

FOR THE FIRST TIME,

**EXTREME DURABILITY**

IS COMBINED WITH

**LIGHTWEIGHT**

MATERIALS FEATURING

**LOW WATER ABSORPTION**

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

**GORE-TEX**  
PRODUCTS



**GORE-TEX**



# ABSTRACT

Durable, waterproof, and breathable safety footwear needs to offer reliable protection for physical work in all weather conditions. Previously, durability has often been associated with heavier and uncomfortable footwear. Now, the new 3-layer EXTRAGUARD upper material is paving the way for an innovative new class of GORE-TEX safety footwear.

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

# THE CHALLENGE

Durable, waterproof safety footwear helps to provide protection against injuries to feet at work. Many people believe: "Bulky boots provide better protection for your feet." Typically, 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 becomes saturated with water. Ultimately, wetness deprives 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 durable 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 LINING TECHNOLOGY

- ☑ DURABLY WATERPROOF
- ☑ BREATHABLE
- ☑ CHEMICAL RESISTANT

## EXTRAGUARD UPPER TECHNOLOGY

- ☑ VERY ROBUST
- ☑ LIGHTWEIGHT
- ☑ STAYS LIGHT WHEN WET
- ☑ LOW WATER ABSORPTION
- ☑ QUICK REDRY
- ☑ EASY CLEAN & MAINTENANCE
- ☑ REDUCED HEAT LOSS WHEN WET



# GORE-TEX EXTRAGUARD SAFETY FOOTWEAR



# 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 durable 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 wrinkle, crease, warp, or fade. All these functional features translate into a long product life.



DURABLY WATERPROOF



BREATHABLE



VERY ROBUST



RESISTANT TO CHEMICALS

## DURABILITY

Pairs of GORE-TEX boots were issued to field workers for user trial. Each pair of boots consisted of 1 GORE-TEX EXTRAGUARD boot and 1 Regular GORE-TEX Leather Boot



GORE-TEX EXTRAGUARD SAFETY FOOTWEAR



After 6 months of use under extreme weather conditions GORE-TEX EXTRAGUARD safety footwear (left shoe) did not change its shape, color or function while the sibling GORE-TEX leather boot (right shoe) showed some wear and tear.

## LIGHTWEIGHT

When dry, the durable and abrasion resistant EXTRAGUARD upper material construction is 40 percent lighter than leather. Due to the innovative low water absorption design GORE-TEX EXTRAGUARD safety footwear retains its functional features even after months of use and constant wear in wet environments. It also preserves functional features once the water repellent finish has worn off, which is not the case with conventional leather safety footwear.



LIGHTWEIGHT

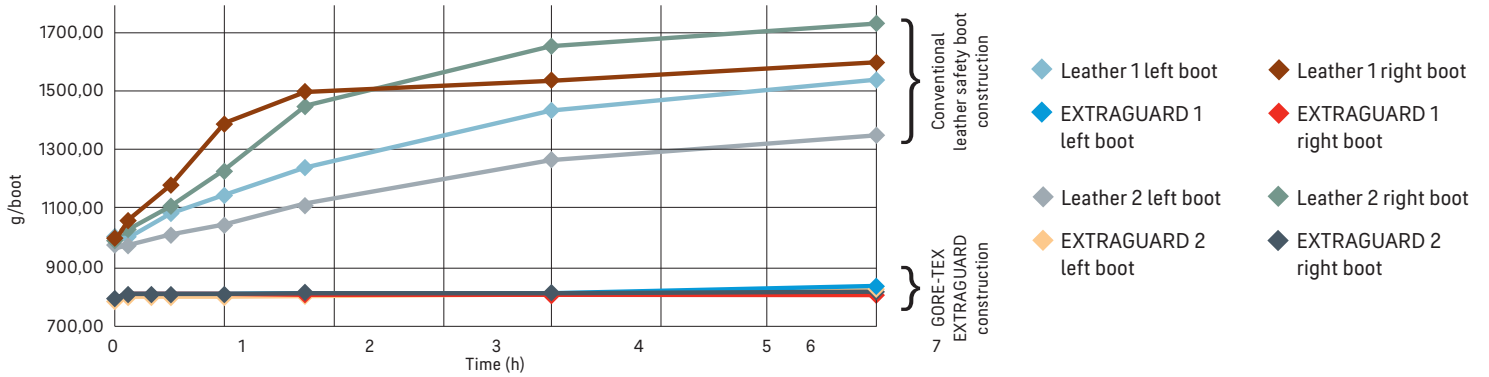


STAYS LIGHT WHEN WET



# LOW HEAT LOSS WHILE WET

## WEIGHT GAIN OF SAFETY FOOTWEAR\* WHEN WET

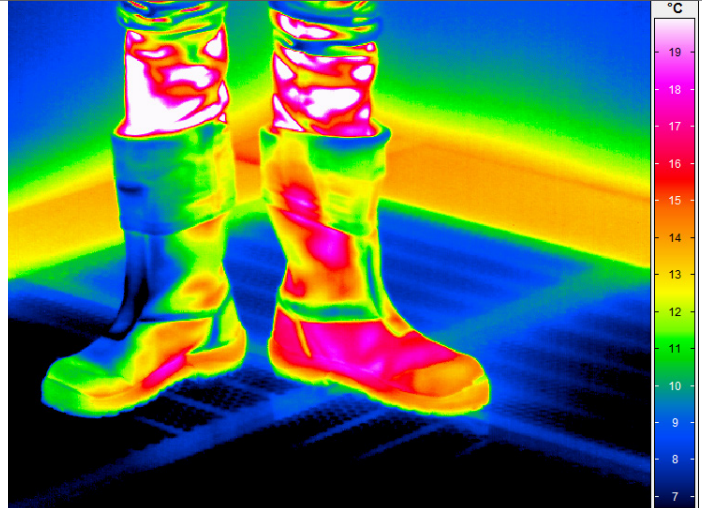


Compared with conventional safety leather footwear, GORE-TEX EXTRAGUARD footwear has very low water absorption, confirmed by the water bucket test.

\*Artificially aged to replicate 2-3 months of wear

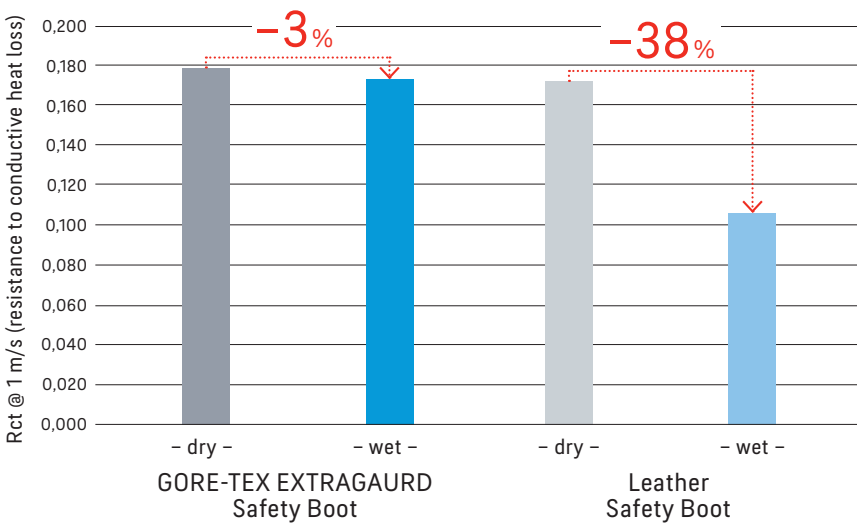
# LOW HEAT LOSS WHILE WET

Since little to 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.



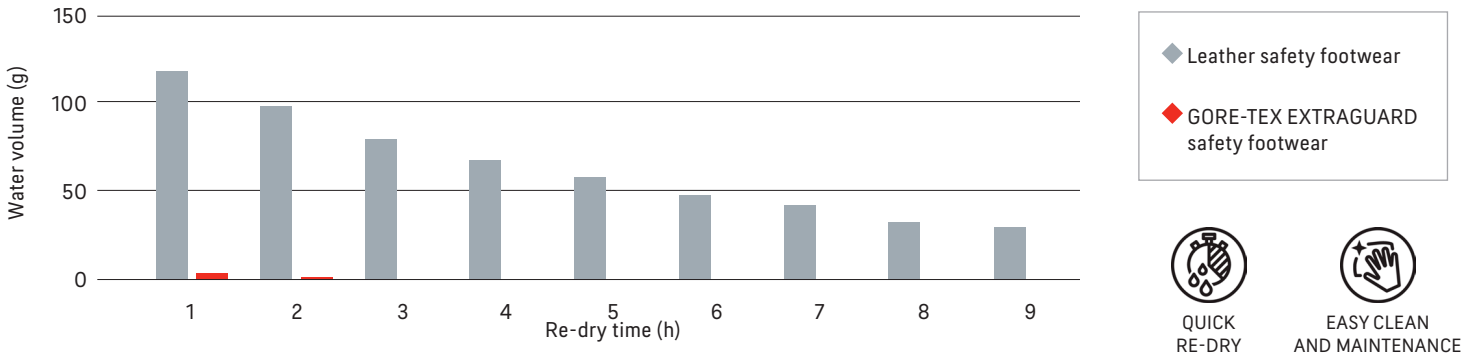
\*Conductive heat loss: a conductive heat loss occurs when the outer surface of a boot becomes saturated with water. This wet surface draws heat away from the foot (passive heat loss) far faster than when the surface is dry. The only way that wearers can compensate for this is if they keep moving. Otherwise 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.

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

# QUICK RE-DRY\*

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.

\*Artificially aged to replicate 2-3 months of wear

## 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.





“ 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 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

”

## EXTRAGUARD UPPER MATERIAL AND SUSTAINABILITY

W. L. Gore & Associates is committed to continuously improving the environmental impact of its products without compromising on durable performance.

All new product technology developments need to support the Sustainability Strategy, for example by selecting sustainable materials, reducing manufacturing waste or using simpler transport solutions.

EXTRAGUARD upper is a great example due to its robust and durable performance (waterproof and breathable). This is confirmed by a variety of tests for durability and breathability ( $R_{et}$  values) carried out by independent testing centres.

Reduced environmental impact: less chemicals used than in the production of conventional upper materials, less water consumption and reduced  $CO_2$  emissions equate to a smaller carbon footprint when compared with safety footwear made of conventional, highly reliable upper materials for rugged end-use.

The innovative and vegan upper material is chromium-free, supplied in consistent quality (rolled good) and no longer requires extra inspection on receipt. This significantly reduces work and material waste.