

Table 7 (continued)

Test conditions	Coefficient of friction
Condition B (backward forepart slip)	≥0,36

5.3.6 Innocuousness

Protective footwear shall not adversely affect the health or hygiene of the user. Protective footwear shall be made of materials such as textiles, leather, rubbers or plastics that pose no risk to the wearer health and hygiene. The materials shall not, in the foreseeable conditions of normal use, release or degrade to release substances generally known to be toxic, carcinogenic, mutagenic, allergenic, toxic to reproduction or otherwise harmful.

For all leather parts tested in accordance with ISO 20344:2021, 6.9, the pH value shall be not less than 3,2. If the pH value is below 4, the difference Figure shall be less than 0,7.

For all leather parts tested in accordance with ISO 20344:2021, 6.11, the quantity of chromium VI shall not exceed 3,0 mg/kg.

NOTE Information about critical substances in footwear and footwear components are available in ISO/TR 16178^[2] and Regulation (EC) No. 1907/2006 (REACH) Annex 17^[2].

5.3.7 Seam strength

The materials of area A and B (see Figure 6) may be connected by stitching, welding or other suitable methods. When tested according to ISO 20344:2021, 5.25 the connection shall fulfil a strength of at least 10 N/mm.

5.4 Upper

5.4.1 General

The materials used in the upper of footwear shall be assessed according to their type and the type of footwear.

5.4.1.1 Class I footwear, determination of the area where upper requirements apply

The area where upper requirements apply shall be assessed by measuring from the horizontal surface beneath the outsole (as "H" is measured in Figure 6). Any materials in the upper below the height defined in Table 8 shall meet the requirements of the upper (see Table 2).

Table 8 — Height, below which upper requirements apply

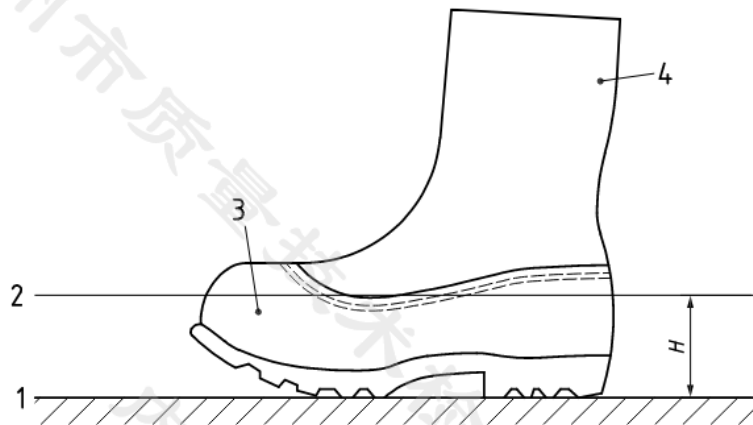
Size of footwear European	minimum height mm			
	Design A	Design B	Design C	Design D and E
36 and below	44	64	113	172
37 and 38	46	66	115	175
39 and 40	48	68	119	182
41 and 42	50	70	123	188
43 and 44	52	72	127	195
45 and above	53	73	131	202

All upper materials shall fulfil the requirements given in 5.4.2 to 5.4.7.

When other than upper materials exist in the footwear above the heights given in [Table 8](#), they shall meet the tear strength ([5.5.2](#)) and abrasion resistance ([5.5.3](#)) requirements for lining. In the case of leather materials, they shall also meet the requirements for pH value and for chromium VI content ([5.3.6](#)).

5.4.1.2 Hybrid footwear, determination of the area where upper requirements apply

The Area A, shall be measured as H , between the lowest point of the top of the visible polymer (or rubber) part and the ground (see [Figure 6](#)) and shall have a minimum height corresponding to the values given in [Table 8](#) for design B. All materials in this area shall meet the requirements of the upper (see [Table 2](#)).



Key

- 1 ground
- 2 H , lowest point of the area A and the ground
- 3 area A
- 4 area B

Figure 6 — Measurement “H”

5.4.2 Thickness

When tested in accordance with ISO 20344:2021, 6.1, the minimum thickness of the upper shall be at least at any point in accordance with [Table 9](#).

Table 9 — Minimum thickness of upper material

Type of material	Minimum thickness mm
Rubber	1,5
Polymeric material	1,0

5.4.3 Tear strength

When tested in accordance with ISO 20344:2021, 6.3, the tear strength shall be in accordance with [Table 10](#).

Table 10 — Minimum tear strength of upper

Type of material	Minimum force N
Leather	120
Coated fabric and textile	60

5.4.4 Tensile properties

When tested in accordance with ISO 20344:2021, 6.4, the tensile properties shall be in accordance with Table 11.

Table 11 — Tensile properties

Type of material	Tensile strength N/mm ²	Breaking force N	Modulus at 100 % elongation N/mm ²	Elongation at break %
Leather split	≥15	—	—	—
Rubber	—	≥180	—	—
Polymeric material	—	—	≥1,0	≥250

5.4.5 Flexing resistance

Tested in accordance with ISO 20344:2021, 6.5, the flexing resistance shall be in accordance with Table 12. No damages, like e.g. pinholes and cracks, shall be visible to the unaided eye.

Table 12 — Flexing resistance

Type of material	Flexing resistance
Rubber	No cracking before 125 000 flex cycles
Polymeric material	No cracking before 150 000 flex cycles

5.4.6 Water vapour permeability and coefficient

Footwear shall comply with one of the following criteria's:

- The water vapour permeability of upper materials shall be at least 0,8 mg/(cm²·h) and the water vapour coefficient shall be at least 15 mg/cm² when tested in accordance with ISO 20344:2021, 6.6, 6.7 and 6.8. A maximum area of 10 % of non-water vapour permeable materials is acceptable when measured according to ISO 20344:2021, 6.2.3.
- If the upper contains an area of maximum 25 % of non-water vapour permeable material, measured according to ISO 20344:2021, 6.2.3, all remaining materials shall fulfil a water vapour permeability of at least 2,0 mg/(cm²·h).

5.4.7 Resistance to hydrolysis

For polyurethane uppers tested in accordance with ISO 20344:2021, 6.10, no cracking shall occur before 150 000 flex cycles.