# DURALITE
THERMOPLASTIC
COMPOSITE MATERIAL

duralite
COMPOSITES

Duralite performance composites is the leading supplier of high performance fiber reinforced thermoplastic composite materials for the construction of orthopaedic and orthotic components.

# DURALITE
# Thermoplastic composite material

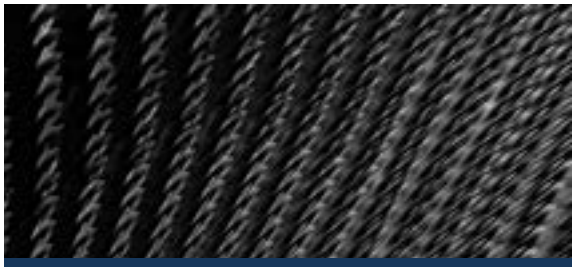
Duralite proprietary technology has advantages over other thermoplastic technologies in the method that the materials are produced, which leads to greater consistency and accuracy. Duralite composites have a high shock attenuation and resiliency which results in enhanced energy return and response. The composites provide superior stability and support, yet are lightweight and thin to reduce fatigue and stress.

## Duralite Benefits

### The benefits of Duralite for shoe and insole manufacturers

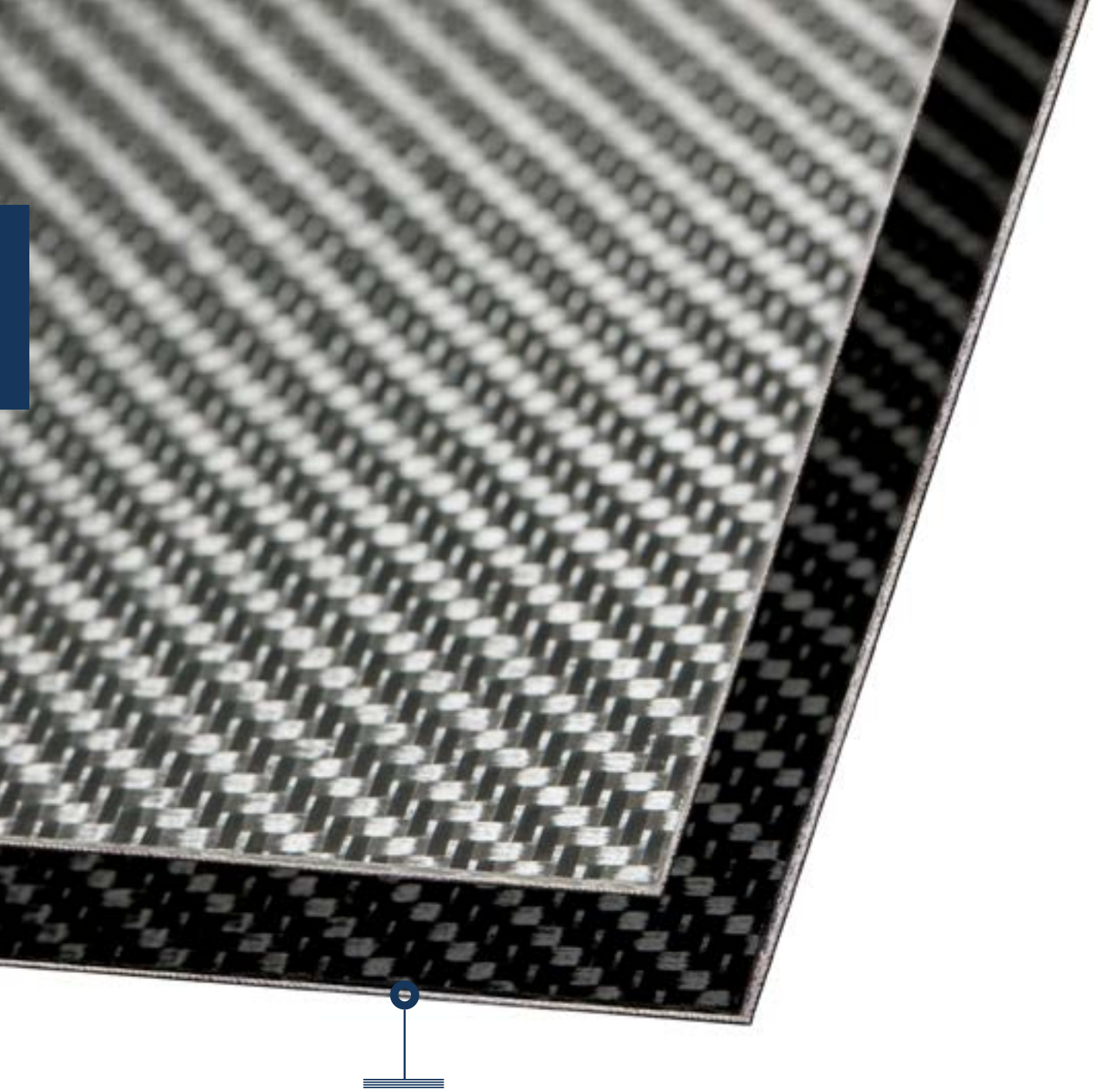
Duralite is built up out of carbon or glass fiber layers or a combination of both with a thermoplastic artificial resin. The high percentage of fiber layers (one fiber layer per 0.25 mm of material volume) makes Duralite one of the most durable composite materials. An increasing percentage of carbon fibers ensures a higher stiffness at a lower material weight.

Duralite offers excellent mechanical properties. At a temperature of 140°C, Duralite is already slightly deformable (Duralite Hyperform at 70°C) and at 210-230°C it is fully thermoplastic. After deformation and compression the material stiffness and stability increases by a factor of eight. The sheets may be sawn, die cutting, snipped or waterjet cutted.



### The benefits of Duralite for end-users

Duralite Performance Composite materials are used to enhance footwear performance. Duralite materials have unique attributes that, when used strategically, can reduce the weight of footwear substantially while increasing biomechanical stability. Our materials are used in combination with other components to create footwear which is truly engineered. The 'resilience' (spring or responsiveness) effect of Duralite composite materials means they return to their original shape through millions of cycles thus contributing to reduced foot fatigue and injury prevention. Duralite materials have performance and weight advantages. Similar to a continuous 'bridge'. Duralite materials provides engineered strength from one end of the component to the other.



Duralite is featured by **1 fiber layer per 0.25 mm**
This makes Duralite an unique standard

AT LEAST
40%
LIGHTER
COMPARING TO
CONVENTIONAL
MATERIALS

# Manufacturing overview

*Our woven series materials are offered in a variety of fiber (carbon and glass) combinations.*
*Each is chosen for its own unique performance, aesthetic and economic attributes.*

210°C
/230°C
FULLY
DEFORMABLE

# A variety of materials

**DURALITE GLASS** | glass fiber
*A cost effective woven composite.*
Glass fiber products are a cost effective composite materials with all woven glass fiber reinforcement. Similar performance characteristics compared to the carbon/ glass options but slightly thicker and heavier (glass weights more than carbon fiber) The glass fiber products are available in different thicknesses (see material selection guide overview).

AT LEAST
50%
STRONGER
COMPARING TO
CONVENTIONAL
MATERIALS

**DURALITE CARBON** | carbon fiber
*The greatest strength to weight option available.*
The carbon fiber products are the lightweight and resilient products for improved performance.

**DURALITE MIX** | carbon/glass fiber
*The most efficient carbon product.*
Carbon/glass fiber products blend the optimal performance, aesthetics and cost effectiveness with glasreplacing of carbon fibers on the outside. Carbon fibers are orientated 90 degrees to the glass fibers for bi-directional mechanical properties.

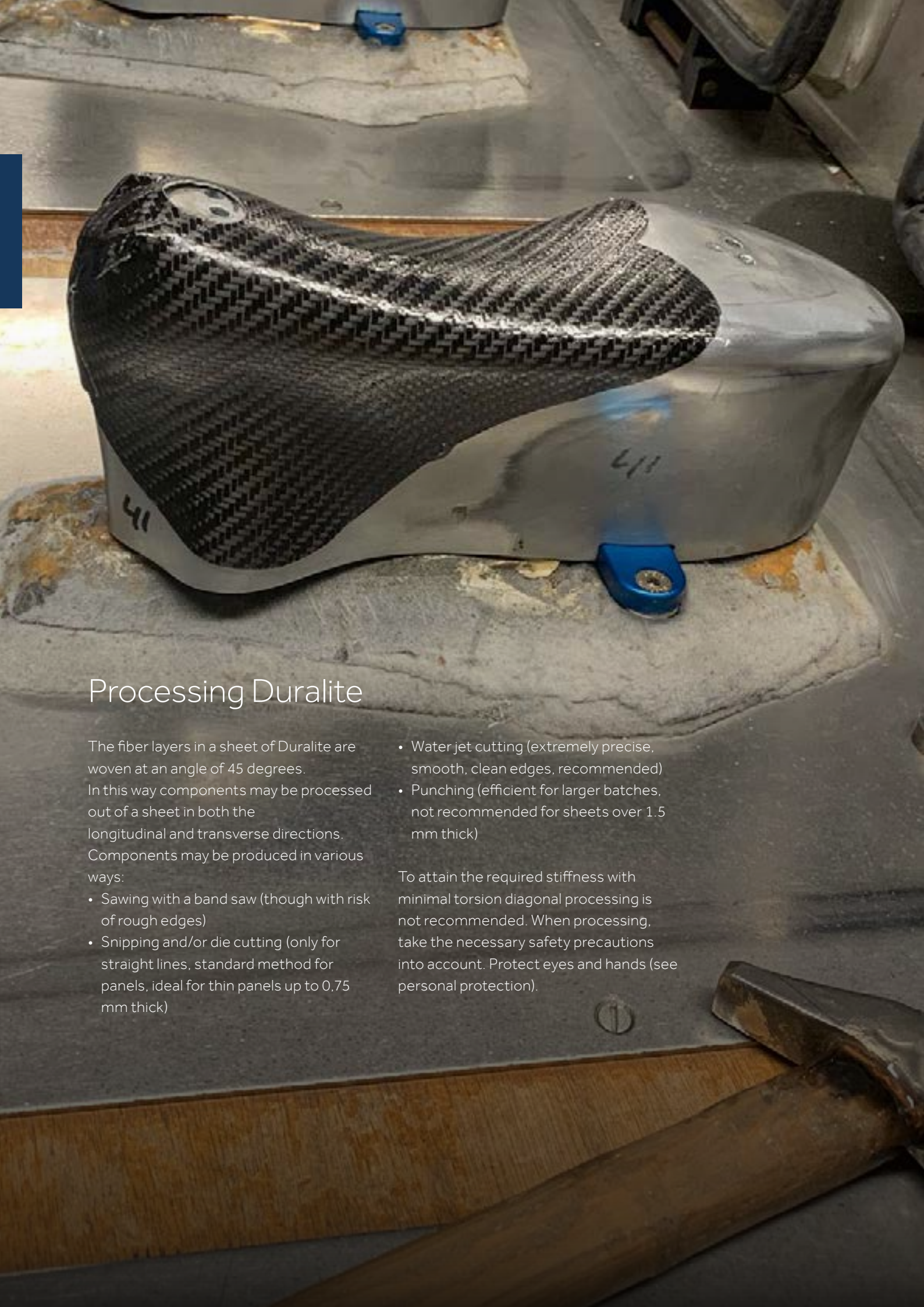
SIMPLE
FINISHED

**DURALITE XT** | carbon/glass fiber
*A continuous fiber-reinforced thermoplastic composite.*
This very strong and durable material is available in several rigidity types ranging from Ease Flex to Ultra-Rigid. Duralite XT is suitable for all kinds of high-quality applications in orthopedics (orthosis, braces, soles) and in the world of sports (shoes and athletic applications).

*The unique composition gives Duralite XT special/specific properties such as:*
- High impact and tear resistance
- Superior kickback and resilience
- Easy to mold and finish, requiring no special handling
- Easy to edit
- Modern prints

RANGE
SOLE
PATTERNS

**DURALITE HYPERFORM** | Carbon/Glass Fiber
*A mixed fiber that is easier to deform at a lower temperature.*
It has the same properties as Duralite Mix but deforms at a temperature of 70°C, making it easier to work with and quicker to reshape.



# Processing Duralite

The fiber layers in a sheet of Duralite are woven at an angle of 45 degrees.
In this way components may be processed out of a sheet in both the longitudinal and transverse directions.
Components may be produced in various ways:

- Sawing with a band saw (though with risk of rough edges)
- Snipping and/or die cutting (only for straight lines, standard method for panels, ideal for thin panels up to 0,75 mm thick)
- Water jet cutting (extremely precise, smooth, clean edges, recommended)
- Punching (efficient for larger batches, not recommended for sheets over 1.5 mm thick)

To attain the required stiffness with minimal torsion diagonal processing is not recommended. When processing, take the necessary safety precautions into account. Protect eyes and hands (see personal protection).

# Shaping Duralite

Duralite is already slightly deformable at a temperature of 140°C (Duralite Hyperform at 70°C). By heating the Duralite material to a temperature of 210 to 230°C it becomes fully deformable. It is important that Duralite is processed within 15 to a maximum of 30 seconds once it is in an activated state. This causes the fiber layers to melt together so that the structure becomes firmer and its original stiffnessis increases. After cooling the shaped sheet recovers its original aesthetic appearance.

**Using a press**

Within a few seconds place the activated sheet (210-230°C) into the preheated press (175°C). Press the sheet material for 20 seconds at an applied pressure of approximately 6 bar. In this time the temperature is reduced to approximately 60°C, so that the material cools down and retains the shape imposed. This means of shaping is ideal for batch production.

**Using Vacutherm machine**

Probably the most-used method. Applicable to all thickness versions and compositions of Duralite. To prevent adhesion the component to be formed may

*Duralite Composites are easy to weld and glued. We can*

be enclosed between two sheets of silicone. Sufficient applied pressure is essential to obtain a stable and homogeneous final result.

**Using an industrial hot air blower**

Post-processing is simple to achieve by reactivating the material locally using an industrial hot air blower.

Available in sheets and pre-shaped sole plates

# Duralite Sheets

Already, many manufactures of orthopaedic and orthotic components, podology use Duralite. Duralite is available in sheets and special sole blanks in various thicknesses:

GLASS FIBER
**290 GRAM/M²**

MIX
**245 GRAM/M²**

CARBON
**200 GRAM/M²**

| Article | Code | Material | Layers | Color | Thickness | Format |
|---|---|---|---|---|---|---|
| **DURALITE GLASS** | 10.95.025 | Glass | 1 fiber layer | Silver | 0,25 mm | 86 x 100 cm |
| | 10.95.050 | Glass | 2 fiber layers | Silver | 0,50 mm | 86 x 100 cm |
| | 10.95.075 | Glass | 3 fiber layers | Silver | 0,75 mm | 86 x 100 cm |
| | 10.95.100 | Glass | 4 fiber layers | Silver | 1,00 mm | 86 x 100 cm |
| | 10.95.150 | Glass | 6 fiber layers | Silver | 1,50 mm | 86 x 100 cm |
| | 10.95.200 | Glass | 8 fiber layers | Silver | 2,00 mm | 86 x 100 cm |
| **DURALITE MIX** | 10.96.075 | Glass/Carbon | 3 fiber layers | Anthracite | 0,75 mm | 86 x 100 cm |
| | 10.96.100 | Glass/Carbon | 4 fiber layers | Anthracite | 1,00 mm | 86 x 100 cm |
| | 10.96.150 | Glass/Carbon | 6 fiber layers | Anthracite | 1,50 mm | 86 x 100 cm |
| | 10.96.200 | Glass/Carbon | 8 fiber layers | Anthracite | 2,00 mm | 86 x 100 cm |
| | 10.96.250 | Glass/Carbon | 10 fiber layers | Anthracite | 2,50 mm | 86 x 100 cm |
| | 10.96.300 | Glass/Carbon | 12 fiber layers | Anthracite | 3,00 mm | 86 x 100 cm |
| **DURALITE HYPERFORM** | 10.96.300 | Glass/Carbon | 2 fiber layers | Anthracite | 0,44 mm | 100 x 60 cm |
| **DURALITE CARBON** | 10.97.025 | Carbon | 1 fiber layer | Black | 0,25 mm | 86 x 100 cm |
| | 10.97.050 | Carbon | 2 fiber layers | Black | 0,50 mm | 86 x 100 cm |
| | 10.97.075 | Carbon | 3 fiber layers | Black | 0,75 mm | 86 x 100 cm |
| | 10.97.100 | Carbon | 4 fiber layers | Black | 1,00 mm | 86 x 100 cm |
| **DURALITE -XT** | 10.98.2110 | Glass/Polypropylene/Polyester/Acrylic | | Black/grey | 1.50 mm | 91,5 x 61 cm |
| | 10.98.2120 | Glass/Polypropylene/Polyester/Acrylic | | Black/grey | 1.80 mm | 91,5 x 61 cm |
| | 10.98.2130 | Glass/Polypropylene/Polyester/Acrylic | | Black/grey | 2.00 mm | 91,5 x 61 cm |
| | 10.98.2140 | Glass/Polypropylene/Polyester/Acrylic | | Black/grey | 2,30 mm | 91,5 x 61 cm |
| | 10.98.2150 | Glass/Polypropylene/Polyester/Acrylic | | Black/grey | 2,50 mm | 91,5 x 61 cm |
| | 10.98.2160 | Glass/Polypropylene/Polyester/Acrylic | | Black/grey | 3,00 mm | 91,5 x 61 cm |
| **SILICONE** | 10.98.210 | Silicones | | Transparent | 2,00 mm | 100 x 120 cm |

# Duralite
# Sole Plates Patterns

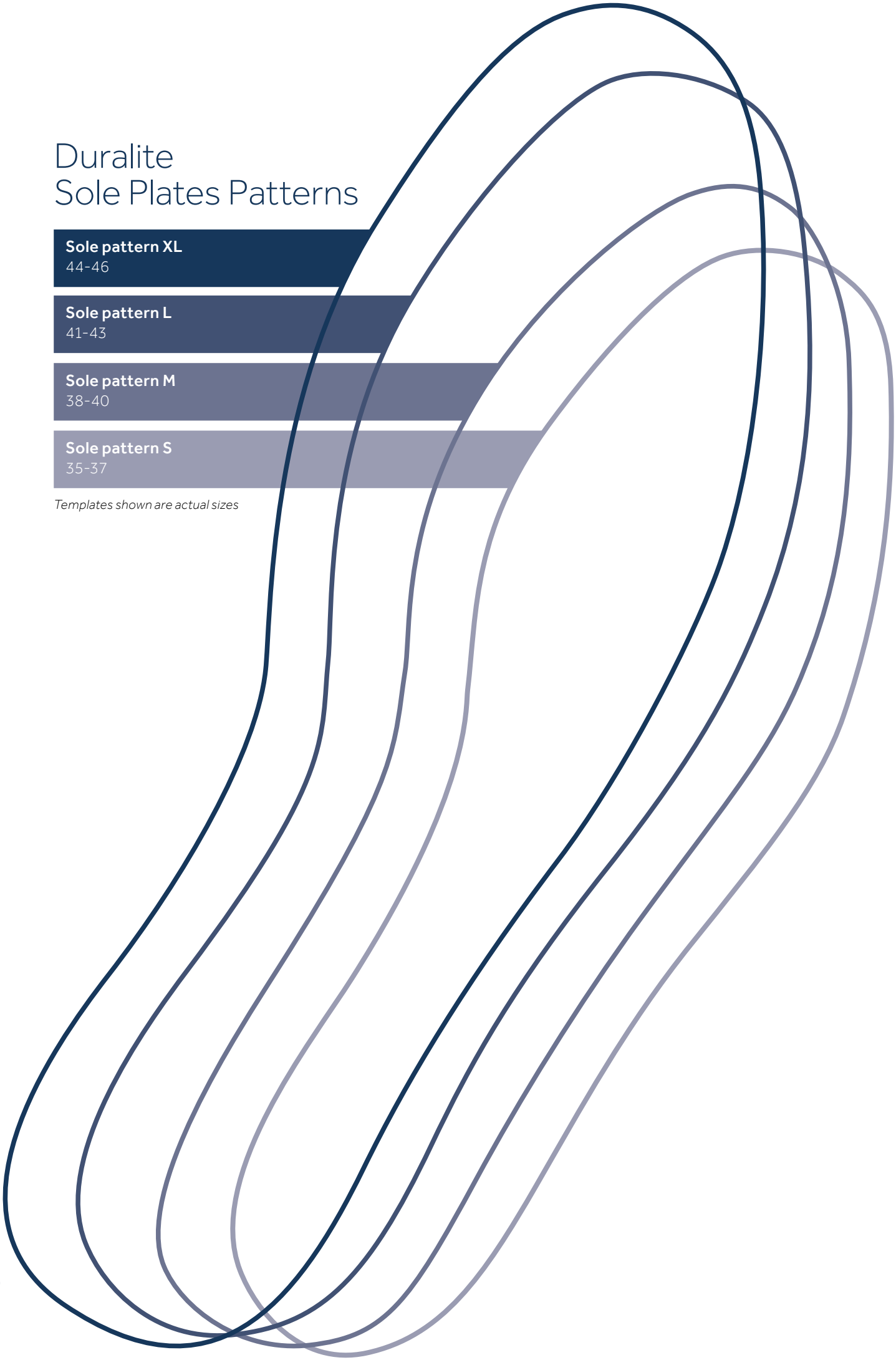
**Sole pattern XL**
44-46

**Sole pattern L**
41-43

**Sole pattern M**
38-40

**Sole pattern S**
35-37

*Templates shown are actual sizes*



# Duralite Sole Plates

| Article | Code | Material | Size | Shoe size | Unit | Thickness |
|---|---|---|---|---|---|---|
| **SOLE PLATE** | 10.99.100 | Glass/Carbon | Small (S) | 35-37 | Pair | 1.50 mm |
| | 10.99.110 | Glass/Carbon | Medium (M) | 38-40 | Pair | 1.50 mm |
| | 10.99.120 | Glass/Carbon | Large (L) | 41-43 | Pair | 1.50 mm |
| | 10.99.130 | Glass/Carbon | Extra (XL) | 44-46 | Pair | 1.50 mm |
| | 10.99.200 | Glass/Carbon | Small (S) | 35-37 | Pair | 2.00 mm |
| | 10.99.210 | Glass/Carbon | Medium (M) | 38-40 | Pair | 2.00 mm |
| | 10.99.220 | Glass/Carbon | Large (L) | 41-43 | Pair | 2.00 mm |
| | 10.99.230 | Glass/Carbon | Extra (XL) | 44-46 | Pair | 2.00 mm |
| | 10.99.300 | Glass/Carbon | Small (S) | 35-37 | Pair | 2.50 mm |
| | 10.99.310 | Glass/Carbon | Medium (M) | 38-40 | Pair | 2.50 mm |
| | 10.99.320 | Glass/Carbon | Large (L) | 41-43 | Pair | 2.50 mm |
| | 10.99.330 | Glass/Carbon | Extra (XL) | 44-46 | Pair | 2.50 mm |
| | 10.99.400 | Glass/Carbon | Small (S) | 35-37 | Pair | 3.00 mm |
| | 10.99.410 | Glass/Carbon | Medium (M) | 38-40 | Pair | 3.00 mm |
| | 10.99.420 | Glass/Carbon | Large (L) | 41-43 | Pair | 3.00 mm |
| | 10.99.430 | Glass/Carbon | Extra (XL) | 44-46 | Pair | 3.00 mm |
| **SOLE PLATE PLUS** *Special sole plate with higher carbon content* | 10.99.250 | Glass/Carbon | Small (S) | 35-37 | Pair | 2.00 mm |
| | 10.99.260 | Glass/Carbon | Medium (M) | 38-40 | Pair | 2.00 mm |
| | 10.99.270 | Glass/Carbon | Large (L) | 41-43 | Pair | 2.00 mm |
| | 10.99.280 | Glass/Carbon | Extra (XL) | 44-46 | Pair | 2.00 mm |
| **DURALITE-XT** | 10.99.5110 | Duralite XT | Small (S) | 35-37 | Pair | 2.30 mm |
| | 10.99.5120 | Duralite XT | Medium (M) | 38-40 | Pair | 2.30 mm |
| | 10.99.5130 | Duralite XT | Large (L) | 41-43 | Pair | 2.30 mm |
| | 10.99.5140 | Duralite XT | Extra (XL) | 44-46 | Pair | 2.30 mm |

duralite
COMPOSITES

A BRAND OF FRECOMA | www.duralitecomposites.com