

REPORT: Ready for ECOdesigned footwear

PRODUCT: EVA PHOENIX

COMPANY: TECNIFOAM, S.L.

.....
Report No.: C-20121417





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■ What does the Ready for ECOdesigned footwear label stand for?



The materials and components that constitute the footwear have the greatest environmental impacts throughout their life cycle. Thus, being able to identify materials and components that reduce these impacts is key to the eco-design of footwear and sustainable development in this sector.

INESCOP offers the 'Ready for ECOdesigned footwear' certificate that attests that the materials or components that are awarded with it are made from sustainable materials, have been subjected to the control of restricted substances and have adequate durability.

Together with this certificate, INESCOP grants the 'Ready for ECOdesigned footwear' label, which identifies certified products, thus facilitating their detection by footwear manufacturers who are committed to the sustainability of their products.

■ What shall a material or component comply with to get this certificate?

1. Sustainable materials

For a material or component to be considered sustainable, it shall fulfil at least one of the following characteristics or properties:

- Incorporate recycled material
- Renewable origin
- Organic origin
- Bio-based
- Environmentally friendly
- Biodegradable/Compostable
- Others (to be studied by INESCOP)

2. Restricted chemicals

The materials and components suitable for this label shall prove to comply with the control of the substances restricted by Annex XVII of the European REACH Regulation.

3. Durability

Extending the useful life of products is one of the objectives of eco-design since a durable product decreases the rate of waste generation. Thus, the materials and components that make up a shoe shall prove their resistance to the stresses undergone during the use of footwear.



01

Key concepts

Recyclable/recycled materials: Recyclable materials are those that can be transformed, after their use, into new materials (recycled materials). A recyclable material may be made from raw materials or recycled materials, at the same time a recycled material may or may not be recyclable.

Materials of renewable origin: A renewable resource is an element that in the environment can be replenished or regenerated at a similar or even faster rate than its consumption or use by people. Therefore renewable materials are those that can be generated without being depleted.

Organic materials: Raw materials derived from plants/animals that have been grown/raised in an environmentally friendly way and based on requirements regulated and verified by a competent body. In general, the use of artificial chemical compounds during cultivation/farming such as pesticides, herbicides, fertilisers or antiparasitics is avoided.

Environmentally friendly materials: Materials/products that have been produced in an environmentally friendly way. In general, the use of volatile compounds such as solvents and metallic pigments is avoided, and they imply the use renewable energies, manual processes, and circular production processes, the optimisation of water use, etc.

Bio-based materials: These are synthesised materials based on biomass (of animal, plant origin...). This type of materials may be completely bio-based (100% bio-based) or partially bio-based (composite materials in different percentages of biomass, plastics, metals, etc.).

Biodegradable: Materials capable of being degraded by microorganisms (fungi, bacteria...) to molecules that will eventually be mineralised to CO₂ and water, without leaving physical evidence of their existence. It is not necessary for a material to have been manufactured from biomass for it to be biodegradable, there are biodegradable plastics made from petroleum. That is, biodegradability does not depend on the raw material, but on the chemical structure of the material.

Compostable: Partial and accelerated biodegradation process that takes place under controlled conditions (humidity/temperature/oxygen) obtaining a product that serves as a soil amendment/fertiliser known as compost. Both micro-organisms and macro-organisms (more common in home composting) participate in this process.

European REACH Regulation: It is the Regulation (EC) No. 1907/2006, acronym for Registration, Evaluation, Authorisation and Restriction of Chemical substances and mixtures. It entered into force on the 1st June 2007 and its main objective is to improve the protection of human health and the environment against the risk that may be involved in the manufacture, marketing and use of substances as such, contained in chemical mixtures or in articles.



02

Product description

Orderer: TECNIFOAM, S.L.

Type of product: EVA pellets

EVA (Ethyl Vinyl Acetate) pellets, named **EVA PHOENIX**, the composition of which incorporates recycled material, intended for the injection of footwear soles.

Ref: EVA PHOENIX



EVA pellets incorporating recycled material

This material is intended for the manufacture of women's, men's and children's town footwear and school footwear.

Product details:

EVA PHOENIX consists of EVA pellets based on an innovative formulation with a blend of materials including recycled materials from polymeric footwear waste.

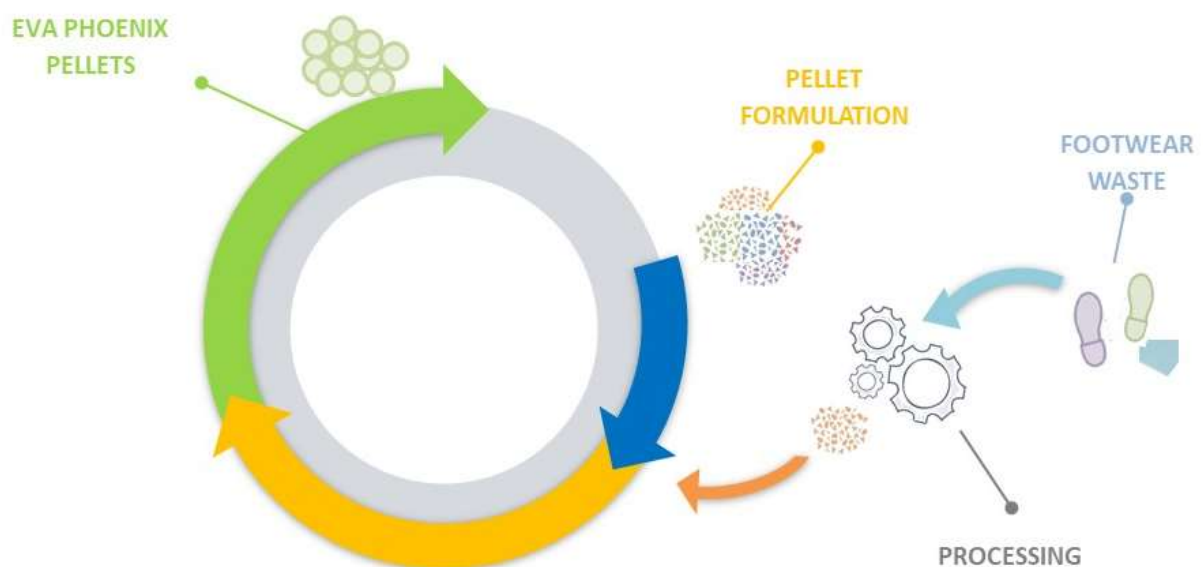


03 Sustainable material

The fact that these pellets are sustainable is due to the fact that they incorporate recycled raw materials in their composition, mainly pre-consumer SBR, from the manufacture of shoe soles, scraps and other production waste, incorporating up to 40% recycled material depending on the formulation.

This reduces the extraction of fossil resources by decreasing the incorporation of virgin raw materials and prevents recycled waste from being disposed of in landfills, with all the environmental impacts that this entails. Annex I shows a set of images of the different recycled materials incorporated in the pellets. The manufacturing process of sustainable pellets from recycled materials has been verified through the review of the documentation, the visit to the facilities and the traceability of the materials by INESCOP staff.

The process is as follows: TECNIFOAM acquires different production waste, such as soles, scraps, test pieces and burrs that have been previously collected and pre-treated. This shredded material is incorporated in the formulation together with other raw materials and compounds, to obtain the final pellets with 40% recycled material and with optimal properties, both in terms of chemical composition and durability for their application in the footwear sector. Below is a diagram of the process:





04 Restricted chemicals

The restricted chemicals linked to this type of material shall meet the limits established in Annex XVII of the REACH Regulation. The restricted chemicals are dimethyl fumarate (DMFU), metals (Cd and Pb), phthalate plasticisers, polycyclic aromatic hydrocarbons (PAHs) and organotin compounds.

The verification of compliance with restricted chemicals has been performed by reviewing the following technical report included in Annex II:

- INESCOP report No. C-20121089 referring to sample "EVA PHOENIX".

05 Durability

The durability verification has been carried out with the following physical tests:

- Hardness (UNE-ISO 7619-1:2011)
- Density (UNE-ISO 2781:2015, method A)
- Abrasion resistance (UNE-EN 12770:2000)
- Tensile strength (UNE-EN 12803:2001/AC:2002)
- Elongation at break (UNE-EN 12803:2001/AC:2002)
- Tear strength (UNE-EN 12771:2000)
- Flex resistance (UNE-EN ISO 17707:2005)
- Organoleptic identification (Method Inescop -6091)

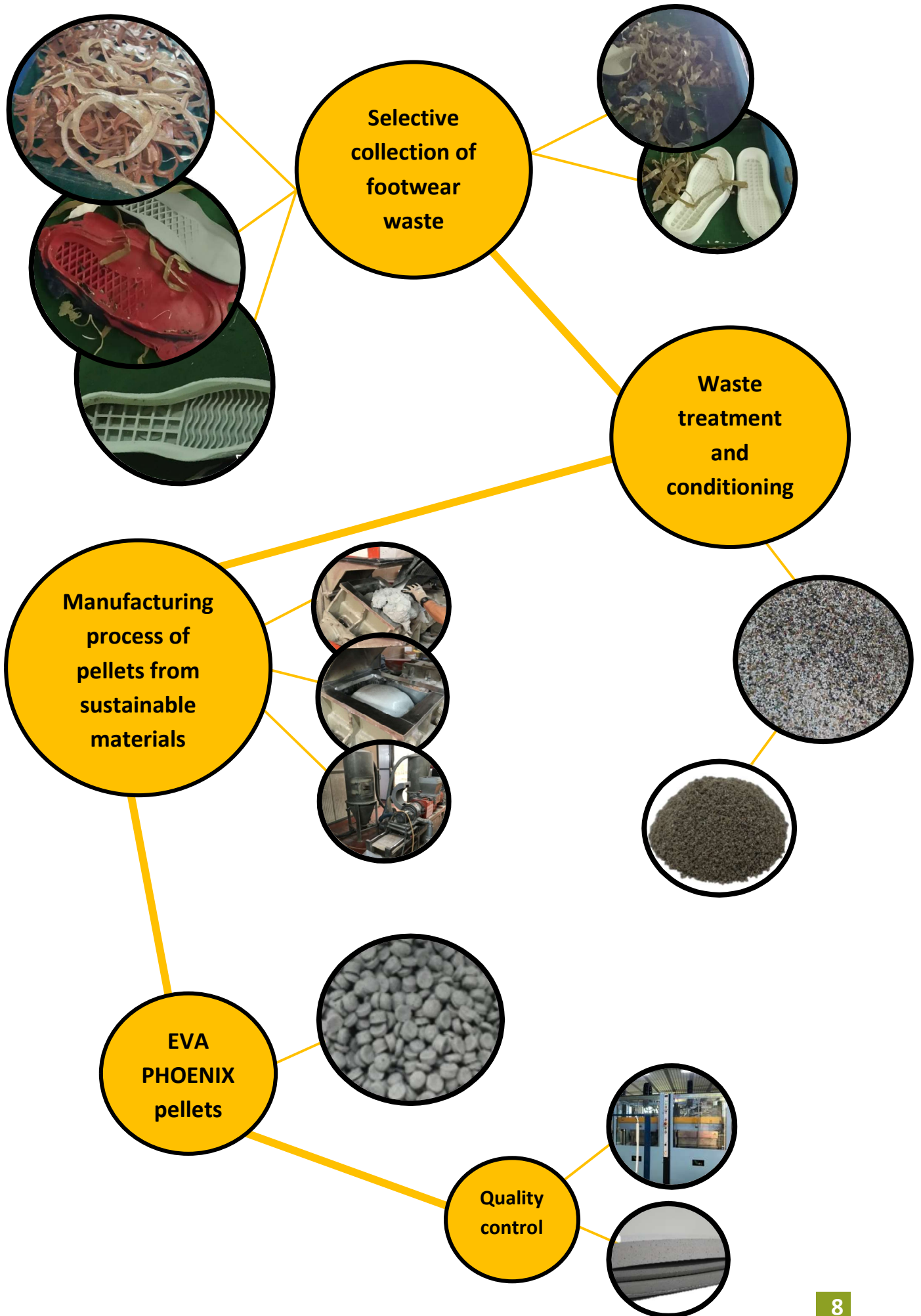
The results obtained can be found in Annex II:

- INESCOP report No. C-20121089 referring to sample "EVA PHOENIX"

According to the orderer, the samples referenced in the analysis correspond to the same materials that are certified with the "Ready For ECOdesigned Footwear" label.



Annex I





Annex II



INFORME Nº: C-20121089

ASUNTO: Control de material para suelas para sello
"Ready for ECOdesigned footwear".

SOLICITANTE: TECNIFOAM, S.L.

I. MUESTRAS:

Varias plaquetas de EVA celular de color gris con dos espesores, según fotografía, con referencia "EVA PHOENIX". _____



II. ENSAYOS SOLICITADOS:

- DUREZA (UNE-ISO 7619-1:2011)
- DENSIDAD (UNE-ISO 2781:2015, método A)
- RESISTENCIA A LA ABRASIÓN (UNE-EN 12770:2000)
- RESISTENCIA A LA TRACCIÓN (UNE-EN 12803:2001/AC:2002)
- ALARGAMIENTO A LA ROTURA (UNE-EN 12803:2001/AC:2002)
- RESISTENCIA AL DESGARRO (UNE-EN 12771:2000)
- RESISTENCIA A LA FLEXIÓN SOBRE PROBETAS (UNE 59532:1994)
- IDENTIFICACIÓN ORGANOLÉPTICA (Método Inescop-6091)
- DETERMINACIÓN DEL CONTENIDO DE FUMARATO DE DIMETILO (UNE-CEN ISO/TS 16186:2013 EX)

Polígono Industrial Campo Alto. C/ Alemania, 102 - Aptdo. Correos 253 - 03600 Elda, Alicante (España)
Tel. + 34 965 395 213 - inescop@inescop.es - www.inescop.es

ARNECO
utarnedo@inescop.es

ELCHE
utelche@inescop.es

FUENVALIDA (C.C.)
asiocat@asiocat.com



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- DETERMINACIÓN DEL CONTENIDO DE COMPUESTOS ORGÁNICOS DEL ESTAÑO (UNE-CEN ISO/TS 16179:2013 EX)
- DETERMINACIÓN DEL CONTENIDO DE PLASTIFICANTES TIPO FTALATO (UNE-CEN ISO/TS 16181:2011 EX)
- DETERMINACIÓN DE HIDROCARBUROS AROMÁTICOS POLICÍCLICOS (PAH) (ISO TS 16190:2013)
- DETERMINACIÓN DEL CONTENIDO TOTAL DE METALES EN MATERIALES (UNE-EN ISO 17072-2:2019)

III. RESULTADOS:

ENSAYO	EVA PHOENIX	Recomendación		
		(1)	(2)	(3)
DUREZA (°Shore A, 3s)	56	--	--	--
DENSIDAD (g/cm ³)	0,57	--	--	--
R. ABRASIÓN (mm ³)	98	≤400	≤400	≤300
R. TRACCIÓN (MPa) ⁽⁵⁾	3,4	≥2,5	≥2,5	≥3
ALARGAMIENTO (%) ⁽⁵⁾	320	≥250	≥250	≥300
R. DESGARRO (N/mm) ⁽⁶⁾	6,7	≥3,0	≥3,0	≥4,0
R. FLEXIÓN (23°C) ⁽⁷⁾ (mm aumento a 100 kc)	0	≤10 ⁽⁴⁾	≤10 ⁽⁴⁾	≤10 ⁽⁴⁾
IDENTIF. ORGANOLÉPTICA ⁽⁸⁾	EVA microporoso	--	--	--

- (1) Requisitos establecidos en la norma UNE 59900:2014 para calzado de caballero con suelas de EVA celular.
- (2) Requisitos establecidos en la norma UNE 59910:2014 para calzado de señora, con suelas de EVA celular.
- (3) Requisitos establecidos en la norma UNE 59920:2014 para calzado de niño infantil y colegial, con suelas de EVA celular.
- (4) Requisito de Inescop para material de suela de calzado.
- (5) Probeta utilizada: halterio 1, tipo S1.
- (6) Probeta tipo S1.
- (7) Probetas de 5 mm de espesor.
- (8) La identificación organoléptica se realiza por un panel de expertos y atiende a criterios subjetivos de valoración en el que se involucran el olfato, la vista o el tacto. Por tanto, su fiabilidad no es la misma que la de un espectro de infrarrojos.



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ENSAYOS QUÍMICOS

DETERMINACIÓN DEL CONTENIDO DE FUMARATO DE DIMETILO (DMFU)

MUESTRA	DMFU (ppm*)	Requisito ⁽¹⁾ (ppm*)
EVA PHOENIX	< 0,1	< 0,1

Técnica: GC-MS

LQ (Límite de Cuantificación) = 0,1ppm*

DETERMINACIÓN DEL CONTENIDO DE COMPUESTOS ORGÁNICOS DEL ESTAÑO

COMPUESTO	"EVA PHOENIX" (ppm**)	Requisito ⁽¹⁾ (ppm**)
Di-butil estaño (DBT) 14488-53-0	< 0,1	< 1000
Di-octil estaño (DOT) 250252-87-0	< 0,1	< 1000
Tri-butil estaño (TBT) 36643-28-4	< 0,1	< 1000
Tri-fenil estaño (TPhT) 668-34-8	< 0,1	< 1000

Técnica: GC/MS

LQ (Límite de Cuantificación) = 0,1 ppm**



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DETERMINACIÓN DEL CONTENIDO DE PLASTIFICANTES TIPO FTALATO

FTALATO	Nº CAS	"EVA PHOENIX" (ppm*)	Requisito ¹ (ppm*)
Ftalato de dibutilo (DBP)	84-74-2	< 50	
Ftalato de di-2-etilhexilo (DEHP)	117-81-7	< 50	
Ftalato de bencil butilo (BBP)	85-68-7	< 50	
Ftalato de diisobutilo (DIBP)	84-69-5	< 50	
Ftalato de di-n-octilo (DNOP)	117-84-0	< 50	
Ftalato de di-n-hexilo (DNHP)	84-75-3	< 50	
Ftalato de diisononilo (DINP)	28553-12-0	< 50	
Ftalato de diisododecilo (DIDP)	26761-40-0	< 50	
Ftalato de Bis(2-metoxietilo) (DMEP)	117-82-8	< 50	
Ftalato de Diisooheptilo (DIHP)	71888-89-6	< 50	
Ftalato de dipentilo (DPP)	131-18-0	< 50	
Ftalato de diisopentilo (DIPP)	605-50-5	< 50	
			Σ todos < 1000

Técnica: GC/MS

LQ (Límite de Cuantificación) = 50 ppm*

DETERMINACIÓN DE HIDROCARBUROS AROMÁTICOS POLICÍCLICOS (PAH)

PAH	Nº CAS	"EVA PHOENIX" (ppm*)	Requisito ⁽¹⁾ (ppm*)
Benzo(a)antraceno	56-55-3	< 0,2	< 1
Benzo(a)pireno	50-32-8	< 0,2	< 1
Benzo(b)fluoranteno	205-99-2	< 0,2	< 1
Benzo(e)pireno	192-97-2	< 0,2	< 1
Benzo(j)fluoranteno ⁽²⁾ +	205-82-3	< 0,2	< 1
Benzo(k)fluoranteno ⁽²⁾	207-08-9	< 0,2	< 1
Dibenzo(a, h)antraceno	53-70-3	< 0,2	< 1
Criseno	218-01-9	< 0,2	< 1

Técnica: GC-MS.

LQ (Límite de Cuantificación) = 0,2 ppm*



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DETERMINACIÓN DEL CONTENIDO TOTAL DE METALES EN MATERIALES

MUESTRA	Pb (ppm*)	Requisito Pb ⁽¹⁾ (ppm*)	Cd (ppm*)	Requisito Cd ⁽¹⁾ (ppm*)
EVA PHOENIX	n.d.	< 500	n.d.	< 100

Técnica: ICP/MS

LQ (Límite de Cuantificación)= 16 ppm*

(1) Requisito según Anexo XVII del reglamento REACH (CE) nº 1907/2006 y sus modificaciones (Registro, evaluación, autorización y restricción de sustancias y mezclas químicas).

(2) Estos compuestos se cuantifican conjuntamente.

(*) mg de sustancia química / kg de muestra.

(**) mg equivalentes de Sn/ kg de muestra.

IV. COMENTARIOS:

La muestra cumple con los requisitos establecidos para el sello "Ready for ECOdesigned footwear", para su uso en suelas de calzado de caballero, señora y niño infantil y colegial, fabricadas de EVA celular.

NOTA: El contenido del presente informe no está cubierto por la acreditación de ENAC ni por sus acuerdos internacionales de reconocimiento.



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V. CONDICIONES AMBIENTALES:

Excepto cuando se especifican otras condiciones, los ensayos que figuran en el presente informe se han realizado en las condiciones ambientales siguientes:

Temperatura:	23±2°C
Humedad relativa:	50±5%

Elda, 17 diciembre 2020.



Digitally Signed by M. J. Fernández
Date: 2020.12.17 15:40:19 CET
Contact: mjfernandez@inescop.es

Fdo.: M^a José Fernández Fernández
Ingeniera Química

Puede consultar las prescripciones del laboratorio en la dirección
<http://www.inescop.es/prescripcioneslaboratorio>