

## Piñatex ORIGINAL: Properties

TESTED PROPERTY	TEST METHOD	RESULTS
Tear Strength	ISO9073-4	197 N Dir 1 153 N Dir 2
Tensile Strength	ISO9073-18	>500 N Dir 1 405 N Dir 2
Seam Rupture	ISO13935-2	301.7 N Dir 1 468.1 N Dir 2
Density	EN ISO 2420:2002, Variation from indicated valued: $\pm 0.1 \text{ g/cm}^3$	0.35 $\text{g/cm}^3$
Grammage	EN ISO 2420:2002	500 $\text{g/m}^2$
pH	EN ISO 3071:2006	6.7
Abrasion/Martindale	JLR Test Method #TPJLR.52.001. As per STJLR.51.536 (1&2) Specifications for Light and Heavy Duty.	Moderate Pile Loss on textile starts from 40 K cycles using 12 KPa load.
Cold Crack resistance of finish	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	No cracking at $-10 \text{ }^\circ\text{C}$
Finish Adhesion	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	12.6 N/10 mm
Colour fastness to rubbing cycles © - change in colour and staining	EN ISO 11640 (Perspiration solution according to EN ISO (11641) Assessment according to ISO 105-A02 and ISO 105-A03 (Grey Scale Rating, GSR) (Minimum: Dry 4; Wet: 3; Perspiration: 3)	Dry 4-5 for all Wet 3-4 for all
Colour fastness to light	EN ISO 105-B02 Xenon Light and Blue wool scale (BWS) (Minimum BWS5)	>BWS5
Water spotting	EN ISO 15700 Assessment according to ISO 105-A02 (Minimum 3)	4-5, no change
Colour Fastness to washing	BSEN ISO 105 – C06:2010 (GSR 4)	A1M 40 C pass B1M 50 C pass C1M 60 C pass
Formaldehyde	EN ISO 14184-1:2011	< DL (Not detected)
Phthalates	EN ISO 15777 Extraction and GC-MS	Conform to requirements
Chlorophenols	EN ISO 17070:2015 ISO 13365:2011	< DL (Not detected)

Organotin Compounds	EN ISO 17353:2005	<DL (Not detected)
Aromatic amines from azo dyes	ISO 14362-1	< DL (Not detected)
Alkylphenols (AP)/ Alkylohenol Ethoxylates (APEO), Orthophenylphenol	ISO 18254-2016	< DL (Not detected)
Carcinogenic, allergenic dyes compounds	DIN 54231:2005	< DL (Not detected)
PAHs Analysis	AfPS GS 2014:01	< DL (Not detected)
Volatile Organic Compounds	HS-Screening GC-MS	< DL (Not detected)
Pesticides	DIN 38407-F2 (1993-02) mod; DIN 38407-F14 (1995-10) mod. ICQ CH086	< DL (Not detected)
Resistance by ignition to cigarettes	BS EN 1021-1:2006	Conform to requirements
Resistance by ignition to match	BS EN 1021-2:2006	Conform to requirements

## Piñatex METALLIC: Properties

TESTED PROPERTY	TEST METHOD	RESULTS
Tear Strength	ISO9073-4	121 N Dir 1 105 N Dir 2
Tensile Strength	ISO9073-18	>500 N Dir 1 289 N Dir 2
Density	EN ISO 2420:2002, Variation from indicated valued: $\pm 0.1 \text{ g/cm}^3$	0.35 $\text{g/cm}^3$
Grammage	EN ISO 2420:2002	500 $\text{g/m}^2$
pH	EN ISO 3071:2006	6.7
Abrasion/Martindale	JLR Test Method #TPJLR.52.001. As per STJLR.51.536 (1&2) Specifications for Light and Heavy Duty.	Moderate Pile Loss on textile starts from 20 K cycles using 12 kPA load.
Finish Adhesion	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	12.6 N/10 mm
Formaldehyde	EN ISO 14184-1:2011	< DL (Not detected)
Phthalates	EN ISO 15777 Extraction and GC-MS	Conform to requirements
Chlorophenols	EN ISO 17070:2015 ISO 13365:2011	< DL (Not detected)

Organotin Compounds	EN ISO 17353:2005	<DL (Not detected)
Aromatic amines from azo dyes	ISO 14362-1	< DL (Not detected)
Alkylphenols (AP)/ Alkylohenol Ethoxylates (APEO), Orthophenylphenol	ISO 18254-2016	< DL (Not detected)
Carcinogenic, allergenic dyes compounds	DIN 54231:2005	< DL (Not detected)
PAHs Analysis	AfPS GS 2014:01	< DL (Not detected)
Volatile Organic Compounds	HS-Screening GC-MS	< DL (Not detected)
Pesticides	DIN 38407-F2 (1993-02) mod; DIN 38407-F14 (1995-10) mod. ICQ CH086	< DL (Not detected)

## Piñatex PLUMA: Properties

TESTED PROPERTY	TEST METHOD	RESULTS
Tear Strength	ISO9073-4	63 N Dir 1 52 N Dir 2
Tensile Strength	ISO9073-18	270 N Dir 1 179 N Dir 2
Density	EN ISO 2420:2002, Variation from indicated valued: $\pm 0.1 \text{ g/cm}^3$	0.272 g/cm <sup>3</sup>
Grammage	EN ISO 2420:2002	311 g/m <sup>2</sup>
pH	EN ISO 3071:2006	6.7
Abrasion/Martindale	JLR Test Method #TPJLR.52.001. As per STJLR.51.536 (1&2) Specifications for Light and Heavy Duty.	Moderate Pile Loss on textile starts from 40 K cycles using 12 kPA load.
Cold Crack resistance of finish	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	No cracking at - 10 °C
Finish Adhesion	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	12.6 N/10 mm
Colour fastness to rubbing cycles © - change in colour and staining	EN ISO 11640 (Perspiration solution according to EN ISO (11641) Assessment according to ISO 105-A02 and ISO 105-A03 (Grey Scale Rating, GSR) (Minimum: Dry 4; Wet: 3; Perspiration: 3)	Dry 4-5 for all Wet 3-4 for all
Colour fastness to light	EN ISO 105-B02 Xenon Light and Blue wool scale (BWS) (Minimum BWS5)	>BWS5
Water spotting	EN ISO 15700 Assessment according to ISO 105-A02 (Minimum 3)	4-5, no change

Colour Fastness to washing	BSEN ISO 105 – C06:2010 (GSR 4)	A1M 40 C pass B1M 50 C pass C1M 60 C pass
Formaldehyde	EN ISO 14184-1:2011	< DL (Not detected)
Phthalates	EN ISO 15777 Extraction and GC-MS	Conform to requirements
Chlorophenols	EN ISO 17070:2015 ISO 13365:2011	< DL (Not detected)
Organotin Compounds	EN ISO 17353:2005	<DL (Not detected)
Aromatic amines from azo dyes	ISO 14362-1	< DL (Not detected)
Alkylphenols (AP)/ Alkylohenol Ethoxylates (APEO), Orthophenylphenol	ISO 18254-2016	< DL (Not detected)
Carcinogenic, allergenic dyes compounds	DIN 54231:2005	< DL (Not detected)
PAHs Analysis	AfPS GS 2014:01	< DL (Not detected)
Volatile Organic Compounds	HS-Screening GC-MS	< DL (Not detected)
Pesticides	DIN 38407-F2 (1993-02) mod; DIN 38407-F14 (1995-10) mod. ICQ CH086	< DL (Not detected)
Resistance by ignition to cigarettes	BS EN 1021-1:2006	Conform to requirements
Resistance by ignition to match	BS EN 1021-2:2006	Conform to requirements

## Piñatex MINERAL: Properties

TESTED PROPERTY	TEST METHOD	RESULTS
Tear Strength	ISO9073-4	109 N Dir 1 83 N Dir 2
Tensile Strength	ISO9073-18	>500 N Dir 1 305 N Dir 2
Density	EN ISO 2420:2002, Variation from indicated valued: $\pm 0.1 \text{ g/cm}^3$	0.35 $\text{g/cm}^3$
Grammage	EN ISO 2420:2002	500 $\text{g/m}^2$
pH	EN ISO 3071:2006	6.7
Abrasion/Martindale	JLR Test Method #TPJLR.52.001. As per STJLR.51.536 (1&2) Specifications for Light and Heavy Duty.	Moderate Pile Loss on textile starts from 40 K cycles using 12 kPa load.

Cold Crack resistance of finish	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	No cracking at – 10 °C
Finish Adhesion	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	12.6 N/10 mm
Colour fastness to rubbing cycles © - change in colour and staining	EN ISO 11640 (Perspiration solution according to EN ISO (11641) Assessment according to ISO 105-A02 and ISO 105-A03 (Grey Scale Rating, GSR) (Minimum: Dry 4; Wet: 3; Perspiration: 3)	Dry 4-5 for all Wet 3-4 for all
Colour fastness to light	EN ISO 105-B02 Xenon Light and Blue wool scale (BWS) (Minimum BWS5)	>BWS5
Water spotting	EN ISO 15700 Assessment according to ISO 105-A02 (Minimum 3)	4-5, no change
Colour Fastness to washing	BSEN ISO 105 – C06:2010 (GSR 4)	A1M 40 C pass B1M 50 C pass C1M 60 C pass
Formaldehyde	EN ISO 14184-1:2011	< DL (Not detected)
Phthalates	EN ISO 15777 Extraction and GC-MS	Conform to requirements
Chlorophenols	EN ISO 17070:2015 ISO 13365:2011	< DL (Not detected)
Organotin Compounds	EN ISO 17353:2005	<DL (Not detected)
Aromatic amines from azo dyes	ISO 14362-1	< DL (Not detected)
Alkylphenols (AP)/ Alkylohenol Ethoxylates (APEO), Orthophenylphenol	ISO 18254-2016	< DL (Not detected)
Carcinogenic, allergenic dyes compounds	DIN 54231:2005	< DL (Not detected)
PAHs Analysis	AfPS GS 2014:01	< DL (Not detected)
Volatile Organic Compounds	HS-Screening GC-MS	< DL (Not detected)
Pesticides	DIN 38407-F2 (1993-02) mod; DIN 38407-F14 (1995-10) mod. ICQ CH086	< DL (Not detected)
Resistance by ignition to cigarettes	BS EN 1021-1:2006	Conform to requirements
Resistance by ignition to match	BS EN 1021-2:2006	Conform to requirements

Tests conducted at Intertek UK, Underwrites Laboratories (USA) and BLC.

Piñatex Mineral comply with REACH and its Annex XVII regulation.

Please note these tests were performed between 2017 and 2019.

## Piñatex PERFORMANCE: Properties

TESTED PROPERTY	TEST METHOD	RESULTS
Tear Strength	BS EN ISO 9073-4:1997	149 N Dir 1 112 N Dir 2
Tear strength (Baumann)	BS EN ISO 3377-2:2016	115 N Dir 1 100 N Dir 2
Tensile Strength	BS EN ISO 9073-18:2008	686 N Dir 1 602 N Dir 2
Tensile Strength	BSEN ISO 13934-1:2013	400 N Dir 1 310 N Dir 2
Softness	BSEN ISO 17235:2015	2.10 mm
Density	EN ISO 2420:2002, Variation from indicated valued: $\pm 0.1 \text{ g/cm}^3$	0.223 $\text{g/cm}^3$
Grammage	EN ISO 2420:2002	567 $\text{g/m}^2$
Abrasion/Martindale	JLR Test Method #TPJLR.52.001. As per STJLR.51.536 (1&2) Specifications for Light and Heavy Duty.	Moderate Pile Loss on textile starts from 150000 K cycles using 12 kPA load.
Finish Adhesion	EN ISO 11644, Dry Adhesion (Minimum 2 N/10 mm)	> 10 N/10 mm
Formaldehyde	EN ISO 14184-1:2011	< DL (Not detected)
Phthalates	EN ISO 15777 Extraction and GC-MS	Conform to requirements
Chlorophenols	EN ISO 17070:2015 ISO 13365:2011	< DL (Not detected)
Organotin Compounds	EN ISO 17353:2005	<DL (Not detected)
Aromatic amines from azo dyes	ISO 14362-1	< DL (Not detected)
Alkylphenols (AP)/ Alkylohenol Ethoxylates (APEO), Orthophenylphenol	ISO 18254-2016	< DL (Not detected)
Carcinogenic, allergenic dyes compounds	DIN 54231:2005	< DL (Not detected)
PAHs Analysis	AfPS GS 2014:01	< DL (Not detected)
Volatile Organic Compounds	HS-Screening GC-MS	< DL (Not detected)
Pesticides	DIN 38407-F2 (1993-02) mod; DIN 38407-F14 (1995-10) mod. ICQ CH086	< DL (Not detected)
Resistance by ignition to cigarettes	BS EN 1021-1:2006	Conform to requirements

Tests conducted at Intertek UK, Underwrites Laboratories (USA) and BLC (Eurofins).

Piñatex Performance comply with REACH and its Annex XVII regulation.