XLANCE®
WHAT IS IT?

1.1 INTRODUCTION

XLANCE® is a polyolefin-based elastic yarn. More specifically, it is based on copolymers of (crystallizable) ethylene and (non-crystallizable) 1-octene monomers. These copolymers, at the solid state, build an elastomeric network, where the crystallites serve as reinforcements and act as physical crosslinks to connect the flexible amorphous chains.

In addition, after spinning, XLANCE® undergoes a process to form covalent crosslinks, with the aim to provide the yarn extra thermal stability and mechanical integrity beyond the crystal melting point (i.e., 120 °C).
Unlike the covalent crosslinks, which are permanent in nature, the crystallites serve as thermally reversible links: at temperatures above their melting point (i.e., 120 °C), they disappear, enabling some degree of formability, and re-form upon cooling back, thus allowing yarn setting.

### 1.2 ELASTOMERIC NETWORK

- **Covalent Cross-Links**
- **Crystallites**
- **Flexible Chains**

![Diagram](image-url)

- $T < T_m (120^\circ C)$
- $T > T_m (120^\circ C)$
- $T < T_m (120^\circ C)$
XLANCE® FIBER.

VALUE PROPOSITION.

Thanks to the combination of a polyolefin backbone and a peculiar structure, XLANCE® has unique properties, differentiating it from common polyurethane-based Spandex.

“XLANCE® fiber is a unique, elastic fiber that is olefin-based and designed for durable, comfortable stretch performance, with excellent heat and chemical resistance.”
2.1 COMFORT

While Spandex has an inherently high stretch power, XLANCE® features a “gentle stretch power”: the force required to stretch XLANCE® is much lower than the force required to stretch Spandex, like the compressive force the yarn returns when released. This accounts for the unique comfort stretch feeling of XLANCE® shaping fabrics. In addition, the low modulus of XLANCE® provides a soft hand, allowing the base fiber to define the fabric feel.

2.2 LOW TEMPERATURE HEAT SETTINGS

Thanks to its molecular architecture, XLANCE® can be heat-set just above the crystal melting-temperature, that is already starting from 130°C. This enables energy saving and combination with thermosensitive fibers.
2.3 THERMAL RESISTANCE

Thanks to the covalent crosslinks, XLANCE® can withstand temperatures higher than 220 °C without compromising its integrity and stretch performance. This makes it suitable for high-temperature textile processes.

The behavior of Spandex is quite different: to get 100% heat-set efficiency, one needs to go up to 180 °C, at which temperature the fiber looses mechanical integrity and elastic properties quickly.

Micrographs comparing XLANCE® and Spandex fibers before and after 3 minutes treatment at 220 ± 3 °C - fibers were placed on a slide side by side, covered with slipcover and placed on a hot stage for 3 minutes; after cooling, the slipcover was gently removed, leading to the disintegration of Spandex but not of XLANCE®.
2.4 CHEMICAL RESISTANCE

The absence of any easily-attackable group in the polyolefin backbone plus the presence of the covalent crosslinks confer to XLANCE™ fibers an excellent chemical resistance to any aggressive chemical, such as strong acids, alkalis, oxidizing agents (e.g., sodium hypochlorite), enzyme wash conditions.

On the right, 1 ml of concentrated (98%) sulphuric acid was applied to the center of a denim fabric containing XLANCE® for a minimum of 4 hours, before rinsing with water: XLANCE® yarn remains fully intact.
2.5 UV RESISTANCE

XLANCE® yarn is inherently resistant to UVA and UVB radiations.

**UV Irradiation Time (hr) % Deformation @0.01 N — Third Cycle**

- UV 5
  - XLANCE®
  - SPANDEX
- UV 10
  - XLANCE®
  - SPANDEX

**Exposure to UV Light**

- Tenacity Retention (%)

**Exposure to Xenon Light**

- Tenacity Retention (%)

**DEFORMATION**

UV irradiation
Its resistance to oxidative degradation makes XLANCE® yarn also extraordinary resistant to chlorine, such that, upon exposure to swimming pool conditions, it retains its physical properties for hundreds of hours, much longer than “chlorine-resistant Spandex” do.

Comparison between warp-knitted fabrics made with either PA- XLANCE™ or PA-chlorine-resistant Spandex yarns.

On the right, SEM images of competition garments containing either XLANCE® or Spandex after 5 months of swimwear test: XLANCE® remains fully intact while Spandex yarn is broken and fragmented by oxidative degradation.