084 Method 1 : 50 kW/m$^2$ | $CIT_G$ (4 minutes) (dimensionless) | 3 | **0.01** | ≤ 1,2 | ≤ 0,9 | ≤ 0,75 |
| T11.01 EN 17084 Method 1 : 50 kW/m$^2$ | $CIT_G$ (8 minutes) (dimensionless) | 3 | **0.01** | ≤ 1,2 | ≤ 0,9 | ≤ 0,75 |

## REQUIREMENT 2

| Test method | Parameter | Number of tests | Continuous parameter mean | Compliance parameter R2-HL1 | Compliance parameter R2-HL2 | Compliance parameter R2-HL3 |
|---|---|---|---|---|---|---|
| T02 ISO 5658-2 | CFE (kW/m²) | 3 | **22.9** | ≥ 13 kW/m² | ≥ 13 kW/m² | ≥ 13 kW/m² |
| T03.01 ISO 5660-1: 50 kW/m² | MARHE (kW/m²) | 3 | **8.26** | -- | -- | ≤ 90 kW/m² |
| T10.01 EN ISO 5659-2 : 50 kW/m² | Ds (4 minutes) (dimensionless) | 3 | **34.4** | ≤ 600 | ≤ 300 | ≤ 150 |
| T10.02 EN ISO 5659-2 : 50 kW/m² | VOF4 (min) | 3 | **90.7** | ≤ 1200 min | ≤ 600 min | ≤ 300 min |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (4 minutes) (dimensionless) | 3 | **0.01** | ≤ 1,2 | ≤ 0,9 | ≤ 0,75 |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (8 minutes) (dimensionless) | 3 | **0.01** | ≤ 1,2 | ≤ 0,9 | ≤ 0,75 |

## REQUIREMENT 3

| Test method | Parameter | Number of tests | Continuous parameter mean | Compliance parameter R3-HL1 | Compliance parameter R3-HL2 | Compliance parameter R3-HL3 |
|---|---|---|---|---|---|---|
| T02 ISO 5658-2 | CFE (kW/m²) | 3 | **22.9** | ≥ 13 kW/m² | ≥ 13 kW/m² | ≥ 13 kW/m² |
| T10.01 EN ISO 5659-2: 50 kW/m² | Ds (4 minutes) (dimensionless) | 3 | **34.4** | -- | ≤ 480 | ≤ 240 |
| T10.02 EN ISO 5659-2: 50 kW/m² | VOF4 (min) | 3 | **90.7** | -- | ≤ 960 min | ≤ 480 min |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (4 minutes) (dimensionless) | 3 | **0.01** | ≤ 1,2 | ≤ 0,9 | ≤ 0,75 |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (8 minutes) (dimensionless) | 3 | **0.01** | ≤ 1,2 | ≤ 0,9 | ≤ 0,75 |

## REQUIREMENT 7

| Test method | Parameter | Number of tests | Continuous parameter mean | Compliance parameter R7-HL1 | Compliance parameter R7-HL2 | Compliance parameter R7-HL3 |
|---|---|---|---|---|---|---|
| T02 ISO 5658-2 | CFE (kW/m²) | 3 | **22.9** | ≥ 20 kW/m² | ≥ 20 kW/m² | ≥ 20 kW/m² |
| T03.01 ISO 5660-1: 50 kW/m² | MARHE (kW/m²) | 3 | **8.26** | -- | ≤ 90 kW/m² | ≤ 60 kW/m² |
| T10.04 EN ISO 5659-2: 50 kW/m² | Ds max (dimensionless) | 3 | **37.4** | -- | ≤ 600 | ≤ 300 |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (4 minutes) (dimensionless) | 3 | **0.01** | -- | ≤ 1,8 | ≤ 1,5 |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (8 minutes) (dimensionless) | 3 | **0.01** | -- | ≤ 1,8 | ≤ 1,5 |

**REQUIREMENT 17**

| Test method | Parameter | Number of tests | Continuous parameter mean | Compliance parameter R17-HL1 | Compliance parameter R17-HL2 | Compliance parameter R17-HL3 |
|---|---|---|---|---|---|---|
| T02 ISO 5658-2 | CFE (kW/m²) | 3 | **22.9** | ≥ 13 kW/m² | ≥ 13 kW/m² | ≥ 13 kW/m² |
| T03.01 ISO 5660-1: 50 kW/m² | MARHE (kW/m²) | 3 | **8.26** | -- | ≤ 90 kW/m² | ≤ 60 kW/m² |
| T10.04 EN ISO 5659-2: 50 kW/m² | Ds max (dimensionless) | 3 | **37.4** | -- | ≤ 600 | ≤ 300 |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (4 minutes) (dimensionless) | 3 | **0.01** | -- | ≤ 1,8 | ≤ 1,5 |
| T11.01 EN 17084 Method 1 : 50 kW/m² | $CIT_G$ (8 minutes) (dimensionless) | 3 | **0.01** | -- | ≤ 1,8 | ≤ 1,5 |

## 5.- CLASSIFICATION AND FIELD OF APPLICATION

This classification has been carried out according to European standard EN 45545-2:2020+A1:2023. Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and component.

Classifications obtained are as follows:

| Product reference: **Biond Bio Print Film + Biond Bio Protection Film** | Classification according to EN 45545-2:2020+A1:2023 standard |
|---|---|

| REQUIREMENT | HAZARD LEVEL |
|---|---|
| R1 | HL1, HL2 and HL3 |
| R2 | HL1, HL2 and HL3 |
| R3 | HL1, HL2 and HL3 |
| R7 | HL1, HL2 and HL3 |
| R17 | HL1, HL2 and HL3 |

## 6.- FIELD OF APPLICATION

(1) Classifications valid for the product described in the description of the classified product section.

(2) Classifications valid for any colour and/or pattern of the product, as it is detailed in EN 45545-2:2020+A1:2023 standard, chapter 4.2.f.

## 7.- LIMITATIONS

This classification document does not represent type approval or certification of the product.

## ANNEX

Applus RESCOLL

INNOVATION
APPLICATION
FORMATION
CARACTERISATION

8, allée Geoffroy Saint Hilaire
CS30021
F-33615 PESSAC Cedex
Tél : (33) 05 47 74 69 00
Fax : (33) 05 47 74 80 13

Mél : rescoll@rescoll.fr
http://www.rescoll.fr

cofrac ESSAIS
Accreditation N°1-1995
Scope available
www.cofrac.fr

SIRET 437 950 173 00041 – NAF 7490B – VAT FR 81437950173

| Test report n°2502332 of the 18/04/2025 | Nb Pages : | 7 |
|---|---|---|
| Recipient : | Carla SALINAS | |
| Company : | LGAI Technological Center<br>Ronda de la Font del Carme, s/n (Campus UAB) 08193 BELLATERRA (Cerdanyola del Valles), SPAIN | |
| Y/ Référence : | 9600511603 | |
| O/ Référence : | AF-2503-00909 | |
| Sample reception date : | 27/03/2025 | |
| Report issue date : | 18/04/2025 | |
| Test officer : | Gwénaëlle BABANINE<br>Stéphanie RAÏS<br>Camille DUBOURG | |

Laboratory Manager

Signature numérique de SANDRINE ISABELLE AUSSET
Date : 2025.04.18 12:30:49 +02'00'

| RESCOLL | Test report<br>N° 2502332 | BA/2502332<br>Page 2/7 |
|---|---|---|

## DESCRIPTION OF THE MATERIAL

| | |
|---|---|
| Material name* | Biond Bio Print Film + Biond Bio Protection Film |
| Material description* | Final product with two products, to be used on trains.<br><br>Layer 1 (exposed to fire) is a biobased material :<br>Thickness : 60 µm<br>Grammage : 75 g/m²<br>Color : Clear<br><br>Layer 2 is a biobased material :<br>Thickness : 90 µm<br>Color : White<br>Appearance : matte<br><br>Fixation method : Glued<br>Substrate : metallic sheet |
| Color* | White |
| Thickness* | Layer 1 : 60 µm<br>Layer 2 : 90 µm |
| Density | Information not provided by the customer |
| Surface density | Information not provided by the customer |
| Manufacturer | Information not provided by the customer |
| Batch number | Information not provided by the customer |

*Information provided by the customer

| RESCOLL | Test report<br>N° 2502332 | BA/2502332<br>Page 3/7 |
|---|---|---|

| | |
|---|---|
| Test performed | **Measurement of Critical Flux at Extinction (CFE) – Test performed under COFRAC accreditation** |
| Test Standard | ISO 5658-2 : 2006 + ISO 5658-2/A1 : 2011 |
| Test Procedure | MO769 C |
| Rescoll Referece | 2502332 |
| Material name | Biond Bio Print Film + Biond Bio Protection Film |

*The results are valid only for the fire-test-exposure conditions described in this procedure and for the specimens assessed ; they cannot be the only criteria to evaluate risk of fire hazard of the product.*

## TEST CONDITIONS

*These tests are performed in permanents RESCOLL's installations (33600 Pessac, France).*

| | | | |
|---|---|---|---|
| **Test date :** | 31/03/2025 | **Sample reception date :** | 27/03/2025 |
| **Pilot flame gas :** | Propane | **Test device :** | PARA 1001 |
| **Number or samples tested :** | 3 | **Conditioning (ENCL 1014)** | 23 ± 2 °C , 50 ± 5 % HR |

*Remarks : As the product has a shiny metallic surface, Samples 4 to 6 are tested with mat black paint.*

## RESULTS

| | Sample 1 | Sample 2 | Sample 3 | Average |
|---|---|---|---|---|
| Ignition time (s) | 41 | 47 | 64 | 51 |
| Flameout time (s) | 228 | 223 | 181 | 211 |
| Burnt lenght (mm) | 380 | 370 | 330 | 360 |
| Test duration (s) | 828 | 823 | 781 | 811 |
| Flaming droplets burning more than 10 seconds | No | No | No | NA |
| CFE (kW/m²) | 20,3 | 21,7 | 26,7 | 22,9 |
| Qsb (MJ/m²) | 3,5 | 3,5 | 3,8 | 3,6 |

CFE = Critical Flux at Extinction
Qsb = Average thermal energy

## OBSERVATIONS

Test specimens 1 and 2: Small blisters appear on the surface of the specimen and ignite.
Test specimen 3: When the test was launched, the coating on the specimen melts in places.

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|---|---|---|

## TABLE OF MEASUREMENTS

The table below contains the propagation times of the flame front to reach each distance along the test sample :

| Distance (mm) | Time (s) | | |
|---|---|---|---|
| | Sample 1 | Sample 2 | Sample 3 |
| 50 | 42 | 48 | 72 |
| 100 | 43 | 49 | 76 |
| 150 | 45 | 53 | 80 |
| 200 | 72 | 66 | 88 |
| 250 | 102 | 95 | 100 |
| 300 | 137 | 135 | 132 |
| 350 | 185 | 181 | / |
| 400 | / | / | / |
| 450 | / | / | / |
| 500 | / | / | / |
| 550 | / | / | / |
| 600 | / | / | / |
| 650 | / | / | / |
| 700 | / | / | / |
| 750 | / | / | / |

| RESCOLL | Test report N° 2502332 | BA/2502332 Page 5/7 |
|---|---|---|

| | |
|---|---|
| Test performed | Measurement of smoke density – Test performed under COFRAC accreditation |
| Test Standard | ISO 5659-2 : 2017 |
| Test Procedure | MO112 I |
| Rescoll Referece | 2502332 |
| Material name | Biond Bio Print Film + Biond Bio Protection Film |

*The results are valid only for the fire-test-exposure conditions described in this procedure and for the specimens assessed ; they cannot be the only criteria to evaluate risk of smoke obscuration of the product.*

## TEST CONDITIONS

*These tests are performed in permanents RESCOLL's installations (33600 Pessac, France).*

| | | | |
|---|---|---|---|
| Test date | 03 & 11/04/2025 | Sample reception date | 27/03/2025 |
| Heat Flux | 50 kW/m² | Test device | CHFUM 1002 |
| Pilot Flame | No | Conditioning (ENCL 1014) | 23 ± 2 °C , 50 ± 5 % HR |
| Cone-sample separation | 25 mm | Test duration : | 600 seconds |
| Tested face | White | Number of tests : | 3 |
| Intumescing material | No | Grid/wires used : | No |

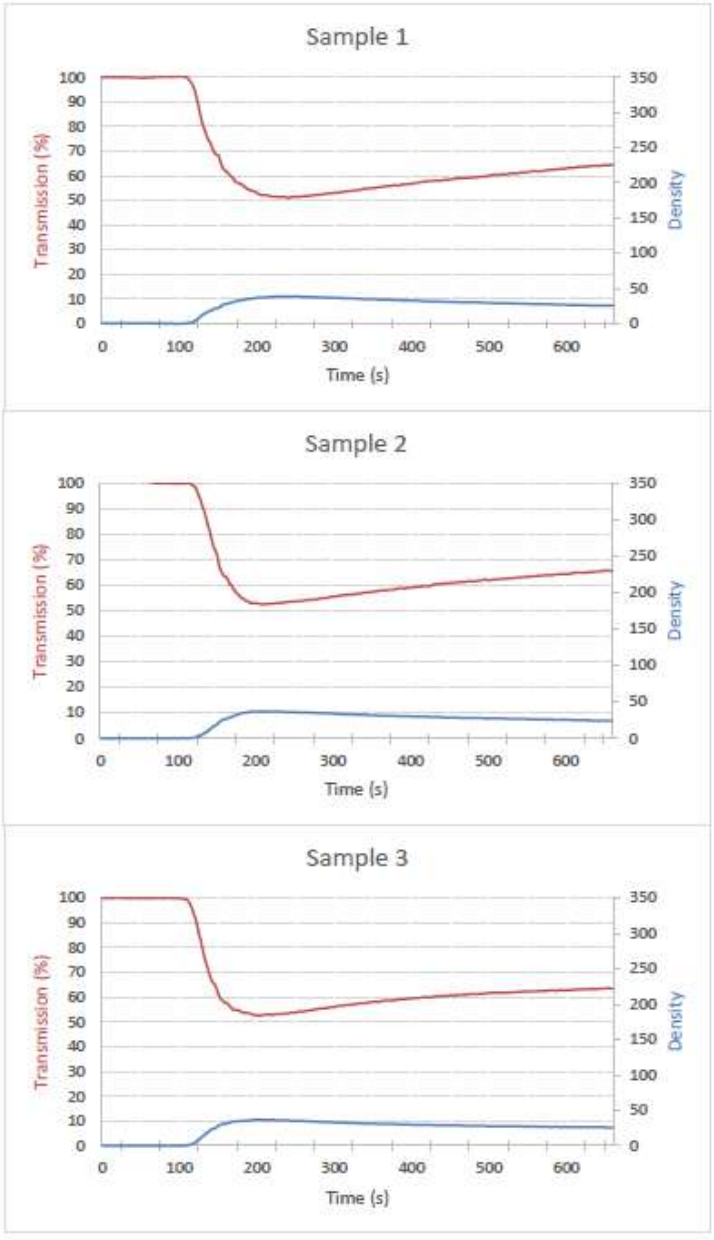
## RESULTS

| | Sample 1 | Sample 2 | Sample 3 | Average |
|---|---|---|---|---|
| Thickness (mm) | 0,9 | 0,9 | 0,9 | 0,9 |
| Mass (g) | 36,0 | 34,8 | 33,9 | 34,9 |
| Final mass (g) | 35,3 | 34,2 | 33,3 | 34,3 |
| Mass loss (g) | 0,7 | 0,6 | 0,6 | 0,6 |
| Time to ignition (s) | No ignition | | | NA |
| Time to flameout (s) | | | | NA |
| VOF4 | 92,7 | 87,2 | 92,1 | 90,7 |
| Ds (4) | 36,3 | 33,7 | 33,2 | 34,4 |
| Ds (10) | 25,1 | 24,1 | 26,0 | 25,1 |
| Ds max | 38,5 | 36,9 | 36,8 | 37,4 |
| Ds max during the 10 first minutes of test | 38,5 | 36,9 | 36,8 | 37,4 |
| Correction factor Dc | 0,9 | 3,2 | 3,9 | 2,7 |

Remarks : n/a

| RESCOLL | Test report N° 2502332 | BA/2502332 Page 6/7 |
|---|---|---|

The figures below show the evolution of Specific Smoke Density (Ds) and light transmission over time :



| RESCOLL | Test report N° 2502332 | BA/2502332 Page 7/7 |
|---|---|---|

| Test performed | Measurement of Smoke Toxicity - Test performed under COFRAC accreditation |
|---|---|
| Test Standard | EN 17084 |
| Test Procedure | MO112 I |
| Rescoll Referece | 2502332 |
| Material name | Biond Bio Print Film + Biond Bio Protection Film |

## TEST CONDITIONS

*These tests are performed in permanents RESCOLL's installations (33600 Pessac, France).*

| Test date | 03 & 11/04/2025 | Sample reception date | 27/03/2025 |
|---|---|---|---|
| Heat Flux | 50 kW/m² | Test device | CHFUM 1002 |
| Pilot Flame | No | Conditioning (ENCL 1014) | 23 ± 2 °C , 50 ± 5 % HR |
| Cone-sample separation | 25 mm | Test duration : | 600 seconds |
| Tested face | White | Number of tests : | 3 |
| Intumescing material | No | Grid/wires used : | No |

## RESULTS

Results at 4 minutes :

| Gas component | Epr 1 | | Epr 2 | | Epr 3 | | |
|---|---|---|---|---|---|---|---|
| | [µL/L] | [mg/m³] | [µL/L] | [mg/m³] | [µL/L] | [mg/m³] | |
| CO | 99,9 | 98,0 | 97,6 | 95,7 | 93,3 | 91,5 | |
| CO2 | 255,0 | 393,0 | 352,5 | 543,3 | 303,4 | 467,6 | |
| SO2 | 4,0 | 9,0 | 2,7 | 6,1 | 1,2 | 2,7 | |
| NO | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | |
| NO2 | 0,5 | 0,8 | <LQ* | <LQ* | 0,3 | 0,5 | |
| HBr | 0,3 | 0,9 | <LQ* | <LQ* | <LQ* | <LQ* | |
| HCl | <LQ* | <LQ* | 2,4 | 3,1 | <LQ* | <LQ* | |
| HCN | 2,2 | 2,1 | 0,0 | 0,0 | 1,1 | 1,0 | |
| HF | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | Average $CIT_G$ |
| $CIT_G$ | 0,01 | | 0,01 | | 0,01 | | 0,01 |

**< LQ : Inferior to the quantification method limits*

Results at 8 minutes :

| Gas component | Epr 1 | | Epr 2 | | Epr 3 | | |
|---|---|---|---|---|---|---|---|
| | [µL/L] | [mg/m³] | [µL/L] | [mg/m³] | [µL/L] | [mg/m³] | |
| CO | 126,0 | 123,6 | 123,1 | 120,8 | 124,8 | 122,4 | |
| CO2 | 332,8 | 513,0 | 432,3 | 666,3 | 396,6 | 611,3 | |
| SO2 | 2,9 | 6,5 | 2,8 | 6,3 | 2,0 | 4,5 | |
| NO | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | |
| NO2 | <LQ* | <LQ* | 0,7 | 1,1 | <LQ* | <LQ* | |
| HBr | <LQ* | <LQ* | <LQ* | <LQ* | 0,2 | 0,6 | |
| HCl | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | |
| HCN | 2,0 | 1,9 | 1,7 | 1,6 | <LQ* | <LQ* | |
| HF | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | <LQ* | Average $CIT_G$ |
| $CIT_G$ | 0,01 | | 0,01 | | 0,01 | | 0,01 |

**< LQ : Inferior to the quantification method limits*