

CLASSIFICATION REPORT

Petitioner's reference: **Digidelta Internacional Import Export, S.A.**
Industrial zone Torres Novas, Lote 1
Casal Torteiro, 2350-483 Torres Novas
Portugal

Prepared By: **LGAI Technological Center, S.A. (APPLUS)**
Campus UAB
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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."

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- 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): $60 \pm 5\%$
 - Grammage (g/m^2) = $75 \pm 10\%$
 - 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/m ²)	3	22.9	≥ 13 kW/m ²	≥ 13 kW/m ²	≥ 13 kW/m ²
T03.01 ISO 5660-1: 50 kW/m ²	MARHE (kW/m ²)	3	8.26	--	--	≤ 90 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 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/m ²)	3	22.9	≥ 13 kW/m ²	≥ 13 kW/m ²	≥ 13 kW/m ²
T10.01 EN ISO 5659-2: 50 kW/m ²	Ds (4 minutes) (dimensionless)	3	34.4	--	≤ 480	≤ 240
T10.02 EN ISO 5659-2: 50 kW/m ²	VOF4 (min)	3	90.7	--	≤ 960 min	≤ 480 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 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/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
T10.04 EN ISO 5659-2: 50 kW/m ²	Ds max (dimensionless)	3	37.4	--	≤ 600	≤ 300
T11.01 EN 17084 Method 1 : 50 kW/m ²	CIT _G (4 minutes) (dimensionless)	3	0.01	--	≤ 1,8	≤ 1,5
T11.01 EN 17084 Method 1 : 50 kW/m ²	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/m ²)	3	22.9	≥ 13 kW/m ²	≥ 13 kW/m ²	≥ 13 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
T10.04 EN ISO 5659-2: 50 kW/m ²	Ds max (dimensionless)	3	37.4	--	≤ 600	≤ 300
T11.01 EN 17084 Method 1 : 50 kW/m ²	CIT _G (4 minutes) (dimensionless)	3	0.01	--	≤ 1,8	≤ 1,5
T11.01 EN 17084 Method 1 : 50 kW/m ²	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
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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.



Digitally signed by
Salvador Suñol Gálvez



Digitally signed by Vanessa
Tutusaus Domingo

Laboratory Manager
LGAI Technological Center S.A. (APPLUS)

Euroclass Responsible
LGAI Technological Center S.A. (APPLUS)

The results refer exclusively to the samples tested at the time and under the conditions indicated.

The uncertainties expressed in this document pertain to the expanded uncertainty, which has been obtained by multiplying the typical measurement uncertainty by the coverage factor $k=2$ which, for a regular distribution, corresponds to a coverage probability of approximately 95%.

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

ANNEX



INNOVATION
APPLICATION
FORMATION
CARACTERISATION

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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 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 Stéphanie RAÏS Camille DUBOURG		

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

This Analysis Report testifies to the characteristics of the samples tested but does not presuppose the characteristics of similar products. Tests are performed at the address listed in the report footer unless specifically mentioned per test in the body of the report.

In the event of a change in the report, Rescoll shall not be responsible for the reports previously issued (destruction at the responsibility of the customer).

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**The laboratory cannot be considered responsible for information provided by the client that could affect the validity of the results.*

RESCOLL	Test report N° 2502332	BA/2502332 Page 2/7
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DESCRIPTION OF THE MATERIAL

Material name*	Biond Bio Print Film + Biond Bio Protection Film
Material description*	<p>Final product with two products, to be used on trains.</p> <p>Layer 1 (exposed to fire) is a biobased material : Thickness : 60 µm Grammage : 75 g/m² Color : Clear</p> <p>Layer 2 is a biobased material : Thickness : 90 µm Color : White Appearance : matte</p> <p>Fixation method : Glued Substrate : metallic sheet</p>
Color*	White
Thickness*	Layer 1 : 60 µm 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 N° 2502332	BA/2502332 Page 3/7
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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 Reference	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 of 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/m ²)	20,3	21,7	26,7	22,9
Qsb (MJ/m ²)	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.

RESCOLL	Test report N° 2502332	BA/2502332 Page 4/7
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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
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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
Intumescent material	No	Grid/wires used :	No

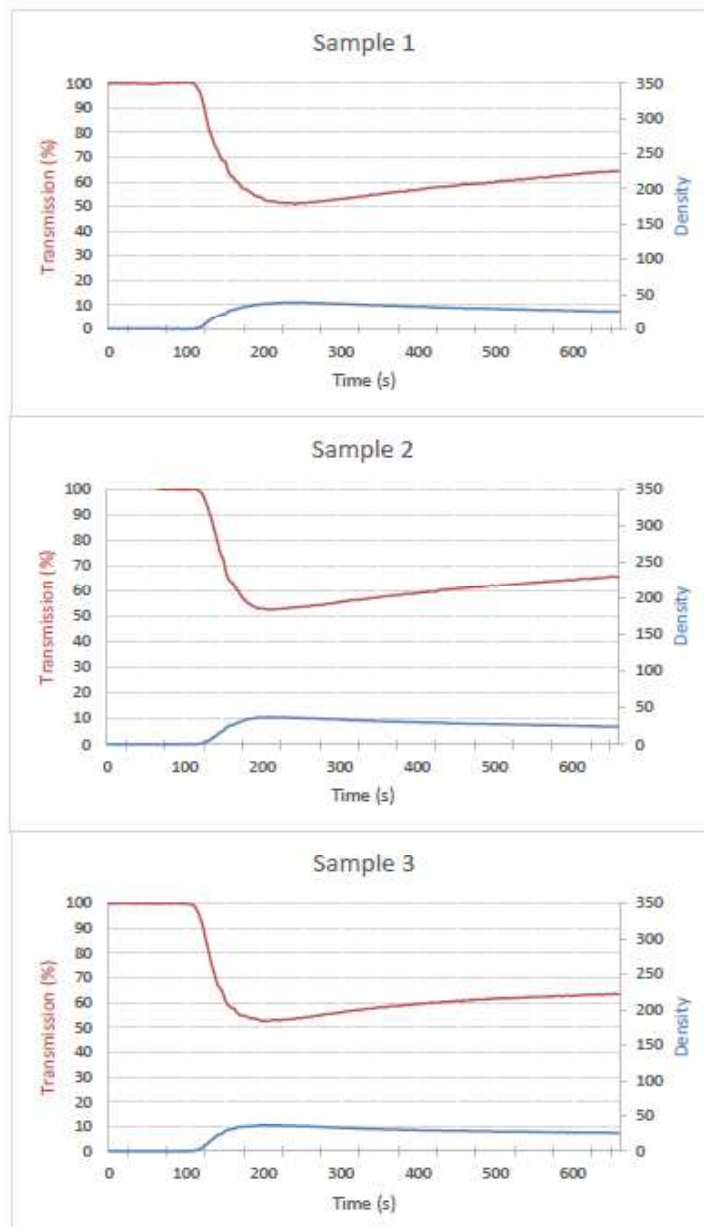
RESULTS

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

TEST CONDITIONS

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

Test date	03 & 11/04/2025	Sample reception date	27/03/2025
Heat Flux	50 kW/m ²	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
Intumescent material	No	Grid/wires used :	No

RESULTS

Results at 4 minutes :

Gas component	Epr 1		Epr 2		Epr 3		Average CTF ₀
	[µL/L]	[mg/m ³]	[µL/L]	[mg/m ³]	[µL/L]	[mg/m ³]	
CO	99,9	98,0	97,6	95,7	93,3	91,5	
CO ₂	255,0	393,0	352,5	543,3	303,4	467,6	
SO ₂	4,0	9,0	2,7	6,1	1,2	2,7	
NO	<LQ*	<LQ*	<LQ*	<LQ*	<LQ*	<LQ*	
NO ₂	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*	
CTF ₀	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		Average CTF ₀
	[µL/L]	[mg/m ³]	[µL/L]	[mg/m ³]	[µL/L]	[mg/m ³]	
CO	126,0	123,6	123,1	120,8	124,8	122,4	
CO ₂	332,8	513,0	432,3	666,3	396,6	611,3	
SO ₂	2,9	6,5	2,8	6,3	2,0	4,5	
NO	<LQ*	<LQ*	<LQ*	<LQ*	<LQ*	<LQ*	
NO ₂	<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*	
CTF ₀	0,01		0,01		0,01		0,01

* LQ : Inferior to the quantification method limits