

MIRAFI *RSi* and *H₂Ri* patented performance

Unique double layer construction with wicking fibers

MIRAFI® *RSi* and *H₂Ri* woven geotextiles utilize 3 different types of yarns (Figure 1) to optimize performance of the patented double layer weaving technology with wicking that creates a truly uniquely performing geotextile.

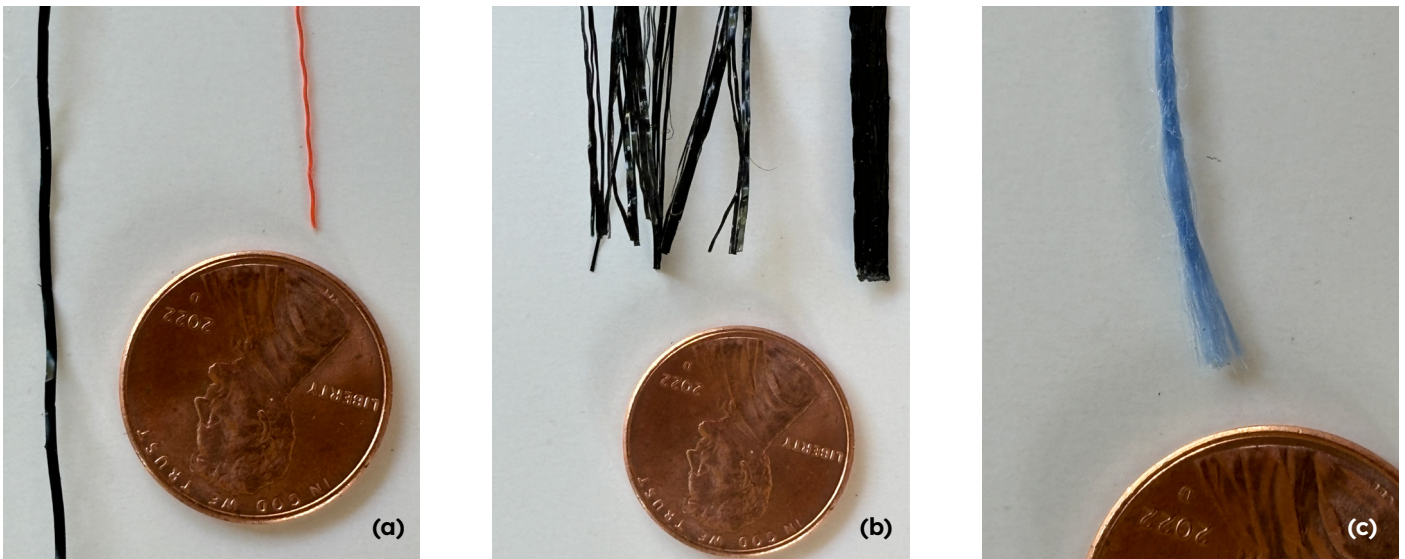


Figure 1: The unique patented construction of MIRAFI *RSi* and *H₂Ri* geotextiles utilize 3 different types of yarns to optimize performance: (a) orange and black monofilament yarns, (b) high modulus fibrillated yarn (pulled open on the left to show fibrillations), (c) blue wicking yarn

The original woven geotextiles utilized flat slitted film (slit film) woven together to construct a single layer fabric that was very smooth, almost impermeable and low performance. Today, most woven geotextiles still utilize this single layer construction without wicking fibers, but use monofilaments for improved permeability. Unfortunately, this type of construction still creates a very smooth surface with little soil interaction (see Figures 2 and 3).

MIRAFI *H₂Ri*, *RS380i*, and *RS580i* are innovative geotextiles that are constructed utilizing monofilament, high modulus fibrillated, and wicking yarns (see Figure 1) to create a patented double-layer weave pattern with wicking. This design arranges the yarns to create a corrugated weft yarn set adjacent to a stuffer pick (see Figures 4, 5, and 6). Specifically, MIRAFI *RS580i* and *RS380i* include wicking

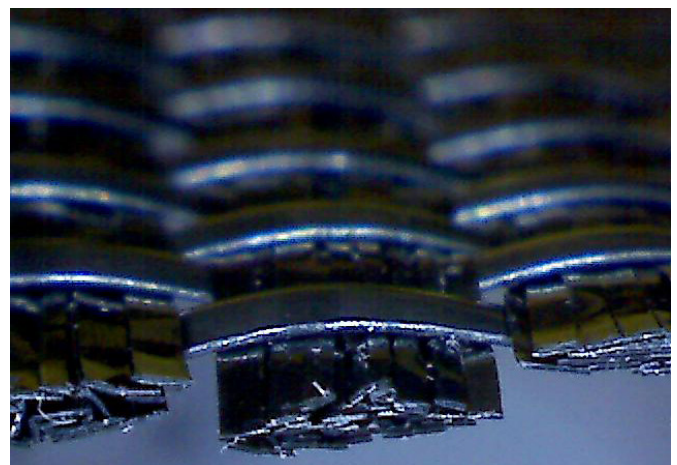


Figure 2: Typical woven geotextile with single layer construction

fibers in some stuffer picks (see Figure 5), while **MIRAFI H₂Ri** uses wicking fibers in all stuffer picks (see Figure 6). Although this terminology may be unfamiliar to those outside the technical textile industry, it underscores the unique properties of the **MIRAFI H₂Ri** and **RSi-Series**, which are crucial for enhanced geotextile performance, providing more than three times the surface area of typical woven geotextiles.

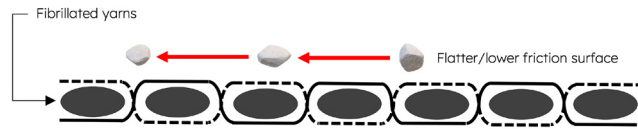


Figure 3: Cross section of a typical woven geotextile. In contrast to MIRAFI RS380i and RS580i, this structure creates a smoother surface with less opportunity for soil interaction/friction

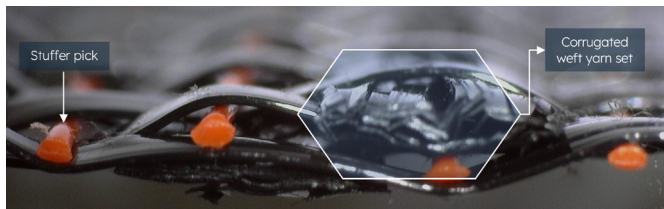


Figure 4: MIRAFI RS580i cross-sectional image illustrating stuffer pick and weft yarn set

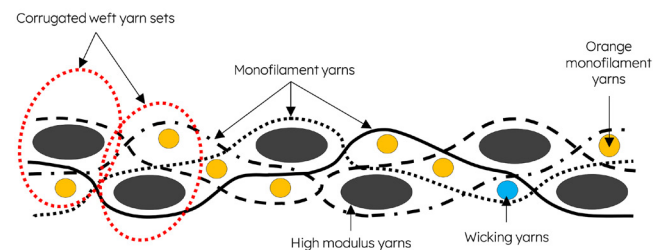


Figure 5: Cross sectional diagram and photo of MIRAFI RS380i and RS580i, illustrating wicking yarn and orange monofilament yarn placement

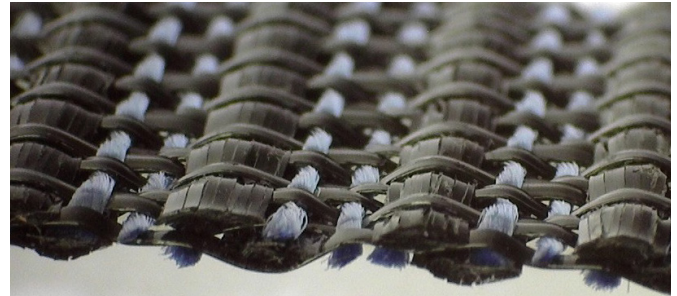
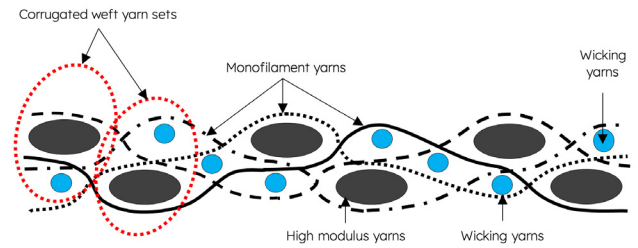


Figure 6: Cross sectional diagram and photo of MIRAFI H₂Ri structure, illustrating wicking yarn placement

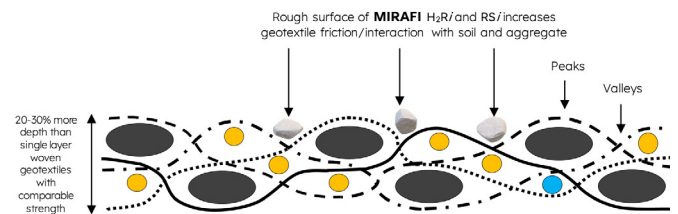


Figure 7: Cross sectional diagram of MIRAFI RS380i/RS580i structure, illustrating patented corrugated weft yarn sets. This structure creates “Peaks” and “Valleys” in fabric surface. The double-layer construction increases soil friction/interaction for improved lateral restraint at low strain levels

The unique construction of **MIRAFI RSi** and **H₂Ri** creates a surface on the geotextile with larger “peaks” and “valleys” at the yarn cross over points than a typical single layer geotextile (Figure 7). For example, **MIRAFI H₂Ri**, **RS380i** and **RS580i** have 8 to 9 weft yarn sets per square inch of fabric, resulting in 8 to 9 deep corrugations (“valleys”) in the fabric every square inch. The larger density of deep corrugations results in a combination of higher surface area and higher in plane friction, resulting in greater shear resistance with a wider range of soil /rock types compared to a typical single layer woven geotextile (Figure 2 and 3). In a recent Study by Louisiana Transportation Research Center, LTRC¹, the improved friction characteristics of the **MIRAFI RSi-Series** were found to provide high lateral restraint of the base course at low strain levels

MIRAFI RS_i and **H₂R_i** geotextiles patented double layer weave technology also creates a geotextile with better water flow and more resistance to clogging. The unique woven structure of **MIRAFI RS_i** and **H₂R_i** contains “stacked” multi cross-sectional yarns, which create more depth (20–30% increase) in the structure with a three-dimensional aspect (Figure 7). The increased depth creates a highly tortuous path (Figure 8) that improves long-term waterflow by increasing clogging resistance, while retaining finer soil particle sizes compared to a typical single layer geotextile (Figure 9).

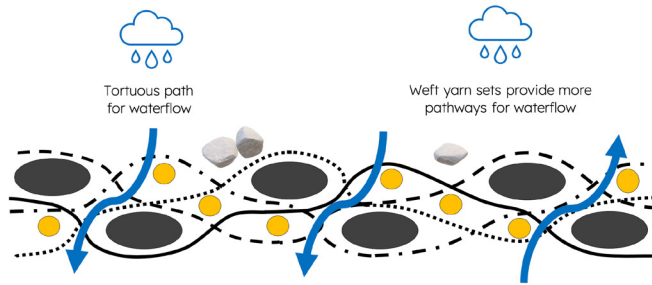


Figure 8: Cross sectional diagram of MIRAFI RS380_i, RS580_i, and H₂R_i structure, illustrating a higher number of interstices within the fabric structure, creating multiple channels that provide a more tortuous path for increased waterflow with less blinding/clogging

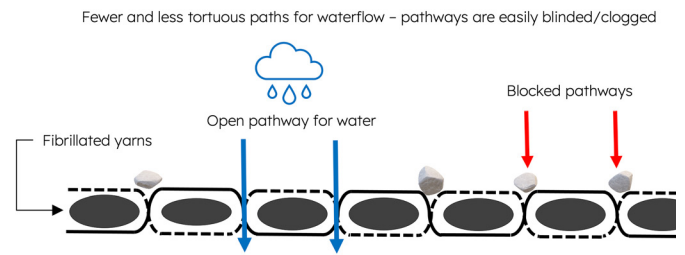


Figure 9: Cross sectional diagram of a typical woven geotextile with single-layer construction. This structure provides a straight, less tortuous path for waterflow through the geotextile

References:

1. Abu-Farsakh, M.Y. (2019), Final Report 603 Accelerated Load Testing of Geosynthetic Base Reinforced/Stabilized Unpaved & Pavement Test Sections, Louisiana Transportation Research Center, LA.

Notes:

1. U.S. Patent 8,594,054; 12,123,113; 8,333,220; 8,598,054; 10,669,650; 7,874,767; 8,070,395

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