



DOCUMENT	SECTOR PROFILE
DIVISION	03 – PPE
SCOPE	13 EN STANDARDS
STATUS	✓ CE-READY

EN 388 EN 407 EN 12477 EN 13594 EN 511 EN 659 EN 17092 EN 1621 EN ISO 11611 EN ISO 11612 EN 469 EN ISO 20471 EN 1

GLOVES · GARMENTS · FOOTWEAR · CE MARKING

Protection, proven.

Every code on a PPE label is a promise. Tti tests it clause by clause, then takes it to the CE mark.

13

EN STANDARDS

138

TEST CLAUSES

3

PRODUCT FAMILIES

I–III

CE CATEGORIES

2025

MOTO PPE ACCREDITED

WHY IT MATTERS



When PPE fails, the consequences are not abstract.

Every failure has a clause.

Each EN test clause simulates exactly the hazard the product is meant to stop. Five real-world failures, and the clause written to prevent each one.



LOG	FAILURE IN THE FIELD	CONSEQUENCE	CLAUSE	WHAT THE TEST SIMULATES
F-01	 A glove does not resist a blade	Hand injury	EN 388 · 6.2 / 6.3	Coup and TDM cut tests drive a calibrated blade across the palm material
F-02	 A hi-vis jacket loses its reflectivity	Road accident	EN ISO 20471 · 6.1 / 6.2	Retroreflection measured new, then again after washing, abrasion and flexing
F-03	 Heat passes through a firefighter's suit	Burn	EN 469 · 6.2.1.3	Heat transfer through the full layer assembly under a calibrated flame
F-04	 Welding spatter ignites a jacket	Burn, garment fire	EN ISO 11611 · 6.8	Drops of molten metal counted until the skin side rises 40 K
F-05	 Riding trousers shred in a slide	Abrasion injury at speed	EN 17092 · 4.3	Impact abrasion: the fabric meets a moving abrasive surface

F-01 TO F-03 FROM TTI MAGAZINE V2, CH. 6 · F-04 AND F-05 ADDED EXAMPLES · CLAUSES PER THE EN STANDARDS



SPECIMEN IN FLIGHT – EVERY GLOVE ARRIVES AS A SAMPLE FIRST

DIVISION 03 – PPE TESTING & CE CERTIFICATION

One laboratory, from first stitch to CE mark.

PPE is sold on the strength of a code on a label: 4X42C, Class 3, AAA. Each code is a promise that a glove, a jacket or a boot will hold back a specific hazard.

Tti provides the evidence behind those promises. Division 03 tests gloves, garments and footwear against 13 European standards and 138 individual clauses in ISO/IEC 17025 accredited laboratories, then coordinates the route to CE marking with recognised Notified Bodies.

Manufacturers in Sialkot and across Pakistan work with one partner from development testing through the technical file to EU type-examination, and keep that partner for annual renewal and production inspection.

544

ACCREDITED METHODS

LAB 022

PNAC • ISO/IEC 17025

70+

ECONOMIES VIA ILAC MRA

3days

STANDARD TURNAROUND

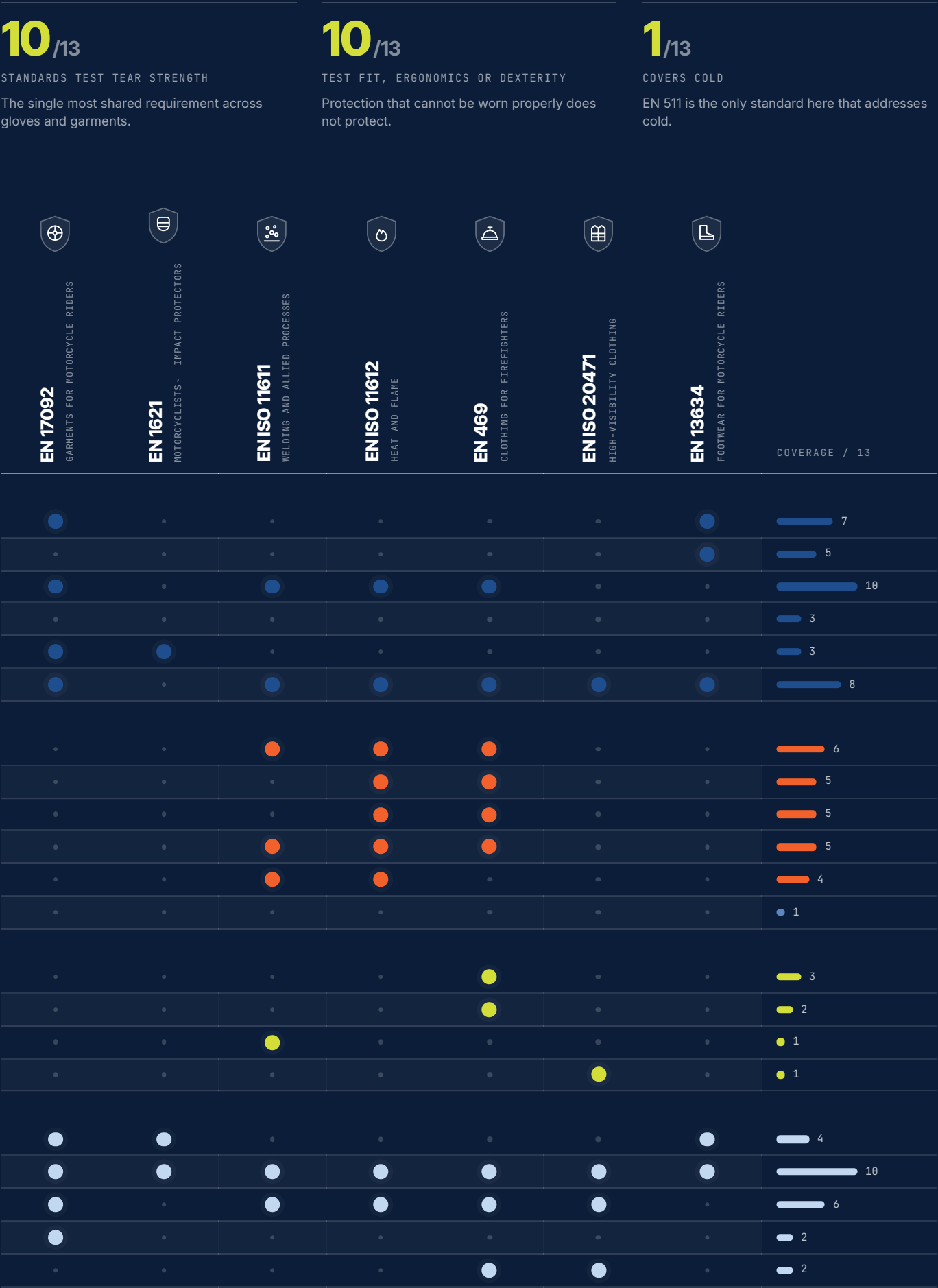
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HAZARD MAP — 21 HAZARDS × 13 STANDARDS

21 hazards. 13 standards. One lab.

						
HAZARD \ STANDARD	EN 388 MECHANICAL RISKS	EN 407 THERMAL RISKS	EN 12477 GLOVES FOR WELDERS	EN 13594 MOTORCYCLE RIDERS	EN 511 PROTECTION AGAINST COLD	EN 659 GLOVES FOR FIREFIGHTERS
MECHANICAL						
Abrasion	●	•	●	●	●	●
Cut	●	•	●	●	•	●
Tear	●	●	●	●	●	●
Puncture	●	•	●	•	•	●
Impact	•	•	•	●	•	•
Seam & tensile strength	•	•	•	●	•	●
THERMAL						
Flame spread	•	●	●	•	•	●
Contact heat	•	●	●	•	•	●
Convective heat	•	●	●	•	•	●
Radiant heat	•	●	•	•	•	●
Molten metal	•	●	●	•	•	•
Cold	•	•	•	•	●	•
ENVIRONMENT						
Water penetration	•	•	•	•	●	●
Liquid chemicals	•	•	•	•	•	●
Electrical resistance	•	•	•	•	•	•
Visibility	•	•	•	•	•	•
HUMAN FACTORS						
Innocuousness	•	•	•	●	•	•
Fit, ergonomics, dexterity	•	•	●	●	•	●
Dimensional stability	•	•	•	•	•	●
Restraint	•	•	•	●	•	•
Comfort, water vapour	•	•	•	•	•	•



01

FINGERS · CUT

EN 388 6.2 / 6.3 TDM

LEATHER SHELL

Abrasion 6.1 · tear 6.4

BACK OF HAND · IMPACT

EN 388 P · EN 13594 4.11

GRIP ON STEEL

Puncture EN 388 6.5

SECTION 01 — PROTECTIVE GLOVES · 6 STANDARDS · 54 CLAUSES

Hands first.

The hand is the most exposed tool on any shop floor. Six glove standards, from a blade to molten metal to a slide at speed.

**EN 388**
5 CLAUSES**EN 407**
7 CLAUSES**EN 12477**
9 CLAUSES**EN 13594**
10 CLAUSES**EN 511**
6 CLAUSES**EN 659**
17 CLAUSES

DECODING THE LABEL

Read the marking.

A glove's pictogram carries a code, one character per test. Each digit is a level earned against a fixed threshold; **X** means not tested or not applicable. These are the codes Tti issues evidence for.



SPECIMEN · LEATHER WORK GLOVE



EN 388:2016+A1:2018

Mechanical risks · example marking 4X42CP

Example marking – not a test record

4	X	4	2	C	P
LEVEL 1-4	LEVEL 1-5 OR X	LEVEL 1-4	LEVEL 1-4	LEVEL A-F	PASS OR BLANK
Abrasion	Coup blade cut	Tear	Puncture	TDM cut · EN ISO 13997	Impact
100 · 500 · 2,000 · 8,000 cycles	Index 1.2 · 2.5 · 5 · 10 · 20	10 · 25 · 50 · 75 N	20 · 60 · 100 · 150 N	2 · 5 · 10 · 15 · 22 · 30 N	EN 13594 knuckle method



EN 407:2020

Thermal risks · example marking 413X4X

4	1	3	X	4	X
LEVEL 1-4	LEVEL 1-4	LEVEL 1-4	LEVEL 1-4	LEVEL 1-4	LEVEL 1-4
Flame spread	Contact heat	Convective heat	Radiant heat	Small molten splashes	Large molten metal
Afterflame max. 20 · 10 · 3 · 2 s	100 · 250 · 350 · 500 °C	HTI min. 4 · 7 · 10 · 18 s	Not tested	10 · 15 · 25 · 35 drops	30 · 60 · 120 · 200 g



EN 511:2006

COLD · EXAMPLE

2**1****1**

Convective cold Contact cold Water penetration

Three digits; water penetration is 0 or 1.



EN 13594:2015

MOTORCYCLE · EXAMPLE

2**KP**

Level 1 or 2 Knuckle protection

Level 2 gloves pass the harder impact-abrasion and cut tests.



EN 12477:2002

WELDERS · EXAMPLE

A**B**

Higher heat, less dexterity

More dexterity, e.g. TIG

Type A for heavy welding, Type B where fingertip feel matters.

01 — PROTECTIVE GLOVES · SCOPE

Six standards. Every clause.

GLOVES AT THE WELDING ARC

**EN 388** 2016+A1:2018

Mechanical risks

05

CLAUSES

- 6.1 Abrasion resistance
- 6.2 Blade cut resistance
- 6.3 Cut resistance (EN ISO 13997)
- 6.4 Tear resistance
- 6.5 Puncture resistance

**EN 407** 2020

Thermal risks

07

CLAUSES

- 6.2 Limited flame spread
- 6.3 Contact heat
- 6.4 Convective heat
- 6.5 Radiant heat
- 6.6 Small splashes of molten metal
- 6.7 Large quantities of molten metal
- 6.8 Tear resistance

**EN 12477** 2002

Gloves for welders

09

CLAUSES

- 6.1 Abrasion (EN 388)
- 6.2 Blade cut (EN 388)
- 6.4 Tear (EN 388)
- 6.5 Puncture (EN 388)
- 6.2 Flame spread (EN 407)
- 6.3 Contact heat (EN 407)
- 6.4 Convective heat (EN 407)
- 6.6 Molten metal splashes (EN 407)
- EN 420 Dexterity

**EN 13594** 2015

Motorcycle riders

10

CLAUSES

- 4.2 Innocuousness
- 4.3 Hard inclusions
- 4.4 Ergonomic requirements
- 4.5 Sizing and cuff length
- 4.6 Restraint
- 4.7 Tear strength
- 4.8 Seam strength
- 4.9 Cut resistance
- 4.10 Impact abrasion resistance
- 4.11 Impact protection of knuckles

**EN 511** 2006

Protection against cold

06

CLAUSES

- 4.1 Mechanical requirements
- 4.2 Flexibility behaviour
- 4.3 Water penetration
- 4.4 Extreme cold flexibility
- 4.5 Convective cold
- 4.6 Contact cold

**EN 659** 2003+A1:2008

Gloves for firefighters

17

CLAUSES

- 3.2 Sizes
- 3.3 Abrasion
- 3.4 Cut
- 3.5 Tear
- 3.6 Puncture
- 3.7 Burning behaviour
- 3.8 Convective heat
- 3.9 Radiant heat
- 3.10 Contact heat
- 3.11 Heat resistance of lining
- 3.12 Heat shrinkage
- 3.13 Dexterity
- 3.14 Seam breaking strength
- 3.15 Time for removal
- 3.16 Water penetration
- 3.17 Whole glove integrity
- 3.18 Liquid chemical penetration

02

RETROREFLECTIVE TAPE
Class 3 min. 0.20 m² · 6.1/6.2

FABRIC AND SEAMS
Tensile 5.5.1 · bursting 5.5.2

FLUORESCENT BACKGROUND
Colour new and after Xenon 5.1/5.2

SECTION 02 — PROTECTIVE GARMENTS · 6 STANDARDS · 63 CLAUSES

Second skin.

Clothing that has to be seen, survive flame and molten metal, or hold together in a slide. Tested as fabric, as seams and as a finished garment.

General

High-visibility

Motorcycle

Heat & flame

Welding

Firefighting

THERMAL FAMILY

Heat, flame and molten metal.

Three garment standards and one glove standard share a thermal language. Each letter in the code is a separate exposure; each number is how much of it the material survives.

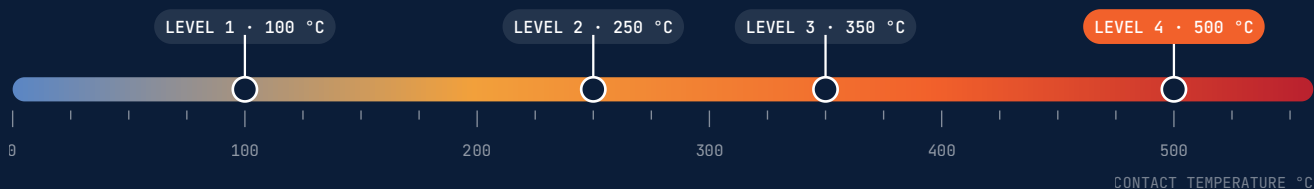
EXAMPLE MARKING	EN ISO 11612 · A1 B2 C1 E3
READ AS	FLAME, CONVECTIVE 2, RADIANT 1, IRON 3



EN ISO 11612:2015 CLOTHING AGAINST HEAT AND FLAME · CODE LETTERS

A Limited flame spread A1 A2 A1 surface, A2 edge ignition	B Convective heat B1 B2 B3 HTI24 4 · 10 · 20 s	C Radiant heat C1 C2 C3 C4 RHTI24 7 · 20 · 50 · 95 s	D Molten aluminium D1 D2 D3 100 · 200 · 350 g	E Molten iron E1 E2 E3 60 · 120 · 200 g	F Contact heat F1 F2 F3 5 · 10 · 15 s at 250 °C
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EN 407 · contact heat CONTACT TEMPERATURE THE GLOVE HOLDS BACK FOR AT LEAST 15 S



EN ISO 11611 · welding

CLASS 1 AND CLASS 2

	Class 1	Class 2
SPATTER DROPS	min. 15	min. 25
RADIANT RHTI24	min. 7 s	min. 16 s
TYPICAL WORK	Light spatter, gas welding	Heavy spatter, MMA, MAG



EN 469 · firefighters

FOUR PERFORMANCE LETTERS, LEVEL 1 OR 2

Xf_{1/2}

Heat transfer, flame

Xr_{1/2}

Heat transfer, radiation

Y_{1/2}

Water penetration

Z_{1/2}

Water vapour resistance

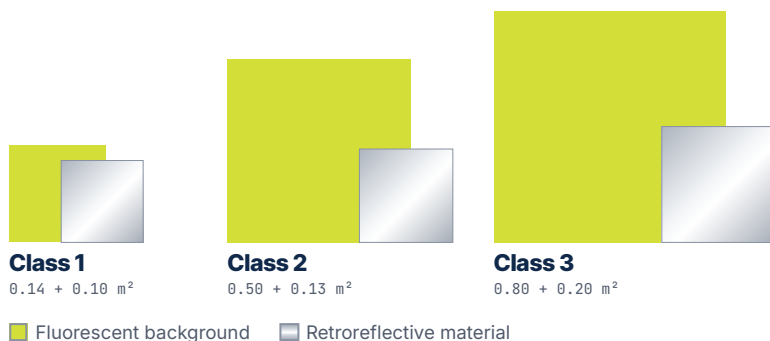
Level 2 is the higher protection on every letter.

VISIBILITY AND IMPACT

Visible by day, by night, at speed.

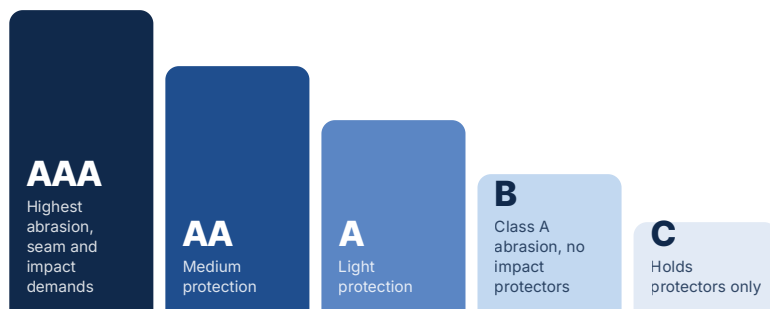
EN ISO 20471 · minimum areas

SQUARES TRUE TO AREA



EN 17092 · garment classes

HIGHEST TO LOWEST



EN 1621 · transmitted force

LOWER IS BETTER · MEAN kN

EN 1621-1 · limb	LEVEL 1	max. 35 kN
EN 1621-1 · limb	LEVEL 2	max. 20 kN
EN 1621-2 · back	LEVEL 1	max. 18 kN
EN 1621-2 · back	LEVEL 2	max. 9 kN

ONE-PIECE LEATHERS · EN 17092 SCOPE

Six standards. Every clause.

63 CLAUSES
INCL. ANSI/ISEA 107



EN 17092 2020

Garments for motorcycle riders

10

CLAUSES

- 4.1.2 Innocuousness
- 4.1.3 Dimensional stability
- 4.1.4 Performance after cleaning
- 4.2 Impact energy absorption
- 4.3 Impact abrasion resistance
- 4.4 Structurally strong seams (SSS)
- 4.5 Tear strength
- 4.6 Restraint
- 4.7 Additional construction requirements
- 4.8 Fit and ergonomics



EN 1621 series

Motorcyclists' impact protectors

04

CLAUSES

- 5.2 Innocuousness
- 5.3 Minimum dimensions of protection zone
- 5.4 Impact attenuation
- 5.5 Ergonomic requirements



EN ISO 11611 2024

Welding and allied processes

11

CLAUSES

- 4.3 Size and fit
- 6.2 Tensile strength
- 6.3 Tear strength
- 6.4 Burst strength (knitted)
- 6.5 Seam strength
- 6.6 Dimensional change
- 6.7 Limited flame spread
- 6.8 Impact of molten metal spatter
- 6.9 Heat transfer (radiation)
- 6.10 Electrical resistance
- 6.11 Fat content of leather



EN ISO 11612 2015

Heat and flame

13

CLAUSES

- 4.2 Size and fit
- 6.2 Heat resistance
- 6.3 Limited flame spread
- 6.4 Dimensional change
- 6.5.1 Tensile strength
- 6.5.2 Tear strength
- 6.5.3 Burst strength
- 6.5.4 Seam strength
- 7.2 Convective heat (B)
- 7.3 Radiant heat (C)
- 7.4 Molten aluminium splash (D)
- 7.5 Molten iron splash (E)
- 7.6 Contact heat (F)



EN 469 2020

Clothing for firefighters

13

CLAUSES

- 4.3 Design requirements
- 6.2.1.1 Flame spread
- 6.2.1.2 Contact heat
- 6.2.1.3 Heat transfer, flame
- 6.2.1.4 Heat transfer, radiation
- 6.2.1.6 Heat resistance
- 6.2.1.7 Heat resistance, materials
- 6.2.2 Liquid chemical penetration
- 6.2.3.1 Tensile strength
- 6.2.3.2 Tear strength
- 6.2.4 Water penetration (Y1/Y2)
- 6.2.5 Dimensional change
- 6.3.1 Water vapour resistance (Z1/Z2)



EN ISO 20471 2013 · ANSI 107

High-visibility clothing

12

CLAUSES

- 4.2 Design
- 4.3 Sizing
- 5.1 Colour, new material
- 5.2 Colour after Xenon test
- 5.3 Colour fastness
- 5.4 Dimensional change
- 5.5.1 Tensile strength
- 5.5.2 Bursting strength
- 5.5.3 Coated materials
- 5.6 Water vapour and thermal resistance
- 6.1 Retroreflective performance, new
- 6.2 Retroreflective performance, after testing

RETROREFLECTIVE TRIM

Measured new, and again after the washes the label promises.

SECTION 03 — FOOTWEAR · 1 STANDARD · 21 CLAUSES

From the ground up.

EN 13634 takes a motorcycle boot apart layer by layer: upper, lining, outsole and the way they are built together. Safety and occupational footwear follow the EN ISO 20344 family.

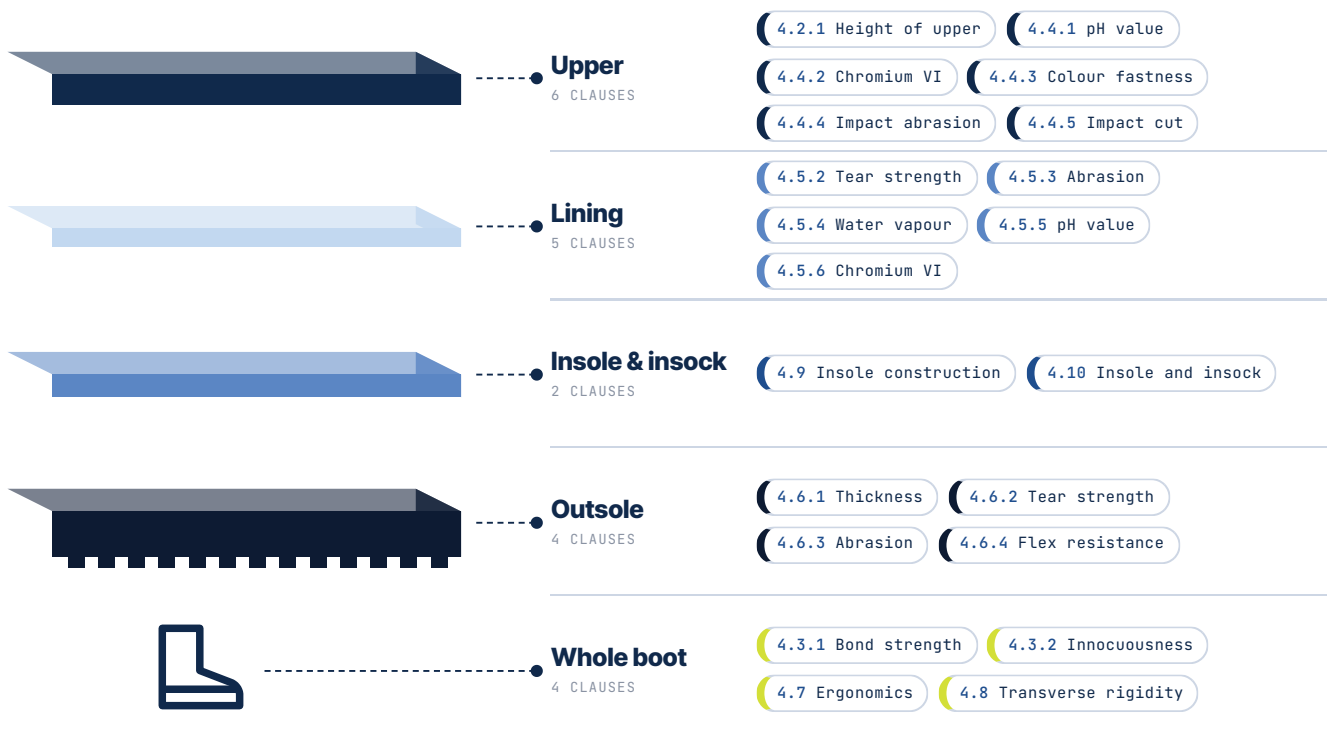
EN ISO 20344 Test methods for all safety, protective and occupational footwear

EN ISO 20345 Safety footwear · toe cap to 200 J

EN ISO 20346 Protective footwear · toe cap to 100 J

EN 13634:2017 · the boot in section

CLAUSES KEYED TO THE LAYER THEY TEST



ALSO TESTED

EN 455 surgical gloves

EN 13795 surgical gowns

EN 14683 · ASTM F2100 masks

ANSI/ISEA 105 working gloves

Surgical gloves, gowns and masks are handled by Division 15, Surgical & Medical Devices.

SECTION 04 — CHEMISTRY INSIDE PPE

Safe to wear, not just safe to use.

Protective equipment sits against skin for a full shift. Four of the standards we test carry an innocuousness clause: the materials themselves must not harm the wearer. That is chemistry, and it runs in the same accredited laboratory.

EN 13594	4.2 Innocuousness, gloves
EN 17092	4.1.2 Innocuousness, garments
EN 1621	5.2 Innocuousness, impact protectors
EN 13634	4.3.2 Innocuousness • 4.4.1 pH • 4.4.2 Cr VI
EN ISO 11611	6.11 Fat content of leather

EN ISO 17075-2

Cr VI

Hexavalent chromium

Ion chromatography on leather uppers and linings

EN ISO 4045

pH

Acidity of leather

Skin-contact check, EN 13634 4.4.1 and 4.5.5

TOF screen

F

Total organic fluorine

Flags PFAS finishes on coated materials

EN ISO 4048

Fat

Fat content of leather

EN ISO 11611 6.11, welding leathers

FTIR

IR

Genuine leather

Spectrum confirms the material on the label

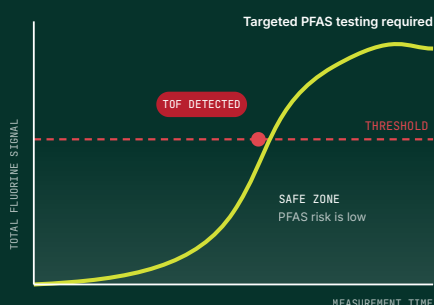
Extractable

Pb

Heavy metals

Metals in coatings, trims and hardware

PFAS SCREEN • TOTAL ORGANIC FLUORINE



2025 • CIC LABORATORY

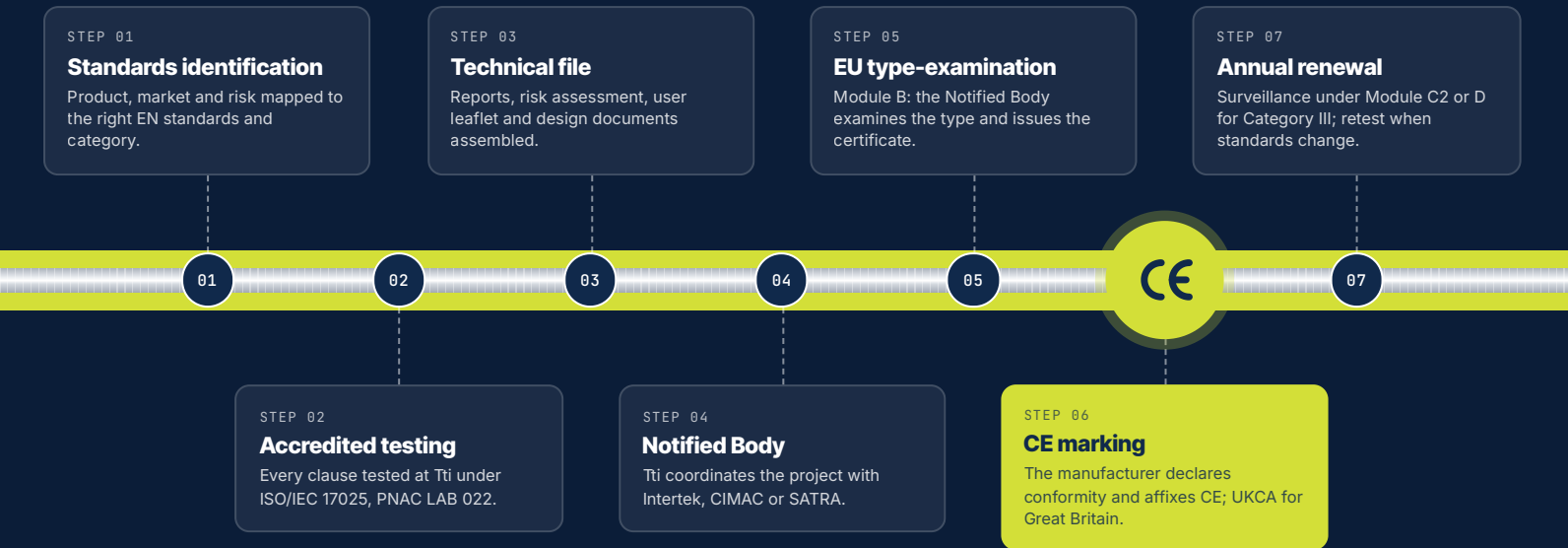
First in Pakistan accredited for Cr VI by EN ISO 17075-2 and for TOF.

Ion chromatography separates hexavalent chromium from leather extracts at trace level; the TOF screen flags fluorinated finishes before targeted PFAS analysis.

SECTION 05 – ONE-STOP CE CERTIFICATION

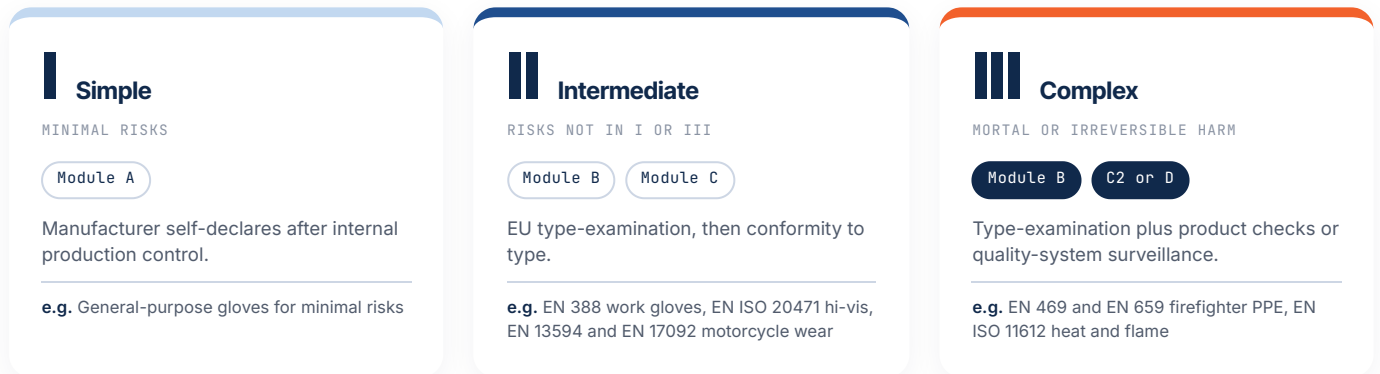
From sample to CE mark.

REGULATION	(EU) 2016/425
ALSO	UKCA · GREAT BRITAIN
ROLE OF TTI	TEST · FILE · COORDINATE



Three risk categories, three conformity routes

REGULATION (EU) 2016/425 · ANNEX I

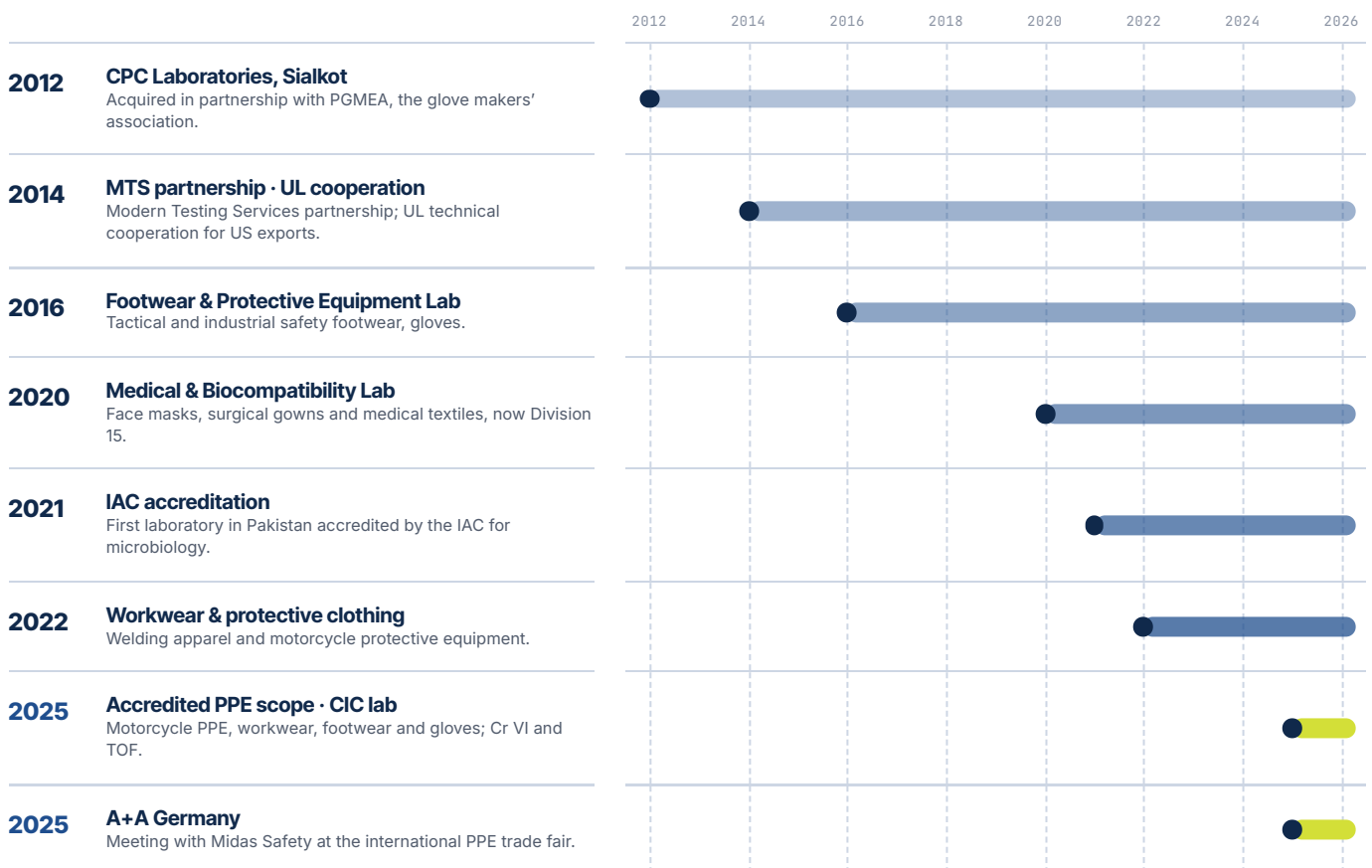


Tti tests, compiles the technical file and coordinates the project. The Notified Body examines the type and issues the EU type-examination certificate; the manufacturer then signs the EU declaration of conformity and affixes the CE mark.



PPE AT TTI, YEAR BY YEAR

Built for PPE, one lab at a time.



2016

PPE LABORATORY ESTABLISHED

13

EN STANDARDS IN SCOPE

138

LISTED TEST CLAUSES

1st

CR VI 17075-2 IN PAKISTAN



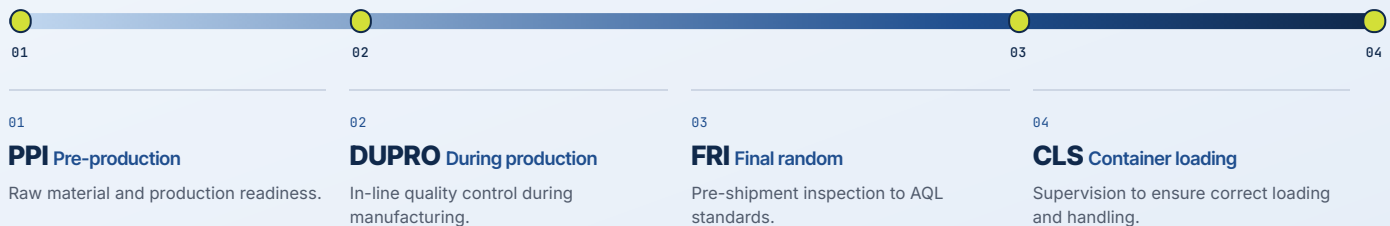
SECTION 06 – INSPECTION · ISO/IEC 17020, IB-006

Checked on the line, not only in the lab.

A certified type means nothing if production drifts. Our inspectors check PPE before, during and after production and at loading, to ANSI/ASQ Z1.4 sampling.

BEFORE PRODUCTION

SHIPMENT



AQL · ANSI/ASQ Z1.4-2008 · LEVEL II

0

CRITICAL

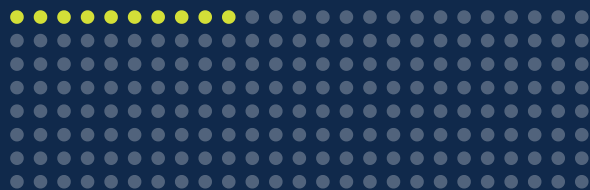
2.5

MAJOR

4.0

MINOR

Worked example: a lot of 5,000 pairs is code letter L, so 200 pairs are drawn. The lot passes with up to 10 major and 14 minor defects, and no critical defect.



200 SAMPLES · 10 MAJOR DEFECTS ALLOWED

CE LABEL AND LEAFLET CHECK

- ✓ CE mark, with the Notified Body number for Category III
- ✓ Manufacturer name and postal address
- ✓ Model or type identification
- ✓ EN standard, pictogram and performance code
- ✓ Size marking
- ✓ Care and cleaning instructions
- ✓ User information leaflet in the market's language
- ✓ EU declaration of conformity, or where to find it

32.49°N
74.52°E

SIALKOT, PUNJAB
TTI LIAISON OFFICE
KASHMIR ROAD

SIALKOT — WHERE THE GLOVES ARE MADE

Sialkot is Pakistan's leather, PPE and sports-goods hub. We are there.

2012

CPC Laboratories

Acquired with the Pakistan Gloves Manufacturers and Exporters Association to put accredited testing inside the cluster.

Only

Private TIC liaison office

The only private testing, inspection and certification liaison office in Sialkot.

2025

A+A Germany

Meeting with Midas Safety at the international PPE trade fair; a long-standing supply-chain partnership strengthened.



SIALKOT LIAISON OFFICE

Opposite Mag Town Masjid, Kashmir Road, Sialkot-51310 · (052) 3573367

The first and only TIC liaison office in Sialkot's leather, PPE and sports-goods hub.

WORK WITH US

Start with a sample.



01

Request a quotation

Tell us the product, market and category. We scope the standards and clauses.

quotations@tttilabs.net



02

Send samples

Book through the eTRF portal or hand them to our Sialkot or Lahore team.

etrftttilabs.net



03

Accredited testing

Every clause under ISO/IEC 17025, with direct access to the engineers.

3-day standard TAT



04

Report and technical file

Reports ready for the Notified Body, the technical file and your buyer.

CE · UKCA

Markets we test for

EUROPEAN UNION

CE marking

Regulation (EU) 2016/425

UNITED KINGDOM

UKCA marking

PPE Regulation 2016/425 as retained in GB

UNITED STATES

ANSI/ISEA 105

Hand protection classification

UNITED STATES

ANSI/ISEA 107

High-visibility safety apparel

Five questions that scope a PPE project

HAVE THE ANSWERS READY, SAVE A WEEK

Q1

Which market?

EU, UK, US, or several at once.

Q2

Which hazard?

The risk decides the standard and the category.

Q3

Which claim?

The performance code you intend to print.

Q4

Which variants?

Sizes, colours and materials in the family.

Q5

Which follow-up?

Renewal, production inspection, buyer audits.

TALK TO THE PPE TEAM

QUOTATIONS



quotations@tttilabs.net

MARKETING



marketing@tttilabs.net

SAMPLE BOOKING



etrftttilabs.net

UAN · ALL OFFICES



111 786 001

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PROTECTION, PROVEN. · PPE TESTING · CE CERTIFICATION · INSPECTION · WWW.TTILABS.NET



Tti Testing Laboratories

Protection, proven.



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