

# BERG S3 safety shoe



LACUNA

## PROTECTIVE FOOTWEAR – TYPES OF PROTECTIVE TOE CAPS

Protective toe caps as part of safety shoe protect foot and provide shock absorption up to 200 J, in accordance with EU Standard EN ISO 20345.

Protective toe caps used in the production of protective footwear are categorized as metal and non-metal protective toe caps

**METAL TOE CAPS** are categorized into the following groups:

- **STEEL CAPS:** the pioneer of all safety caps used in the production of safety footwear. Steel caps are thin, extremely strong and cost-effective. Compared to non-metal caps, steel caps are somewhat heavier, however, they possess exceptional impact resistance and are therefore still often used in the production of protective footwear, especially technical footwear with high protective requirements (such as anti-cut footwear for foresters). Apart from their weight, another disadvantage of these caps is that, after an impact, the cap does not return to its original position, since it is not elastic, and they also possess a somewhat lower degree of thermal insulation.

- **ALUMINUM CAPS** are a new-generation metal caps; they are very light, thin, with a low profile and suitable for making protective sports design footwear. ALU caps are often compared to non-metal caps which are also lighter, but thicker compared to ALU caps and less suitable for protective sports design footwear. Their thermal insulation is good.

ALU caps are more expensive, however, their price is justified, since they are about 30% lighter than steel caps, and the entire shoe is consequently lighter and more comfortable to wear, which is important for users in everyday work.

**COMPOSITE (NON-METAL) toe caps used for footwear protection in shoes are categorized into 3 groups:**

- **PVC PROTECTIVE CAPS** – very light caps, just as safe as metal protective caps but a bit more robust with a thicker profile. Composite caps require a certain thickness so that footwear with PVC caps could pass all tests and meet the standards prescribed by European laws regarding personal protective equipment, namely, EU Regulation 2016/425 regarding PPE.

PVC caps are very common in the production of protective footwear due to their metal-free properties; they do not conduct electrical current and possess good thermal insulation.

- **FIBERGLASS PROTECTIVE CAPS** - composite caps made of glass threads of a very strong structure – Due to the high density achieved by a random combination of glass threads, fiberglass caps are thinner, lighter than PVC caps, and yet highly resistant to impact. The great advantage of fiberglass caps over metal caps is that, in the event of an impact, the so-called “elastic effect” occurs and the cap does not deform but retains its original shape and consequently additionally protects the foot from injury. Fiberglass caps are an extremely good alternative to ALU caps, since, like ALU caps, they are very thin, comfortable and more affordable, and protective footwear bearing fiberglass caps is increasingly present in the world of PPE.

Protective footwear with fibreglass protective caps is characterized by high comfort and practicality, with less foot fatigue and good thermal insulation.

- **CARBON PROTECTIVE CAPS** - the best among composite caps, since they are the thinnest and lightest, very strong, but also the most expensive. Carbon fiber is known to be one of the strongest fibers in the world and is used in industries where the price is inconsequential and secondary, whereas the primary goal is to achieve maximum possible safety (military industry, aviation industry, etc.). Although very few manufacturers of protective footwear use protective caps made of carbon fibers because their price is very high, it should be noted that footwear bearing carbon-fibre caps is characterized by exceptional comfort and practicality.