

# AFX FOOTWEAR DESIGN GUIDELINES

## CARBON FIBER PLATE OPTIMUM DESIGN GUIDELINES

1. AFX Plates may be designed in full or partial profile to maximize plate function and material usage.
2. Preferred Characteristics for optimum AFX benefit (*Figure 1*)
  - a. **SMOOTH CONTOURS** to minimize stress concentrations
  - b. **MAXIMIZE SURFACE AREA** (Within design constraints) to optimize use of fibers (strength + performance)
    - i. Width of plate can be adjusted to increase/decrease flex in certain areas.
  - c. **FLAT PLATE PROFILE** is the most cost-effective approach
    - i. If 3D contour is required, limit to toe to heel curve
    - ii. For all other 3D contours contact Carbitex for design guidance [designsupport@carbitex.com](mailto:designsupport@carbitex.com)
    - iii. Flat AFX plate will form to slight contours in mold
3. Design characteristics to avoid (reduces fiber strength and AFX properties)
  - a. Forked or Narrow surface areas (*Figure 2*)
  - b. Avoid holes, especially in flex zone
    - i. If needed for part locator in tool, keep to minimum size and maintain perpendicular to the flat plate
  - c. Avoid sharp radius cutouts
4. Visible Window on bottom of outsole
  - a. If design will utilize a visible window to show the AFX plate on the shoe bottom, contact Carbitex for design guidance [designsupport@carbitex.com](mailto:designsupport@carbitex.com)
5. Mold Considerationsa. For AFX injection and overmolding guidelines see “AFX Application and Integration Guidelines” at <https://www.carbitex.com/AFXApplicationGuidelines.pdf>
6. Optimizing material yield
  - a. Nesting pattern must be in proper alignment with fibers - Use heel to toe fiber alignment with only minor deviations to avoid plate twisting
    - i. Cut profile with fibers in alignment with flex line (*Figure 6*)
    - ii. If material is identified with a specified cutting direction the nesting should align parts with that direction
  - b. Consider part nesting optimization when designing the AFX plate
    - i. Slight modifications to width / length can increase part yield

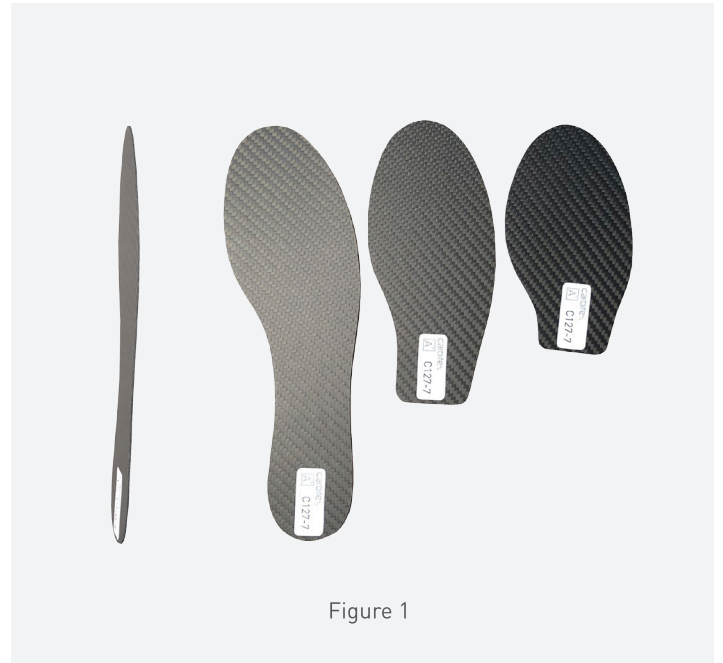


Figure 1

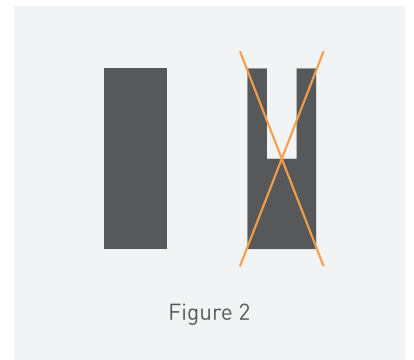


Figure 2



Figure 6: Fiber Orientation perpendicular to flex zone

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## NESTING EXAMPLE

