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How outdoor outsoles work

An outdoor shoe typically features various technologies and materials to help the wearer enjoy the best possible experience especially on the rougher side of the terrain spectrum.

Specifically, the outsole will keep the wearer on his feet on difficult terrain ... literally – it is the part of the shoe that provides the grip, which helps the wearer keep his footing. On the other side of the spectrum, when speed is of the essence a trail runner, for instance, will need an outsole that helps him travel over rough terrain with the least resistance. In the middle is the hybrid or multi-purpose customer who wants an outsole that will serve him equally well in mall halls as it will on light hiking trails.

Types of soles

There are several types of outsoles, each of which have their own role. Not all, however, are suitable for outdoor shoes.

- **Commando or Lugged:** today it is the classic hiking rubber outsole – a thick, knobby tread on the sole offers great traction, it is weather resistant, and has a thicker sole profile.

The founder of Vibram first patented this design, which was based on the tread on military tanks, after the deaths of six of his friends, which was partly blamed on inadequate footwear on mountainous terrain. Before this, up until the mid-1930's, mountain climbers would wear shoes with leather soles, which are slippery so they would attach cleats or pound in hobnails for traction.

In 1952, the first K2 summit was accomplished by a team wearing boots with Vibram soles. Today, there is a variety of Vibram soles that are designed for specific footwear needs.

- **Christy Wedge:** a lightweight, wedged, foam-type white sole that offers some traction and stability.
- **Dainite:** low-profile, hard wearing rubber soles with recessed rubber studs, most often seen on English country-type shoes.
- **Cork Nitrile:** a rubber composite workboot sole with a low profile. The sole is made from a mixture of cork and rubber, which keeps weight down without losing durability. This type of sole doesn't normally feature a tread, which means mud or loose terrain will stick to the soles.
- **Plantation Crepe:** originally made from Crepe rubber (latex straight from the rub-

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ber tree), but today it's synthetic. Known for a milky-yellow colour, sticky texture, and a heavier type of sole, which was popularised by the British Army in WWII.

Construction

The outsole and upper can be joined using several methods

- **Injection moulding:** the cheapest method, combines vulcanisation and cementing. A layer of cement is injected between the in-

sole, upper and the outsole. It is used for light boots. Moulded outsoles offer a light-weight, athletic form of support.

- **Littleway construction (inside stitching):** a waterproof method that entails stitching the out-, in-, and midsole together and is often used on trail shoes, hiking boots, and some climbing boots.
- **Stitchdown:** the upper is stitched to the insole using heavy thread – the upper is flared out, stitched to the insole, and then cemented to the outsole. This method allows the footwear owner to easily resole the shoe, if needed.
- **Strobel:** the upper and outsole are joined by using heat to weld the materials together or through the use of adhesives, which creates a flexible footwear that is usually also less bulky.

The way the heel is shaped adds to how the footwear supports the wearer.

- **Cut-away or bevelled heel:** helps with shock absorbency.
- **Raised heel:** helps with braking and reduces the chance of the wearer sliding or falling on steep descents.

Materials

The material that the outsole is made from adds its own qualities to the footwear.

- **Rubber:** maintains traction and stability over a variety of terrain conditions, and is waterproof and slip resistant.
 - Softer rubber: offers better grip on smooth surfaces, but will wear out faster.
 - Harder rubber: more durable than soft rubber, but has less grip on smooth surfaces.
- **PU (Polyurethane):** light, abrasion-resistant, good shock absorption and keeps water out. It does, however, take strain in warm, humid conditions. There are two types of PU: cellular and solid. Both have similar qualities, but the latter is more durable. Among outdoor footwear, PU is most often found on trekking shoes and boots.
 - **TPU (Thermoplastic Polyurethane):** abrasion and oil resistant.

These outsole materials are not used for outdoor footwear:

- **EVA (Ethylene Vinyl Acetate):** lightweight, but absorbs water easily. Most often used in sport and casual shoes.
- **Leather:** not very durable and does not have grip. It is usually used for soles on indoor footwear and not recommended **To p26**



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for wear outside.

- **PVC (Polyvinyl Chloride):** a cost-effective, waterproof material that can easily be moulded, offers good insulation, and is oil and abrasion resistant. It, however, does not offer good traction.

Benefits to a lugged sole

The tread pattern on the outsole plays a role in the type of traction the wearer will gain from the footwear. Typically, patterns with a variety of sizes and lug shapes offer better traction than those that have a uniform pattern – the deeper the tread, the better the traction.

The actual lugs, the knobby pieces on the sole, are often designed in v-shapes or as diamonds.

The tread has several ways of influencing the grip:

- On **soft, muddy terrain** – where the foot will press into the mud – a deep tread will help the wearer to get a good grip in the wet conditions, and a widely spaced pattern will offer traction and not clog up as easily with mud. The tread shouldn't be so deep, however, that it will feel unstable on rocky terrain.
- On a **solid, slippery surface** only small areas of the sole (the lugs) make contact with the surface, which means that the pressure, and the grip, is increased.
- When **going downhill**, angled tread helps with grip.
- To lend aid **when climbing**, the forefoot lugs typically face towards the rear of the foot.

The tread also plays a role in making sure ground material is released and doesn't accumulate under the sole.

Typically, an outdoor shoe's tread pattern will be open on the sides. A tread design that *encloses* the pattern will retain water inside the grooves, because the liquid can't escape along the sides.

The type of tread pattern is described as aggressive or semi-aggressive:

- **Aggressive tread pattern:** deep tread and a varying pattern, which offer greater stability and traction. Useful on loose, steep terrain, as well on muddy and wet terrain.
- **Semi-aggressive tread pattern:** shallow tread and less diversity in the pattern.

Outsoles for the activity

Type of outsole typically found on the different types of outdoor footwear:

- **Approach shoe:** for traction on rocks or steep dirt on the way to the climb.
 - o Construction: the sole wraps above the toe box and around the back of the heel, providing added protection.
 - o Material: sticky rubber for added traction.
 - o Tread: semi-aggressive with shallow lugs.
- **Climbing shoe:** for added grip.
 - o Construction:

- As a rule of thumb, the steeper the climb, the more down-turned the sole.
- For crack climbs, the sole pitch is less severe, with the toes almost flat so that they can fit into the cracks.


o Material: often a rubber compound, with soft, sticky rubber at the toes and more durable rubber at the heels.

- **Fly-fishing or wading boot:** for traction on underwater and wet surfaces. There are typically four options for wading boot soles:
 - o Felt sole: the best option for wading in rivers on rocks, because of its grip on slippery rocks. Not good for hiking long distances, because it can be slippery on wet grass or mud. It can carry organisms to different water systems, which has prompted certain countries such as New Zealand to ban used felt soled boots from being brought into the country.
 - o Rubber lug sole: offers the best traction and stability outside of the water and is a good option if your customer will be walking for a distance to get to the water. Rubber soles should have aggressive tread. The worst choice of the four for once your customer is in the water as it can get slippery on the river's rocks.
 - o Removable studs or cleats on a felt sole: offers some traction while hiking as well as while in the water. There is an opinion, however, that the studs make a noise in the water and could scare away the fish.
 - o Sticky rubber sole: a recent development in wading boots, the softer rubber offers better traction in the water than traditional rubber soles would, but not as good as felt.
- **Hiking boot:** for backpackers who carry a heavy load.
 - o Material: hard rubber.
 - o Tread: aggressive – a technical pattern made from a harder rubber, with deeper and wider-spaced lugs in a variety of heights.
- **Light hiking boot:** for a day hike, when the wearer won't be carrying a heavy load.
 - o Construction: a stiff sole.
 - o Tread: aggressive – a technical pattern made from a harder rubber, with deeper and wider-spaced lugs in a variety of heights.
- **Hiking shoe:** for a day hiker who is not carrying heavy loads.
 - o Construction: a lightweight sole, that is made from a harder type of rubber, but not stiff.
 - o Tread: semi-aggressive tread pattern, similar to that found on a trail running shoe, but more durable.
- **Hunting boot:** each type of hunting has its own requirements.
 - o Bow hunting: low lugs for maximum ground contact, so that the wearer can feel what he's stepping on. **To p28**



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- o Gun hunting: the forefoot should be able to flex.
- o Hunting on open plains: good flexibility and grip.
- **Mountaineering boot:** for carrying heavy loads, and designed to be used with crampons.
 - o Construction: either:
 - A semi-rigid sole with a rear welt for a crampon, but no front toe welt. Used for moving quickly in mountainous terrain, as well as for climbing rocks.
 - A fully rigid sole with a toe and heel welt for step-in crampons. Good for use when vertical ice climbing, alpine snow routes, and other mountaineering. A durable, stiff sole will minimise flexing while supporting the full weight of the climber and his pack.
 - o Material: hard rubber.
 - o Tread: aggressive.
- **Trail running shoe:** for moving fast over uneven terrain.
 - o Profiles: there are typically four sole profiles based on the heel-toe drop:
 - Barefoot or minimalist: 0mm heel-toe drop.
 - Low profile: 0-6mm heel-toe drop.
 - Standard or traditional profile: 6-14mm heel-toe drop.
 - Maximalist: these soles offer the most cushioning possible in order to absorb impact, and therefore feature a massive stack height.
 - o Construction: flexible sole designed to be sensitive to the terrain.
 - o Material: softer, sticky rubber for enhanced grip on smooth or slippery rocks.

- o A compound rubber will provide durability and grip.
- o Tread: aggressive, for stability. If the trail is likely to be muddy, deep lugs will enhance grip and are designed to be *self-cleaning*, which means the wearer isn't weighed down by mud. Big lugs will offer increased traction.
- **Water shoe or sandal:** for use in and around wet terrain.
 - o Construction:
 - Some shoe styles feature drain holes around the sole. This feature is useful when it comes to getting rid of water inside the shoe, but keep in mind that these same holes can also allow things, such as sand and grit, to get inside the shoe.
 - A closed-toe sandal design will offer the foot more protection. It also, however, allows debris to collect and not fall out as easily as an open design would.
 - o Material: soft or semi-soft rubber, which is durable, but soft enough to mould to the terrain and offer grip.
 - o Tread: a flatter tread pattern increases the sole's surface area that is in contact with the ground, thereby increasing traction on slippery surfaces. The tread is gained through a process called siping: a razor microcutting feature that creates small slices in the sole of the shoe.

* *Welt: a strip of leather that runs around the perimeter of the outsole, with the purpose of attaching the upper to the outsole. Not to be confused with the rand, which is a raised protective binding that runs around the area where the upper and sole are joined and forms a protection barrier against stones, etc., especially in front of the toe.*

HI-TEC's OX and Flash

THE OX and Flash Hike are exciting new developments from HI-TEC that will be hitting the shelves in SS16.

"The OX collection really pushes the boundaries incorporating two brand new technologies. "It's a super versatile outdoor-urban collection," says Jo-Anne Esterhuizen of Hi-Tec SA. An exciting partnership with Michelin Tyres gives a high performance technical outsole resulting in ultimate traction and durability that is adaptable to any terrain. XLR8 is HI-TEC's latest midsole technology: it's 10% lighter than regular EVA, boosts performance and is a great benchmark for comfortability.

The OX collection launches with their new campaign, *Comfortable Anywhere*. "Consumers are happiest when they are comfortable, and our SS16 collections are built around this messaging," says Esterhuizen. "The shoes are so comfortable they put you at ease in every situation you find yourself; shoes for wherever, whatever and whenever – they have you covered."

"We're focusing on keeping a clean look

with commercial colourways," says Gordon Stokes of Hi-Tec SA. "It's very much aimed at the younger, outdoor urbanite who wants to get out of town on the weekend and into nature."

"The V-Lite Flash Hike, hitting the shelves in April, is another superb design," says Esterhuizen. "It is a high end technical hiking boot, definitely one of my favourites to hit the market, and speaks true of our latest campaign, *Built To Conquer*. The leather is super soft, and packed with our top technologies to help you float along the toughest terrain."

More features include i-Shield technology that repels water and dirt and is resistant to stains, the Dri-Tec waterproof membrane that helps keep feet dry, the Pittards leather upper offers durability and breathability, Ortholite sockliner with slow recovery foam that offers excellent cushioning, anti-odour and microbial properties, and the Vibram Rollingait System provides durability and traction.

