

FOR THE FIRST TIME,
EXTREME DURABILITY
IS COMBINED WITH
LASTING LIGHTWEIGHT

GORE-TEX safety footwear engineered with
EXTRAGUARD upper technology sets new standards.

GORE-TEX
PRODUCTS



ABSTRACT

Robust, waterproof, and breathable safety footwear needs to offer reliable protection for physical work in all weather conditions. In the past, robustness has often automatically been associated with heavier footwear and less comfort for the feet. Now, the new 3-layer EXTRAGUARD upper technology is paving the way for the manufacture

of a totally new class of GORE-TEX safety footwear. Research has shown that this product technology is highly robust and lightweight, but it also remains lightweight even after months of intense use in wet and mud. Like all other GORE-TEX safety footwear, it is durably waterproof and breathable.

THE CHALLENGE

Robust, waterproof safety footwear helps to provide protection against injuries to feet at work. Many people believe: "The bulkier the boots, the better the protection for your feet." However, usually bulky boots are not that comfortable. Wearers notice another disadvantage of conventional boots for heavy work when worn during strenuous activities for hours on end and in the rain. Over time, the water repellent finish wears off and the boot uppers start absorbing water. Although the boots remain waterproof, they become heavier as the outer surface gets saturated with water. And, ultimately wetness robs the feet of warmth and can cause conductive heat loss.

THE GOAL

What exactly are the needs of people whose work involves heavy to moderate physical activity, such as construction, railway construction and maintenance, utilities companies and agriculture? First and foremost, they need robust footwear that is durably waterproof and provides protection against sharp metal objects, mechanical impacts, common chemicals, sparks and dirt. They also want safety footwear that is lightweight, highly breathable, and comfortable to wear.



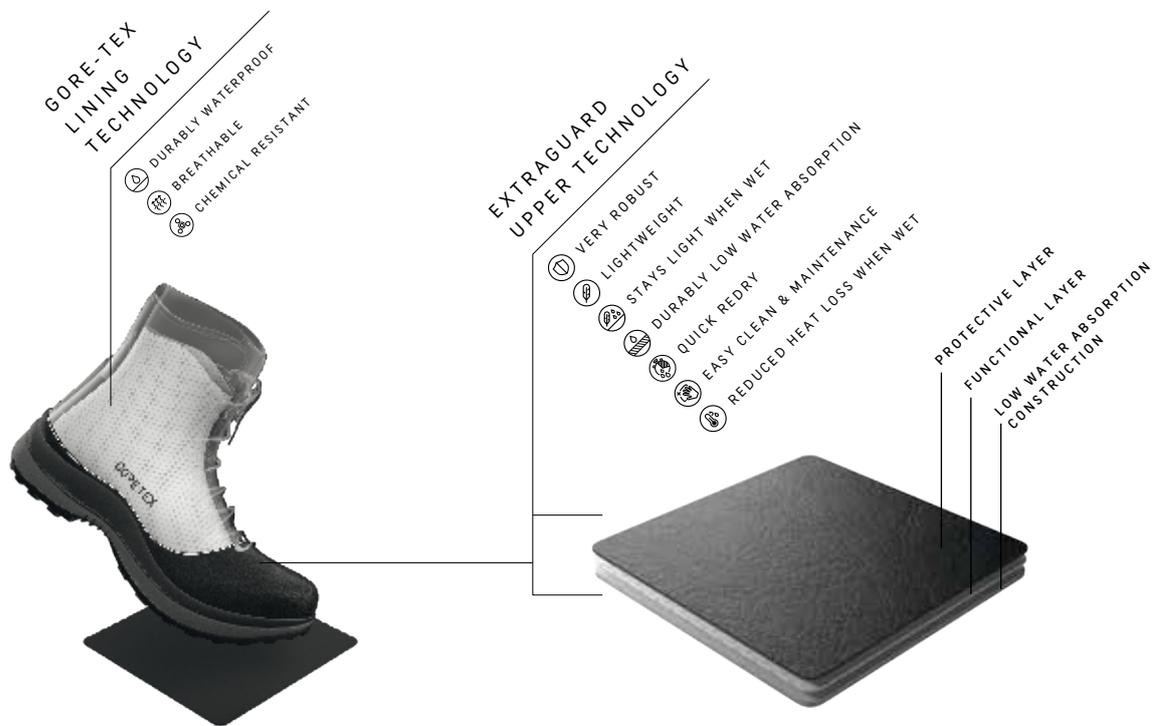
INNOVATIVE UPPER

EXTRAGUARD is a new upper technology from Gore that combines the benefits of a robust upper material with the advantages of lightweight, breathable textiles. This paves the way for the manufacture of a whole new class of GORE-TEX safety footwear.

The new EXTRAGUARD upper is made of 3 layers:

1. The highly abrasion-resistant and robust protective layer
2. The functional layer, the thickness of which can vary for specific uses
3. The innovative low water absorption construction.

This 3-layer upper is sealed with GORE® Seam Tape and, together with the GORE-TEX lining (inner bootie construction), integrated into the safety boot. Seam sealing prevents moisture from making its way into the boot through the seams. GORE-TEX EXTRAGUARD safety footwear only absorbs minimal water on the upper, even after months of extensive use and loss of the water repellent finish. The GORE-TEX bootie ensures the waterproofness of the safety footwear even if the upper material has been damaged. GORE-TEX EXTRAGUARD safety footwear combines the following features and benefits.



GORE-TEX EXTRAGUARD
SAFETY FOOTWEAR

3-layer technically engineered upper construction – seam-sealed with GORE® Seam Tape – and GORE-TEX lining (bootie construction).

GORE-TEX SAFETY FOOTWEAR WITH EXTRAGUARD UPPER

GORE-TEX safety footwear engineered with EXTRAGUARD upper is **durably waterproof and breathable**. It exceeds the requirements of EN ISO 20345/347.

GORE-TEX safety footwear engineered with EXTRAGUARD upper technology is **very robust** and yet comfortable right from the start. It needs no breaking in. These boots provide protection against sharp and falling objects, heat, common chemicals, abrasion, and wetness.

They don't vary in shape or colour and don't produce wrinkles or folds. All these functional features translate into a long product life.



DURABLY
WATERPROOF



BREATHABLE



VERY
ROBUST



RESISTANT TO
CHEMICALS



Even after months of use under extreme weather conditions GORE-TEX EXTRAGUARD safety footwear (right shoe) doesn't change its shape, colour or function.

MATERIAL PROPERTIES OF EXTRAGUARD UPPER:

- ◆ Consistent quality: even thickness, no colour variations, leather look but no scars and scratch marks
- ◆ Form stability: no need for additional reinforcements in the boot construction
- ◆ Material can be seam-sealed with GORE® Seam Tape
- ◆ Multiple design options: stick-on reflective elements, protective or colour patches, printing, PU castings (plastic) and other applications.

When dry, the robust and abrasion resistant EXTRAGUARD upper material construction is **40 percent lighter** than leather. Due to the low water absorption construction from the outside, it **remains lightweight when integrated into GORE-TEX safety footwear engineered with EXTRAGUARD upper**. GORE-TEX EXTRAGUARD safety footwear retains its functional features even after months of use and constant wear in wet environments. It also retains them once the water repellent finish has worn off, as is the case with conventional safety footwear.



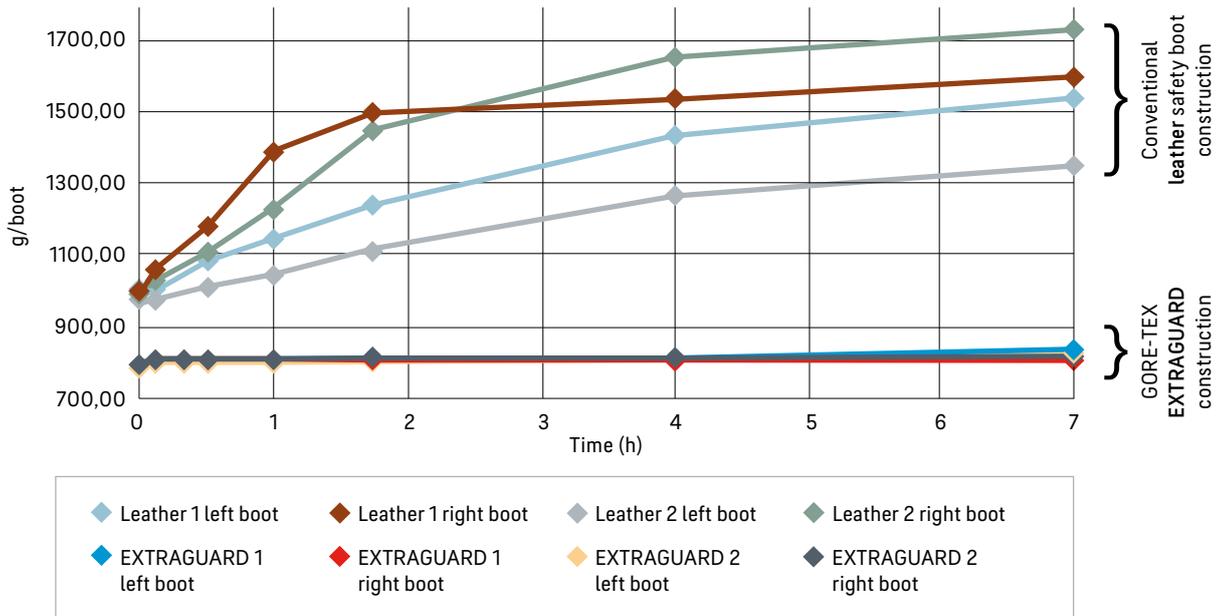
LIGHTWEIGHT



STAYS LIGHT
WHEN WET

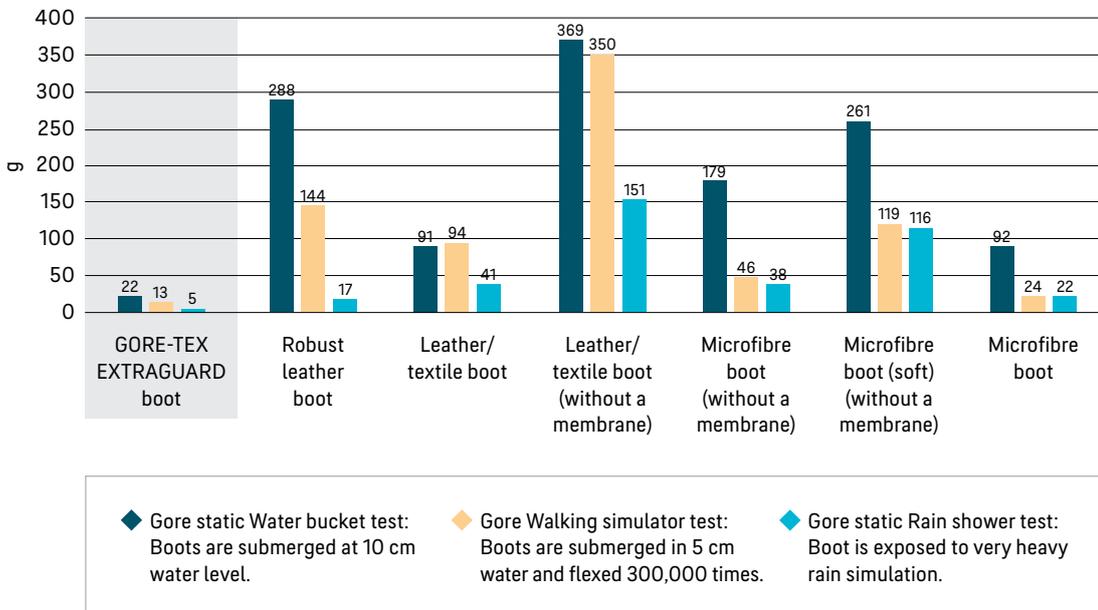


WEIGHT GAIN OF SAFETY FOOTWEAR* WHEN WET



Compared with conventional safety footwear, GORE-TEX EXTRAGUARD footwear has very low water absorption, confirmed by the Water bucket test.

WEIGHT GAIN OF TYPICAL SAFETY BOOTS WITH DIFFERENT UPPER MATERIALS* IN WET CONDITIONS



Different tests show that GORE-TEX EXTRAGUARD safety boots only gain a minimal amount of weight due to moisture from the outside. Thanks to their robustness, they retain these properties and remain light even in wet environments.

COMPARISON OF RESISTANCE TO CONDUCTIVE HEAT LOSS*

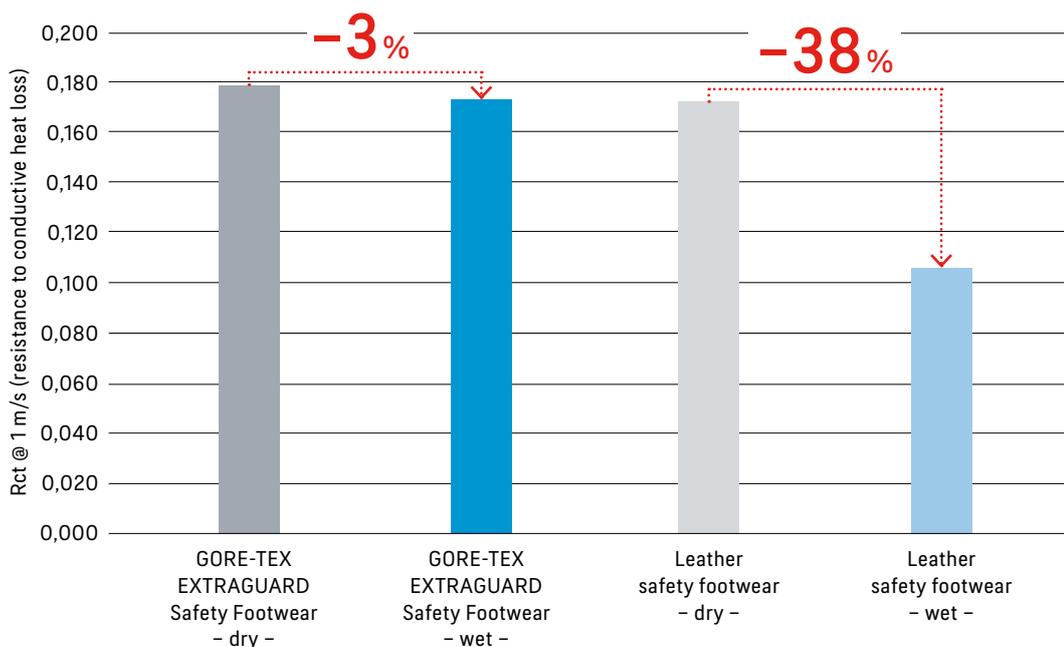
Water from the outside only ever gets as far as the innovative low water absorption construction where it is prevented from penetrating further. No moisture accumulates between the upper material and the waterproof inner bootie. This reduces **conductive heat loss**, which can occur in safety footwear using conventional upper materials. Feet stay dry and comfortable, even in wet or cold conditions.



REDUCED HEAT LOSS WHEN WET



Conductive heat loss of a GORE-TEX EXTRAGUARD safety footwear (right shoe) is considerably less than that of an identical leather version.



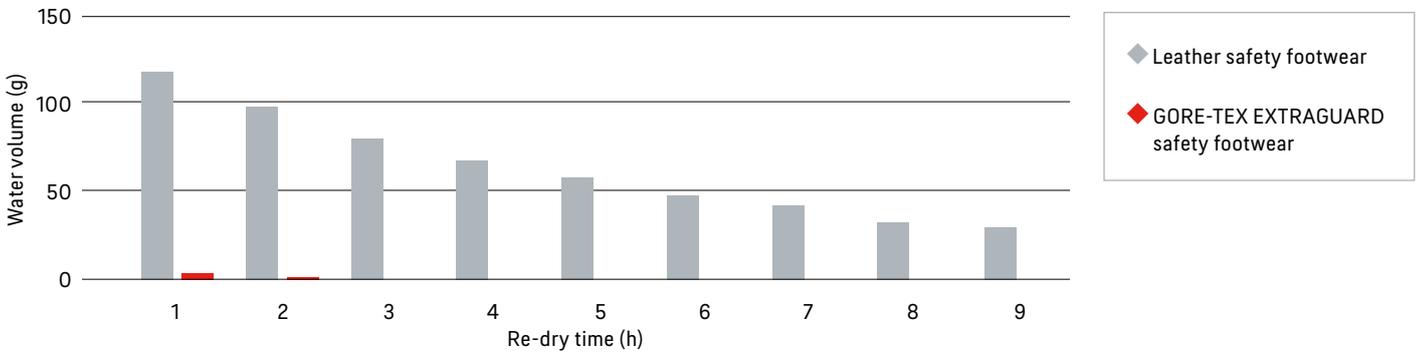
The potential heat loss of wet leather boots is significantly higher than that of wet GORE-TEX EXTRAGUARD boots.

*Conductive heat loss: a conductive heat loss occurs when the outer surface of a boot becomes saturated with water. This wet surface draws heat away from the foot (passive heat loss) far faster than when the surface is dry. The only way that wearers can compensate for this is if they keep moving. Otherwise they get cold feet. Very often, it will feel like feet are uncomfortably damp and clammy. Some people even assume that the boots are leaking, and that water is penetrating, even though that's not the case.

RE-DRY OF STANDARD SAFETY FOOTWEAR*

When compared with traditional leather or textile safety footwear, the low water absorption construction of GORE-TEX EXTRAGUARD safety footwear ensures quick re-dry. In wet environments, the upper materials used in conventional safety footwear absorb considerable amounts of water as

soon as the water repellent finish wears off. This makes them feel heavy. By comparison, GORE-TEX EXTRAGUARD footwear hardly absorbs any moisture on the outside. This translates into significantly faster drying times when compared with standard safety footwear.



As GORE-TEX EXTRAGUARD boots only absorb minimal moisture from the outside, they dry considerably faster than standard safety footwear.

The material is suitable for all-season boots. GORE-TEX EXTRAGUARD footwear is easy to clean. They can be rinsed under the tap or hose them down. Specific care products as they are needed for leather, are not necessary.



QUICK RE-DRY



EASY CLEAN AND MAINTENANCE

PRODUCT BENEFITS:

- ◆ Lightweight when dry
- ◆ Stays light when wet
- ◆ Very robust
- ◆ Quick re-dry
- ◆ Easy to clean, no maintenance needed
- ◆ Reduced heat loss when wet



FIELD TESTS AND USER FEEDBACK

Field tests with robust all-season boots resulted in satisfied wearers. Testers were impressed by the lightweight of the safety boots, which remained light even after many hours of work in wet conditions. They were equally impressed by the high level of breathability and quick re-dry properties. Wearers positively rated the fact that the EXTRAGUARD upper looks like leather and offers manufacturers new design options but has the properties of textiles. Despite their robustness and mechanical

stability, GORE-TEX EXTRAGUARD safety footwear is highly breathable – considerably more so than leather. This results in excellent comfort, making working far easier in tough conditions.

*Artificially aged to replicate 2-3 months of wear



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Through qualitative market research, we have gained a deep understanding of the dilemma that wearers are still facing today when picking the right safety boots. One of the key themes we heard consistently is that they often have to compromise between robust protection and lightweight comfort. Not anymore. In a variety of product tests that we ran with workers in road construction, landscaping, utilities and agriculture more recently, wearers of GORE-TEX EXTRAGUARD safety boots were surprised by the combined lightweight and robustness those boots provide. Many trial participants were impressed by the fact that the boots could still be hosed down with a pressure washer even when the outer surface of the safety boots had become worn through work-related use. The boots also did not feel clammy inside the following day. The test boots had often become so popular that it was difficult to get them back for further tests in our labs...

Helmut Klug, GORE-TEX Professional Product Specialist

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EXTRAGUARD UPPER MATERIAL AND SUSTAINABILITY

Gore is committed to continuously improving the environmental impact of its products without compromising on durable performance. Thus, all new product technologies need to support the sustainability strategy, for example by selecting sustainable materials, reducing manufacturing waste or using simpler transport solutions.

The EXTRAGUARD upper is a great example due to its robust and durable performance, prolonging product life. This is confirmed by a variety of tests carried out under laboratory and real-life conditions. The material also sets new standards in terms of the low environmental impact of its production, using few resources and minimizing CO₂ emissions.