

PERFORMANCE PROTECTIVE FOOTWEAR



workMaster™
by RESPIREX

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THE WORKMASTER™ STORY

THE HIGHEST SPECIFICATIONS

Our category leading dielectric footwear is used globally to protect high voltage workers and our Hazmax™ boots are used wherever people work with dangerous or aggressive chemicals.

Workmaster™ boots are manufactured at our automated state of the art footwear factory based in Crawley (in the United Kingdom). The injection moulding manufacturing process guarantees a seamless, leak-free construction. This modern high-volume production facility enables the manufacture of different types and styles of boots within the same operating run, giving the flexibility to meet rapidly changing market demands.

Workmaster™ is a division of Respirex™, a leading supplier of personal protective solutions, specialising in the design and manufacture of high-performance chemical, particulate and respiratory protective clothing.

www.respirex.com

OUR BOOT FEATURES

All of our boots are approved to either EN ISO 20345:2011 or EN ISO 20347:2012 depending on their application. These icons are used throughout the catalogue to highlight the specific features and benefits of each boot.



S5 Category Safety Boot

Complies with the requirements for safety footwear in EN ISO 20345:2011 and additionally includes a closed set region, antistatic properties energy absorption of seat region, resistance to fuel oil, penetration resistance and a cleated out-sole.



S4 Category Safety Boot

Complies with the requirements for safety footwear in EN ISO 20345:2011 and additionally includes a closed set region, antistatic properties energy absorption of seat region and resistance to fuel oil.



SB Category Safety Boot

Complies with the requirements for safety footwear in EN ISO 20345:2011.



OB Category Occupational Footwear

Complies with the requirements for occupational footwear in EN ISO 20347:2012.



Energy Absorbing Heel

Provides a minimum of 20J cushioning at the heel, reducing the risk of fatigue and injury to joints and spine.

Boot Marking: E



Cut Resistant

Resistance to repeated cutting strokes from a sharpened blade (to the method defined in EN 388). Achieves a result of class 4 (minimum pass is 2.5).

Boot Marking: CR



Toecap and Mid-sole

Epoxy coated steel toecap fitted tested for 200J impact resistance and 15kN compression. Stainless steel penetration resistant mid-sole fitted with penetration resistance greater than or equal to 1100N.

Boot Marking: P



Toecap

Epoxy coated steel toecap fitted tested for 200J impact resistance and 15kN compression.



Fuel and Oil Resistant

The outer sole is resistant to oil, ensuring the working life of the boot won't be compromised if used in oily environments. The test involves immersion in oil for 22 hours after which the sole is checked for excessive swelling, shrinkage or increased hardness.

Boot Marking: FO



Cold Insulation

The thermal insulation properties of the boot ensure that the temperature decrease inside a boot at 23°C when placed in a cold chamber at -17°C is less than 10°C after 30 minutes when measured at the upper surface of the insole.

Boot Marking: CI



Slip Resistant SRA

Tested and approved for resistance to slip on a ceramic tile floor coated with a dilute soap solution of sodium lauryl sulphate (NaLS). The test measures forward slip on the heel and with the boot flat to the floor.

Boot Marking: SRA



Slip Resistant SRC

Tested and approved for resistance to slip on a ceramic tile floor coated with a dilute soap solution of sodium lauryl sulphate (NaLS). The test measures forward slip on the heel and with the boot flat to the floor.

Boot Marking: SRC



High Voltage

Dielectric boots that comply with the EN50321 standard for electrically insulating footwear.



Hot Contact

The sole has been tested for contact with a hot metal surface at 300°C for 60 seconds.

Boot Marking: HRO



Heat Resistant

Approved to EN15090:2012 F3A, the fire fighter boot standard.



Antistatic

The electrical resistance of the boot falls between 100 kΩ and 1000 MΩ ensuring that any build up of static charge by the wearer will be conducted safely to earth.



Electro-Static Discharge

This boot is suitable for use in Electrically Protective Areas (EPA) conforming to EN 61340-5. The electrical resistance falls between 100 kΩ and 35 MΩ.



Chemical Protection

EN 13832-3: 2018 approval for footwear highly resistant to chemicals.

FOOD BOOTS

Footwear for the food industry needs to combine comfort, low temperature performance and slip resistance. To ensure a long working life boots also need to be resistant to the fats and acids commonly found in food production, together with popular cleaning and disinfecting agents.



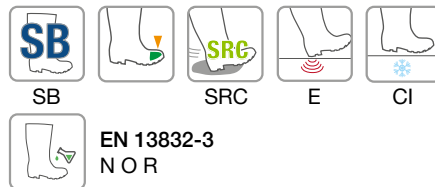
FOODLITE

An exceptionally lightweight food industry boot designed for wearer comfort and low-temperature performance.

- Lightweight for increased wearer comfort
- Superb low temperature flexibility down to -40°C
- Chemically resistant boot certified to EN 13832-3:2018 and resistant to common food industry chemicals, including cleaning, disinfecting and sanitising agents
- Slip resistant moulded sole (SRC)
- Ergonomic cushioned insole (removable & machine washable) for greater wearer comfort
- Environmentally friendly PVC and Halogen free construction
- Biodegradable & Phalate free



EN 20345



Available in white with a blue sole, or solid blue

CRYOLITE & THE ENVIRONMENT

PVC & Halogen Free - Our Cryolite boot range contains no Halogens (Halogens include Chlorine, Fluorine, Bromine and Iodine), commonly used in the production of PVC boots. When halogens reach their flammable temperature, they release dangerous plumes of toxic gases, such as hydrogen chloride.

Phthalate Free - Cryolite boots are also phthalate free (these are mainly used as plasticizers, primarily to soften PVC) - Research suggests that Phthalates may be endocrine disruptors that can interfere with hormone systems and may cause cancerous tumours, birth defects, and other developmental disorders.

Biodegradable Material - The Cryolite material will degrade in UV light or by natural oxidation or ozonolysis over a number of years (steel toe caps and mid-soles, if fitted, will not degrade, but pose no risk to the environment).

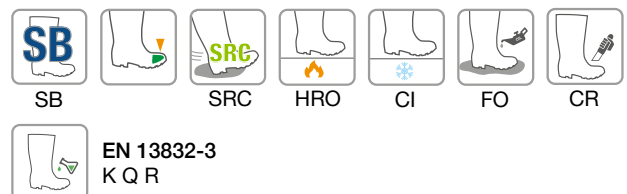


FOODMAX

Designed to be resistant to the chemicals used in the food processing industry and maintain its flexibility in temperatures as low as -40°C, the Foodmax boot features an integral steel toe cap and vulcanized rubber sole for superior cut and slip resistance.

- Chemically resistant boot certified to EN 13832-3:2018 (footwear protecting against chemicals)
- Resistant to common food industry chemicals, including cleaning, disinfecting and sanitising agents
- Excellent resistance to oil and animal fats
- Blown mid-sole reduces weight and increases cushioning, significantly reducing wearer fatigue and risk of injury to joints and spine
- Superb low temperature flexibility down to -40°C
- 200 Joule epoxy coated steel toe cap
- Antistatic - Electrical resistance meets the requirements of EN ISO 20345:2011 A (0.1MΩ to 1,000MΩ)
- Vulcanized rubber sole for improved slip resistance - 30% better than a conventional safety boot sole
- Durable, cut-resistant vulcanised rubber sole, significantly extends working life, even in harsh terrain
- Cleated outsole for maximum grip in wet and oily conditions (SRC)
- Fuel and oil resistant sole

EN 20345



CHEMICAL BOOTS

Our proprietary Hazmax™ compound provides exceptional protection against broad range of chemicals.

Hazmax™ boots are trusted by first responders and safety experts to provide protection in the most demanding of circumstances and are the ideal choice for dealing with hazardous or aggressive chemicals

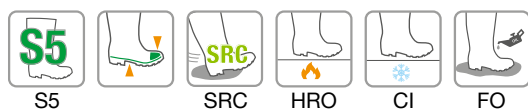
HAZMAX™ BOOT

A chemically protective anti-static boot with an integral steel toe cap and vulcanised rubber sole for superior slip resistance. Applications include petrochemical, pharmaceutical, chemical waste handling and aluminium processing.

- Manufactured from our proprietary Hazmax compound, providing significantly better chemical resistance than PVC or PU materials
- Chemically resistant boot certified to EN 13832-3:2018 (footwear protecting against chemicals)
- Conforms to EN 943-1 (Chemical protective clothing) and certified to this standard as part of an appropriate Respirax gas-tight suit
- Vulcanized rubber sole for improved slip resistance - 30% better than a conventional safety boot sole
- Durable, cut-resistant vulcanised rubber sole, significantly extends working life, even in harsh terrain
- Cleated outsole for maximum grip in wet and oily conditions (SRC)
- Ergonomic cushioned insole (removable & machine washable) for greater wearer comfort



EN 20345



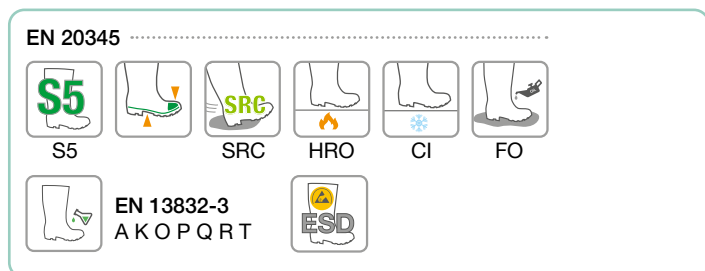
EN 13832-3
A K O P Q R T

HAZMAX™ ESD BOOTS FOR STATIC SENSITIVE APPLICATIONS

A chemically protective safety boot suitable for use in Electrically Protective Areas and conforming to EN61340-5. Suitable for applications such as pharmaceuticals, electronics manufacture and ATEX environments.

All properties the same as Hazmax, except for the addition of:

- ESD properties meet the requirements of EN 61340-5-1:2016 (0.1MΩ to 100MΩ) and EN 61340-5-1:2007 (0.1MΩ to 35MΩ)

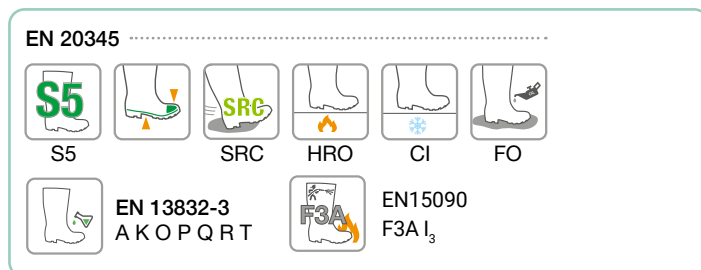


HAZMAX™ FPA HEAT RESISTANT CHEMICAL BOOTS

A heat-resistant chemical safety boot, conforming to the EN15090 F3A I₃ fire boot standard for flame resistance, radiant heat and heat insulation of the sole. Used by emergency responders and for marine chemical transportation.

All properties the same as Hazmax, except for the addition of:

- Conforms to EN 15090:2012 F3A Fire fighter boot standard
- Heat insulation of the sole EN 15090:2012 (HI3): The sole withstands 40 minutes at 250°C with an increase in internal temperature of less than 21°C after 10 minutes



HAZMAX™ ESD FPA HEAT RESISTANT CHEMICAL BOOTS FOR STATIC SENSITIVE APPLICATIONS

A heat-resistant chemical safety boot, conforming to the EN15090 F3A I₃ fire boot standard for flame resistance, radiant heat and heat insulation of the sole, that is also suitable for use in Electrically Protective Areas and conforming to EN61340-5. Specifically designed for use with the Respirix GTL ESD gas-tight suit for use by emergency responders in potentially explosive atmospheres.

All properties the same as Hazmax, except for the addition of:

- ESD properties meet the requirements of EN 61340-5-1:2016 (0.1MΩ to 100MΩ) and EN 61340-5-1:2007 (0.1MΩ to 35MΩ)
- Conforms to EN 15090:2012 F3A Fire fighter boot standard
- Heat insulation of the sole EN 15090:2012 (HI3): The sole withstands 40 minutes at 250°C with an increase in internal temperature of less than 21°C after 10 minutes

EN 20345

S5 SRC HRO CI FO

EN 13832-3 AKOPQRT ESD F3A I₃ EN15090 F3A I₃



HAZMAX™ MAXI OVERBOOTS

A chemically protective anti-static overboot with a vulcanised rubber sole for superior slip resistance and designed to be worn over safety boots.

- Ingenious rear entry design ensures the boot is quick and easy to fit and remove
- Green chemically resistant compound shaft certified to EN 13832-3 (see page 27 for chemical permeation data)
- Meets the requirements of NFPA 1991 (chemical vapour protection)
- Resistant to chemical warfare agents and decontamination solutions
- Black vulcanised rubber sole for maximum grip - 30% better than a conventional safety boot sole



For use with safety boots

EN 20347

OB SRC A HRO FO

EN 13832-3 AKOPQRT

HAZMAX™ MAXI ESD OVERBOOTS

A chemically protective overboot with a vulcanised rubber sole for superior slip resistance suitable for use in Electrically Protective Areas and conforming to EN61340-5. Suitable for applications such as pharmaceuticals and electronics manufacture and designed to be worn over safety boots.

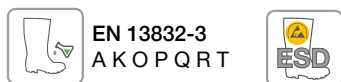
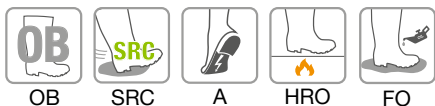
All properties the same as Hazmax Maxi, except for the addition of:

- ESD properties meet the requirements of EN 61340-5-1:2016 (0.1MΩ to 100MΩ) and EN 61340-5-1:2007 (0.1MΩ to 35MΩ)



For use with safety boots

EN 20347



HAZMAX™ COMPACT OVERBOOTS

A chemically protective front-opening overboot with a slip resistant sole designed to be worn over safety shoes and trainers.

- Chemically resistant Hazmax™ compound shaft and sole certified to EN 13832-3 (see page 27 for chemical permeation data)
- Conforms to EN 943-1 (chemical protective clothing)
- Meets the requirements of NFPA 1991 (chemical vapour protection)
- Single piece injection moulded construction with integral moulded fastener ensures there are no seams or mounting/fastener holes to leak
- No metal fasteners or components used in the construction, removing the potential for chemical corrosion

EN 20347



For use with safety shoes/trainers

CBRN

Designed to be worn over standard issue combat boots, CBRN overboots provide protection for military, police and civil defence personnel against chemical warfare agents and toxic/hazardous chemicals.

CBRN AMBIDEXTROUS OVERBOOT

A chemically protective anti-static overboot with an ambidextrous quick-don design. Tested against a broad range of hazardous chemicals and chemical warfare agents, the boot design allows it to be fastened single-handedly in less than five seconds.

- Manufactured from our chemically resistant Hazmax™ FPA compound and certified to EN 13832-3:2018 (Footwear protecting against chemicals)
- Greater than 24 hours permeation resistance against HD Mustard, VX & GD chemical warfare agents
- Resistant to Chemical Warfare agents and decontamination solutions
- Quick & easy to decontaminate
- Slip resistant, non-clogging sole design
- Fuel and oil resistant upper and sole
- Ingenious rear entry design ensures the boot is quick and easy to fit and remove
- Single ambidextrous design allows the boot to be worn on either the right or left foot to speed fitting and removal
- Specifically designed to fit and completely cover military issue combat boots
- Can be rolled and stored in a kit-bag



For use with combat boots



Available in Olive Green or Combat Black

EN 20347



EN 13832-3
A K O P Q R T

CBRN OVERBOOT - WARFARE AGENT TESTING

WARFARE AGENT	CODE	CAS NO.	METHOD	BREAK THROUGH
Cyanogen Chloride	CK	506-77-4	TOP 8-2-501	>6 hours
HD Mustard	HD	505-60-2	TOP 8-2-501	>24 hours
Hydrogen Cyanide	AC	74-90-8	TOP 8-2-501	>8 hours
Lewisite	L	40334-70-1	Finabel 0.7.c	> 24 hours
Novachok A 234			TOP 8-2-501	>24 hours
Phosgene	CG	75-44-5	TOP 8-2-501	>8 hours
Sarin	GB	107-44-8	TOP 8-2-501	>24 hours
Soman	GD	96-64-0	TOP 8-2-501	>24 hours
Tabun	GA	77-81-6	Finabel 0.7.c	>24 hours
TGD	TGD		TOP 8-2-501	>24 hours
VX	VX	50782-69-9	TOP 8-2-501	>24 hours

SIZING:

	NATO Stock Numbers (Combat Black):	US Size	EU Size	UK Size
X-Small	8430-99-472-1024	3 - 4½	34 - 35	2 - 3½
Small	8430-99-176-1246	5 - 6½	37 - 38	4 - 5½
Medium	8430-99-752-8650	7 - 8½	39 - 41	6 - 7½
Large	8430-99-969-4195	9 - 10½	42 - 43	8 - 9
X-Large	8430-99-894-9283	11 - 12	44 - 45	10 - 11
XX-Large	8430-99-444-9493	13 - 14	46 - 47	12 - 13
XXX-Large	8430-99-752-8664	15 - 16	48 - 50	14 - 15

FLAME RESISTANT

Boots that are resistant to heat and flame for use in areas where there is a risk of sparks from welding or grinding or in proximity to heat and flame.



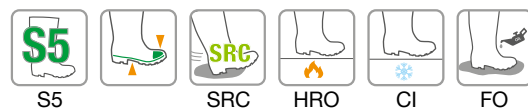
ISOTEC FLAME BOOTS

A heat-resistant safety boot conforming to the EN 15090 HI3 F3A fire boot standard for flame resistance, radiant heat (20kW/m²) and heat insulation of the sole (250°C for 40 minutes). These boots are designed for use in areas where there is a risk of sparks from welding or grinding or for close proximity fire fighting.



- Conforms to EN 15090:2012 F3A Fire fighter boot standard
- Heat insulation of the sole EN 15090:2012 (HI3): The sole withstands 40 minutes at 250°C with an increase in internal temperature of less than 21°C after 10 minutes
- Chemically resistant boot certified to EN 13832-3:2018 (footwear protecting against chemicals)
- Certified to the Marine Equipment Directive
- Vulcanized rubber sole for improved slip resistance - 30% better than a conventional safety boot sole
- Durable, cut-resistant vulcanised rubber sole, significantly extends working life, even in harsh terrain
- Cleated outsole for maximum grip in wet and oily conditions (SRC)
- Fuel and oil resistant sole

EN 20345



EN 13832-3
K N Q



EN15090
F3A I₃



2014/90/EU MED/3.4

Fire-Fighter's Outfit: Boots, Marine Equipment Directive
0474

DIELECTRIC BOOTS

Dielectric boots should be used where there is a risk of electric shock from high voltages. They provide protection because their insulating properties stop electric current from being grounded.

They are suitable for live working on high voltage installations such as sub-stations, overhead line clearing, excavating or moling close to live cables, electric/hybrid vehicles and electric railways and transportation.

DIELECTRIC HV3 BOOTS

An electrically insulating dielectric boot with an integral steel toe cap. The Workmaster™ Dielectric HV3 boot allows high voltage live working at up to 26.5kV with every boot tested at 30kV.

- Injection moulded using our proprietary HV3 compound for a seamless boot with superior electrical insulation properties
- Step voltage protection up to 35kV*
- Arc flash protection – Meets the requirements of ASTM F2621-2019 at 40Cal/cm²**
- 200 Joule epoxy coated steel toe cap
- Lightweight for increased wearer comfort
- Superb low temperature flexibility down to -40°C
- Environmentally friendly PVC and Halogen free construction
- Biodegradable & Phalate free
- Slip resistant moulded sole (SRC)

EN 20345



SB



SRC



E



Live Working
CLASS 3
EN 50321-1
26.5kV



Step Voltage
35kV
40
Cal/cm²
ARC FLASH TESTED



DIELECTRIC HV3 MAXI OVERBOOT


An electrically insulating dielectric overboot designed to be worn over safety boots or shoes. The Workmaster™ Dielectric HV3 Maxi overboot allows high voltage live working at up to 26.5kV with every boot tested at 30kV.


- Injection moulded using our proprietary HV3 compound for a seamless boot with superior electrical insulation properties
- Ingenious rear entry design ensures the boot is quick and easy to fit and remove - Ideal for personnel who have to continually enter and exit hazardous areas
- Single piece injection moulded construction with integral moulded fastener ensures there are no seams or mounting/fastener holes to leak
- Lightweight for increased wearer comfort
- Environmentally friendly PVC and Halogen free construction
- Biodegradable & Phalate free
- Kick-off lug





For use with safety boots

EN 20347


OB


SRC


I



Live Working
CLASS 3
EN 50321-1
26.5kV





DIELECTRIC BOOTS


An electrically insulating dielectric boot with an integral steel toe cap and vulcanised rubber sole for superior slip resistance. The Respirex Dielectric boot allows high-voltage live working at up to 17kV, with every boot tested at 20kV AC, with optional DC testing at 50kV (Class 2).


- Injection moulded using our proprietary Dielectric compound for a seamless boot with excellent electrical insulation properties
- Step voltage protection up to 35kV*
- Arc flash protection – Meets the requirements of ASTM F2621-2019 at 40Cal/cm²**
- 200 Joule epoxy coated steel toe cap (soft toe version also available)
- Vulcanized rubber sole for improved slip resistance - 30% better than a conventional safety boot sole
- Durable, cut-resistant vulcanised rubber sole, significantly extends working life, even in harsh terrain
- Cleated outsole for maximum grip in wet and oily conditions (SRC)
- Ergonomic cushioned insole (removable & machine washable) for greater wearer comfort


EN 20345



SB



SRC


HRO



CI


FO


E



Live Working
CLASS 2
EN 50321-1
17 kV



Step Voltage
35kV

40
Cal/cm²
ARC FLASH TESTED

DIELECTRIC COMPACT OVERBOOT

An electrically insulating dielectric overboot approved to current European standards, The Workmaster™ Dielectric overboot allows high-voltage live working at up to 17.5kV, with every boot tested at 20kV.



For use with safety shoes/trainers

- Injection moulded using our proprietary Dielectric compound for a seamless boot with excellent electrical insulation properties
- Easy to use front opening & fastening overboot - ideal for personnel who have to continually enter and exit hazardous areas
- Single piece injection moulded construction with integral moulded fastener ensures there are no seams or mounting/fastener holes to leak
- No metal fasteners or components used in the construction
- Slip resistant, moulded sole (SRC)

EN 20347



OB



SRC



I



FO



Live Working
CLASS 2
EN 50321-1
17 kV

DIELECTRIC MAXI OVERBOOT

A Class 1 electrically insulating dielectric overboot with a vulcanized rubber sole for superior slip resistance. The Workmaster™ Maxi Dielectric overboot is designed to be worn over safety boots and allows live working at up to 7.5kV with every boot tested at 20kV for ASTM F1117.

- Injection moulded using our proprietary Dielectric compound for a seamless boot with excellent electrical insulation properties
- Ingenious rear entry design ensures the boot is quick and easy to fit and remove - ideal for personnel who have to continually enter and exit hazardous areas
- Single piece injection moulded construction with integral moulded fastener ensures there are no seams or mounting/fastener holes to leak
- Vulcanized rubber sole for greatly improved slip resistance in wet and oily conditions (SRC)
- Durable, cut-resistant vulcanised rubber sole, significantly extends working life, even in harsh terrain
- Fuel and oil resistant sole



For use with safety boots

EN 20347



OB



SRC



I



HRO



FO

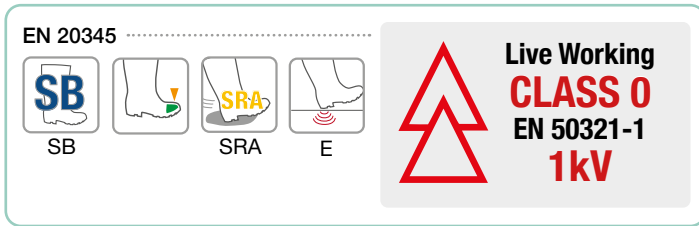


Live Working
CLASS 1
EN 50321-1
7.5kV

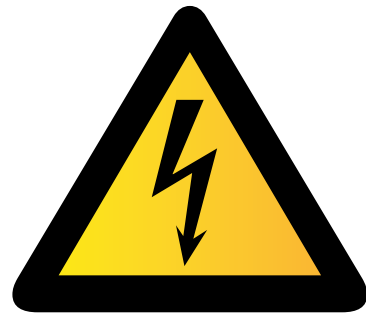
DIELECTRIC N BOOT

A Class 0 electrically insulating dielectric boot with an integral steel toe cap and Nitrile/PVC sole. The Workmaster™ Dielectric N boot allows high-voltage live working at up to 1kV, with every boot tested at 5kV.

- Injection moulded using our proprietary Dielectric compound for a seamless boot with excellent electrical insulation properties
- 200 Joule epoxy coated steel toe cap (soft toe version also available)
- Slip resistant moulded sole
- Cleated outsole for maximum grip
- Moisture absorbing insole (removable and machine washable)
- Energy absorbing tunnel system in heel to EN 20345:2011 E



INSULATING (DIELECTRIC) FOOTWEAR FOR LIVE WORKING



EN 50321-1:2018 is the new standard for insulating footwear for live working and replaces EN 50321:1999 and is currently out for approval as an IEC standard which will make it a global standard, not just European.

The main changes in the 2018 revision are the introduction of four new classes (see below) for working up to 36 KV (the old standard only went up to Class 0 - 1 KV). Boots are now tested by filling with water instead of ball bearings to simulate water or perspiration potentiality wicking up the lining and creating a flash over. There is also now an electrical test after perforation of the sole by a nail, to ensure boots still give electrical protection after perforation. Even non-metallic perforation inserts can allow water to pass through them so will allow an electrical current to pass when the sole is punctured. The table below lists the classes and the test requirements:

	Maximum Working Voltage	Withstand Test Voltage	Leakage Current Test Voltage	Maximum Leakage Current
Class 00	500V	5kV	2.5kV	3mA
Class 0	1kV	10kV	5kV	5mA (8 mA)
Class 1	7.5kV	20kV	10kV	10mA (16 mA)
Class 2	17.5kV	30kV	20kV	18mA
Class 3	26.5kV	40kV	30kV	20mA
Class 4	36kV	50kV	40kV	24mA

(Overboot requirements are in brackets where they are different to knee high boots)

The new standard also includes requirements for DC current; all boots used for DC must be tested for DC according to the new standard and this is available as an option (contact us for details).

RE-TESTING DIELECTRIC FOOTWEAR

Not many people are aware that Annex B2 of the standard for dielectric footwear - EN 50321:2000 (Electrically insulating footwear for working on low voltage installations), requires that all approved dielectric footwear is re-tested every year. This is why Workmaster™ boots have a space to record periodic inspection testing next to the CE markings on the boot. This requirement applies to all CE marked dielectric footwear from every manufacturer - if boots are not re-tested then they are effectively no-longer compliant to the standard.



SAFETY BOOTS

Footwear for use in construction needs to combine all-day comfort with safety for the wearer. Risks include falling objects, crushing and treading on sharp objects such as nails or screws, which is why S5 rated boots are essential.

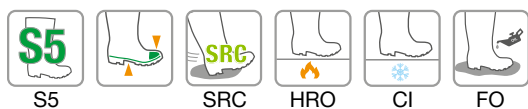
DIGGER BOOT

Designed to resist cutting and wear of the sole through repetitive use with spades and forks, the Workmaster Digger boot features an integral steel toe cap and midsole together with a vulcanized rubber sole for superior slip resistance.

- Integral 200 Joule epoxy coated steel toecap and stainless steel penetration resistant mid-sole
- Durable, cut-resistant vulcanised rubber sole - lasts between two and four times longer than PVC boots when digging
- Vulcanized rubber sole for improved slip resistance - 30% better than a conventional safety boot sole
- Cleated outsole for maximum grip in wet and oily conditions (SRC)
- Heat resistant sole EN 20345:2011 HRO, 60 seconds at 300°C
- Cold insulation to EN ISO 20345:2011 CI
- Moisture absorbing insole (removable and machine washable)
- Fuel and oil resistant sole
- Antistatic - Electrical resistance meets the requirements of EN ISO 20345:2011 A (0.1MΩ to 1,000MΩ)



EN 20345

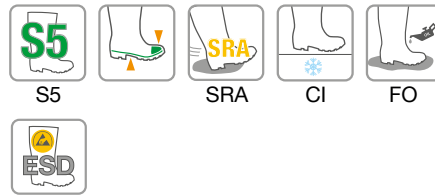


SOLESTAR ESD SAFETY BOOTS

The Solestar ESD is a high performance Electro-Static Discharge safety boot; conforming to the latest European standards it incorporates a steel toecap and midsole together with an oil resistant non-marking sole and is available in sizes 3 to 15 (UK).

- Integral 200 Joule epoxy coated steel toecap and stainless steel penetration resistant mid-sole
- ESD properties meet the requirements of EN 61340-5-1:2016 (0.1MΩ to 100MΩ) and EN 61340-5-1:2007 (0.1MΩ to 35MΩ)
- Antistatic - Electrical resistance meets the requirements of EN ISO 20345:2011 A (0.1MΩ to 1,000MΩ)
- Slip resistant moulded sole
- Cleated outsole for maximum grip

EN 20345

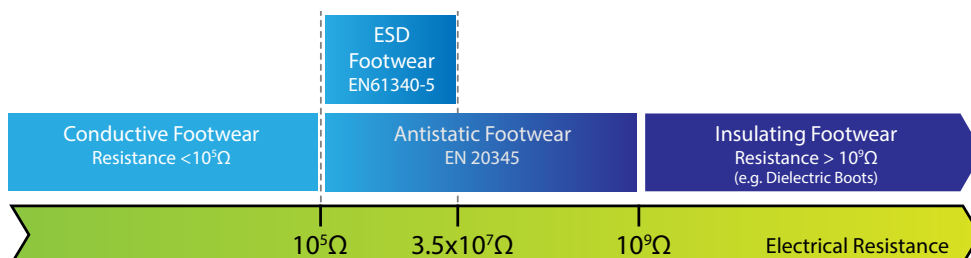


ANTISTATIC AND ESD FOOTWEAR

According to EN 20345: 2011, a shoe or boot is considered to be **antistatic** if its' measured electrical contact resistance falls between **100 kΩ** (10^5 ohms) and **1 GΩ** (10^9 ohms). With a lower resistance, a shoe or boot is considered to be conductive and at higher values, to be insulating. This 100kΩ to 1GΩ range is regarded a sensible compromise, giving protection from electrostatic build up and protection from electrical shocks at lower voltages.

For some industries the risk of uncontrolled electrical discharge (sparks) in potentially explosive atmospheres or the protection of sensitive electronic components and devices are also important considerations. In these situations, another standard for Electro-Static Discharge (ESD) control applies: EN 61340-5-1 ("Electrostatics. Protection of electronic devices against electrostatic phenomena").

For **ESD** footwear the lower limit of electrical resistance is **100 kΩ** (the same as for antistatic footwear) and the upper limit is **35 MΩ** (3.5×10^7 ohms). This means that a boot that is ESD-capable is by definition also antistatic at the same time. Conversely, not every antistatic boot is ESD-capable e.g. If an electrical resistivity of 100 MΩ is measured, the shoe is antistatic but outside the ESD limits. If the shoe has an electrical resistance of only 1 MΩ, it is both antistatic and ESD-capable.



SLIP RESISTANCE

There are two slip resistance tests specified in EN ISO 20345:2011 (with the method described in EN13287); the first is soapy water (Sodium Lauryl Sulfate solution) on a ceramic tile. If the footwear passes this test then the boot can be marked **SRA**. The second is oil (Glycerol) on a steel plate, if the boot passes this test then it can be marked **SRB**. If a boot passes both the SRA and SRB test then it can be marked **SRC**.

There is a common misunderstanding that SRC is the best for slip resistance - this is not the case! Since the introduction of slip testing, accidents caused by slips have not reduced; this is because to pass the slip requirements on oily steel manufacturers have to sacrifice some slip performance in water, but most slip accidents occur where water is the contaminant (over 95%).

The SRB test (oil on steel) has a very low pass/fail limit and the error in measurement is +/- 50%. The pass value is so low that the probability of a fall in this environment is still high. Because of this it is expected that in the next revision of EN ISO 20345 the SRB test will be significantly changed and SRC removed.

The Workmaster™ vulcanised rubber sole produces very high levels of slip resistance with soapy water on a ceramic tile, and these test results have been confirmed during customer wear tests. Due to the performance characteristics of the sole material, boots with our vulcanised rubber sole also achieve a pass on the SRB (oil on steel test), **without compromising SRA performance** and are marked SRC. Some manufacturers add rubber to PVC to improve its resistance to fuel & oil, but this does not improve slip performance.

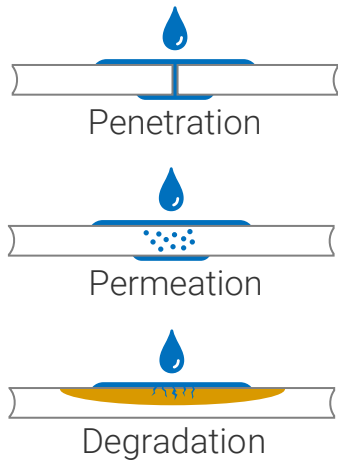


HEAT & FLAME RESISTANCE

Boots that are resistant to heat and flame for use in areas where there is a risk of sparks from welding or grinding or in proximity to heat and flame. Heat resistant safety boots conform to the EN15090 F3A I₃ fire boot standard for flame resistance, radiant heat (20 kW/m²) and heat insulation of the sole (250°C for 40 minutes).



CHEMICAL PENETRATION, PERMEATION AND DEGRADATION



There are three mechanisms that you need to consider when looking at the use of chemicals with personal protective equipment:

PENETRATION:

Chemical penetration is ingress through a material on the non-molecular level - i.e. through holes, cracks, pores, seams etc. This isn't usually an issue with moulded footwear until it starts to age (where on some compounds chemical or UV degradation can cause brittleness and cracking), but can be a big problem with leather or synthetic fabric footwear.

CHEMICAL PERMEATION:

Chemical Permeation is the process by which a chemical passes through a material at the molecular level. The rate of permeation will be determined by the material, its thickness and the temperature.

Actual Breakthrough Time - is the time that the chemical is first detected on the on the inner surface of the material, this will depend to an extent on the sensitivity of the detection equipment and method of analysis.

Normalised Breakthrough Time - is the time taken to reach a specific permeation rate (for European standards this is defined as $0.1\mu\text{g}/\text{min}\cdot\text{cm}^2$, for American standards it is $1\mu\text{g}/\text{min}\cdot\text{cm}^2$). This is the measure used in permeation tables as it will be consistent between testing laboratories.

DEGRADATION:

Degradation is the physical change to the material caused by the chemical, which can include swelling, stiffening, wrinkling, changes in colour, and other physical deterioration. The slower the degradation occurs in the presence of a chemical, the more protective the material is for that specific chemical.

Degradation tests results are subjective as they are based solely on a visual assessment of the material.

EN 13832 FOOTWEAR PROTECTING AGAINST CHEMICALS

- This is the European safety standard for chemical protective footwear and is divided into three parts. Part 1 deals with terminology and test methods, Part 2 with requirements for limited contact with chemicals and Part 3 with requirements for prolonged contact with chemicals. The standard is intended for use in conjunction with EN ISO 20345 (Safety footwear standard), EN ISO 20346 and EN ISO 20347 (Occupational footwear standard)

For certification to EN 13832 Part 3, boots are tested for chemical degradation over a period of 23 hours against a minimum of three chemicals from a list of 15 designated challenge chemicals contained in Part 1 of the standard (the designated letters are the same as for the EN 374 glove standard), after which they must pass a series of mechanical tests. Permeation tests are then performed for the selected chemicals and normalised breakthrough must be greater than 121 minutes.

Footwear approved to EN 138832 Part2 is only intended for limited contact with chemicals and is not recommended for people working with, or in proximity to, dangerous or aggressive chemicals.

Just because a boot is approved to EN13832 does not mean that it is necessarily safe to use with every chemical. Respirer test boots against a broad range of chemicals in addition to those required to pass EN13832 and you should use this permeation data to check suitability against your particular chemical (or mix of chemicals), in the same way that you would check gloves or protective clothing.

HAZMAX™ BOOTS – CHEMICAL PERMEATION

CHEMICAL	CAS NO.	METHOD	BREAKTHROUGH TIME
Acetic acid (Glacial)	64-19-7	EN 16523	Over 12 HOURS
Acetone	67-64-1	EN374-3	Over 2 HOURS
Acetone Cyanohydrin	75-86-5	EN374-3	Over 8 HOURS
Acetonitrile	75-05-08	EN374-3	Over 6 HOURS
Acrylic Acid	79-10-7	EN374-3	Over 8 HOURS
Acrylonitrile	107-13-1	EN374-3	Over 2 HOURS
Ammonia 5%	1336-21-6	EN374-3	Over 8 HOURS
Ammonia Gas	7664-41-7	EN374-3	Over 8 HOURS
Ammonium Pentadecafluoro-octanoate (30% in water)	3825-26-1	EN374-3	Over 8 HOURS
Aniline	62-53-3	EN374-3	Over 8 HOURS
Anti-knock(Tetraethyl lead 60% Dibromoethane 30%/ Dichloroethane 10% TEL-CB)	78-00-2 / 106-03-4 / 107-06-2	EN374-3	Over 8 HOURS
Aqueous Phenol 85%	108-95-2	EN374-3	Over 8 HOURS
Arsenic Acid	7778-39-4	EN374-3	Over 8 HOURS
Benzene	71-43-2	EN374-3	Over 4 HOURS
Benzyl Chloride	100-44-7	EN374-3	Over 8 HOURS
Bromine	7726-95-6	EN374-3	Over 7 HOURS
Buta-1,3diene Gas	106-99-0	EN374-3	Over 3 HOURS
Butyl Acetate	123-86-4	EN374-3	Over 6 HOURS
Cable oil		EN374-3	Over 8 HOURS
Carbazole	86-74-8	EN374-3	Over 8 HOURS
Carbon Disulphide	75-15-0	EN374-3	Over 1 HOUR
Chlorine Gas	7782-50-5	EN374-3	Over 3 HOURS
Chloroacetic Acid 85%	79-11-8	EN 16523	Over 32 Hours
Chromic Acid	1333-82-0	EN374-3	Over 8 HOURS
Cyanogen Chloride	506-77-4	NFPA	No permeation detected
Cyclohexylamine	108-91-8	EN374-3	Over 8 HOURS
Dichloromethane	75-09-02	EN374-3	Over 1 HOUR
Diethylamine	109-89-7	EN374-3	Over 2 HOURS
Diethylene Glycol dimethyl-ether	111-46-6	EN374-3	Over 8 HOURS
Dimethyl Formamide	68-12-2	EN374-3	Over 8 HOURS
Dimethylformamide	68-12-2	EN374-3	Over 3 HOURS
Epichlorohydrin	106-89-8	EN374-3	Over 7 HOURS
Ethanol (Ethyl Alcohol)	64-17-5	EN374-3	Over 8 HOURS
Ethyl Acetate	141-78-6	EN374-3	Over 4 HOURS
Ethylene Glycol	107-21-1	EN374-3	Over 8 HOURS
Ethylene Dichloride	107-06-2	EN374-3	Over 8 HOURS
Ethylene Oxide	75-21-8	EN374-3	Over 2 HOURS
Ethylenediamine tetra-acetic acid tetrasodium salt (EDTA) 5%	64-02-8	EN374-3	Over 8 HOURS
Formaldehyde 37%	79-11-8	EN374-3	Over 8 HOURS
Formic Acid 65%	64-18-6	EN374-3	Over 8 HOURS
Heptane	142-82-5	EN374-3	Over 8 Hours
Hexane	110-54-3	EN374-3	Over 7 HOURS
Hydrazine	302-01-2	EN374-3	Over 8 HOURS
Hydrazine 5%	7803-57-8	EN374-3	Over 8 HOURS
Hydrochloric Acid 37%	7647-01-0	EN 16523	Over 32 HOURS
Hydrochloric Acid 48%	7647-01-0	EN374-3	Over 8 HOURS
Hydrofluoric Acid 48%	7664-39-3	EN374-3	Over 66 HOURS
Hydrofluoric Acid 73%	7664-39-3	EN374-3	Over 8 HOURS
Hydrogen Chloride Gas	7647-01-0	EN374-3	Over 8 HOURS

CHEMICAL	CAS NO.	METHOD	BREAKTHROUGH TIME
Hydrogen Fluoride gas anhydrous	7664-39-3	EN374-3	Over 1 HOUR
Hydrogen Peroxide (10 volume (3%) solution)	7722-84-1	EN374-3	Over 8 HOURS
Hydrogen Peroxide 50%	7722-84-1	EN374-3	Over 8 HOURS
Iso-butane	75-28-5	EN374-3	Over 8 HOURS
Iso-butane followed by Hydrofluoric acid 71-75%	75-28-5 + 7664-39-3	EN374-3	Over 8 HOURS
Iso-propanol (IPA)	67-63-0	EN 16523	Over 32 HOURS
Lewisite	541-25-3	NFPA	No permeation detected
m-Cresol	108-39-4	EN374-3	Over 8 HOURS
Methanol	67-56-1	EN374-3	Over 8 HOUR
Methyl Ethyl Ketone (M.E.K) 2-Butanone	78-93-3	EN374-3	Over 2 HOURS
Methyl Iodide 99%	74-88-4	EN374-3	Over 1.5 HOURS
Methyl Methacrylate	80-62-6	EN 369	Over 3 HOURS
methyl-1,2-pyrrolidone	872-50-4	EN369	Over 8 HOURS
Methylene Chloride Gas	74-87-3	EN374-3	Over 1 HOUR
Monochloroacetic acid	79-11-8	EN374-3	Over 8 HOURS
Mustard Gas	505-60-2	NFPA	No permeation detected
Naphalene	91-20-3	EN374-3	Over 8 HOURS
N,N-Dimethylaniline	121-69-7	EN374-3	Over 8 HOURS
N,N-dimetyl acetamide	127-19-5	EN374-3	Over 8 HOURS
Nitric Acid 50%	7697-37-2	EN 16523	Over 32 HOURS
Nitric Acid 70% conc	7697-37-2	EN 16523	Over 32 HOURS
Nitric Acid Etchant 80/20	7697-37-2	EN374-3	Over 8 HOURS
Nitro Benzene	98-95-3	EN374-3	Over 3 HOURS
Oleum 40% SO ₃	8014-95-7	EN374-3	Over 8 HOURS
Oxalic Acid saturated solution	6153-56-6	EN374-3	Over 8 HOURS
Phenol 50% in Methanol	108-95-2/ 67-56-1	EN374-3	Over 8 HOURS
Phosphoric acid 25%	7664-38-2	EN 16523	Over 32 HOURS
Phosphoric acid 75%	7664-38-2	EN 16523	Over 32 HOURS
Propylene 1,2 oxide	75-56-9	EN374-3	Over 1 HOUR
Red Fuming Nitric acid	7697-37-2	EN374-3	Oner 4 HOURS
Saren Gas	107-44-8	NFPA	No permeation detected
Sodium Cyanide 30wt%	143-33-9	EN374-3	Over 8 HOURS
Sodium Hydroxide 40%	1310-73-2	EN374-3	Over 8 HOURS
Sodium Hypochlorite 16%	7681-52-9	EN374-3	Over 8 HOURS
Styrene	100-42-5	EN374-3	Over 8 HOURS
Sulphuric Acid 96%	7664-93-9	EN374-3	Over 8 HOURS
Tetrachloroethylene	127-18-4	EN374-3	Over 3 HOURS
Tetraethyl Lead (Octel Anti Knock)	78-00-2	EN374-3	Over 8 HOURS
Tetrahydrofuran	109-99-9	EN374-3	Over 3 HOURS
Toluene	108-88-3	EN374-3	Over 4 HOURS
Toluene 2,4 Diisocyanate	584-84-9	EN374-3	Over 8 HOURS
Trichloroethane	71-55-6	EN374-3	Over 6 HOURS
Trichloroethylene 1,1,2	79-01-6	EN374-3	Over 3 HOURS
Triethanol-amine	102-71-6	EN374-3	Over 8 HOURS
Triethylene Glycol	112-27-6	EN374-3	Over 8 HOURS
Trigonox K-80 Cumyl hydroperoxide 80% / 20% Cumene	80-15-9/ 98-82-8	EN 369	Over 8 HOURS
VX	50782-69-9	NFPA	No permeation detected
Xylene	1330-20-7	EN374-3	Over 4 HOURS

Chemicals in **bold** are the 15 standard test chemicals defined in EN943-2:2002

FOODLITE & FOODMAX BOOTS CHEMICAL PERMEATION

Both Foodlite and Foodmax boots are engineered to be resistant to chemicals and disinfectants commonly used in the food industry. Foodmax boots offer increased resistance against acids and some more aggressive chemicals and solvents.

The table shows Normalised Breakthrough times to EN374-3:2003 for Foodmax boots and Foodlite boots, for more details visit www.workmasterboots.com

CHEMICAL	CAS NO.	FOODMAX	FOODLITE
Acetone	67-64-1	>½ hour	
Acetonitrile	75-05-08	>1 hour	
Ammonia Gas	7664-41-7	>4 hours	>8 hours
Carbon Disulphide	75-15-0	>1 hour	
Chlorine Gas	7782-50-5	>8 hours	
Dichlorobenzene	95-50-1, 106-46-7, 541-73-1	>7 hours	
Dichloromethane	75-09-02	>1 hour	
Diethylamine	109-89-7	>2 hours	
Dimethyl Formamide	68-12-2	>1 hour	
Ethanol	64-17-5	>8 hours	>8 hours
Ethyl Acetate	141-78-6	>2 hours	>2 hours
Hexane	110-54-3	>3 hours	>1 hour
Hydrogen Chloride Gas	7647-01-0	>8 hours	
Isopropanol (IPA)	67-63-0		>32 hours
Lactic acid	50-21-5	>8 hours	>8 hours
Methanol	67-56-1	>4 hours	>8 hours
Methyl pyrrolidone	872-50-4		>8 hours
Nitro Benzene	98-95-3	>8 hours	
Nitric Acid	7697-37-2		>32 hours
Oleic acid	112-80-1	>7 hours	
Phosphoric acid	7664-38-2	>8 hours	>8 hours
Potassium Hydroxide 40%	1310-58-3	>8 hours	
Sodium Hydroxide 40%	1310-73-2	>8 hours	>32 hours
Sodium Hypochlorite 16%	7681-52-9	>8 hours	>8 hours
Sulphuric Acid 96%	7664-93-9	>8 hours	
Tetrachloroethylene	127-18-4	>2 hours	
Tetrahydrofuran	109-99-9	>½ hour	
Toluene	108-88-3	>3 hours	>1 hour

FEATURES

BOOT FEATURES

- 1 Slip-resistant vulcanised rubber sole
- 2 Steel toe cap
- 3 Stainless steel mid-sole
- 4 Removable & washable comfort insole
- 5 Cushioned heel
- 6 Kick-off lug
- 7 Adjustable height
- 8 Single piece injection moulded construction
- 9 Non-wicking polyester lining

Not all features are present on all boots - please check the product page for the specific boot you are interested in.



SIZING CHART

Our boots and overboots are available in a broad range of sizes. Workmaster™ Compact overboots are designed for use over a conventional safety shoe or safety trainer, while the Maxi overboots are designed for use over traditional safety boots.

BOOTS

UK	3	4	5	6	7	8	9	10	11	12	13	14	15
EU	35	36	37	39	41	42	43	44	45	46	47	49	50
US	4	5	6	7	8	9	10	11	12	13	14	15	16

MAXI & COMPACT OVERBOOTS

	MEDIUM	LARGE	EXTRA LARGE
UK	6 – 8	9 – 11	12 – 15
EU	39 – 42	43 – 45	46 – 50
US	7 – 9	10 – 12	13 – 16

MAINTAINING YOUR BOOTS

- 1 Boots are machine washable at up to 40°C
- 2 Strong chemicals or other types of contamination should be washed off as soon as possible
- 3 Boots should be inspected for damage prior to use
- 4 Dielectric boots should be electrically re-tested after one year of use



workMaster™
by RESPIREX

FIND OUT MORE

For more details on our range of specialist protective footwear call us on +44 (0)1737 778 600 or visit our website:

www.workmasterboots.com