



EUROPEAN LINEN : A COMFORT STUDY ON TEXTILE PERFORMANCE

EUROPEAN CONFEDERATION
OF LINEN AND HEMP | CELC



Comfort Study: How Linen Performs, 2014
by Cetelor Laboratory - University of Lorraine, France

► N°1 VENTILATION

AIR PERMEABILITY NF EN ISO 9237 (1995)

This test measures the rate of air flow through the fabric.

The permeability values are adjusted for thickness in order to compare the intrinsic values.

The best ventilation results were obtained with 100% LINEN. It has a **cooling effect, for example, for a sports activity** in temperate or warm environment.



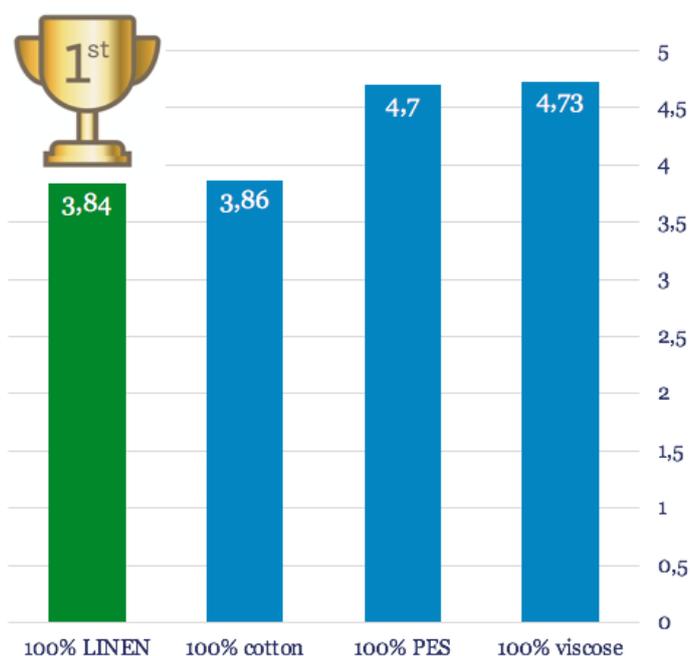
Permeability to air / thickness - mm/s -
NF EN ISO 9237 (1995)

► N°1 BREATHABILITY

RET: WATER-VAPOUR RESISTANCE - SKIN MODEL NF EN 31092: 1994 / ISO 11092: 1993

Skin model test conditions are close to those for the human body, with vapour production (perspiration) during moderate sport exercise in temperate environment: atmospheric temperature 20°C, relative humidity of the environment 40%, stable temperature. The lower the RET value obtained, the more breathable the fabric.

100% linen textiles show the best breathability (permeability to water vapour), meaning they let perspiration pass through.



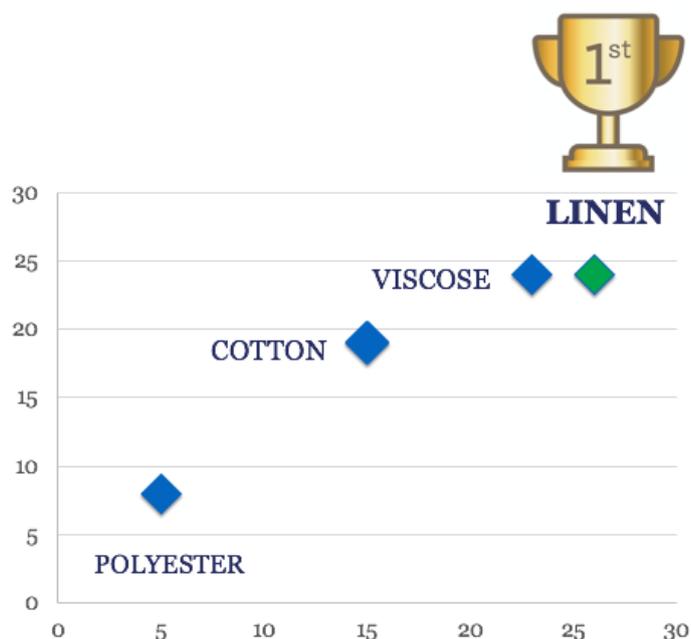
Permeability to water vapour
Water-vapour resistance Ret- m²Pa/W Skin Model
ISO 11092 standard

► N°1 ABSORPTION

BEHAVIOUR OF DRY FABRICS WITH RESPECT TO WATER – TEST ON HORIZONTAL SURFACE - NF G07 – 165 (1993)

This test studies a textile's reaction to a drop of liquid: absorption capacity (instant or slow) + drop diffusion (direction and distribution).

100% LINEN absorbs the liquid instantly and diffuses it over the largest surface area, thereby promoting better wicking.



Behaviour of dry fabrics with respect to water - mm row and column - NF G07-165

► N°1 MOISTURE MANAGEMENT

MMT AAT CC TEST METHOD 195 2009 (AMERICAN STANDARD)

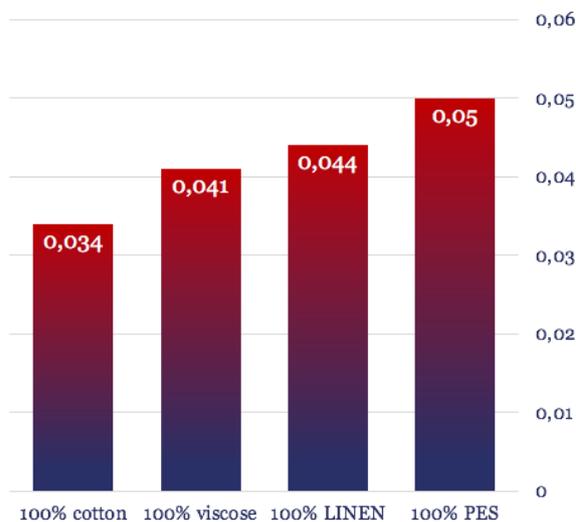
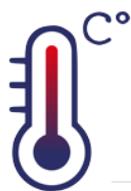
This test places fabric between 2 sensors and records the evolution of the perspiration within the fabric from both sides for 120 seconds.

100% Linen and 100% Viscose exhibited the best moisture management in the study = class 5 =

- medium to rapid wetting & absorption,
- rapid diffusion
- large diffusion surface



Moisture Management Tester classification scale 1 to 6 - AATCC 195 standard



Insulation / Thermal Resistance Rct- m2 k/W
Skin Model ISO 11092 standard

BALANCED WARMTH HEAT RETENTION

RCT: THERMAL RESISTANCE

This test uses the skin model and determines if the fabric holds in heat.

Ranking 2nd for insulation, **100% linen offers a good compromise between coolness and heat retention.**

The result is a product that's comfortable in summer, and also appropriate for winter, by adapting the choice of yarn, weave, stitch.

IMT COMFORT INDEX

The IMT Comfort Index is a ratio between insulation (RCT) and breathability (RET), indicating fabrics most comfortable to wear.

100% LINEN represents the highest Comfort Index with 0,388.

The study in its entirety is available on our website www.europeanflax.com

Study of 4 representative samples of different compositions - 100% LINEN, European Flax® and Masters of Linen® certified - 100% PES - 100% VISCOSE - 100% COTTON. 4 ring spun yarns with equivalent yarn count were sourced, knitted on same 18-gauge, bleached and dried with same protocol.

CETELOR - Centre d'Essais Textile Lorrain _ Technology platform dedicated to Textile and Clothing companies, a service of Nancy University, France

CETELOR's main activities • ISO/IEC 17025 certified laboratory testing • Broad range of tests, from fibres to finished products Accreditation 1-2401 (for scope, consult www.cofrac.fr) • Applied R&D on fibrous materials (pilot lines)

• Basic research on fibres and composites.

Cetelor is a member of the Bast Fibre Authority, the scientific platform created by the CELC for the identification of bast fibres and for product compositional analysis.

www.laboratoiretextile.fr

ABOUT THE EUROPEAN CONFEDERATION OF FLAX/LINEN AND HEMP | CELC



CELC is the only European agro-industrial organization federating all the stages of production and transformation for flax/linen & hemp - 10 000 European companies in 14 countries -, leading this industry of excellence in a globalized context.

This mission relies on the innovative and environmental values of these natural fibres, guaranteed by traceability labels EUROPEAN FLAX® and MASTERS OF LINEN®.

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