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Presidencia de la Nación | Ministerio de Producción

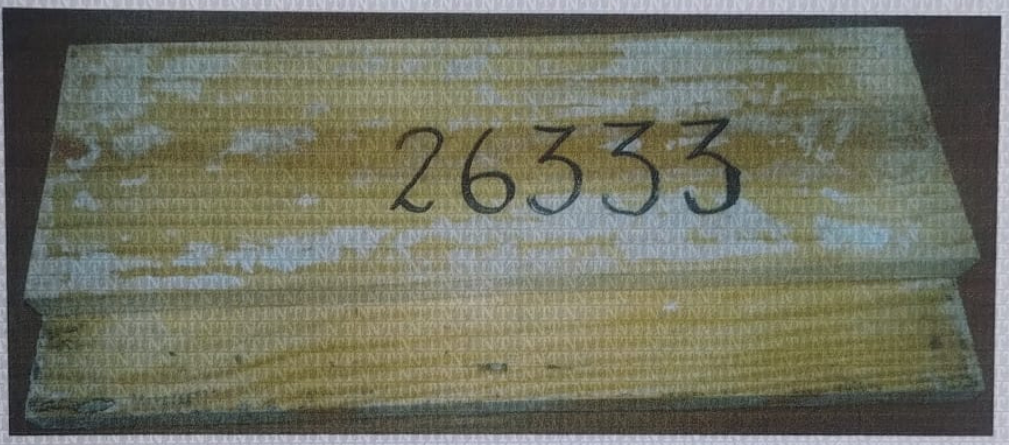
Informe de Ensayo

OT N°101 - 26333 Único
Página 1 de2

Fecha de Informe: 15/03/2016

Solicitante
Minotti Pablo David
Echeverria 2073 - Piso 4 Dpto. B - (1419) – Ciudad Autónoma de Buenos Aires.

Elemento
Una (1) muestra de madera con tratamiento, identificada por el solicitante como: **"Tablas de madera tratadas con Aditivo Primer Intumescente MINIT para lacas y pinturas al agua y lacas".**



Determinaciones requeridas
Clasificación de acuerdo al Índice de Propagación de Llama.

Fecha de Recepción
03/02/2016

Fecha de ensayo
10/03/2016

Metodología empleada
El ensayo de Propagación Superficial de Llama se realizó de acuerdo a la **Norma IRAM 11910-3:1994 "Materiales de Construcción, Reacción al fuego, Determinación del índice de propagación de llama – método del panel radiante"** (coincide con los métodos de ensayo de la Norma NBR 9442:1986 y ASTM E162:1994).

Este informe no podrá ser reproducido parcialmente sin la

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Parque Tecnológico Miguelete

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OT N°101 - 26333 Único
Página 2 de2

Resultados

F(promedio):	3,09
Q(promedio):	9,57
I(promedio):	**30,23**

Teniendo en cuenta la Tabla de Clasificación de la Norma IRAM 11910-1 del año 1994, el **Índice de Propagación de Llamas (I)** hallado del material denominado: **"Tablas de madera tratadas con Aditivo Primer Intumescente MINIT para lacas y pinturas al agua y lacas"** se clasifica como:

"Clase RE 3: Material de Baja propagación de llama"
(A esta clase pertenecen los materiales con un índice entre 26 y 75)
Coincide con la Clase B de la Norma brasileña NBR 9442/1986

Referencias para el ensayo de determinación de la propagación superficial de llama

Clase	Clase ABNT	Denominación	Norma IRAM	Criterio de clasificación
RE 1	-	Incombustible	11910-2	Anexo A de la norma
RE 2	A	Muy baja propagación de llama	11910-1	Índice: 0 a 25
RE 3	B	Baja propagación de llama	11910-1	Índice: 26 a 75
RE 4	C	Mediana propagación de llama	11910-1	Índice: 76 a 150
RE 5	D	Elevada propagación de llama	11910-1	Índice: 151 a 400
RE 6	E	Muy elevada propagación de llama	11910-1	Índice mayor a 400

Definiciones:
Un factor derivado de la rapidez de propagación del frente de llama (F) y otro relativo al calor liberado por el material ensayado (Q) son combinados para proveer el Índice de propagación superficial de llama (I).
I: Índice de propagación superficial de llama.
F: Factor de propagación de llama.
Q: Factor de evolución de calor

Los resultados contenidos en el presente informe corresponden a las condiciones en las que se realizaron las mediciones y/o ensayos.

Fin del Informe

Arq. BASILIO HASAPOV
COORDINADOR
U.T. TECNOLOGÍA EN INCENDIOS
INTI-CONSTRUCCIONES

Arq. INÉS DOLMANN
DIRECTORA TECNICA
INTI - Construcciones

«La reproducción y difusión del presente informe se halla sujeta a las cláusulas obrantes en la primer foja, anverso y reverso»

ASTM 162 (METODO PANEL RADIANTE EN MADERA, CARTÓN Y PAPEL. RESULTADO: DNI (DID NOT IGNITE / NO ENTRO EN IGNICIÓN)

Equivalente con los estándares europeos: CSE RF 3/77; y BS 476 part 6 and part 7

Govmark

96-D Allen Boulevard
Farmingdale, New York 11735-5626 USA
Tel. +1 (631) 293-8944 Fax +1 (631) 293-8
e-mail: testing@govmark.com

Received:04/05/2016	Completed:04/07/2016	Letter: P	JB	P.O.#:	Test Report #:	3-12594-0-

Client's Identification	Style: Wood Treated by Spray wit Flame Retardant. Date of Mfg.: 03/31/2016. Composition: Pine Wood. Thickness: 1". (see continuation)

Tested For: Pablo Minotti
Flame Retardant Technologies LLC
1330 NW 78th Ave
Miami, FL 33126

Key Test: ASTM E 162 725

Tel: 1-(305)-400-8889 **Ext:**
Fax: 1-( )- -

CLIENT'S IDENTIFICATION (continuation):
Product End Use: MINIT Flame Retardant, for Wood cardboard and Paper Treatment.
Additional Information: Pine Wood Treated by Spray with the Product MINIT Flame Retardant for Wood Cardboard and Paper.

Category: Radiant Panel LE 2015a; V 09/15 NTR 2/16 PC: 24H+ME /dl SM/mg

APPROXIMATE [x] THICKNESS [ ] DIAMETER OF MATERIAL (as measured by Govmark): 1.514"

TEST PERFORMED: ASTM E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

SPECIMEN: [x] Rigid Material: 6" x 18"
[ ] Cellular Sheet Foam Materials: 6" x 18"
[ ] Fabric/Flexible Materials: 10" x 22"
[ ] Cable: 18" lengths were grouped to form 6" x 18" test specimens

BRIEF DESCRIPTION OF TEST: The test specimen faces a radiant heat source. At the beginning of the test period an igniting flame impinges at the top of the specimen. Visual observation is made of the downward progression of the flame front. The test is completed when the flame front has progressed to the 15" mark, or after an exposure time of 15 minutes, whichever occurs first. The heat given off by the burning specimen is automatically recorded. The combination of the two factors, flame front progression and heat, result in a Flame Spread Index.

NOTES: * While the Standard calls out "Radiant Panel Index", Govmark reports "Flame Spread Index", since this is the terminology used in most Code specifications. "Flame Spread Index" and "Radiant Panel Index" are identical for the purposes of this report.

** Flashing is defined as a flame front of 3 seconds or less in duration. Where ANY flashing has occurred, an individual specimen's Flame Spread Index is understood to be qualified as "(Flashing)".

REMARKS:

Specimen #	Non Sustained (Flashing**) Flame Front Off Gas Ignition (yes/no)	Sustained Flame Front Ignition at (mm:ss)	All Flaming Out (mm:ss)	Test End (mm:ss)	Drips Flame on Test Floor (yes/no)
1	Yes	01:30	SB	15:00	No
2	Yes	01:09	SB	15:00	No
3	Yes	00:49	SB	15:00	No
4	Yes	00:54	11:33	15:00	No

ABBREVIATIONS WHICH MAY BE USED IN "REMARKS":
DNI = Did not ignite

CERTIFICATION: I certify that the above results were obtained after testing specimens in accordance with the procedures and equipment specified above.

Robert I. Brown

AUTHORIZED SIGNATURE
GOVMARK

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LAB SERVICE

TEST REPORT

Nº 1143-27-522

VÁLIDO SOLO CON CERTIFICADO DE COMPRA. MINIT IGNIFUGOS

Applicant/ Manufacturer	MINIT Fire Retatadant (MINIT Ignifugos) Pablo David Minotti ID: 20224196270 Argentina
Product	MINIT Ignifugos / Fire retardant applied on different specimens described below
Reference Standard/ Method Tests	BSS 7239-88. // ASTM E-662. // EN 13823. // ISO 5659-2. TESTS METHODS FOR TOXIC GAS GENERATION BY MATERIALS ON COMBUSTION.
Description of Test Specimens	REF A -Total pieces with fire retardant (provided by Applicant/ Manufacturer) - 4 piece of 100% cotton fabric, treated with MINIT Ignifugos/ Fire retardant - Ref 1 - 4 piece of 100% polyester fabric, treated with MINIT Ignifugos/ Fire retardant - Ref 2 - 4 piece of synthetic carpet, treated with MINIT Ignifugos/ Fire retardant - Ref 3 - 4 piece of synthetic grass carpet, treated with MINIT Ignifugos/ Fire retardant - Ref 4 - 4 piece of foam, treated with MINIT Ignifugos/ Fire retardant - Ref 5 - 4 piece of wood, treated with MINIT Ignifugos/ Fire retardant - Ref 6 REF B -Total pieces without fire retardant (provided by Applicant/ Manufacturer) - 2 piece of 100% cotton fabric, without fire retardant - Ref 1 - 2 piece of 100% polyester fabric, without fire retardant - Ref 2 - 2 piece of synthetic carpet, without fire retardant - Ref 3 - 2 piece of synthetic grass carpet, without fire retardant - Ref 4 - 2 piece of foam, without fire retardant - Ref 5 - 2 piece of wood, without fire retardant - Ref 6 Size of Specimens: 3" x 3" , specified for test methods Size of Specimens: 15" x 15" , specified for test methods
Date Received	May 20, 2025
Issued Date	Jun 27, 2025
Pages	3

1

BSS 7239-88 is a Boeing standard test method that measures the concentration of toxic gases produced during the combustion of materials, specifically focusing on those used in aircraft interiors. It is a critical tool for evaluating fire safety, especially in the confined spaces of an aircraft cabin, by assessing the potential hazards from toxic gases like carbon monoxide, hydrogen fluoride, hydrogen cyanide, hydrogen chloride, and sulfur dioxide. The test is performed in a controlled environment, where a material sample is burned and the resulting gases are analyzed.

ASTM E-662 is a standard test method that measures the amount of smoke produced by solid materials when exposed to heat and flame, specifically focusing on the specific optical density of the smoke. It's used to evaluate how much light is blocked by the smoke generated by a material, which is an indicator of visibility reduction in a fire. This test is crucial for assessing fire hazards and is often a requirement in various industries and transportation codes. The test measures the "specific optical density," which is a normalized value that accounts for the amount of smoke generated relative to the sample's exposed area and volume.

EN 13823, is a Single Burning Item (SBI) test, is a European standard for evaluating the fire behavior of building products (excluding flooring) when exposed to a thermal attack. The product is mounted in a corner configuration with two walls (or wings) forming a 90-degree angle. A propane gas burner (30kW) is placed at the bottom of the corner to simulate a fire source. The specimen and burner are placed inside an enclosure with an exhaust system that collects combustion gases. Instruments measure heat release, smoke production, and flame spread, while visual observations record burning droplets and other relevant characteristics. The SBI test results are used to classify products into Euroclasses (A1, A2, B, C, D, etc.) which indicate their fire performance.

ISO 5659-2 is an international standard that specifies a method for measuring smoke production from materials, particularly plastics or synthetic, when exposed to heat and flame. It focuses on determining the optical density of the smoke produced in a single-chamber test. This standard is primarily used for research and development, as well as in fire safety engineering for buildings, trains, and ships, rather than for setting building code ratings.

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Validation Code

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TEST REPORT

Nº 1143-27-522

LAB SERVICE

VALIDO SOLO CON CERTIFICADO DE COMPRA.
MINIT IGNIFUGOS

BSS 7239-88 RESULTS:

Relative Room Humidity: 20% / Test Duration: 20 min. // Chamber Wall Temp: 35℃

Carbon Monoxide (CO ppm) at 1.5 minutes / at 4.0 minutes / at maximum
Nitrogen Oxides (as NO2 ppm)
Sulfur Dioxide (SO2 ppm)
Hydrogen Chloride (HCl ppm)
Hydrogen Fluoride (HF ppm)
Hydrogen Cyanide (HCN ppm)

REF A	HCl	HCN	HF	NO2	SO2	CO 1.5	CO 4.0	CO MAX
1	< 1	ND	ND	< 1	ND	5	55	118
2	< 2	ND	ND	< 1	ND	8	98	211
3	< 3	ND	< 2	< 1	< 1	9	101	218
4	< 3	ND	< 2	< 1	< 1	9	125	238
5	< 3	ND	< 2	< 1	< 1	9	127	247
6	< 2	ND	ND	< 1	ND	6	87	209

2

Conclusions:

Boeing BSS 7239 is solely a test procedure and as such, has no specific pass/fail criteria of its own. The reference criteria cited are typical for the transportation industry and are listed for reference purposes only. They may or may not apply to the specific products. Specimens are exposed to the combustion conditions described in ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials. In compliance with this standards the material tested approve the BSS 7239 Tests

ASTM E-662 RESULTS:

REF A	Relative Room Humidity: 33% / Chamber Wall Temp: 35℃
1	Ds (1.5): 34, Ds (4.0): 52, Dm: 114.
2	Ds (1.5): 61, Ds (4.0): 89, Dm: 197.
3	Ds (1.5): 63, Ds (4.0): 91, Dm: 211.
4	Ds (1.5): 64, Ds (4.0): 94, Dm: 212.
5	Ds (1.5): 68, Ds (4.0): 97, Dm: 232.
6	Ds (1.5): 64, Ds (4.0): 95, Dm: 212.

Among the parameters normally reported are:
Ds 1.5 - specific optical density after 1.5 minutes
Ds 4.0 - specific optical density after 4.0 minutes
Dm - maximum specific optical density at any time during the 20 minute test
Authorities generally specify a maximum Ds 1.5 of 100 and a maximum. Ds 4.0 of 200 in either flaming or non-flaming test mode.

Conclusions:

All specimens materials, identified in this report, when tested, meet requirements to smoke rate required by authorities.

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TEST REPORT

Nº 1143-27-522

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EN 13823 RESULTS:

Cumulative smoke production (TSP). Fire Growth Rate (FIGRA). Cumulative heat release (THR). Smoke growth rate (SMOGRA)

REF A	Lateral Flame Spread to End of Specimen	Flaming droplets	Flaming of Fallen Particle Exceeding 10s	FIGRA (w/s)	THR 600s (MJ)	SMOGRA (m^2/s^2)	TSP 600s (m^2)
1	N	N	N	178.68	11.89	79.68	86.15
2	N	N	N	367.17	24.78	187.23	149.95
3	N	N	N	389.82	25.49	162.89	144.56
4	N	N	N	391.25	24.87	161.76	142.82
5	N	N	N	396.12	25.45	163.08	144.78
6	N	N	N	185.98	12.87	83.45	89.27

3

Conclusion on specimens REF A: All specimens materials, identified in this report, when tested, meet requirements to smoke rate required by authorities. (Pass)

REF B	Lateral Flame Spread to End of Specimen	Flaming droplets	Flaming of Fallen Particle Exceeding 10s	FIGRA (w/s)	THR 600s (MJ)	SMOGRA (m^2/s^2)	TSP 600s (m^2)
1	Y	Y	Y	536.04	35.67	239.04	258.45
2	Y	Y	Y	1101.51	74.37	561.96	449.85
3	Y	Y	Y	1069.46	76.47	488.67	433.68
4	Y	Y	Y	1173.75	74.61	485.28	428.46
5	Y	Y	Y	1188.36	76.35	489.24	434.34
6	Y	Y	Y	557.94	38.61	250.35	267.81

Conclusion on specimens REF B: All specimens materials, identified in this report, when tested, do not meet smoke rate required by authorities. (Do not pass)

ISO 5659-2 RESULTS:

The radiator cone was located so that the lower rim of the radiator cone shade junction was 25 mm above the upper surface of the specimen when oriented in the horizontal position. Exposed to a radiant heat source (25kW/m² or 50kW/m²) within a closed chamber. Pilot flame was applied.

REF A	/ Relative Room Humidity: 50% / Chamber Wall Temp: 26°C
1	Ds (1.5): 31, Ds (4.0): 49, Dm: 111.
2	Ds (1.5): 59, Ds (4.0): 86, Dm: 194.
3	Ds (1.5): 61, Ds (4.0): 88, Dm: 208.
4	Ds (1.5): 61, Ds (4.0): 91, Dm: 209.
5	Ds (1.5): 65, Ds (4.0): 94, Dm: 229.
6	Ds (1.5): 61, Ds (4.0): 25, Dm: 209.

Conclusion on specimens REF A: All specimens materials, identified in this report, when tested, meet requirements to smoke rate required by authorities. (Pass)

REF B	/ Relative Room Humidity: 50% / Chamber Wall Temp: 26°C
1	Ds (1.5): 119, Ds (4.0): 182, Dm: 399.
2	Ds (1.5): 213, Ds (4.0): 311, Dm: 689.
3	Ds (1.5): 220, Ds (4.0): 318, Dm: 738.
4	Ds (1.5): 224, Ds (4.0): 329, Dm: 742.
5	Ds (1.5): 238, Ds (4.0): 339, Dm: 812.
6	Ds (1.5): 224, Ds (4.0): 332, Dm: 742.

Conclusion on specimens REF B: All specimens materials, identified in this report, when tested, do not meet smoke rate required by authorities. (Do not pass)

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Presentación valida únicamente con el Certificado / Factura de Compra MINIT Madera

validacion

Homologación de De Densidad de Humo NORMA IRAM 11914

Evaluación Comparativa del Índice de Densidad de Humo (Dm) de diferentes materiales, tratados con Retardante de fuego MINIT Ignífugos, según certificado de ensayo Internacional **IGS 1143-27-522** con Normativa **IRAM 11914 1**.

Comparación de Normativas, Aspecto Propósito, Método de Prueba, Criterios de Evaluación, Similitud con Normas:

ISO 5659-2 Medición de la densidad de humo en cámara cerrada. Se mide la densidad óptica de los humos en función del tiempo y calor irradiado. Densidad óptica específica máxima (Ds). Alta similitud en técnicas de medición.

EN 13823 (SBI Test) Evaluación de la densidad de humo en materiales de construcción mediante SMOGRA. Evaluación de liberación de humo durante la combustión con un objeto en llamas. Tasa de crecimiento de humo **(SMOGRA).**

Ambas normas son compatibles en parte con la evaluación de propagación del humo. IRAM 11914"

En el certificado de ensayo internacional **IGS 1143-27-522** se realizó sobre los siguientes materiales tratados con Retardante de fuego MINIT Ignifugo y no tratados en ensayos comparativos:

- Tela 100% algodón
- Tela 100% poliéster
- Alfombra 100% sintética
- Alfombra de pasto 100% sintética
- Goma espuma
- Madera

En la valuación de la densidad óptica específica corregida (Dmc) de humos en incendios se mide la absorción de luz en una cámara específica para calcular Dm. Densidad óptica específica corregida (Dmc). Especifica los mismos criterios de clasificación.

Desarrollo Comparativo de Normativas Internacionales.

ISO 5659-2 es la norma internacional utilizada para medir la densidad de humo en cámara cerrada. Su método de medición es comparable con IRAM 11914, aunque sus criterios de clasificación difieren levemente.

EN 13823 (SBI Test) evalúa la propagación del fuego y la generación de humo, midiendo SMOGRA. No es idéntico a IRAM 11914 pero se usa en conjunto para clasificar materiales.

IRAM 11914 clasifica los materiales en función de la densidad de humo corregida (Dmc):

≤ 132	Clasificación Baja generación de humo
133 – 264	Mediana generación de humo
265 – 396	Alta generación de humo
> 396	Muy alta generación de humo

Para evaluar un material en Argentina según IRAM 11914, los valores obtenidos de ISO 5659-2 o EN 13823 sirven como referencia.

Conclusión Final

A partir del análisis de normativas internacionales y estudios previos, se ha determinado que los materiales tratados con retardantes de llama MINIT tienen una generación de humo moderada, lo que permite su clasificación en **"Baja a Mediana Generación de Humo" según IRAM 11914 (Dmc 130 - 250).** Comparado con los materiales sin Retardante de llama.

El informe sugiere que los materiales con retardantes de llama MINIT son una opción viable para aplicaciones donde la generación de humo debe ser controlada, cumpliendo con normativas de seguridad.
