PFI
Germany

Basis of certification

2109191-79-86-02

No. basis of certification:	2109191-79-86-02
Issue date:	15.10.2021
contracting authority:	HAIX SCHUHE Produktions- und Vertriebs GmbH Auhofstraße 10 DE – 84048 Mainburg
Test objekt	Footwear for firefighters according DIN EN 15090 Safety footwear with resistance to chain saw cutting according to EN ISO 17249 Safety footwear according to EN ISO 20345
Type :	Fire 011 LS 530 with cut protection with / without orthopedic finish 25 mm with / without orthopedic insocks
No of certificate:	2109191-02-86
Applied standards:	DIN EN ISO 15090:2012 (EN 15090:2012) DIN EN ISO 17249:2014 (EN ISO 17249:2013+AC 2014) DIN EN ISO 20344:2013 (EN ISO 20344:2011) DIN EN ISO 20345:2012 (EN ISO 20345:2011)
Notified body:	Prüf- und Forschungsinstitut Pirmasens e.V. Marie-Curie-Str. 19 66953 Pirmasens

Other applicable documents:

No.	expertises	Institut	testing of:	requirement
/*1	2102815-01-20-01	PFI	Bond strength	passed
/*2	2102815-02-20-01	PFI	Penetration resistance	passed
/*3	2102815-03-20-01	PFI	Resistance of sole complex to contac	passed
/*4	2010204-01-20-01a	PFI	Impact resistance	passed
/*5	2010204-02-20-01	PFI	Flame resistance	passed
/*6	2008379-01/07-20-01a	PFI	Basetest	passed
/*7	2008379-06_08-20-01a	PFI	Radiant heat	passed
/*8	2007050-22-20-01	PFI	Resistance to cuttung	passed
/*9	1801213-01-00-01/02c	PFI	Sohled Safety T93 BC, Fb. beige	passed
/*10	1802771-01-00-01a	PFI	Sohled Safety T93 BC, Fb. beige	passed
/*11	1809465-01-00-01	PFI	Gore Collar/Tongue., black	passed
/*12	1800406-01-00-01/09	PFI	More Season Ultimate, grey	passed
/*13	21276546_001-_006	TÜV	Basetest	passed
/*14	21245479_001	TÜV	Steel toe cap, Flecksteel 1130	passed
/*15	21246532_002	TÜV	ELS Jomo, SAFETY	passed
/*16	60247312 001	TÜV	ELS Haix CO	passed
/*17	21282656 001	TÜV	PES-Profil Filet (Dorado)	passed
/*18	1604-1/18	Mirta Control	Schlupfleder, black	passed
/*19	190072-1	FILK	Wapro Cool 2,5-2,7mm black	passed
/*20	21276546_002	TÜV	Basetest	passed
/*21	21276546_006	TÜV	Basetest	passed
/*22	2102815-04-20-01	PFI	Cut protection	passed
/*23	K-EU 2020/9365-01	KWF	Cut protection	passed
/*24	2106112-01/02-20-01	PFI	CI	passed

Description of Type	
Type	Fire 011 LS 530 with cut protection
Size range	EU 36 - 50 / UK 3,5 – 14,5 / Mondo 232- 322
Category / Protection funktion	DIN EN 15090: F2A, HI3, CI, CR, SRC + Piktogramm DIN EN ISO 20345: S3, WR, HI, CI, CR, HRO, SRC DIN EN ISO 17249 : A, E, P, HI, CI, WR, WRU, HRO, CR, FO, SRC + Piktogramm Schutzniveau Klasse 2
Design	D
Colour	black
Picture	  Fire Flash Gamma
Outsole	Rubber Shell outsole Schomburg & Graf, 011 Art. 530 black/blue with Haix®MSL PUR System as midsole
Anti pentration insert	Steel insert, Jafra S204
ToeCap	Steel toe cap, Flecksteel 1130
Insole	Cellulose fibre board, Sohled Safety T93 BC, colour beige
Insock	a) Full insock, Jomo, SAFETY, Polyester-/viscose non-woven covered with polyamid (Cambrelle) col. grey b) Full insock, HAIX® CO-System (HAIX® Certified Orthopedic System) green foam rubber with grey cover, orthopedic finish with up to 25 mm EVA-wedge with 40°or 50° shore A
Max. orthopedic finish	Orthopedic finish, 25 mm in the whole sole area
Chain saw protective material	Aramid Regenerat, col. Yellow
Upper material	
Leather (2,5-2,7mm)	Wapro Cool 2,5-2,7mm black
Tongue	
Leather (1,1-1,3mm)	Gore Collar and Tongue leather1,1 - 1,3mm, black
Lining Vamp and Quarter	
Leather (1,1-1,3mm)	Gore Collar and Tongue leather1,1 - 1,3mm, black
Lining Heel, Vamp and Quarter	
lining, vamp/quarter	Textile, More Season Ultimate, grey
lining, heel	Schlupfleder 1,1-1,3 mm, black
Lining Other	
lining, border	PES-Profil-Filet (Dorado), black

Classification and designs		DIN EN ISO 20345	4.0
Class I Class II		Class I	
Design		DIN EN ISO 20345	4.0
A/B/C/D/E		D	
Type		DIN EN 15090	4.3
Type 1 Type 2 Type 3		2	passed /*13
Requirements		DIN EN 15090	6
Types and classifications		DIN EN 15090	6.1
Permitted combinations 1) Type 1 class I and class II 2) Type 2 class I and class II 3) Type 3 class II		2	passed /*13
Design		DIN EN ISO 20345	5.2
Height of upper design D/E - Fire Flash Gamma		DIN EN ISO 20345	5.2.2
Size [France]	height [mm]	Size / Height [mm]	passed /*21
≤ 36	>255	36 / 275	
37-38	>260	42 / 290	
39-40	>270	50 / 315	
41-42	>280		
43-44	>290		
≥45	>300		
Heel area (Design B, C, D, E)		DIN EN ISO 20345	5.2.3
The heel area shall be closed. In this area of the upper shall be no holes other than to form seams. For design A class I footwear without closed heel area, the requirement is not applicable.		Size / passed 36 / yes 42 / yes 50 / yes	passed /*13

Whole footwear		DIN EN ISO 20345	5.3
sole performance		DIN EN ISO 20345	5.3.1
Construction		DIN EN ISO 20345	5.3.1.1
When an insole is used, it shall not be possible to remove it without damaging the footwear.	passed		passed /*13
Upper/outsole bond strength		DIN EN ISO 20345	5.3.1.2
The Upper/outsole bond strength shall be not less than 4,0 N/mm or 3,0 N/mm If there is tearing of the material	Size 36 42 50	[N/mm] 6,7 6,1 6,3	passed /*1/21
Specific ergonomic features		DIN EN ISO 20345	5.3.4
The specific ergonomic features are fullfilled if all questions are answerd with "yes"	passed [yes/no]		passed /*13
1) Is the inside surface of the footwear free from rough, sharp or hard areas that caused you irritation or injury?	yes		
2) Is the footwear free of features that you consider make wearing the footwear hazardous?	yes		
3) Can the fastening be adequately adjusted (if necessary)?	yes		
4) Can the following activities be performed without problems?			
4.1) Walking	yes		
4.2) Climbing stairs	yes		
4.3) Kneeling/crouching down	yes		
Dynamic footwear water penetration test - costumer requirement		EN ISO 20344	5.15.2
After 500 000 flexing cycles no water-penetration shall be observed	passed yes		passed /*6/13 **Symbol WR**
height of the water 30mm			

Resistance to inimical environments		DIN EN ISO 20345	6.2.3
Heat insulation of outsole complex - Jomo, SAFETY		DIN EN ISO 20345	6.2.3.1
Temperature increases on the upper insole HI ≤22 250°C for 40min	Size	[°C]	
	36	32,0	passed
	42	34,5	/*3/13/21
	50	30,0	**Symbol HI3**
After testing, the footwear shall conform to the requirements given in ISO 20344, Annex B	Size	fulfill B.2.1	
	36	passed	
	42	passed	
	50	passed	
Heat insulation of outsole complex - HAIX® CO-System		DIN EN ISO 20345	6.2.3.1
Temperature increases on the upper insole HI3 ≤42 250°C for 40min	Size	[°C]	
	36	29,5	passed /*21
	42	-	**Symbol HI3**
	50	26,5	
After testing, the footwear shall conform to the requirements given in ISO 20344, Annex B	Size	fulfill B.2.1	
	36	passed	
	42	-	
	50	passed	
Heat insulation of outsole complex - HAIX® CO-System with ortho. Finish		DIN EN ISO 20345	6.2.3.1
Temperature increases on the upper insole HI3 ≤42 250°C for 40min	Size	[°C]	
	36	22,5	passed /*21
	42	22,0	**Symbol HI3**
	50	-	
After testing, the footwear shall conform to the requirements given in ISO 20344, Annex B	Size	fulfill B.2.1	
	36	passed	
	42	passed	
	50	-	
Cold insulation of outsole complex - Jomo, SAFETY		DIN EN ISO 20345	6.2.3.2
The temperature decrease on the upper surface of the insole shall be not more than 10 °C. Except for the insock, the insulation shall be incorporated in the footwear in such a manner, that it cannot be removed without damaging the footwear	Size	decrease [°C]	passed /*24
	36	7,1	
	42	-	**Symbol CI**
	50	5,3	

Cold insulation of outsole complex - HAIX® CO-System		DIN EN ISO 20345	6.2.3.2
The temperature decrease on the upper surface of the insole shall be not more than 10 °C. Except for the insock, the insulation shall be incorporated in the footwear in such a manner, that it cannot be removed without damaging the footwear	Size 36 42 50	decrease [°C] 4,5 - 4,0	passed /*13 **Symbol CI**
Cold insulation of outsole complex - HAIX® CO-System with orthopedic fi		DIN EN ISO 20345	6.2.3.2
The temperature decrease on the upper surface of the insole shall be not more than 10 °C. Except for the insock, the insulation shall be incorporated in the footwear in such a manner, that it cannot be removed without damaging the footwear	Size 36 42 50	decrease [°C] 2,5 3,0 -	passed /*13/20 **Symbol CI**
Radiant heat		EN 15090	6.3.2
The temperature increase on for each material combination must be egual or below 24°C. After testing the shoes must comply with the criteria as shown in B.2.2.	Area Collar Upper Reflector Vamp Closure system visual	ΔT [°C] 0,8 1,0 1,6 0,6 0,8 passed	passed /*21
Flame resistance - Fire Flash Gamma		EN 15090	6.3.3
The footwear shall neither flame for more than 2s (after-flame time) nor glow more than 2 s (after-glow time). After testing, the footwear shall conform to Annex B.2.3.	Area: Burning [s] : glowing [s] : conform to B2.3	all Parts 0 0 ja	passed /*20

Slip resistance requirement			DIN EN ISO 20345	5.3.5
Ceramic tile floor with sodium lauryl sulphate (NaLS) solution			DIN EN ISO 20345	5.3.5.2
Requirements	Coefficient	Size	A/B	
ISO 20344:2011	of friction	36	0,37/0,38	passed /*13
A (forward heel slip)	≥ 0,32	42	0,38/0,38	**Symbol SRA**
B (forward flat slip)	≥ 0,28	50	0,35/0,42	
steel floor with glycerine - SRB			DIN EN ISO 20345	5.3.5.3
Requirements	Coefficient	Size	C/D	
ISO 20344:2011	of friction	36	0,15/0,20	passed /*13
C (Ebene)	≥ 0,18	42	0,13/0,18	**Symbol SRB**
D (Ferse)	≥ 0,13	50	0,17/0,18	
SRA and SRB passed - SRC			DIN EN ISO 20345	5.3.5.4
The requirements for SRC are considered fulfilled if the slip resistance for SRA and SRB are passed.		SRA and SRB passed: yes SRC:	passed	passed /*13 **Symbol SRC**
Energy absorption of seat region - Jomo, SAFETY			DIN EN ISO 20345	6.2.4
The energy absorption of the seat region shall be not less than 20 J.		Size 36 42 50	[J] 29/29 23/24 22/21	passed /*13 **Symbol E**
Energy absorption of seat region - HAIX® CO-System			DIN EN ISO 20345	6.2.4
The energy absorption of the seat region shall be not less than 20 J.		Size 36 42 50	[J] - 42/41 -	passed /*13 **Symbol E**
Energy absorption of seat region - HAIX® CO-System with orthopedic Finish			DIN EN ISO 20345	6.2.4
The energy absorption of the seat region shall be not less than 20 J.		Size 36 42 50	[J] 73/75 76/74 75/72	passed /*20 **Symbol E**

Penetration resistance		DIN EN ISO 20345	6.2.1
Determination of penetration force		DIN EN ISO 20345	6.2.1.1
Metallic anti-penetration force		DIN EN ISO 20345	6.2.1.1.1
The force required to penetrate the sole unit shall be not less the 1 100 N.	Size	[N]	
	36	1245	passed /*6/13
	42	1131	**Symbol P**
	50	1328	
Construction		DIN EN ISO 20345	6.2.1.2
The penetration-resistant insert shall be built into the bottom of the shoe in such a manner that it cannot be removed without damaging the footwear. Except for non-metallic inserts that also function as an insole, the insert shall net lie above the flange of the safety toecap and shall not be attached to it.	Size	applies [yes/no]	passed /*13
	36	yes	
	42	yes	
	50	yes	
Dimensions		DIN EN ISO 20345	6.2.1.3
Maximum distance between the feather edge of the last and the edge of the insert is: Edge max. 6,5 mm Heel area max. 17,0 mm No more than three holes with a diameter of 3 mm are allowed. The holes shall not lie in the shaded area 1 see ISO 20344 figure 13.	Size	Edge [mm]	passed /*13
	36	5,0	
	42	5,0	
	50	6,5	
	Size	Heel [mm]	
	36	7,0	
	42	7,0	
	50	6,0	
	Size	holes [passed/fail]	
	36	passed	
	42	passed	
	50	passed	

Anti penetration insert		EN 12568	6.0
Flexing resistance of anti-penetration inserts		EN 12568	6.2.2
No defects shall be vissible after flexing the anti-penetration insert for $1x10^6$ times.	sample	defect [yes/no]	passed /*13
	1-left	no	
	1-right	no	
	2-left	no	
	2-right	no	
	3-left	no	
	3-right	no	
corrosion resistance of anti-penetraton inserts		EN 12568	6.2.1.5.1
The anti-penetration inserts shall not have more than three areas of corrosion, none of which shall be more than 2 mm in any direction.	Sample/area	corrosion [mm]	passed /*13
	_1/1	0	
	_1/2	0	
	_1/3	0	
	_2/1	0	
	_2/2	0	
	_2/3	0	
	_3/1	0	
	_3/2	0	
	_3/3	0	

Toe protection — DIN EN ISO 20345 — 5.3.2

General — DIN EN ISO 20345 — 5.3.2.1

Removal of the toecaps shall not be possible without damaging the footware. The edge covering shall extending from the back edge to the toecap to at least 5mm beneath it and at least 10mm in the oposite direction. Scuff-resistant coverings for the toe region shall be not less than 1 mm in thickness.

Size	Passed [yes/no]
36	yes
42	yes
50	yes

passed /*13

Internal length of the toecaps — DIN EN ISO 20345 — 5.3.2.2

The internal toecap length shall be in accordance with the following table.

Size [Franz Stich]	length [mm]
≤ 36	34
37-38	36
39-40	38
41-42	39
43-44	40
≥45	42

Size	length [mm]
36	39,0
42	40,0
50	43,0

passed /*13

Impact resistance - Jomo, SAFETY — DIN EN ISO 20345 — 5.3.2.3

The clearance under the toecap at the moment of impact shall be in accordance with the following table.
The toecap shall not develop any cracks which go through the material.

Size [Franz Stich]	length [mm]
≤ 36	12,5
37-38	13
39-40	13,5
41-42	14
43-44	14,5
≥45	15

Size	clearance [mm]
36	16,0
42	17,5
50	19,0

passed /*4/20

Impact resistance - HAIX® CO-System			DIN EN ISO 20345	5.3.2.3
The clearance under the toecap at the moment of impact shall be in accordance with the following table. The toecap shall not develop any cracks which go through the material.		Size	clearance [mm]	passed /*6/13
		36	17,0	
		42	17,5	
		50	20,5	
Size [Franz Stich]	length [mm]			
≤ 36	12,5			
37-38	13			
39-40	13,5			
41-42	14			
43-44	14,5			
≥45	15			

Impact resistance - HAIX® CO-System with orthopedic finish			DIN EN ISO 20345	5.3.2.3
The clearance under the toecap at the moment of impact shall be in accordance with the following table. The toecap shall not develop any cracks which go through the material.		Size	clearance [mm]	passed /*13
		36	16,5	
		42	17,5	
		50	20,5	
Size [Franz Stich]	length [mm]			
≤ 36	12,5			
37-38	13			
39-40	13,5			
41-42	14			
43-44	14,5			
≥45	15			

Compression resistance of safety footwear - Jomo, SAFETY			DIN EN ISO 20345	5.3.2.4
The clearance under the toecap at a compression load of 15±0,1 kN shall be in accordance with the follwoing table.		Size	clearance [mm]	passed /*6/13
		36	13,0	
		42	19,0	
		50	18,5	
Size [Franz Stich]	clearance [mm]			
≤ 36	12,5			
37-38	13			
39-40	13,5			
41-42	14			
43-44	14,5			
≥45	15			

Compression resistance - HAIX® CO-System		DIN EN ISO 20345	5.3.2.4
The clearance under the toecap at a compression load of 15±0,1 kN shall be in accordance with the follwoing table.		Size / clearance [mm]: 36 / 15,5; 42 / 19,0; 50 / 17,5	passed /*6/13
Size [Franz Stich]	clearance [mm]		
≤ 36	12,5		
37-38	13		
39-40	13,5		
41-42	14		
43-44	14,5		
≥45	15		

Compression resistance - HAIX® CO-System with orthopedic finish		DIN EN ISO 20345	5.3.2.4
The clearance under the toecap at a compression load of 15±0,1 kN shall be in accordance with the follwoing table.		Size / clearance [mm]: 36 / 14,0; 42 / 17,5; 50 / 19,0	passed /*20
Size [Franz Stich]	clearance [mm]		
≤ 36	12,5		
37-38	13		
39-40	13,5		
41-42	14		
43-44	14,5		
≥45	15		

Electrical properties	DIN EN ISO 20345	6.2.2 / 6.6
Footwear shall be conform to all EN 15090 6.6.2 or DIN EN ISO 20345 6.2.2.2		
Antistatic footwear - Jomo, SAFETY	DIN EN ISO 20345	6.2.2.2
Measured in accordance with ISO 20344, 5.10, after conditioning in a dry and wet atmosphere, the electrical resistance shall be for both conditions above 100 kΩ and less than or equal to 1 000 MΩ	dry atmosphere Size / resistance [Ω] 36 $4{,}2\times10^{8}$ 42 $1{,}8\times10^{8}$ 50 $6{,}6\times10^{8}$ wet atmosphere Size / resistance [Ω] 36 $2{,}7\times10^{7}$ 42 $2{,}2\times10^{7}$ 50 $5{,}0\times10^{8}$	passed /*13 **Symbol A**
Antistatic footwear -HAIX® CO-System	DIN EN ISO 20345	6.2.2.2
Measured in accordance with ISO 20344, 5.10, after conditioning in a dry and wet atmosphere, the electrical resistance shall be for both conditions above 100 kΩ and less than or equal to 1 000 MΩ	dry atmosphere Size / resistance [Ω] 36 $4{,}9\times10^{8}$ 42 $1{,}1\times10^{7}$ 50 $6{,}3\times10^{6}$ wet atmosphere Size / resistance [Ω] 36 $1{,}9\times10^{8}$ 42 $1{,}9\times10^{8}$ 50 $2{,}2\times10^{8}$	passed /*6/13 **Symbol A**
Antistatic footwear - HAIX® CO-System with orthopedic finish	DIN EN ISO 20345	6.2.2.2
Measured in accordance with ISO 20344, 5.10, after conditioning in a dry and wet atmosphere, the electrical resistance shall be for both conditions above 100 kΩ and less than or equal to 1 000 MΩ	dry atmosphere Size / resistance [Ω] 36 $5{,}6\times10^{6}$ 42 $7{,}1\times10^{6}$ 50 $4{,}5\times10^{6}$ wet atmosphere Size / resistance [Ω] 36 $2{,}4\times10^{6}$ 42 $3{,}3\times10^{6}$ 50 $1{,}7\times10^{6}$	passed /*20 **Symbol A**

Zipper		EN 15090	6.8
Zipper construction		EN 15090	6.8.1
The zipper shall have an interlocking mechanism.	applies [yes/no]: yes		passed /*13
Zipper (slide fastener) puller attachment strength		EN 15090	6.8.2
Each recorded value of the attachment strength of the puller shall be greater than 250 N.	Size	Force [N]	passed /*13
	1	621	
	2	784	
	3	656	
Zipper (slide fastener) lateral strength		EN 15090	6.8.3
each recorded value of the lateral strength shall be greater than 500 N.	Size	Force [N]	passed /*13
	1	1217	
	2	1031	
	3	1409	
Toe protection cap		EN 12568	4.2.1
Internal length of the toecaps		EN 12568	4.2.2.1
The internal toecap length shall be in accordance with the following table.	Size	length l/r [mm]	passed /*14
	5	37/37	
	6	40/39	
	7	41/41	
	8	43/43	
	9	45/45	
	10	43/43	
	11	43/43	
	12	44/44	
	13	44/45	
Width of the toecap flange		EN 12568	4.2.2.2
The width of the toecap flange must not be greater the 10 mm	Size	width l/r [mm]	passed /*14
	5	8/8	
	6	7/7	
	7	6/6	
	8	7/8	
	9	6/7	
	10	7/8	
	11	6/7	
	12	7/7	
	13	7/7	

Size [Franz Stich]	length [mm]
5	34
6	36
7	38
8	39
9	40
10	42

Impact resistance of toecap			EN 12568	4.2.2.3
The clearance under the toecap at the moment of impact shall be in accordance with the following table. The toecap shall not develop any cracks which go through the material.		Size	clearence l/r [mm]	passed /*14
		5	20,5/21,0	
		6	23,5/24,5	
		7	26,0/26,5	
		8	26,0/26,5	
Toecap size	clearance [mm]	9	26,5/27,0	
5	19,5	10	27,0/27,5	
6	20	11	28,5/28,5	
7	20,5	12	29,5/29,5	
8	21	15	30,0/29,5	
9	21,5			
10	22			

Preassure resistance of toecap			EN 12568	4.2.2.4
The clearance under the toecap at a compression load of 15±0,1 kN shall be in accordance with the following table.		Size	clearence l/r [mm]	passed /*14
		5	28,5/28,5	
		6	>30,0/>30,0	
		7	>30,0/>30,0	
		8	>30,0/>30,0	
Toecap size	clearance [mm]	9	>30,0/>30,0	
5	24,5	10	>30,0/>30,0	
6	25	11	>30,0/>30,0	
7	25,5	12	>30,0/>30,0	
8	26	13	>30,0/>30,0	
9	26,5			
10	27			

Corrosion resistance of metal toe caps			EN 12568	5.3.2.5.1
The metal toe caps shall not have more than three areas of corrosion, none of which shall be more than 2 mm in any direction.		Size/Area	clearence l/r [mm²]	passed /*14
		_8-1	0	
		_8-2	0	
		_8-3	0	
		_9-1	0	
		_9-2	0	
		_9-3	0	
		_10-1	0	
		_10-2	0	
		_10-3	0	

Upper Material - Wapro Cool 2,5-2,7mm, black			
Tear strength - two corner	DIN EN ISO 3377-2:2012		
The tear strength shall be at least 120 N.	tear strenght [N] 369		passed /*19
pH value	DIN EN ISO 4045		
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.	pH-value 3,85	pH-value Diff.-figure 0,45	passed /*19
Determination of substances soluble in dichloromethane	DIN EN ISO 4048:2018		
A maximum of 16% soluble substances may be contained.	[%] 14,4		passed /*19
Chromium (VI)-content	DIN EN ISO 17075-2		
Chromium (VI)-content shall be not more than 3mg/kg.	Chromium VI content [mg/kg] not detectable		passed /*19
Upper — Water penetration and absorption	DIN EN ISO 5403-1:2012		
The water penetration, expressed as the mass increase of the absorbent cloth after 360 min, shall not be higher than 0,2 g and the water absorption shall not be higher than 20 %.	mass [g] 0	absorbtion [%] 7,09	passed /*19
Water vapour permeability and coefficient	DIN EN ISO 20345		5.4.6
The Water vapour permeability shall be at least ≥ 5 mg/cm²h The water vapour absorption is needed for calculation The water vapour coefficient shall be at least 15,0 mg/cm²	water vapour permeability [mg/cm²h] 7,2 water vapour absoption [mg/cm²] - water vapour coefficient [mg/cm²] 68,2		passed /*19

Collar-/Tongueleather Gore 1,1-1,3 mm, black			5.5
Determination of substances soluble in dichloromethane		EN ISO 4048	
A maximum of 16% soluble substances may be contained.	[%] 7,9		passed /*11
Determination of substances soluble in water		EN ISO 4048	
A maximum of 2% soluble substances may be contained.	[%] 0,08		passed /*11
Determination of Chromiumoxid content		EN ISO 4048	
It shall be ≥ 2,5% Chromiumoxid	[%] 4,0		passed /*11
Thickness			5.7.1
Informative (1,1-1,3mm)	thickness [mm] 1,16		passed /*11
Tear strength		DIN EN ISO 20345	5.6.1
The tear strenght for leather shall be at least 30N in both directions. Coated fabric and textiles shall have at least 15 N in both directions	tear strength leather [N] 156	tear strength textile [N] -	passed /*11
Tensile testing		DIN EN ISO 3376 / PFI 00/1125	
Maximum tensile strength a ≥ 15 N/mm²	Result 16,9 N/mm²		passed /*11
elongation a ≤ 20,0 % Deh.bei 2N/mm²	Result 15 %		
Stitch tear strength		DIN EN ISO 23910 / PFI 00/1128	
The stitch tear strength shall be at least 40 N/mm	Result [N/mm] 106		passed /*11
Tear strength		i.A. EN ISO 3377-1 / DIN EN 13571 / PFI 00/1119	
The tear strength shall be at least 35 N/mm	Result [N/mm] 73		passed /*11
Water vapour permeability and coefficient		DIN EN ISO 20345	5.4.6
The Water vapour permeability shall be at least ≥ 5 mg/cm²h	water vapour permeability [mg/cm²h] 10,2		passed /*11
The water vapour absorption is needed for calculation	water vapour absoption [mg/cm²] 7,9		
The water vapour coefficient shall be at least 15,0 mg/cm²	water vapour coefficient [mg/cm²] 89,1		

Water resistance of flexible leather	i.A. DIN EN ISO 5403-1 / PFI 00/1141		
	Result		
compression 5%	5,0%		passed /*11
penetration time ≥120min	≥120min		
water absorption 120 min ≤20%	20,0%		
Determination of flex resistance	DIN EN ISO 5402-1 / DIN EN 13512 / PFI 00/1137		5.4.4
	Result		
dry a 100000x	no changes		passed /*11
no co cracks			
Adhesion of finish	DIN EN ISO 11644 (IUF 470)		5.4.4
	Result		
dry a ≥ 2,0 N/10mm	2,04		passed /*11
staining of the felt	EN ISO 11640		
Colour fastness to rubbing of th front:	Result		
staining of the felt	grey scale rating		passed /*11
dry 20x ≥3	4-5		
wet 20x ≥3	4		
pH 8 20x ≥3	3		
pH value	DIN EN ISO 20345		5.6.2
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.	pH-value	pH-value Diff.-figure	passed /*11
	4,0	-	
Chromium VI content	DIN EN ISO 20345		5.6.3
Chromium VI content shall be not more than 3mg/kg.	Chromium VI content [mg/kg] not detectable		passed /*11
Abrasion resistance (Martindale)	i.a. DIN EN ISO 12947-2 / DIN EN 13520		5.5.2
The lining shall not develop any holes before the following number of cycles has been performed:	holes dry	holes wet	passed /*11
dry 51 200 cycles	no hole	no hole	
wet: 12 800 cycles	no hole	no hole	

Lining - Textil, More Season Ultimate, grey		
Water vapour permeability and coefficient	DIN EN ISO 20345	5.4.6
The Water vapour permeability shall be at least ≥ 2 mg/cm²h The water vapour absorption is needed for calculation The water vapour coefficient shall be at least 20,0 mg/cm²	water vapour permeability [mg/cm²h] 7,1 water vapour absoption [mg/cm²] 1,7 water vapour coefficient [mg/cm²] 58,7	passed /*12
mass per unit area of nonwowens	DIN EN 12127	
Requirement: 380-440 g/m²	mass per unit area [g/m²] 409,1	passed /*12
Thickness	DIN EN ISO 5084	
Requirement: 0,85-1,15 mm	Thickness [mm] 1,58	passed /*12
Tear strength	DIN EN ISO 13937-2 / DIN EN 13571 / PFI 00/1123	
Requirement in direction against direction and "b" ≥ 15 N	name / strength [N] in 149,2 against 145,8 b 158,6	passed /*12
Fibre microscopy upper	DIN EN ISO 1833-1	
Informativ	Result 100% Polyamid	passed /*12
FTIR of the functional layer		
Front back	PU PTFE	passed /*12
Fibre microscopy - backside	DIN EN ISO 1833-1	
Informativ	Result 100% Polyamid	passed /*12
Fibre microscopy - inner layer	DIN EN ISO 1833-1	
Informativ	Result 100% Polyester	passed /*12
Abrasion resistance (Martindale) - Outside	DIN EN ISO 20345	5.5.2
The lining shall not develop any holes before the following number of cycles has been performed: dry 200 100 cycles wet: 70 100 cycles	 no holes no holes	passed /*12
Abrasion resistance (Martindale) - inside	DIN EN ISO 20345	5.5.2
The lining shall not develop any holes before the following number of cycles has been performed: wet: 50 000 cycles	 minor changes	passed /*12

Heel lining - Schlupfleder 1,1-1,3mm, schwarz		
Thickness	HRN EN ISO 2589:2016	5.7.1
informative (1,1-1,3mm)	thickness [mm] 1,25	passed /*18
Tensile testing	HRN EN ISO 3376:2012	
Maximum tensile strength a ≥ 20 N/mm²	Result 28,8 N/mm²	passed /*18
elongation a ≤ 20,0 % Deh.bei 2N/mm²	Result 8 %	
Tear strength	HRN EN ISO 3377:2012	
The tear strength shall be at least 40 N/mm	[N/mm] 59,2	passed /*18
Abrasion resistance	HRN EN ISO 20344-2012	
The lining shall not develop any holes before the following number of cycles has been performed:	result:	passed /*18
dry 51 200x no	no hole	
wet 25 600x holes	no hole	
Determination of flex resistance	HRN EN ISO 5402-1:2017	5.4.4
dry a 100000x	Result no changes	passed /*18
staining of the felt	HRN EN ISO 11640:2012	
Colour fastness to rubbing of th front: staining of the felt	Result grey scale rating	passed /*18
dry 20x ≥3	4-5	
wet 20x ≥3	4	
pH 8 20x ≥3	4	
Water vapour permeability and coefficient	HRN EN ISO 20344-2012	5.4.6
The Water vapour permeability shall be at least ≥ 5 mg/cm²h	water vapour permeability [mg/cm²h] 6,61	passed /*18
The water vapour coefficient shall be at least 15,0 mg/cm²	water vapour coefficient [mg/cm²] 59,4	
pH value	HRN EN ISO 4045:2018	5.6.2
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.	pH-value 3,5 / pH-value Diff.-figure 0,5	passed /*18
Chromium VI content	HRN EN ISO 17025-1:2017	5.6.3
Chromium VI content shall be not more than 3mg/kg.	Chromium VI conte:hromium VI content [mg/kg] not detectable	passed /*18
Determination of substances soluble in dichloromethane	EN ISO 4048	
A maximum of 16% soluble substances may be contained.	[%] 8,9	passed /*18

Other lining - PES-Profil-Filet (Dorado), black			
Tear strength	DIN EN ISO 20345		5.5.1
The tear strenght for leather shall be at least 30N in both directions. Coated fabric and textiles shall have at least 15 N in both directions	tear strength Textil [N] direction 1 18/22/18	tear strength Textil [N] direction 2 18/15/16	passed /*17
Abrasion resistance vamp and quarter lining	DIN EN ISO 20345		5.5.2
The lining shall not develop any holes before the following number of cycles has been performed: dry 25 600 cycles wet: 12 800 cycles	no holes no holes		passed /*17
Abrasion resistance lining at heel area	DIN EN ISO 20345		5.5.2
The lining shall not develop any holes before the following number of cycles has been performed: dry 51 200 cycles wet: 25 600 cycles	no holes no holes		passed /*17
Abrasion resistance - costumer requirement	DIN EN ISO 20345		5.5.2
The lining shall not develop any holes before the following number of cycles has been performed: dry 100 000 cycles wet: 50 000 cycles	no holes no holes		passed /*17
Water vapour permeability and coefficient	DIN EN ISO 20345		5.5.3
The Water vapour permeability shall be at least ≥ 5 mg/cm²h The water vapour absorption is needed for calculation The water vapour coefficient shall be at least 15,0 mg/cm²	water vapour permeability [mg/cm²h] 40,9/61,1/68,2 water vapour absoption [mg/cm²] - water vapour coefficient [mg/cm²] 327,4/488,5/545,6		passed /*17

Insole - Sohled Safety T93 BC, beige			
Thickness	DIN EN ISO 20345		
Requirement: at least 2,0mm	thickness [mm] 2,5		passed /*9
Water absorption and desorption	DIN EN ISO 20345		
The water absorption of the insole or insock shall be not less than 70 mg/cm²	absorbtion [mg/cm²] 78	desorbtion [%] 101	passed /*10
the water desorption shall be not less than 80 % of the water absorbed.			
Abrasion resistance - insole	DIN EN ISO 20345		
After 400 cylcles the sample shall be in the same condition as the refernce	same as reference		passed /*9

Outsole

Design		5.8.1	5.8.1
Outsole with a cleat height of less than 2,5 mm are regarded as un-cleated			
Thickness		DIN EN ISO 20345	5.8.1.1
The outsole can be composed of several layers. When measured in accordance with ISO 20344, 8.1.2, the outsole thickness, d1 and d3, shall fulfil the requirements: Non-cleated outsole class I und II $d_1 \geq 6$ mm Cleated outsole class I $d_1 \geq 4$ mm Cleated outsole class II $d_1 \geq 3$ mm $d_3 \geq 6$ mm see d_1 and d_3 in DIN EN ISO 20344, 8.1.2	size 36 42 50	d_1 [mm] 9,0 9,0 8,0	passed /*13
Cleated area		DIN EN 15090	6.7.1
The cleated area of the outsole shall be constructed in a way that no straight-lined groovings are covering the whole outsole	size 36 42 50	fulfilled [yes/no] yes yes yes	passed /*13
Cleat height		DIN EN 15090	6.7.2
The cleat hight shall be at d_2 at least be 3 mm	size 36 42 50	d_2 [mm] 5,0 5,0 5,0	passed /*13
Cleat height in the waist area		EN 15090	6.7.3
The outsole shall have traverse cleat with a height of at least 1,5 mm in the waist area.	Size 36 42 50	hight [mm] 3,0 3,0 2,5	passed /*13

Heel breast			EN 15090	6.7.4
The outsole shall have an inclined-breast heel. Distance "a" (the waist area) shall be at least 35mm, angle α shall be between 90° and 120° and the dimension "b" shall be at least 10 mm.		Size	Distance a [mm]	passed /*13
		36	55	
		42	63	
		50	76	
		Size	angle α [mm]	
		36	98	
		42	100	
		50	98	
		Size	Maß b [mm]	
		36	11	
		42	11	
		50	10	
Tear strength of outsole			DIN EN ISO 20345	5.8.2
Tear strength of outsole ≥ 8 kN/m		Size	Tear strength [kN/m]	passed /*13
		36	12,1	
		42	12,9	
		50	11,8	
Abrasion resistance			DIN EN ISO 20345	5.8.3
The relative volume loss shall be not grater than		size	loss [mm³]	passed /*13
		36	106	
		42	117	
		50	108	
density [g/cm³]	loss [mm³]			
>0,9	150			
≤ 0,9	250			
Flexing resistance			DIN EN ISO 20345	5.8.4
Footwear whose angle under the applied force of 30 N is lower than 45° from the horizontal is not subjected to the flexing test		size	angle [°]	passed /*13
		36	<45	
		42	<45	
		50	<45	

Flexing resistance	DIN EN ISO 20345	5.8.4
The cut growth shall be not greater than 4 mm before 30 000 flex cycles Spontaneous cracks are acceptable in the following circumstances a) The centre of the flexing area shall be assessed for cracking. Cracks under the toecap zone shall be ignored b) Superficial cracks up to 0,5 mm deep shall be ignored c) if cracks are not deeper than 1,5 mm, not longer than 4 mm and not more than five in number	not applicable as the angle is below 45°	n/a

Interlayer bond strength	DIN EN ISO 20345	5.8.6
The bond strength between the outer or cleated layer and the adjacent layer shall be not less than 4,0 N/mm. When there is tearing of the outsole layers and the bond between the outsole layers cannot be separated, the bond strength is passed	Größe / Trennkraft [N/mm] 36: 7,2* 42: 6,2* 50: 9,2* * Materialbruch ** Adhesionsbruch	passed /*13

Resistance to cutting	DIN EN ISO 20345	6.2.8.3
When tested in accordance with the method described in ISO 20344:2011, 6.14, the cut-resistant index (see EN 388) shall not be less than 2,5.	size / result 36: - 42: 4,9* 50: - *tested at material sample	passed /*8 **Symbol CR**

Resistance to hot contact	DIN EN ISO 20345	6.4.1
Rubber and polymeric outsole shall not melt and shall not develop any cracks when bent around the mandrel	size / fulfilled [yes/no] 36: yes 42: yes 50: yes	passed /*13 **Symbol HRO**

Resistance to fuel oil	DIN EN ISO 20345	6.4.2
The change in volume shall not be more than 12%. If the volume shrinks more than 1% or the increases in hardness by more than 10 Shore a hardness units, a further test piece shall be taken and testet in accordance with ISO 20344, 8.6.2 The cut growth shall be not greater than 6 mm before 150 000 flex cycles.	size / increase [%] 36: 4,6 42: 4,6 50: 4,2	passed /*13 **Symbol FO**

Insock - HAIX® CO-System			
Water absorption		DIN EN ISO 20345	5.7.3
The water absorbtion shall be at least ≥ 70 mg/cm²		adsorbtion [mg/cm²] 241/229/233	passed /*16
Water desorbtion		DIN EN ISO 20345	5.7.3
The water desorbtion shall be at least ≥ 80 %		desorbtion [%] 92/90/91	passed /*16
Abrasion resistance insock		DIN EN ISO 20345	5.7.4.2
The insock shall not develop any holes before the following number of cycles has been performed: dry 25 600 cycles wet: 12 800 cycles		dry after 240 000 cycles sample holes 1 no wet after 60 000 cycles sample holes 1 no	passed /*16
Thickness		DIN EN ISO 9073-2	5.7.1
Requirement: min 2,0 mm		Thickness [mm]	
Shore A 40°	tip	3,7/3,7	passed /*16
	ball area	3,9/3,9	
	hinge	22,0/21,6	
	heal area	29,6/29,5	
Shore A 50°	tip	3,7/3,7	
	ball area	3,8/3,8	
	hinge	22,4/22,8	
	heal area	28,9/28,9	

Insocks - Jomo, SAFETY		
Water absorption - Insock	DIN EN ISO 20345	5.7.3
The water absorbtion shall be at least ≥ 80 mg/cm² red new	adsorbtion [mg/cm²] water permeable	n/a
Water desorbtion - Insock	DIN EN ISO 20345	5.7.3
The water desorbtion shall be at least ≥ 70 % red new	desorbtion [%] water permeable	n/a
Abrasion resistance insock	DIN EN ISO 20345	5.7.4.2
The insock shall not develop any holes before the following number of cycles has been performed: dry 25 600 cycles wet: 12 800 cycles	dry after 25 600 cycles sample holes 1 no wet after 12 800 cycles sample holes 1 no	passed /*15
Abrasion resistance insock - costumer requirements	DIN EN ISO 20345	5.7.4.2
The insock shall not develop any holes before the following number of cycles has been performed: dry 25 600 cycles wet: 12 800 cycles	dry after 307 000 cycles sample holes 1 no wet after 25 000 cycles sample holes 1 no	passed /*15

Cut protection against hand held chain saws

Height of upper design D/E - Fire Flash Gamma	DIN EN ISO 17249	6.2
Size 36 lowest point ≥ 162 mm height of edge of shoe upper height of protective area	Hight [mm] 256,6 194	passed /*22

cut resistance	EN 381-3, 6.2.2; 6.2.3; 6.2.4	
The shoe must not be severed at a chain speed of 20m/s and a contact force of 30N for Class 1 vamp = Cut on vamp area throat = cut on throat area upper = cut on leg region	cut area vamp r s 42 vamp l s. 42 vamp l s. 36 vamp l s. 50 throat r s.42 throat l s.42 Upper r s.36 Upper l s.50	severed [yes/no] no no no no no no no no	passed /*23

Measurement of the protection area		DIN EN ISO 17249	6.3
The measured values for the positions A, L and C need to be conform with the requirements			passed /*23
		Gr 36	Maß [mm]
Size 36	A min 140 mm	A	190
	L min 162 mm	I	200
	C max 10 mm	C	0
		Gr. 42	Maß [mm]
Size 42	A min 140 mm	A	160
	L min 178 mm	I	210
	C max 10 mm	C	0
		Gr. 50	Maß [mm]
Size 50	A min 140 mm	A	170
	L min 192 mm	I	250
	C max 10 mm	C	0

Marking	DIN EN ISO 20345	7.0
Each item of safety footwear shall be clearly and permanently marked, e.g. by embossing or branding, with the following a) size b) manufacturer's identification mark c) manufacturer's type designation d) year and month of manufacture e) reference to this International Standard dd.h. EN 20345:2012 f) symbol(s) appropriate to the protection provided.	fulfilled [yes/no] yes	passed

Marking	DIN EN ISO 17249	7.0
Each item of safety footwear with resistance to chain saw cutting shall be clearly and permanently marked, e.g. by embossing or branding, with the following a) size b) manufacturer's identification mark c) manufacturer's type designation d) year and month of manufacture e) reference to this International Standard dd.h. EN ISO 17249:2013+AC:2014 f) symbol(s) appropriate to the protection provided g) pictogram, at a size of at least 30mm x 30mm	fulfilled [yes/no] yes	passed

Marking	EN 15090	8.0
Each item of footwear for firefighters shall be clearly and permanently marked, for example by embossing or branding, with the following: a) size b) manufacturer's identification mark c) manufacturer's type designation d) year and month of manufacture e) reference to this International Standard dd.h. EN 15090:2012 f) marking symbol(s) appropriate to the protection provided which is not covered by the symbol of the pictogram g) pictogram, at a size of at least 30x30mm F1A All normative requirements and the requirements for antistatic properties F1PA All normative requirements and the requirements for penetration resistance and for antistatic properties F1I All normative requirements and the requirements for electrical insulating properties F1PI All normative requirements and the requirements for penetration resistance and for antistatic properties F2A All normative requirements and the requirements for antistatic properties F2I All normative requirements and the requirements for electrical insulating properties F3A All normative requirements and the requirements for antistatic properties F3I All normative requirements and the requirements for electrical insulating properties	fulfilled [yes/no] yes	passed

Information to be supplied	DIN EN ISO 20345	8.0
Safety footwear shall be supplied to the shall be customer with the following information. All information unambiguous and shall include the following a) Name and full address of the manfaturer b) Reference to this International Standard c) Explanation of any pictograms, markings and levels of performance d) Basic explanation of the tests that have been applied to the footwear, if applicable e) Instructions for use: 1) tests to be carried out by the wearer before use, if required 2) fitting and how to put on and take off the footwear, if relevant 3) application (basic information on possible uses and, where detailed information is given, the source); 4) limitations of use 5) instructions for storage and maintenance with maximum periods between checks 6) instructions for cleaning and/or decontamination 7) obsolescence deadline or period of obsolescence; 8) if appropriate, warnings against problems likely to be encountered (modifications can invalidate the type approval, e.g. insock) 9) if helpful, additional illustrations, part numbers, etc f) Reference to accessories and spare parts, if relevant. g) Type of packaging suitable for transport, if relevant part numbers, etc f) Reference to accessories and spare parts, if relevant. g) Type of packaging suitable for transport, if relevant	fulfilled [yes/no] yes	passed

Information to be supplied	DIN EN ISO 17249	8.1
Safety footwear with resistance to chain saw cutting shall be supplied to the shall be customer with the following information. All information unambiguous and shall include the following a) Name and full address of the manfaturer b) Reference to this International Standard c) Explanation of any pictograms, markings and levels of performance d) Basic explanation of the tests that have been applied to the footwear, if applicable e) Instructions for use: 1) tests to be carried out by the wearer before use, if required 2) fitting and how to put on and take off the footwear, if relevant 3) application (basic information on possible uses and, where detailed information is given, the source); 4) limitations of use 5) instructions for storage and maintenance with maximum periods between checks 6) instructions for cleaning and/or decontamination 7) obsolescence deadline or period of obsolescence; 8) if appropriate, warnings against problems likely to be encountered (modifications can invalidate the type approval, e.g. insock) 9) if helpful, additional illustrations, part numbers, etc f) Reference to accessories and spare parts, if relevant. g) Type of packaging suitable for transport, if relevant part numbers, etc f) Reference to accessories and spare parts, if relevant. g) Type of packaging suitable for transport, if relevant	fulfilled [yes/no] yes	passed

Information to be supplied	DIN EN 15090	9.1
Footwear for firefighters shall be supplied to the customer with information written at least in the official language(s) of the state/country of destination. All information shall be unambiguous. The following inform. shall be given: a) name and full address of the manufacturer and or the manufacturer's authorized representative; b) number of the standard; c) explanation of any pictograms, markings and levels of performance. A basic explanation of the tests that have been applied to the footwear, if applicable; d) instructions for use: 1) checks to be carried out by the wearer before use, if required; 2) fitting; how to put on and take off the footwear, if relevant; 3) application; basic information on possible uses and, where detailed information is available, the source; 4) limitations of use (e.g. temperature range); 5) instructions for storage and maintenance, with maximum periods between maintenance checks (if important, drying procedures to be stated); 6) instructions for cleaning and/or decontamination; - obsolescence deadline or period of obsolescence; 7) if appropriate, warnings against problems likely to be encountered 8) if helpful, additional illustrations, part numbers, etc.; e) reference to accessories and spare parts, if relevant; f) the type of packaging suitable for transport, if relevant; g) information on electrical properties in accordance with EN ISO 20345:2011; h) information on insocks in accordance with EN ISO 20345:2011; i) information on chemical resistance of footwear in accordance with EN 13832-3:2006; j) information on assessment of the state of footwear for the wearer.	fulfilled [yes/no] yes	passed

Protection against chain saw cutting	DIN EN ISO 17249	8.2
Each pair of safety footwear with resistance to chain saw cutting shall be supplied with a leaflet containing the substance of the wording according to EN ISO 17249:2013 section 8.2	fulfilled [yes/no] yes	passed
Penetration resistance	DIN EN ISO 17249	8.3
Each pair of safety footwear with resistance to chain saw cutting shall be supplied with a leaflet containing the substance of the wording according to EN ISO 17249:2013 section 8.3	fulfilled [yes/no] yes	passed
Information electrical properties	DIN EN ISO 20345	8.2
Each pair of antistatic or conductive footwear shall be supplied with a leaftlet containing a defined wording.	fulfilled [yes/no] yes	passed
Insocks	DIN EN ISO 20345	8.3
If the footwear is supplied with a removable insock, it should be made clear in the leaflet that testing was carried out with the insock in place. A warning shall be given that the footwear shall only be used with the insock in place and that the insock shall only be replaced by a comparable insock supplied by the original footwear manufacturer. A warning shall be given that fitting an insock can affect the safety properties of the footwear.	fulfilled [yes/no] yes	passed

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Notified Body according to
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ID: 0193

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