

Tuneable Performance



Balancing comfort, durability, and protection in flame resistant uniform fabrics.

At Woven Fabric Company we care for the planet in everything we do. We choose responsible cotton and recycled fibres and low impact dyes. We keep our supply chain close to reduce travel and waste. Our processes use resources carefully and aim for long service life. We make uniforms that respect people and the world they live in.

Abstract

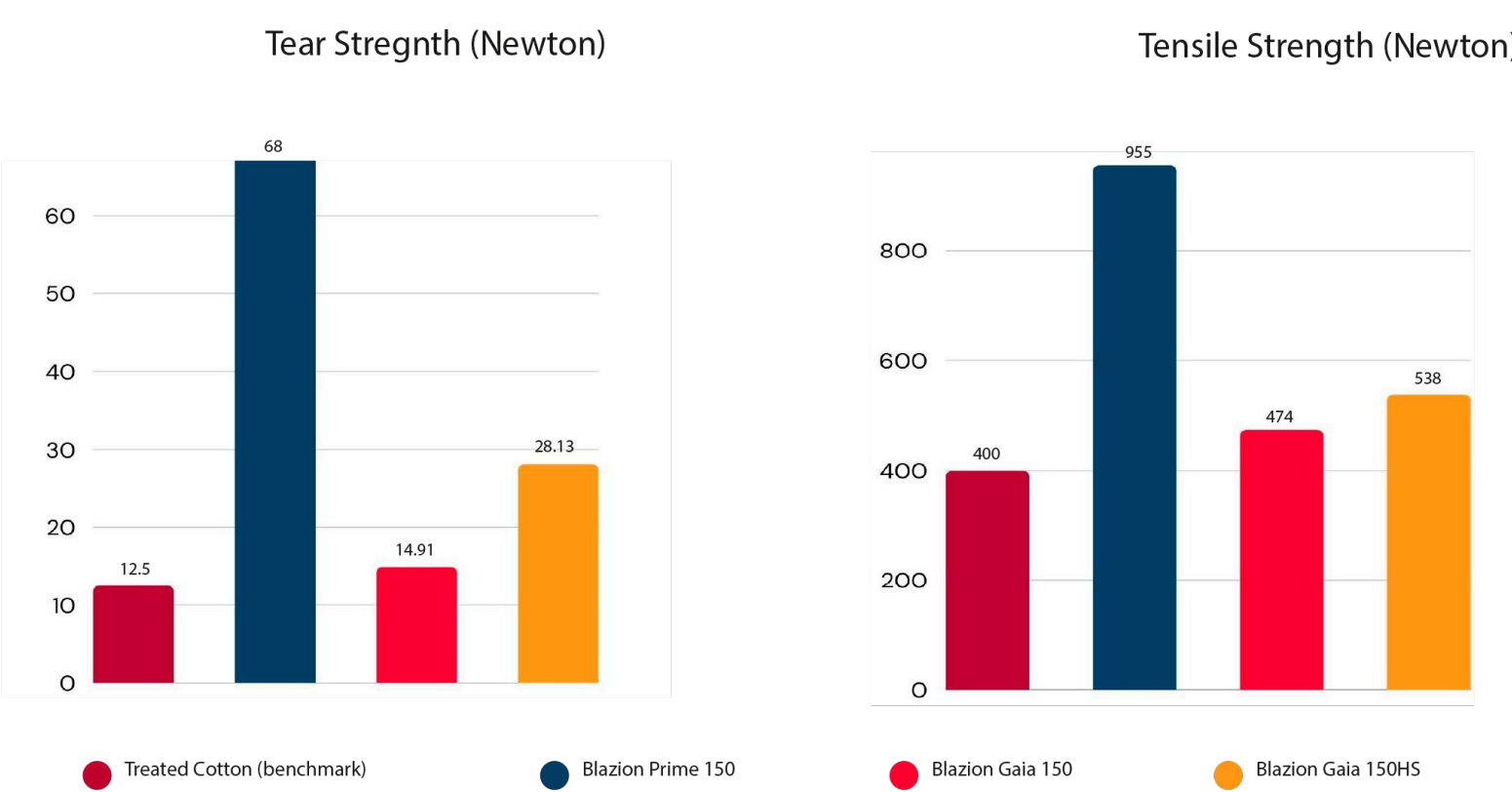
This study compares comfort, durability and flame resistant performance for four fabrics: Blazion Prime 150, Blazion Gaia 150, Blazion Gaia 150HS and a 240 gsm treated cotton benchmark. Tensile and tear strength, air permeability, moisture regain, handle and surface smoothness are evaluated. Findings show Prime leads in strength at low weight, Gaia fabrics improve breathability and comfort through plant based materials, and Gaia 150HS balances comfort with higher strength.

Introduction

The development of flame resistant uniforms requires balancing durability, comfort and protection. Each attribute is essential, but emphasis varies by workplace. A fabric that is strong and durable may feel heavy and uncomfortable. A fabric that is light and breathable may sacrifice some strength. This article compares four fabrics side by side: a 240gsm treated cotton as benchmark, Blazion Prime 150, Blazion Gaia 150 and Blazion Gaia 150HS. The analysis uses laboratory data to understand the trade-offs and to show how different fibres and constructions shape performance.

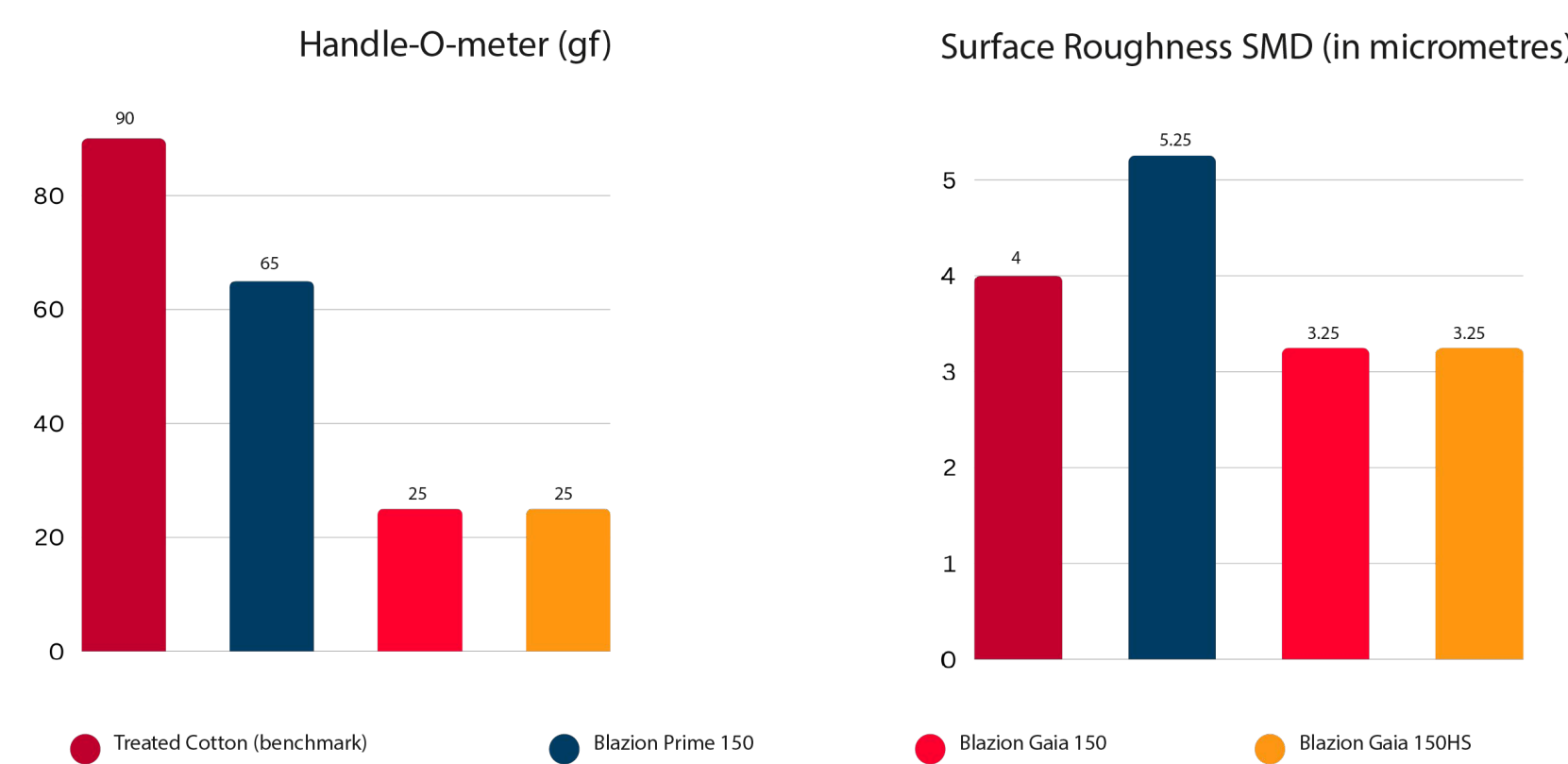
Durability and Strength

Durability is assessed through tear and tensile strength. The benchmark cotton provides a starting point, with a tensile strength of 400 N and a tear strength of 12.5 N at 240 gsm. Blazion Prime 150, at almost forty percent less weight, demonstrates a tensile strength of 955 N and a tear strength of 68 N. This represents a significant improvement in structural integrity. Blazion Gaia 150 records a tensile strength of 474 N and a tear strength of 14.9 N. Blazion Gaia 150HS, engineered for higher strength, performs at 538 N in tensile and 28 N in tear. Both Gaia fabrics therefore surpass the cotton baseline while providing reduced weight and a softer handle. Blazion Prime delivers maximum strength but at the cost of a firmer feel, while Blazion Gaia HS shows a balanced profile.



Comfort and Wearer Experience

Comfort depends on how a fabric interacts with the body during long shifts. Moisture regain, air permeability, handle and surface roughness all contribute to this. The treated cotton absorbs 7 to 8.5 percent moisture, providing moderate comfort, but its low air permeability of 40 l/m²/s makes it feel closed. It also has a high handle value of 90 gf, indicating stiffness. Blazion Prime has lower moisture regain of 4 to 5 percent but significantly higher air permeability at 200 l/m²/s. Its handle is lower at 65 gf, meaning it is easier to flex than cotton, though still firm compared with other options. Blazion Gaia fabrics transform the comfort profile. Both Gaia 150 and Gaia 150HS achieve moisture regain of 12 to 15 percent, which helps absorb perspiration. Air permeability is 250 l/m²/s, ensuring cooler wear. Handle values are 25 gf, showing softness and pliability, while surface roughness is 3.25 µm, smoother than Prime or cotton. The comfort advantage is clear, with Gaia fabrics providing a lighter, cooler and softer experience.



Flame Resistance Performance

Flame resistance is the defining feature of these fabrics. Treated cotton relies on a chemical finish that is rated for 50 wash cycles. Its performance gradually reduces as the finish is removed. The Blazion fabrics use inherent FR fibres. Their flame resistant qualities are permanent, remaining effective throughout the life of the garment. This difference provides greater reliability for industries where long-term protection is essential. The Gaia range, while designed for comfort, does not compromise on inherent FR performance. The Prime variant combines aramid strength with inherent FR qualities, making it a dependable solution where durability is prioritised.

The role of Plant based materials

Blazion Gaia fabrics integrate plant-based materials that improve wearer comfort. These fibres provide high moisture regain and a smoother hand, reducing heat stress during demanding work. They also introduce a renewable origin into fabric composition. This supports sustainability objectives without compromising safety or durability. In practice, this means organisations can provide garments that are protective and responsible, while employees benefit from improved comfort.

Trade offs and options

No single fabric leads in every measure. Treated cotton is familiar and cost effective, yet its protection depends on a finish and its structure feels firm. Blazion Prime 150 delivers the highest strength with stable inherent protection, although the hand remains firmer. Plant based fibres in Blazion Gaia reduce bending rigidity and lower the Handle O Meter force. They feel less stiff and less coarse, which increases softness, improves drape and creates a smoother touch on skin. Gaia 150 suits long shifts and warm conditions where breathability and comfort matter most. Gaia 150HS retains this comfort profile while lifting tensile and tear strength for programmes that need both ease and resilience. Prime fits environments that demand maximum durability. Gaia works best when wearer comfort is the priority. Gaia 150HS serves teams that require a balanced solution that is soft to wear yet strong enough for demanding use.

Conclusion

Uniform fabrics must be selected according to their intended environment. Some workplaces demand maximum durability, others prioritise wearer comfort in long shifts, and many require a balance of both. The data confirms that these needs can be addressed through careful material design. By offering Prime, Gaia and Gaia HS alongside cotton benchmarks, Woven Fabric Company enables organisations to make informed choices. The outcome is not a compromise but a spectrum of solutions that can be tuned to protect, endure and support those who wear them.