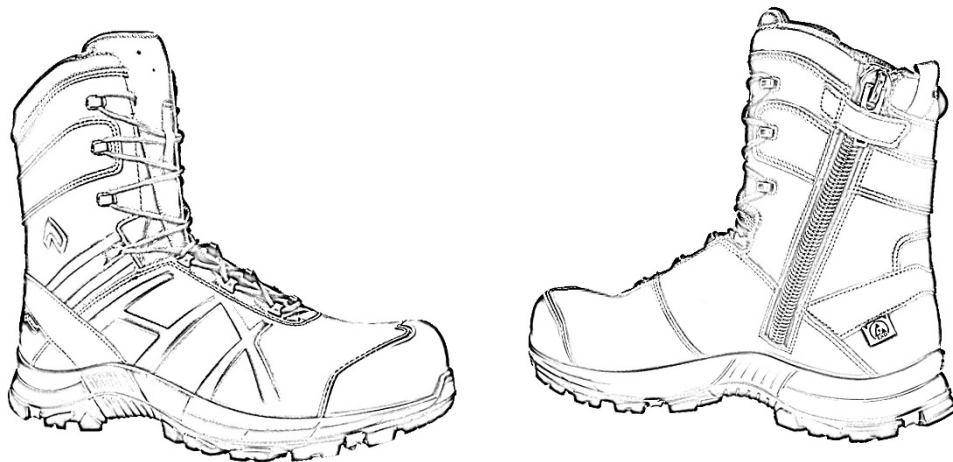


Technical Description

for

High Safety Leather Boot with Sidezipper

Item name: High safety boot made of leather, low weight, closed fittings, side-zipper, outsole based on running shoe technology, waterproof, with breathable climate system, antistatic and additionally ESD- capable according to EN 61340-4-3



1. General requirements

- 1.1 The cut is to be that of a light high leather boot which is to be produced with the “Strobel” method.
- 1.2 The light weight profiled rubber/ PU sole has to be moulded directly to the upper.
- 1.3 The upper leather of the boots is made from bull leather equipped with the light reflecting pigments. This reduces the heating effect of the upper leather by direct sunlight. The sunlight is reflected by the leather, keeping the leather and the feet cooler.
- 1.4 The boot is to be equipped with a membrane that guarantees water tightness and breathability. All lining seams are to be sealed up with a perspiration tape.
- 1.5 The boots, for the size UK 8, have a height of bootleg of approx. 20 cm (Design C), measured from the lowest point of the insole in the heel area up to the highest point of the bootleg (except the tongue).
- 1.6 The rubber sole with PU shock absorption wedge features a profile with excellent anti-slip properties.
- 1.7 The boots are to be produced in UK sizes 3 - 12 and special sizes UK 12 ½ - 15. It must be possible to adjust the width of the boots at a later stage to extra narrow or broad feet.
- 1.8 With three different inner soles it is possible to change the width of the shoe individually.
- 1.9 The boots must be produced and certified according to **EN ISO 20345:2011 (DIN EN ISO 20345:2012)** and are to be marked accordingly.
- 1.10 Additional protective functions are: **S3 HRO HI CI WR SRC.**

- 1.11 The boots have to be certified for the application and compliance of DGUV 112-191 (BGR191), Section 4.2.1/ 4.2.2 or ÖN-Z1259-2012, variant A (modified orthopaedic insole) and variant B (orthopaedic outsole modification).
- 1.12 The certificate of an authorised accredited testing institute must be submitted together with the tendering documentation.
- 1.13 Each pair of boots must be accompanied by an information leaflet containing instructions regarding their fit and wear, about durability, storage and care, as well as information on the applied standards, the sole insert, puncture resistant inserts and antistatic properties.

2. Technical requirements

2.1 Design

- 2.1.1 The boots are equipped with an air conditioning system which allows the circulation of air at each step movement. To improve the breathability a spacer fabric is used as casing.
- 2.1.2 The water tightness is to be assured with a breathable and water resistant membrane.
- 2.1.3 A breathable polyester fabric having a height of 25 - 45 mm (as measured from the upper border edge) has to be used as lining facing to achieve high breathability and a comfortable skin contact.
- 2.1.4 The processing of the materials in the upper may not impair the transport of moisture.
- 2.1.5 A "bootie system" is not allowed, i.e. the lining may not cover the insole.
- 2.1.6 The leather tongue is made as dust or pleated tongue. It is anatomically shaped and is softly padded with reticulated foam. At the tongue is to be attached a suitable fixation made of a textile stripe. The ending of the tongue is to be padded.
- 2.1.7 The heel lining of the boot is made of high abrasion resistant micro fibre heel grip.
- 2.1.8 The upper shaft end forms a textile cuff is padded with soft open cell foam. On the outside the textile sleeve extends below the lace pocket.
- 2.1.9 The closed lacing system exists of laces and plastic and textile loops.
The lacing consists per shoe of 3 pairs of plastic loops in the lower area, 1 pair of textile loops, and 3 pairs of loops at the upper portion as well as one textile stripe at the tongue for tongue fixation. Open fittings like hooks are not allowed.
- 2.1.10 The boots are fitted with a heel bend and a pull-on loop at the rear end of the upper.
- 2.1.11 On the outside of the boots is to provide a pocket made of stretch material for the stowage of the laces.
- 2.1.12 The antistatic property is to achieve by use of a textile tape with metallic threads (antistatic tape) in the inner side of the boot. The antistatic tape must reach into the boot at approx. 5 cm above the upper edge of the insole.
- 2.1.13 The top cover is made of an additional TPU material.
- 2.1.14 The outsole is a modern, light weight and sporty rubber outsole with street/terrain tread with a PU damping wedge with good walking, damping and insulation properties. It is abrasion-proof, non-marking, antistatic, heat, fuel oil resistant. The outsole has a toe spring of 15 - 30 mm and a heel spring of 10 - 20 mm.
- 2.1.15 In the back foot area, the foot has to be encompassed tightly by a good padding and by a moulded inlay sole.

2.1.16 The 2-part sole insert with ventilation channels in the heel area and under ball of the foot can be removed and washed at 30 °C. It is anatomically formed, has excellent moisture absorption properties and dries quickly.

Three different insert soles allow wearers to adjust the boot to the width of their foot.

The fit marks indicate the shoe size.

2.1.17 The boots are structurally suitable for the supply of orthopedic insoles.

2.1 Materials

2.2.1 Upper leather

Hydrophobic full-grain, smooth bullhide,

Colour: black

Thickness: 1.8 – 2.0 mm

Tear strength: ≥ 200 N acc. to EN ISO 20344.

Water penetration time: ≥ 180 minutes with dynamic testing in penetrometer according to EN ISO 5403/-1/ EN ISO 20344.

Water vapour permeability: ≥ 5.0 mg/cm²h according to EN ISO 14268 / EN ISO 20344.

Tanned according to the German human-ecological threshold values.

2.2.2 Tongue leather

Hydrophobic tongue bullhide,

Colour: black

Thickness: 1.1 – 1.3 mm

Tear strength: ≥ 120 N acc. to EN ISO 20344.

Water penetration time: ≥ 120 minutes with dynamic testing in penetrometer according to EN ISO 5403-1/ EN ISO 20344.

Water vapour permeability: ≥ 5.0 mg/cm²h according to EN ISO 14268 / EN ISO 20344.

Tanned in accordance with German human ecological limits.

2.2.3 Casing material

Hydrophobic polyamide knitted fabric,

Colour: black

Tear strength: ≥ 100 N acc. to EN ISO 20344.

Water vapour permeability: ≥ 30.0 mg/cm²h according to EN ISO 14268 / EN ISO 20344.

Abrasion resistance (dry) acc. to EN ISO 20344, 6.12:

≥ 500.000 cycles

2.2.4 Outside heel counter

Embossed PUR laminate

Colour: black

Thickness: 0.8 – 0.9 mm

2.2.5 Tongue fixation stripe

100 % Polyester webbing

Colour: black

Width: 10 mm

Tensile strength: $\geq 1,000$ N

2.2.6 Pull on loop

100 % Polyester webbing

Colour: black

Width: 10 mm

Tensile strength: $\geq 1,000$ N

2.2.7 Casing and tongue inner lining

Breathable polyester profile fabric

Colour: black

Fabric weight: $190 \pm 20 \text{ g/m}^2$

Thickness: 1.9 – 2.1 mm

Abrasion resistance according to EN ISO 20344:

Dry abrasion: $\geq 100,000$

Wet abrasion: $\geq 50,000$

2.2.8 Closed lacing parts per boot

Low friction plastic loops: 3 pairs

Low friction loops on plate: 3 pairs

PES webbing stripe: 10 mm (tongue fixation)

2.2.9 Foam materials

Reticular PUR foam material with a

Volume weight: $95 \pm 5 \text{ kg/m}^3$

Thickness: 7 mm

2.2.10 Inner lining

The inner lining should consist of a 4-layer laminate, consisting of shell fabric, a membrane of ePTFE and a weldable backing fabric.

Construction	Face Fabric: warp knit		70 ± 5% PA 30 ± 5% PES
	Middle layer: nonwoven		100% PES
	Bicomponent membrane based on ePTFE or at least similar		
	Backing fabric: warp knit		100% PA
Colour	grey		
Forbidden substances:	SG-Certificate from independent test institute Compliance to Öko-Tex® Standard 100, Product class II		
Weight	[g/m ²]	280 ± 20	DIN EN 12127
Thickness	[mm]	0.8 ± 0.2	DIN EN ISO 5084
Martindale abrasion resistance face	[cycles]	Dry: $\geq 200,000$	SATRA TM 31A; EN ISO 20344, 6.12
	[cycles]	Wet: $\geq 70,000$	
Martindale abrasion resistance backer knit	[cycles] back	Wet: $\geq 50,000$	
Perspiration fastness		$\geq 3-4$	DIN EN ISO 105-E04
Rub fastness		$\geq 3-4$	DIN EN ISO 105-X12
Thermal insulation R_{ct}	[10 ⁻³ m ² K/W]	≤ 15	DIN EN ISO 11092
Vapour permeability R_{et}	[m ² Pa/W]	≤ 10	DIN EN ISO 11092
Resistance to water penetration	[mbar]	5,000	DIN EN 20811
Water vapour permeability	[mg/cm ² h]	≥ 10.0	DIN EN ISO 20345/20347

(A) Changing of abrasion means for dry testing every 51,200 cycles, changing of abrasion means for wet testing every 25,600 cycles. The test will be finished with the first fibre break

or with the first hole in the face layer, depending on the material. Rewetting every 12,800 cycles, in case of wet testing.

2.2.11 Lining pocket behind zipper opening

The flexible, breathable and waterproof lining material should consist of a 3-layer laminate, consisting of shell fabric, a membrane of ePTFE and a weldable backing fabric.

Construction	Face Fabric: warp knit		100 % PA
	Bicomponent membrane based on ePTFE		
	Backing fabric: knit		100% PA
Colour	black		
Forbidden substances:	SG-Certificate from independent test institute Compliance to Öko-Tex® Standard 100, Product class II		
Weight	[g/m ²]	230 ± 25	DIN EN 12127
Thickness	[mm]	0.8 ± 0.15	DIN EN ISO 5084
Martindale abrasion resistance face	[cycles] [cycles]	Dry: ≥ 500,000 Wet: ≥ 70,000	SATRA TM 31A; EN ISO 20344, 6.12
Martindale abrasion resistance backer knit	[cycles] back	Wet: ≥ 50,000	
Perspiration fastness		≥ 3-4	DIN EN ISO 105-E04
Rub fastness		≥ 3-4	DIN EN ISO 105-X12
Thermal insulation R_{ct}	[10 ⁻³ m ² K/W]	≤ 15	DIN EN ISO 11092
Vapour permeability R_{et}	[m ² Pa/W]	≤ 15	DIN EN ISO 11092
Resistance to water penetration	[mbar]	1,000	DIN EN 20811

2.2.12 Heel grip

High abrasion resistant microfiber non-woven,

Colour: grey

Thickness: 1.1 – 1.3 mm

Abrasion-resistance acc. to EN ISO 20344:

Dry: ≥ 500,000 cycles

Wet: ≥ 300,000 cycles

2.2.13 Antistatic tape

Polyester thread tape with 40 ± 5 % metal threads.

Breadth: 10 ± 1 mm

2.2.14 Sewing threads

Polyamide fibres in a water repellent design,

Dimension: Nm 30/3 and/or 40/3

Colour: black.

2.2.15 Zip fastener

A robust and tear-off protected zip fastener that fulfils mechanical strength properties and testing according to DIN EN 3416-3419. The zip head must be fitted with stoppers at the top.

Material of textile: PES
 Material of the wire: PES
 Purl width: 10.5 mm.

2.2.16 Insole

Non-woven polyester insole,
 Thickness: 2.3 – 2.7 mm.

2.2.17 Protection toe cap

Made from glass fibre reinforced composite material, with soft plastic lip, conforming to EN ISO 20345/ DIN EN 12568.

2.2.18 Heel stiffener

High quality fully recyclable both side bonding thermoplastic material, preformed to the last during the production.
 Thickness: 1.30 – 1.45 mm

2.2.19 Inlay sole

2-part insert made of open-cell foam with abrasion-proof, moisture wicking cover layer made of 100% polyester
 With “fit check marking” at toe line.
 Abrasion resistance according to EN ISO 20344, 6.12, without hole formation
 Dry abrasion: $\geq 150,000$
 Wet abrasion: $\geq 50,000$
 Water absorption: $\geq 150 \text{ mg/cm}^2$ acc. to EN ISO 20344,
 Water desorption: $\geq 90 \%$.
 The insert must be washable at 30 °C.

2.2.20 Penetration resistant insole

Non-metallic penetration retardant insole according to ISO 20345 and EN 12568.

2.2.21 Laces

Water repellent PES boot laces with a minimum length
 UK 3 - 8: 190 cm
 UK 8 ½ - 13 ½ : 200 cm
 UK 14 - 15: 210 cm
 Colour: black

2.2.22 Sole

Light weight, slip-resistant, sporty and profiled, directly molded rubber-outsole with PUR- midsole. An optimal rolling movement of the foot is provided by special toe and heel springs on the sole. The outsole is non-marking, antistatic and ESD-capable, fuel oil resistant according to EN ISO 20345.

The PU damping wedge grants the following characteristics:

- Water resistance
- high stepping damping around the ball and the heel
- very good insulation against cold and heat
- stabilisation of the foot

The rubber anti-slip outsole with lamella grip technology has a self-cleaning profile

- Colour: black/grey
- Sole Thickness (cleated outsole) d_1 $\geq 5.5 \text{ mm}$
- Sole Thickness (cleat height) d_2 $\geq 4.5 \text{ mm}$
- Abrasion resistant acc. to EN ISO 20345: $< 110 \text{ mm}^3$
- Slight ribbed tread in the joint area
- Resistant to hot contact: Symbol **HRO**

- 2.2.23 Cover toe cap
Abrasion resistant TPU over cap with double seam groove
Colour: black.

2.3 Whole Footwear

- | | | | |
|--|----------------|--|-------------------|
| 2.3.1 Slip Resistance: | | | |
| acc. to EN ISO 20345: | given | | symbol SRC |
| 2.3.2 Heat insulation of sole complex (temp. increase) | | | |
| acc. to EN ISO 20345: | ≤ 21.0 °C | | symbol HI |
| 2.3.3 Cold insulation of sole complex (temp. degrease) | | | |
| acc. to EN ISO 20345: | ≤ 7.0 °C | | symbol CI |
| 2.3.4 Energy absorption | | | |
| acc. to EN ISO 20345: | ≥ 30 Joule | | (symbol E)* |
| 2.3.5 Water resistance | | | |
| acc. to EN ISO 20345: | 300,000 cycles | | symbol WR |
| 2.3.6 Resistance to hot contact (outsole) | | | |
| acc. to EN ISO 20347: | no cracks | | symbol HRO |
| 2.3.7 Resistance to fuel oil | | | |
| acc. to EN ISO 20345.: | given | | (Symbol FO)* |
| 2.3.8 ESD-capable | | | |
| according to EN 61340-5-1 | given | | “yellow ESD” |
| 2.3.9 Weight per boot (UK 8): | 810 g ± 5% | | |

*) Included in S3

3. Quality Assurance

When placing an offer, the producer has to submit a written proof that he has the technical precondition to produce waterproof and breathable boots according to the issued specifications. Among other things, according test certificates are to be submitted.

3.1 Waterproofness

3.1.1 Welding seams

After each 50th pair and/or after each disturbance of the producing process, all welded seams should be checked using an imperviousness testing device.

The welding seam must withstand a test pressure of 1 bar for at least 5 minutes. The test report should be made available on demand.

3.1.2 The imperviousness of the shoe

The imperviousness has to be proved with the walking simulator. The existence of this text device has to be shown when submitting the offer.

During the test, the boots have to withstand at least 300,000 cycles without water coming in.

Within the production period, at least 1 pair of shoes is to be tested each week and the results are to be shown on demand.

In addition, further imperviousness tests which correspond to the latest developments in technology can be carried out during production (e.g. test centrifuge) for assessment.

3.2 Other requirements

- 3.2.1 The manufacturer must be certified according to **EN ISO 9001:2015** (Quality Management System) and **EN ISO 14001:2009** (Environmental Management System), and a certification should be submitted with the quotation.
- 3.2.2 The manufacturer must guarantee at the time of submitting his quotation that the boots are manufactured in accordance with the latest human ecological limiting values, for example that the leather used is free of all toxic substances such as PCP, AZO - dies and Chromium-VI.
- 3.2.3 Quality certificates of the manufacturer should be produced on demand for the materials used when the boots are being delivered.
- 3.2.4 Every shoe has to be equipped with a durable, hardwearing and legible ironing label containing company specific data as serial number, size and production site. It is a unique and clear mark of each shoe through which tracing back the shoes and identification is guaranteed in the production company as well as afterwards. The included code number is given to each shoe uniquely. Additionally, the identical labels of both shoes are visibly put onto the outside of the shoebox. Furthermore, the shoebox has to be equipped with an according EAN 13 Code.

4. Service quotation

- 4.1 The manufacturer should guarantee a repair service within 10 working days.