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Polyester Fabrics – Behavior under Heat and Cold

100% polyester fabric is generally heat-resistant but sensitive to extreme temperatures, as it is a synthetic fiber that can melt.

Application	Recommended Temp.	Limit / Danger
Washing	30 °C to 40 °C (optimal)	Max. 60 °C; risk of fiber destruction above
Ironing	(approx. 110 °C)	Max. 150 °C; deformation risk from 120 °C
Print/Transfer	120 °C to 135 °C	Melting often begins at approx. 150 °C
Material Limit	-	Melting point at approx. 250 °C to 260 °C

Please note: Although the actual melting point is high, polyester often starts to become tacky or permanently deforms at around 150 °C.

Specifics regarding washing: Every plastic has a so-called glass transition temperature. For polyester, this is usually between 60 °C and 80 °C. Below this temperature, the fiber is rigid and "glass-like." Above this temperature, the material shifts into a rubber-elastic state. The molecular chains become mobile. In the washing machine, the spinning and mechanical stress cause the fibers to wrinkle permanently. These creases often can never be ironed out again.

Cold resistance: 100% polyester is extremely resilient and retains its properties well below freezing. Unlike some natural fibers, polyester does not become brittle in frost and maintains its flexibility. Since polyester absorbs almost no water (less than 1%), the material itself does not freeze "stiff" like cotton would.

Range	Temperature	Effect / Property
Normal Frost	down to -20 °C	No change; fabric remains flexible and stable.
Extreme Cold	down to -40 °C	Polyester maintains structural integrity without embrittlement.

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PA/EA Knitted Fabrics – Behavior under Heat and Cold

A knitted fabric made of e.g. 80% polyamide (PA) and 20% elastane (EA) reacts more sensitively to heat than pure polyester.

Process / Condition	Temperature	Effect on the fabric
Washing	30 °C to 40 °C	Optimal range; elastane remains elastic.
Ironing	Max. 110 °C	Higher heat leads to "bagginess" and tacky fibers.
Thermal Limit	from approx. 140-150 °C	Elastane fibers can become brittle or melt.
Melting Point (PA)	approx. 220 °C to 260 °C	The base fiber melts; the fabric is destroyed.

Please note: The knit tends to shrink under heat if it has not been heat-set, but usually retains its shape due to the high elastane content as long as the fibers are not damaged.

Behavior in cold: In cold environments, this blend is extremely high-performing and therefore standard for winter sports apparel.

Suppleness: Unlike other plastics, polyamide does not become stiff or brittle in frost.

Elasticity: High-quality elastane retains its stretchability down to -20 °C.

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Signs of Fiber Damage

Symptom	Cause	Description
Hard Touch	Heat exposure	The fabric feels stiff or "boardy" as fibers have fused on the surface.
Permanent Creases	Glass transition	Sharp-edged folds that cannot be removed by re-washing or careful ironing.
Pilling	Mechanics + Heat	The heat-softened fiber surface is roughened by friction, leading to small fiber balls.
White Dust / Lint	Fiber breakage	Small white particles on dark fabric indicate broken, brittle polyester filaments.

Specifically for Elastane Blends (PA/EA):

In this case, damage is usually functional regarding elasticity:

"Bagginess": The garment no longer returns to its original shape after stretching. The elastane threads have snapped or lost their recovery power due to heat (often from 60 °C).

Waviness: Unattractive waves appear at hems or seams because the elastic threads have contracted unevenly or slackened.

Shiny Spots: Washing or ironing too hot can plasticize the surface of polyamide (PA), resulting in unnaturally shiny or dark spots.